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The trend of cerebral aneurysms over the past two centuries: Need for early screening - An observational study

Authors

Arjun Burlakoti[1,2*], Jaliya Kumaratilake[2], Jamie Taylor[3] and Maciej Henneberg[2,4]

[1]UniSA Allied Health and Human Performance, University of South Australia, Adelaide, Australia

[2]School of Biomedicine, Faculty of Health and Medical Sciences, University of Adelaide, Adelaide, Australia

[3]Royal Adelaide Hospital, South Australia Medical Imaging, Adelaide, Australia

[4]Institute of Evolutionary Medicine, The University of Zurich, Zurich, Switzerland

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*Corresponding author's mailing address:

Email: Arjun.Burlakoti@unisa.edu.au, ORCiD = https://orcid.org/0000-0001-9317-6352, Office Phone: +61-08 8302 1206, UniSA Allied Health and Human Performance, University of South Australia, GPO Box: 2471, Adelaide 5001 Australia

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Abstract

Objective

Cerebral aneurysms (CAs) are linked to variations in the cerebral arterial network (CBAN). The aim of this study was to find the optimal age for screening to detect brain arterial variations and predict aneurysms before rupture.

Design and setting

This is an observational, quantitative, and retrospective research. The study analyzed 1127 cases of CAs published from 1761 to 1938. Additionally, Computed Tomography Angiography images of 173 patients treated at the Royal Adelaide Hospital (RAH) between 2011 and 2019 were examined for the presence and the location of aneurysms in CBAN.

Participants

Patients of various medical centres from different countries, males and females of full age range up to 100-years.

Results

Data from 1761 to 1938 included CAs cases of 526-males, 573-females, and 28-unknown sexes. The age of these patients varied from 18 months to 89-years (mean age = 42, SD = 18). Approximately 11.5% of the CAs occurred in patients less than 20-years old. Among the 1078 aneurysms whose location was reported, 76% were located in the internal carotid (IC), middle cerebral (MC), and anterior communicating artery complex (AcomAC) regions, while the remaining 24% were in the vertebrobasilar (VB) region. Among 173 patients from the RAH aged between 18 and 100 years, (male=83 and female=90, mean age=60, SD=16), 94% of the CAs were found in the IC, MC, and AcomAC regions. The pattern of aneurysm occurrence, as indicated by values at the 25th, 50th, and 75th percentiles, along with the minimum and maximum patient ages, has remained consistent from 1761 to 2019.

Conclusion

The distribution pattern of cerebral aneurysms in relation to sex, age and locations in the CBAN, remained steady over the last 260-years resulting in risk of strokes early in life. Therefore, early screening for CBAN segment variations is advised for stroke prevention.

Funding

None

Key words

Subarachnoid haemorrhage; Childhood Aneurysm; Stroke; Hemodynamics; Cerebral Arteries.

Strengths and limitations of this study:

- To our knowledge, the patterns of distribution and trends of occurrence of cerebral aneurysms have not been systematically studied over the past 260 years.
- The prevalence of cerebral aneurysms in every 50 to 100 years has been investigated for the first time.
- Aneurysms can develop at any age in the presence of variations in cerebral basal arterial network (CBAN). Early detection of variations in CBAN in infant using non-invasive ultrasound technique recommended and continuing screening regularly as needed.
- Reported cases from the medical centres are not a random representation of the general population.
- This investigation is not a continuous study.

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Introduction

Anatomical variations among components of the cerebral basal arterial network (CBAN) have been linked to the formation of cerebral aneurysms (CAs)[1] and such variations develop during the period of embryonic life.[2] The period taken for the development of CAs may vary among individuals and once formed they may enlarge, compress the surrounding tissues, and rupture leading to subarachnoid haemorrhage (SAH).[3]

Cerebral aneurysms of all sizes have been observed to cause SAH in adults[4] (incidence 6-10/100000), however, they also occur in the age group 0-20 years (incidence rate=1.4-2 per 100000).[5-7] It is not clear that the occurrence of anatomical variation-related aneurysms is limited to any specific age. The management of complicated CAs is costly and the CAs can leave permanent disabilities or even become fatal costing millions of dollars to families and governments.[7-12] The majority of childhood SAH (i.e., incidence 1.4-2 per 100000 children) are caused by the pre-existing cerebral aneurysms.[13] About 5% of the total cerebral aneurysmal cases diagnosed in the clinical setup were in the age group 0 to 19 years and the incidence of childhood SAH is significantly greater in the older age children.[13] The clinical manifestation of aneurysmal cases seen later in life might be the consequence of aneurysms that developed in early childhood. Therefore, this study aims to review CAs cases from a tertiary medical center and the literature to investigate the recent pattern of CAs and how it has changed over the past 260 years.

Material and method

Study design, and setting

Two types of data were used in this study.

Type-1 data are composed of 1127 cerebral aneurysmal cases that were published in the 407 papers[14] from 1761 to 1938. These CAs were identified at autopsy and included patients of all ages (average age=41.7 years, mode age=41, median age=41, SD=17.7, age range 1.5 to 89 years) (Supplementary Table 1 and Supplementary File 1).

Type-2 data were Cerebral Computed Tomography Angiography (CTA) images obtained from 173 randomly selected patients, who visited the Royal Adelaide Hospital (RAH), South Australia, between January 2011 and December 2019 for a variety of cranial pathologies; their age ranged from 18 to 100 years, males = 83, female = 90, mean age=60 years, median age=62 years, mode age=61, SD=15.72) with (n=102) or without (n=71) aneurysms (Supplementary Table 1 and Supplementary File 2). These images were anonymised, stored in the Carestream data registry system and the patients have given their consent to use their clinical information for research activities. The consent documents taken from each patient were not provided to the researchers to ensure privacy. The Human Ethics permit (approval number: H2014-176, Research Ethics Committee, Office of Research Ethics, Compliance and Integrity, Faculty of Health Sciences, University of Adelaide) granted permission to access and use the deidentified data set from the Carestream data registry system (Vue-RIS-version-11.0.14.35) for research. Thus, the research materials used in this study comprised 1229 observed cases of CAs that spread across all age groups, spanning a period of approximately 260 years.

Data sources and size

Type-1 data: A range of variables (such as, the year CAs was detected, age, sex, location of the aneurysm) related to 1127 cases of CAs reported in publications from 1761 to 1938,[14] were transferred into an excel data file, rearranged and subjected to analysis (Supplementary File 1). Type-2 data: The cerebral CTA of 173-patients recorded from 2011 to 2019 in RAH were accessed to study the presence and absence of CAs in different locations of CBAN based on diagnoses made by clinicians. Some cases had multiple aneurysms located in the various segments of CBAN (Supplementary File 2).

The above cases of CAs were grouped into age ranges 0-5, 6-10, 11-15, 16–20, 21–30, 31–40, 41–50, 51–60, 61–70, 71–80, and over 81 years and transferred into the SPSS v. 25 software, for analyses (Supplementary File 1). The observation error has been tested by repeating the observation of the location of CAs in the cerebral CTA images in 20-cases, a month after the first study. There was 100% agreement of repeated observations with

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those of the first one. The sites of the formation of aneurysms were recorded as the left and right, internal carotid artery (ICA), middle cerebral artery (MCA), anterior cerebral artery (ACA), anterior communicating artery complex (AcomAC), posterior communicating artery (PcomA), posterior cerebral artery (PCA), vertebral artery (VA), basilar artery (BA), posterior inferior cerebellar artery (PICA), anterior inferior cerebellar artery (AICA), superior cerebellar (SCA) and pial arterial regions. In some cases, the areas of location of aneurysms seemed not to have been mentioned and those cases were tabulated under the heading of 'aneurysms located in CBAN (CBAN-an)'. Overall, the locations of nearly 1229 aneurysmal cases from both data sets were broadly divided into four categories: central and bilateral, left and right before being plotted in the bar charts to study the location and distribution trends of aneurysms in the arterial network over the past 260-years (Figure 1 and 2). The aneurysms located in the AcomAC, and basilar arterial regions were classified as the central group of aneurysms. Additionally, in a few cases aneurysms were located simultaneously on left and right sides and those cases were grouped as 'bilateral' (Supplementary File 1 and 2 and Figure 2).

Statistical methods

Data were analysed using Excel and Statistical Package for the Social Sciences (SPSS-IBM, version-25) program (e.g., descriptive, and Chi squared tests). The p values less than 0.05 were considered as statistically significant.

Patient and public involvement

Involving patients was challenging for conducting and planning this research, since researchers were allowed the access only to anonymised raw data recorded in the database. As per the ethics permit (details in the method section), we accessed retrospective anonymized data, precluding patient involvement in research planning and execution. Patients and families visiting the hospital will receive study updates. Input from participants will be encouraged via follow-ups, seminars, and email. Shared experiences and suggestions will be valued, with privacy respected. The shared outcome of this study will be informed to the public, families and patients who attend the RAH hospital for various clinical visits, through a series of meetings, seminars, and media releases.

Findings

This study reviewed 1127 aneurysmal cases of patients of all ages from a total of 407 published articles prior to the year 1939. The ages of these patients (male=526, female=573, unknown sex=28) ranged from 18 months to 89 years of age with an average of 41.70 years, mode of 41 years and median of 41 years (SD=17.7) (Supplementary Table 1, Figure 1a, Figure 1b, Figure 1c, Supplementary File 1). The second group of patients with CAs (44 males and 58 females, and n=102) from the RAH (2011 to 2019) with the age range 18-100 years showed that the most common age for diagnosis or complication of CAs ranged from 31-60 years with the calculated mean, median, mode, and standard deviation (SD), 57.60, 60.00, 48.00, and 13.12 years, respectively (Supplementary Figure 1 and Figure 1d). Analysis of both sets of data revealed that the majority of the patients who presented with complicated aneurysms were in their 3rd to 6th decades of life (Supplementary Table 1, Figure 1 a-d).

The most important aspect of the two sets of data was the wide age range of occurrence of CAs and the fact that some of the complicated aneurysmal cases appeared at an early age (Figure 1a, Figure 1b, Supplementary File 1). A separate analysis was conducted for 853 out of the 1127 cases of CAs recorded before 1938 (male=409, female=438, unknown sex=6), specifically focusing on the age range of 18 to 89 years to align the age groups with the RAH recorded data from 2011 to 2019 (Supplementary Table 1, Figure 1c and Figure 1d). The similarities of standard deviation (15.45) of those 853 cases (from 1761-1938) and the cases that were recorded from 2011 to 2019 in RAH (13.12 years) validated the comparability of our data and the findings (Supplementary Table 1). The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed ages of patients with aneurysms, remained relatively stable from 1761 to 1938 (Figure 3a). Some of these percentile values increased slightly as life expectancy extended from 1761 to the 21st century (Figure 3b). Therefore, the SD, and age distribution of adult patients with ruptured or diagnosed CAs presented in the 2011-2019 dataset were consistent with those cases reported before 1938, indicating persistence of a pattern (Supplementary Table 1, Figure 1 and 3). Specifically, aneurysms are being frequently diagnosed in

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individuals aged 30 to 60 years, and this age range has remained relatively unchanged over the past 260 years (Supplementary Table 1, Figures 1, and 3). Forty nine out of 1127 cases recorded across 407 publications from 1761 to 1938 seemed not to have information about the location of aneurysms in the CBAN, however, 818 out of 1078 identified aneurysms (76%), were in the ICA, MCA and AcomAC regions and rest of them were in the vertebrobasilar region (Supplementary File 1). The location and distribution pattern aneurysms from 102 patients recorded in RAH was consistent with 1078 cases recorded from 1761 to 1938 (Supplementary Files 1 and 2, and Figure 2).

In the type 2 dataset, a total of 135 aneurysms were identified in 102 individuals, with ages ranging from 18 to 83 years, across various components of CBAN (Figure 1d and Supplementary File 2). Among these aneurysms, 38(28.14%) were detected in the right MCA region, while 17(12.6%) were in the right ICA region. In comparison, the left MCA and ICA regions had 27(20%) and 12(8%) aneurysms, respectively, which appeared to be lower in number compared to the right MCA and ICA regions. When considering the distribution of aneurysms based on territory, 55 out of 135 aneurysms (40.74%) in 50 patients were found in the right ICA and MCA territories, whereas 39 out of 135 aneurysms (28.88%) in 37 patients were detected in the left ICA and MCA regions (Supplementary File 2). Out of the 102 individuals with aneurysmal cases included in the study, 33 (24.44%) had aneurysms located in the anterior communicating artery (AcomAC) region, accounting for 33 out of the total 135 aneurysms. An additional 5.9% of the total aneurysms (8 out of 135 aneurysms) were found in the vertebral and basilar arterial regions, as indicated in the Supplementary File 2. A majority of the CAs, 127 out of the total 135 (94% of the total), were in the MCA, ICA, and AComAC regions (Supplementary File 2). Some cases had multiple aneurysms, for example, 2 cases had right ICA and MCA aneurysms, while 10 cases had left ICA and MCA aneurysms (Supplementary File 2).

There were no significant differences between male and female patients affected with CAs in all 1229 cases analysed in those two data sets (Chi-Squared statistic=0.83, $p \geq 0.36$) (Table 1). The sex, age of occurrence and location of CAs appear to have remained steady over the past 260 years across all age groups (Table 1 and Supplementary Table 1, and Figure 3). The mode, mean, and median age and SD of patients with ruptured or diagnosed CAs studied from 2011 to 2019 in RAH matched well with the cerebral aneurysmal cases recorded in the past considering the difference in life expectancy between the two time periods studied (1761-1938 and 2011-2019) (Figures 3 and Supplementary Table 1).

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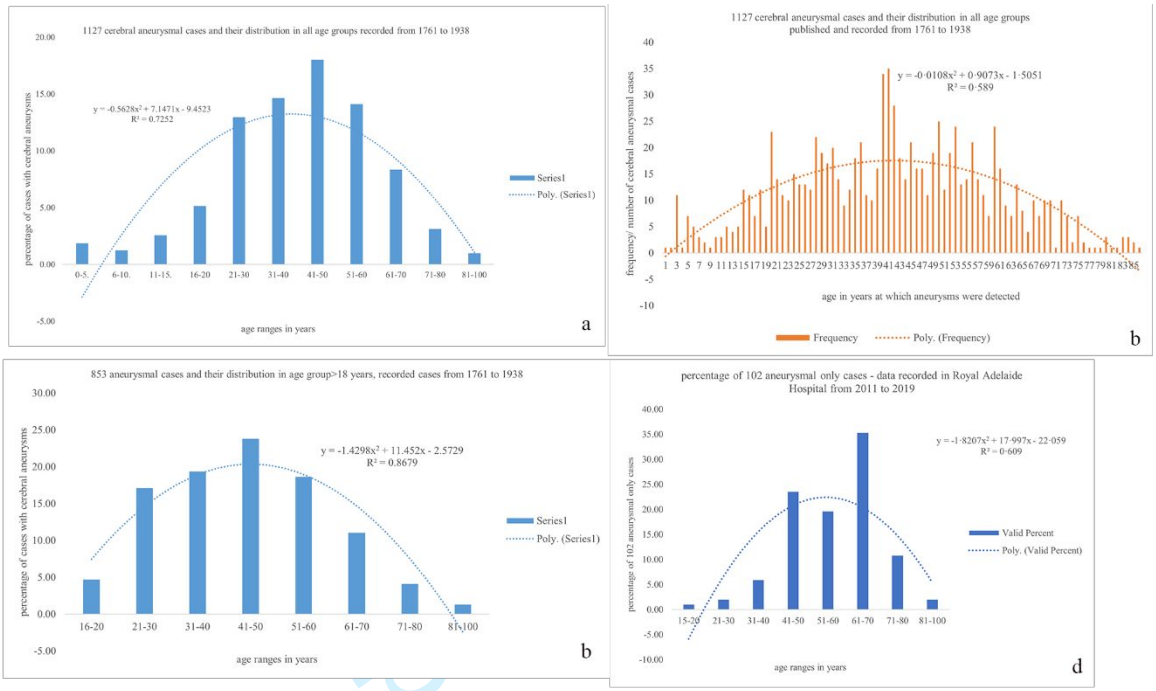

Figure 1- Figures displaying the distribution patterns of cerebral aneurysms in different age groups recorded from 1761 to 1938 and from 2011 to 2019. A polynomial regression lines show the number and distribution of cerebral aneurysm cases across all age groups. a) The distribution of cerebral aneurysmal cases (n=1127) in various age group, recorded from 1761 to 1938.[14] b) The frequency of cerebral aneurysmal cases and their distribution (n=1127) across all age groups recorded[14] from 1761 to 1938. c) Age (≥18 years) related distribution of individuals affected with cerebral aneurysms over the past 260 years (1761 – 1938) (n=853), recorded[14] from 1761 to 1938, and d) Age (18-100 years) related prevalence (%) of cerebral aneurysms in RAH sample from 2011 to 2019 (n=102). The peak prevalence occurred between 31-60 years ($p<0.001$). RAH= Royal Adelaide Hospital. RAH= Royal Adelaide Hospital and 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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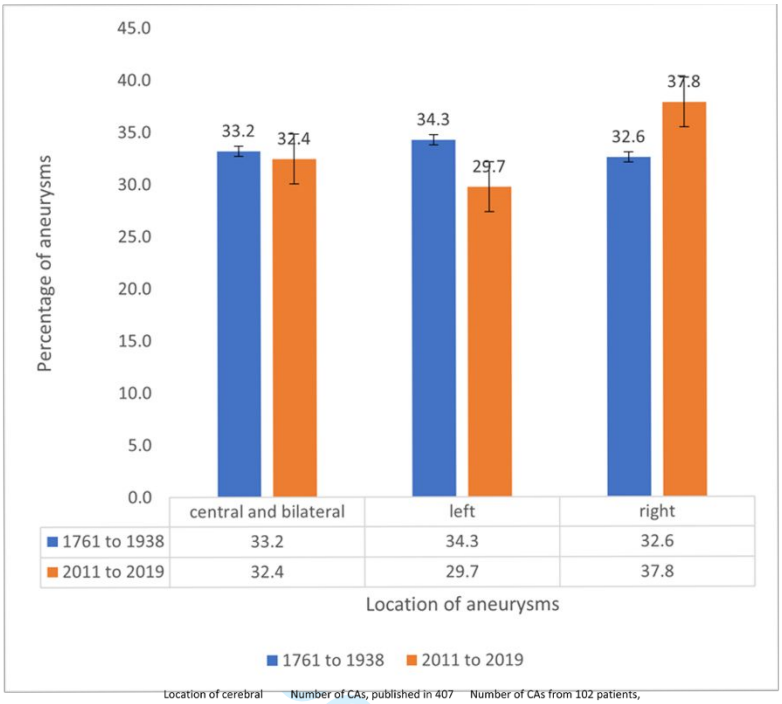

Location of cerebral aneurysms	Number of CAs, published in 407 papers[14], recorded from 1761 to 1938	Number of CAs from 102 patients, recorded from 2011 to 2019 in RAH
central and bilateral	374	44
left	386	40
right	367	51
Total	1127	135

Figure 2- Comparison of the location of cerebral aneurysms between Royal Adelaide Hospital sample (2011 to 2019) (n=135 CAs from 102 patients, orange colour) with those recorded in 407 publications[14] (1761 to 1938) (n=1127 CAs, blue colour). CAs=cerebral aneurysms, 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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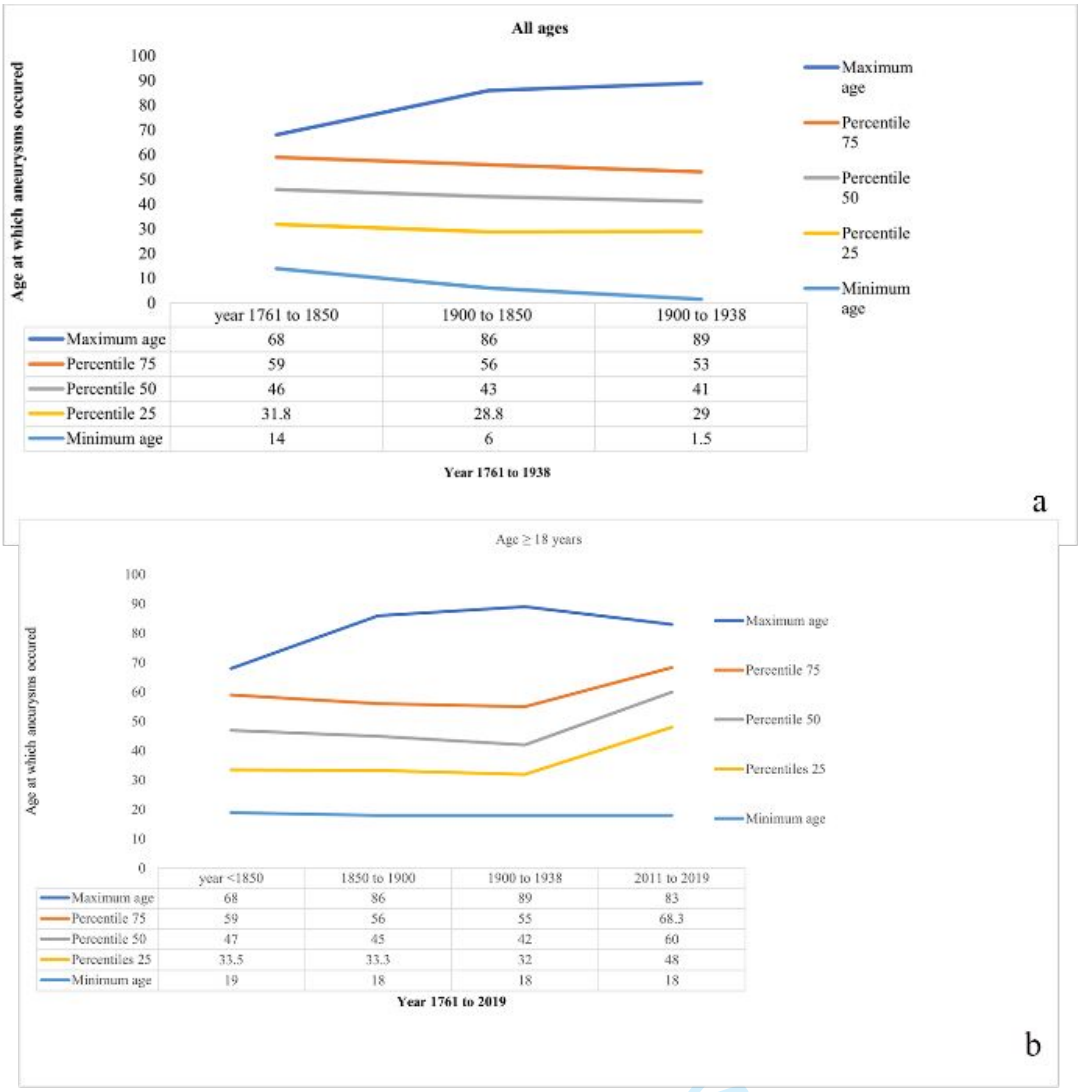

	year 1761 to 1850	1900 to 1850	1900 to 1938
Maximum age	68	86	89
Percentile 75	59	56	53
Percentile 50	46	43	41
Percentile 25	31.8	28.8	29
Minimum age	14	6	1.5

	year <1850	1850 to 1900	1900 to 1938	2011 to 2019
Maximum age	68	86	89	83
Percentile 75	59	56	55	68.3
Percentile 50	47	45	42	60
Percentiles 25	33.5	33.3	32	48
Minimum age	19	18	18	18

Figure 3: Comparison figures showing the trend of occurrence of cerebral aneurysms at different age group (n=1127) from 1761 to 2019. (a)The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed all ages of patients with aneurysms, from 1761 to 1938[14]; b) The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed patients with >18 years of age with aneurysms, recorded from 1761 to 1938[14] and 2011 to 2019 in RAH. RAH = Royal Adelaide Hospital, 14 =Data from: McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328

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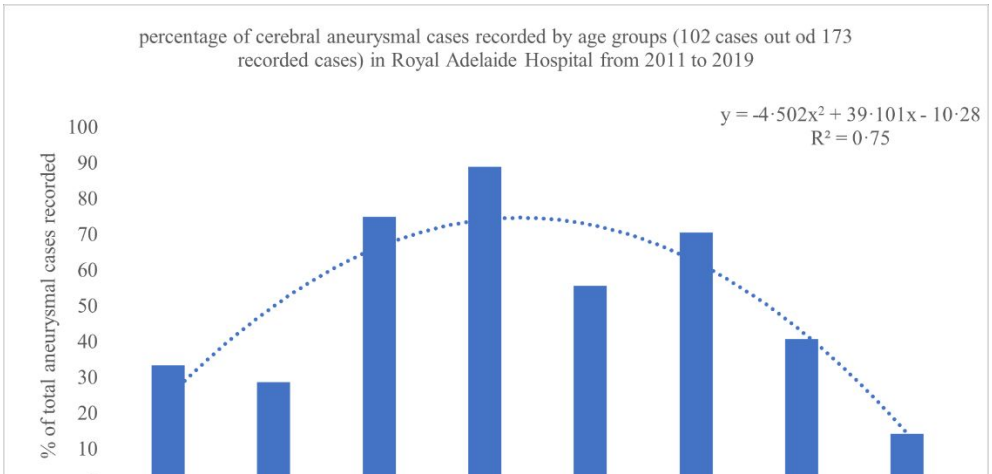

Supplementary Figure 1- The prevalence (%) of cerebral aneurysms in relation to age (18-100 years, n=173, cases with aneurysms=102, cases without aneurysm=71), with a median of 62 years, a mean of 60 years, and a standard deviation of 15.75. The peak prevalence occurs between 31-60 years ($p<0.001$).

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Table 1: Prevalence of cerebral aneurysms in males and females: a comparison of the recent hospital-based data recorded in RAH from 2011 to 2019 with the autopsy data published before from 1761 to 1938.

Sex	N=173, cases with or without cerebral aneurysms recorded in RAH from 2011 to 2019.	1127 aneurysm cases (from 1761 to 1938) recorded in 407 publications.[14]
Sex not defined	0	28
Female	90	573
Male	83	526
Female to male sex ratio	1.08	1.09

Legend- RAH = royal Adelaide hospital, 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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Supplementary Table 1: Statistical parameters of distributions of aneurysmal cases reported from 1761 to 1938,[14] and recorded in RAH from 2011 to 2019.

		102 patients with cerebral aneurysmal aneurysms recorded in RAH from 2011 to 2019	1127 patients with cerebral aneurysms recorded in 407 publications - published from 1761 to 1938							
Statistics - all cases with cerebral aneurysms		age>18, 2011 to 2019	age>18 years, 1761 to 1938	age >= 18 & year < 1850	age >= 18 & year >= 1850 & year < 1900	age >= 18 & year >= 1900	all age, year <1850	all age, year < 1900 & year >= 1850	all ages, year >= 1900	all age group, all years, >400 publications
Age in years										
N	Valid	102	851	41	252	560	42	278	613	935
	Missing	0	0	0	0	0	7	14	171	192
Mean age		57.6	44.7	44.3	45.60	44.3	43.6	42.6	41.2	41.7
Median age		60.0	43.0	47.0	45.00	42.0	46.0	43.0	41.0	41.0
Mode age		48.0	41.0	20.0	40.0	41.0	20.0	40.0	41.0	41.0
Std. Deviation		13.1	15.5	15.6	15.6	15.4	16.1	17.5	17.9	17.7
Minimum age		18.0	18.0	19.0	18.0	18.0	14.0	6.0	1.5	1.5
Maximum age		83.0	89.0	68.00	86.0	89.0	68.0	86.0	89.0	89.0
Percentiles	25	48.0	32.0	33.50	33.3	32.0	31.8	28.8	29.0	29.0
	50	60.0	43.0	47.00	45.0	42.0	46.0	43.0	41.0	41.0
	75	68.3	56.0	59.00	56.0	55.0	59.0	56.0	53.0	54.0

Legend: 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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Discussion

The age and locations at which CAs occur in the CBAN has not changed over past 260 years (Figures1, 2 and 3, Table 1 and Supplementary Table 1) despite the life expectancy has increased over time worldwide and the progress in medicine. In the past people had shorter life span on average, and yet the CAs occurred at the same ages as they do now.[15] The life expectancy recorded at below 50 years in 1940 and even below 40 years in 1850 was way lower compared to the one recorded above 80 years of age since the year 2000 in Australia.[15] A separate analysis was done for 853 out of the 1127 CAs recorded[14] before 1938 focusing on the age range of 18 to 89 years to align the age group with the currently RAH recorded data from 2011 to 2019, since there were no aneurysmal cases of children (age<18years) in the RAH dataset. In Adelaide there is a separate hospital for children where aneurysmal cases would have been treated, but the authors had no access to these data (Supplementary file 2). Royal Adelaide Hospital is a general hospital, thus individuals of 18 years and less are not admitted. Current study compared the cases of CAs diagnosed by CTA imaging technique (from 2011-2019) with those verified by surgery and autopsy[14], since there were no cerebral angiogram facilities in early years (i.e., before 1938). The cases of aneurysms are commonly diagnosed, when the patients are presented at medical centres after attacks of stroke.[16] Cerebral aneurysms in the past seemed to be ruptured and complicated as early as 18 months of age and as late as 89 years of age with a wide range of age (Supplementary File 1). The findings suggested that the change in lifestyle nor medical practice had no effect at the age/time of formation of CAs in general population. Clinical investigation of lipid profiles in patients commenced after 1950,[17] and they started attributing arterial diseases and aneurysms to the hyperlipidaemia, however, the manifestation of occurrence of aneurysms by age in the past 260 years seems not to be different from the current age of occurrence. Although the lifestyle and the external influences, including medical practice, changed over more than two centuries, aneurysms still occur at approximately the same age. Therefore, aneurysms occur and rupture on their own internal circumstances and are not related to the diet, environmental, and external factors.[18] The most likely internal factor is the severity of the variation on the segments of CBAN that adversely affects the hemodynamics resulting in the formation of aneurysms.[1,19] The condition of the arterial wall should not have changed over the last 260 years and that seems to be less significant than the variation in the components of CBAN. The segmental and communicating arteries play a crucial role in dampening the systolic pressure within the CBAN and reducing the likelihood of aneurysm formation.[1,19] The severity of arterial variation can have negative effects on the blood flow dynamics through the variant segment of the component of the CBAN.[1,19] The incidence of CAs is about 3.3% in the general population and may not be diagnosed, until they get enlarged as the size of the aneurysm <3mm in diameter can be missed.[20] Imaizumi and colleagues found that the prevalence rate of CAs was 4.32% in Japan.[12] The incidence rate of CAs in childhood (age <18 years) has been reported to be 0.5- 4.6%, which is almost as common as the incidence rate observed among adults.[13] Treating CAs cases with a diameter less than 3-mm requires careful consideration, as almost all cases of SAH were caused by ruptured aneurysms, and nearly 50 % cases can be attributed to pre-existing small aneurysms of ≤ 3mm in diameter.[21] The majority of CAs are detected only when they cause a stroke or other pathological effect (e.g., compression of the optic tract).[4] Individuals older than 18 years are no longer considered children.[6,13]

Most of the symptomatic cases of CAs in the paediatric age group were observed in older children (15 + years) [13], and only complicated cases of CAs were generally diagnosed and reported.[22,23] If the incidence of childhood CAs described (ranges from 0.17 to 4.6%),[24] is corrected for number of years lived, it would be 18.4% of the total aneurysmal cases amongst adults. The adult patients included in CAs studies ideally have an age range of 18-years and above, which can include individuals up to the age of 100 years.[12,15] In contrast, the childhood group included in aneurysmal studies typically ranges from birth up to 18-years of age and a few studies have categorized patients who are 18-years or older under the adult group.[6,13] When we consider the age range, 0-18 years and 19- 100 years, the incidence of childhood CAs, that should be multiplied by 5 times to correct for the number of years lived, can be comparable to that in adults because the childhood period of life is much shorter than the adulthood. Therefore, the age range of adult group (≥20 years up to 100 years) included in the CAs and stroke studies would be about five times more than the age range of children (i.e., ≤18 years).[22,23] That means adults have 5 times more years to develop CAs compared to children. Therefore, the incidence of childhood CAs per year is almost equivalent to adult.[21,25] Hens, CAs could develop in early childhood in the presence of a significantly variant component of cerebral arterial anatomy,[1,2] and it could take years for them to balloon before

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becoming symptomatic and being observed in a tertiary medical center. The overall pattern of location and distribution of childhood CAs was similar to adult as they commonly occurred in ICA, MCA and AcomAC regions.[3] Therefore the development of CAs is not age related and found to be prevalent in all age ranges.[10,12,13,26] Cerebral aneurysms may not always be associated to the advanced age, history of smoking, drinking alcohol but start forming as early as in the childhood in the presence of variant components of cranial blood vessels.[27] Smoking, hypertension and increased consumption of alcohol and use of drugs could enhance weakening the vessel wall in the presence of arterial variation and genetic disorder leading to the advancement of aneurysms and its complication.[13] The mean age at which people were affected by cerebral aneurysms was reported to be 55 to 57 years of age in a study conducted using 1085 aneurysmal cases from 2008 to 2016.[28] There are a few reports of CAs published between 1938 and 2011 that could have been compiled for statistical analyses. However, their inclusion into this study, would not have changed its basic conclusions: i.e., large age range and no change through time in the occurrence of CAs.

Transcranial Doppler has been found to be effective in studying brain vessels[26,29] in infants and can be incorporated as a screening tool to detect variant intracranial vessels that could predispose them to the development of cerebral aneurysms later in life. Ultrasonographic (USG) video screening, involving the placement of the probe in the fontanelles of babies before they close, for variant cerebral arteries, might be introduced as a routine procedure due to its safety.[29] Detecting variant components of CBAN using our proposed low-risk cranial USG techniques may help identify at-risk patients early, benefiting them for life. For example, individuals with a diameter ratio greater than 1.4 between the left and right ACA have a 27-fold increased risk of developing cerebral aneurysms in the AcomAC region.[1] The ACA asymmetry can be measured by placing USG probes in a baby's fontanelles, in a simple clinical setup before the fontanelles fuse. Parents of children found to have variations in CBAN could be advised to schedule follow-up brain 'Magnetic Resonance Angiography' scans at specific intervals, such as every 5 years, especially if a more affordable technology for detecting brain aneurysms becomes available. This study was not designed to examine the characteristics of aneurysms, but the focus was on the distribution of aneurysms in different segments of CBAN, trend of occurrence of aneurysms over the past 260-years, and the comparison of cerebral aneurysms in all age ranges.

Limitations:

The insufficient data on the lack of personal and family history, history of smoking, lipid profile, and blood pressure are limitations of this study. A larger survey and a prospective study could be conducted. A prospective study could involve using ultrasound techniques to identify variations in brain vessels among infants.

Conclusion

Brain arterial aneurysms can develop early in the presence of variant arterial components. Screening children under 24 months using transcranial ultrasonography for variant cerebral arteries may be practical. Those with variations should undergo periodic tests for aneurysms, aiming to prevent haemorrhagic strokes.

Data sharing statement

Additional data are available by emailing Arjun.Burlakoti@unisa.edu.au

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None

ORCID iD

Arjun Burlakoti http://orcid.org/0000-0001-9317-6352

Author contribution statement

Arjun Burlakoti- conceived the idea, collected, and analysed both sets of data, took pictures, recorded videos, contributed to conceptualization, prepared and drafted the manuscript.

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Jaliya Kumaratilake- conceived the idea, contributed to the concept, aided in data interpretation, editing and the revision of the manuscript and approving the article.

Jamie Taylor- conceived the idea, contributed to the concept, aided in data interpretation, editing and the revision of the manuscript and approving the article.

Maciej Henneberg- conceived the idea, masterminded, and helped in statistics, data analysis and interpretation, editing and approving the article.

Competing interests

None declared. All authors have nothing to disclose.

Ethical Approval Statement

The University of Adelaide, Human Research Ethics Board granted permission to access and use data for this research project (Ethics Approval Number: H2014-176).

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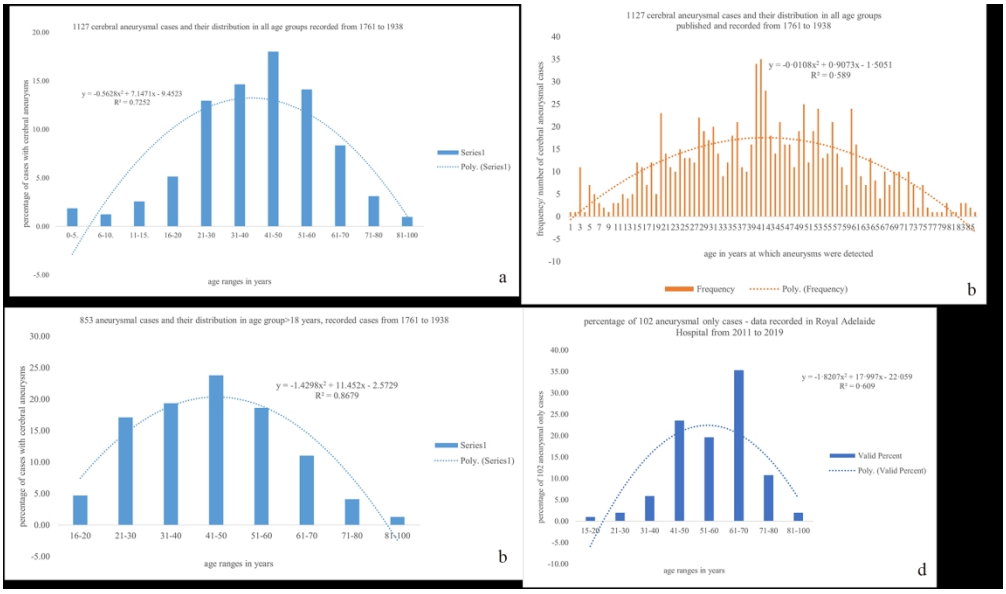

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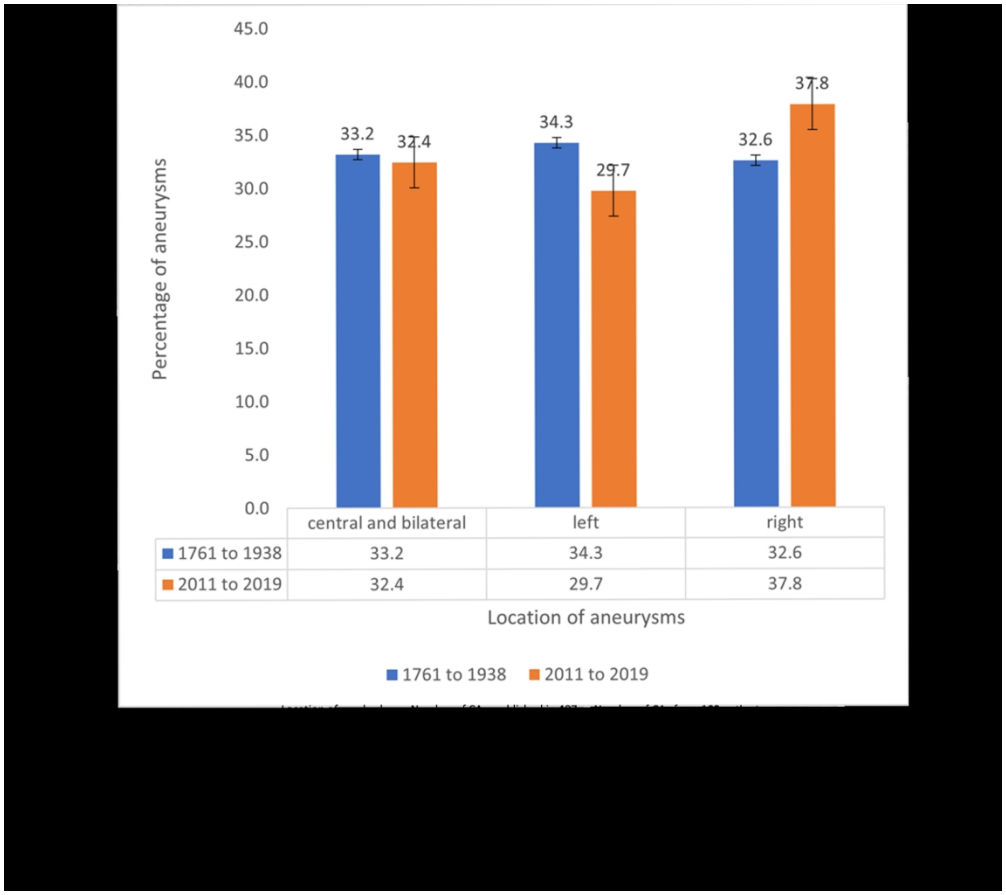

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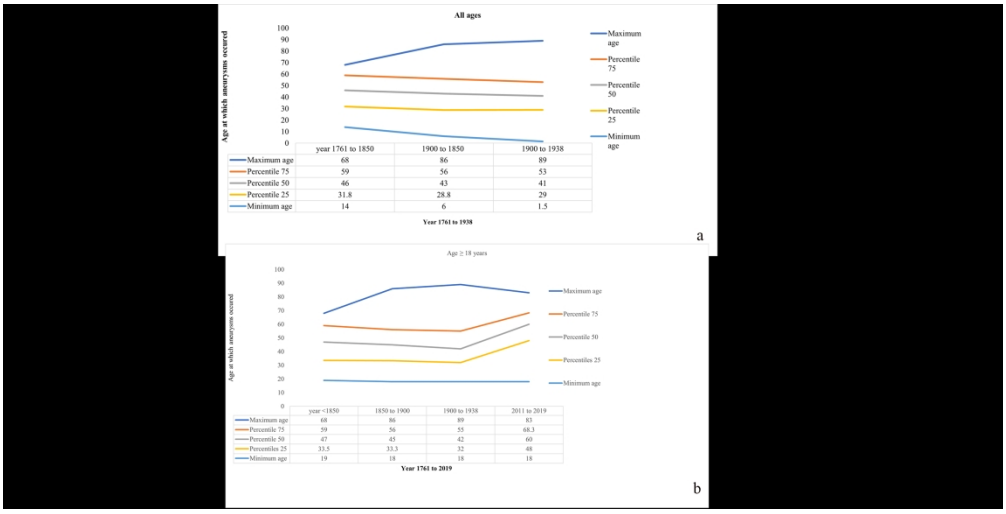

Figure 3: Comparison figures showing the trend of occurrence of cerebral aneurysms at different age groups (n=1127) from 1761 to 2019. (a)The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed all ages of patients with aneurysms, from 1761 to 1938[14]; b) The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed patients with >18 years of age with aneurysms, recorded from 1761 to 193814 and 2011 to 2019 in RAH. RAH = Royal Adelaide Hospital, 14 =Data from: McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328

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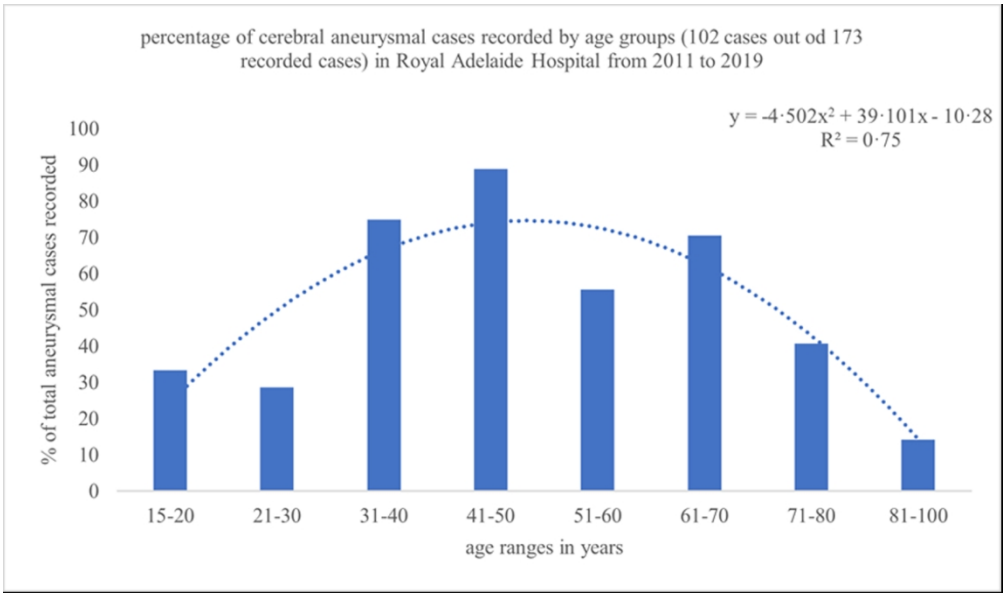

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Table 1: Prevalence of cerebral aneurysms in males and females: a comparison of the recent hospital-based data recorded in RAH from 2011 to 2019 with the autopsy data published before from 1761 to 1938.

Sex	n=173, cases with or without cerebral aneurysms recorded in RAH from 2011 to 2019.	1127 aneurysm cases (from 1761 to 1938) recorded in 407 publications.[14]
Sex not defined	0	28
Female	90	573
Male	83	526
Female to male sex ratio	1.08	1.09

Legend: RAH = royal Adelaide hospital, 14=McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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Supplementary Table 1: Statistical parameters of distributions of aneurysmal cases reported from 1761-1938,[14] and recorded in RAH from 2011 to 2019.

		102 patients with cerebral aneurysmal aneurysms recorded in RAH from 2011 to 2019	1127 patients with cerebral aneurysms recorded in 407 publications - published from 1761 to 1938							
Statistics - all cases with cerebral aneurysms		age>18, 2011 to 2019	age>18 years, 1761 to 1938	age >= 18 & year < 1850	age >= 18 & year >= 1850 & year < 1900	age >= 18 & year >= 1900	all age, year <1850	all age, year < 1900 & year >= 1850	all ages, year >= 1900	all age group, all years, >400 publications
Age in years										
N	Valid	102	851	41	252	560	42	278	613	935
	Missing	0	0	0	0	0	7	14	171	192
Mean age		57.6	44.7	44.3	45.6	44.3	43.6	42.6	41.2	41.7
Median age		60.0	43.0	47.0	45.0	42.0	46.0	43.0	41.0	41.0
Mode age		48.0	41.0	20.0	40.0	41.0	20.0	40.0	41.0	41.0
Std. Deviation		13.1	15.5	15.6	15.6	15.4	16.1	17.5	17.9	17.7
Minimum age		18.0	18.0	19.0	18.0	18.0	14.0	6.0	1.5	1.5
Maximum age		83.0	89.0	68.0	86.0	89.0	68.0	86.0	89.0	89.0
Percentiles	25	48.0	32.0	33.5	33.3	32.0	31.8	28.8	29.0	29.0
	50	60.0	43.0	47.0	45.0	42.0	46.0	43.0	41.0	41.0
	75	68.3	56.0	59.0	56.0	55.0	59.0	56.0	53.0	54.0

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Legend: 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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Supplementary file 1: contains type 1 data

Manuscript title: The bread of cerebral aneurysms over the past two centuries: Need for early screening - An observational study.

Abbreviations: PcomA= posterior communicating artery, ICA=internal carotid artery, BA=basilar artery, AcomA=anterior communicating artery, MCA=middle cerebral artery, ACA=anterior cerebral artery, PCA=posterior cerebralral artery, SCA=superior cerebellar artery, AICA=anterior inferior cerebellar artery, VA=vertebral artery, CBAN=cerebral basal arterial network (artery involved not known), PICA=posterior inferior cerebellar artery. McDonald & Korb 1939=McDonald CA, Korb M. Intracranial aneurysms. Archives of neurology and psychiatry (Chicago) 1939; 42(2): 298-328.)

age in years	age range in years	sex, m=male, f=female	side affected	arteries involved	status of aneurysms; ruptured=y, not ruptured=n	arterial condition	year of aneurysm detected
60	51-60	m	bilateral	PcomA	n	Vessels rigid, with deposit on inner lining	1761
52	51-60	f	undefined	ICA	y	no information available	1778
64	61-70	f	bilateral	ICA	n	no information available	1779
20	16-20	f	midline	BA	y	no information available	1814
20	16-20	f	midline	BA	y	no information available	1815
57	51-60	m	midline	AcomA	y	Calcareous deposits on coats of vessels	1825
57	51-60	m	right	ACA	y	Coats of aneurysm thick	1825
		m	midline	AcomA	y	not available	1825
59	51-60	f	midline	AcomA	y	no information available	1826
59	51-60	m	midline	BA	y	Middle layer of sac, cartilaginous	1826
		m	right	MCA		no information available	1826
19	16-20	m	left	MCA	y	no information available	1827
39	31-40	f	left	PcomA	y	no information available	1827
45	41-50	m	left	MCA	y	no information available	1827
35	31-40	m	midline	BA	n	Carotid and vertebral arteries normal	1828
21	21-30	f	midline	BA	y	Calcareous deposits on vessels	1829
24	21-30	m	left	VA	y	Arteries diseased, in some places cartilaginous	1829
			midline	BA		Coats of vessels cartilaginous	1829
60	51-60	m	right	MCA	y	wall thin but firm	1831
63	61-70	f	left	MCA	y	No bone or other appearance of disease	1831
60	51-60	m	right	MCA	y	Sac with thin, firm parietes	1832
42	41-50	f	right	ICA	y	no information available	1833
54	51-60	m	midline	BA	y	no information available	1833
28	21-30	f	left	ACA	n	middle layer thick	1834
			left	ICA	n	no information available	1834
			right	VA	n	no information available	1835
68	61-70	m	midline	BA	n	Yellow plaques on surface	1836
20	16-20	f	midline	BA	n	no information available	1837
59	51-60	m	midline	BA	y	Middle layer of artery cartilaginous	1837
60	51-60	m	undefined	ICA	y	no information available	1837
35	31-40	m	right	MCA	y	other vessels normal	1839
14	11-15.	m	midline	BA	n	Middle layer of wall thickened	1842
20	16-20	f	undefined	PCA	n	no information available	1842
49	41-50	m	left	ICA	y	Vessels thickened	1842
41	41-50	m	midline	BA	y	Arteries atheromatous	1844
54	51-60	m	midline	BA	n	no information available	1844
20	16-20	f	right	PcomA	y	no information available	1846
47	41-50	m	midline	BA	y	no information available	1846
58	51-60	m	midline	BA	y	na	1846
58	51-60	m	midline	BA	y	no information available	1846
62	61-70	f	right	PcomA	y	no information available	1846
34	31-40	m	left	PcomA	y	no information available	1847
35	31-40	m	left	ICA	y	no information available	1847
52	51-60	f	left	ICA	y	haltby arteries	1848
		m	midline	BA	n	no information available	1848
33	31-40	m	midline	BA	y	no information available	1849
35	31-40	m	midline	BA	y	Other arteries healthy	1849
39	31-40	f	undefined	ICA	y	No calcareous deposit in cerebral vessels	1849
		m	undefined	VA	n	Calcareous deposit in wall of sac	1849
18	16-20	f	left	PcomA	y	No fatty atheromatous changes in arteries	1850
30	21-30	m	midline	BA	y	Other vessels without changes	1850
70	61-70	f	left	ICA	n	no information available	1850
20	16-20	f	undefined	PCA	n	no information available	1851
21	21-30	f	midline	AcomA	n	no information available	1851
35	31-40	m	left	MCA	y	no information available	1851
38	31-40	m	midline	BA	n	no information available	1851
45	41-50	m	midline	BA	n	no information available	1851
65	61-70	m	undefined	ICA	n	no information available	1851
		m	midline	BA	n	no information available	1851
		m	midline	BA	n	no information available	1851
		f	undefined	MCA	y	no information available	1851
53	51-60	f	midline	BA	y	no information available	1855
56	51-60	m	right	PCA	y	no information available	1855
57	51-60	m	right	MCA	n	Vessels very atheromatous	1855
70	61-70	f	midline	BA	n	no information available	1855
		m	left	MCA	y	Arteries not atheromatous	1855
35	31-40	m	midline	BA	n	no information available	1856
40	31-40	f	left	PCA	n	Vessels thin but healthy	1856
52	51-60	f	right	ICA	y	Middle coat thickened	1857
47	41-50	f	left	ICA	y	no information available	1858
54	51-60	m	midline	BA	n	Vertebral arteries thickened	1858
56	51-60	m	right	SCA	n	Atheroma	1858
60	51-60	f	midline	AcomA	y	Vessels thickened and rigid	1858
17	16-20	f	left	MCA	y	Embolic	1859
30	21-30	f	left	MCA	y	no information available	1859
34	31-40	m	midline	BA	y	Healthy vessels	1859
35	31-40	f	left	ACA	y	Healthy vessels	1859
43	41-50	f	midline	BA	y	Atheroma	1859
58	51-60	m	left	MCA	y	Atheroma	1859
16	16-20	m	left	ICA	n	no information available	1860
24	21-30	f	midline	BA	y	embolic	1860
47	41-50	f	midline	BA	n	Plates in coats of aneurysm	1860
24	21-30	m	right	MCA	y	Walls of sac calcareous	1861
14	11-15.	m	left	MCA	y	Walls of sack thick and atheromatous no disease of other vessels	1862
42	41-50	m	midline	BA	y	Vessels otherwise healthy	1862
48	41-50	f	midline	BA	n	no information available	1862
56	51-60	m	midline	BA	n	Atheroma	1862
68	61-70	m	left	MCA	y	Wall of sac hard and cretaceous	1862
80	71-80	f	midline	AcomA	n	healthy vessels	1862
28	21-30	m	midline	BA	y	Healthy vessels	1864
37	31-40	m	midline	BA	y	Other vessels slightly atheromatous	1864
			undefined	AICA		Atheroma	1864
16	16-20	m	left	ICA	n	Vessels healthy	1865
24	21-30	m	left	MCA	y	Soft arteries	1865
39	31-40	m	midline	BA	y	No atheroma	1865
43	41-50	f	left	ICA	y	Walls atheromatous	1865
46	41-50	f	left	ACA	n	Vessels very atheromatous	1865
49	41-50	f	midline	AcomA	y	Other arteries healthy	1865
51	51-60	f	midline	BA	y	Arteries not diseased	1865
53	51-60	m	left	MCA	y	Walls not atheromatous	1865
59	51-60	f	right	MCA	y	no information available	1865
		m	left	ACA	y	no information available	1865
21	21-30	f	left	MCA	y	No disease of vessels	1866
61	61-70	f	left	VA	y	no information available	1866
27	21-30	f	left	ICA	y	Arteries thickened	1867
29	21-30	f	left	MCA	y	no information available	1867
78	71-80	f	right	MCA	y	No atheroma	1867
13	11-15.	m	right	MCA	y	Rest of arteries healthy	1868
24	21-30	f	left	ICA	y	no information available	1868
34	31-40	f	left	MCA	n	Walls of aneurysmatheromatous; vessels at base not diseased	1868
36	31-40	f	midline	BA	y	Old endocarditis; questionable embolic origin	1868
40	31-40	m	left	ACA	y	Small atheromatous patches on wall	1868
40	31-40	m	left	MCA	y	Vessels normal	1868
50	41-50	f	left	MCA	n	Thick and opaque, but not materially diseased	1868
53	51-60	f	left	PcomA	y	Slightly atheromatous	1868
56	51-60	f	right	MCA	n	Arteries sclerotic, with atheromatous plates	1868
56	51-60	m	left	MCA	n	Vessels very atheromatous	1868
59	51-60	f	midline	BA	y	Atheroma	1868
60	51-60	f	right	MCA	y	Vessels very atheromatous	1868
14	11-15.	m	left	ICA	y	Other vessels healthy	1869
19	16-20	m	left	VA	y	no information available	1869
28	21-30	m	left	MCA	y	no information available	1869
41	41-50	f	right	MCA	y	no information available	1869
48	41-50	f	left	MCA	y	Atheroma	1869
56	51-60	m	right	ICA	y	Several patches ofdegeneration onbasilar artery	1869
61	61-70	f	midline	BA	n	Vessels atheromatous	1869
12	11-15.	f	right	MCA	y	Embolic occlusion (endocarditis)	1870
13	11-15.	m	right	MCA	y	Other vessels healthy; embolic origin of aneurysm	1870
15	11-15.	m	right	MCA	y	Embolic origin	1870
17	16-20	f	left	ACA	y	Vessels healthy	1870
20	16-20	m	right	MCA	y	Embolic origin	1870
26	21-30	f	left	MCA	n	Vessel plugged by yellow fibrin (vegetations on aortic valves)	1870
26	21-30	m	midline	BA	n	Remaining vessels healthy	1870
26	21-30	f	right	MCA	y	Syphilitic lesions	1870
35	31-40	m	undefined	PCA	n	no information available	1870
37	31-40	m	midline	BA	y	Calcareous degeneration of coats of vessel	1870
49	41-50	m	midline	BA	y	no information available	1870
50	41-50	f	left	PCA	y	Slight atheromatous patches	1870
60	51-60	m	left	VA	y	Vessels diseased	1870
67	61-70	m	right	VA	y	Atheroma	1870
54	51-60	m	midline	AcomA	y	Atheromatous	1871
		f	left	MCA	y	Arteries at base highly Atheromatous	1871
29	21-30	m	midline	BA	n	Other arteries at base atheromatous	1872
45	41-50	m	left	VA	y	Slight atheromatous changes	1872
61	61-70	f	midline	BA	y	Vessels atheromatous	1872
20	16-20	f	right	PcomA	y	Embolic	1873
20	16-20	m	undefined	CBAN	y	Embolic	1873
24	21-30	m	undefined	CBAN	y	Embolic arachnoiditis	1873
27	21-30	m	undefined	CBAN	y	Perforated embolized wall of small arach noid artery	1873
40	31-40	m	right	MCA	y	Embolic	1873
68	61-70	m	midline	AcomA	n	W alls trick ; other vessels healthy	1873
		m	midline	BA	n	Vessels thickened	1874
24	21-30	m	undefined	ICA	n	no information available	1875
33	31-40	m	left	ICA	n	Marked arteriosclerosis	1875
40	31-40	f	right	ICA	n	Walls of sac partly calcified	1875
43	41-50	m	right	MCA	y	no information available	1875
45	41-50	m	midline	AcomA	y	Arteries slightly atheromatous	1875
45	41-50	m	left	MCA	y	Vessels normal	1875
46	41-50	m	bilateral	ICA	n	Intimai arteriosclerosis	1875
53	51-60	f	left	ICA	y	Walls thick and atheromatous	1875
56	51-60	m	left	VA	n	no information available	1875
60	51-60	f	undefined	SCA	y	Intense atheroma of vessels	1875
69	61-70	f	midline	AcomA	n	Vessels atheromatous	1875
34	31-40	f	right	MCA	y	no information available	1876
34	31-40	m	left	MCA	y	no information available	1876
41	41-50	m	midline	AcomA	y	Rest of arteries free of atheroma	1876
50	41-50	f	right	MCA	y	Atheroma	1876
63	61-70	f	right	ICA	y	no information available	1876
16	16-20	m	midline	BA	y	no information available	1877
18	16-20	f	right	MCA	n	no information available	1877
20	16-20	m	midline	AcomA	y	No other disease of vessels	1877
22	21-30	f	left	ICA	n	Vessels healthy, probably embolic	1877
40	31-40	f	right	MCA	y	Healthy vessels	1877
40	31-40	m	left	MCA	y	Vessels at base healthy	1877
42	41-50	m	right	MCA	y	Arteries tortuous andsmall in caliber; deposits of calcareous degeneration	1877
53	51-60	f	midline	BA	n	no information available	1877
12	11-15.	m	right	PCA	y	Embolic (endocarditis)	1878
30	21-30	m	left	ICA	n	Thickening of vessels , with syphilitic infil tration of small cells	1878
47	41-50	f	right	MCA	y	Very atheromatous	1878
50	41-50	m	right	ACA	n	All arteries and aneurysm white and opaque;microscopic syphilitic changes of Heubner	1878
72	71-80	f	left	MCA	y	Vessels atheromatous	1878
20	16-20	m	left	MCA	y	Not atheromatous	1880
36	31-40	m	left	VA	y	Thickened walls: endarteritis	1880
39	31-40	m	right	MCA	y	no information available	1880
40	31-40	f	midline	AcomA	y	Atheroma	1880
44	41-50	m	midline	BA	y	no information available	1880
55	51-60		left	MCA	n	Stiff and atheromatous	1880
57	51-60	m	midline	BA	y	Atheromatous vessels at base	1880
75	71-80	f	midline	BA	n	Atheiomatous	1880
12	11-15.	m	left	MCA	y	Wall of sac atheroma tous; other vessels healthy	1881
40	31-40	f	left	PcomA	y	Healthy vessels	1881
44	41-50	m	midline	BA	y	no information available	1881
50	41-50	f	midline	AcomA	y	no information available	1881
73	71-80	f	right	ICA	n	Very atheromatous	1881
80	71-80	f	right	PcomA	n	Wall thickened	1881
16	16-20	m	midline	BA	y	no information available	1882
17	16-20	m	midline	AcomA	y	Healthy	1883
40	31-40	m	midline	BA	n	Atheroma	1883
		f	undefined	ICA	y	no information available	1883
61	61-70	m	left	VA	n	Fatty degeneration of intima	1884
		m	undefined	CBAN	y	Embolic	1884
29	21-30	f	left	MCA	y	Atheroma	1885
40	31-40	m	left	MCA	n	Calcareous clot in sac	1885
23	21-30	f	left	ICA	y	Syphilitic	1886
22	21-30	f	left	ICA	n	Walls hard; no atheromatous degeneration	1886

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27	21-30	m	midline	BA	y	Syphilitic	1886
20	16-20	f	left	MCA	n	Embolic	1887
30	21-30	m	right	VA	y	Embolic (endocarditis)	1887
30	21-30	m	right	MCA	y	Embolic (endocarditis)	1887
31	31-40	m	right	ICA	n	no information available	1887
36	31-40	m	midline	BA	y	No embolism or atheroma	1887
40	31-40	f	right	MCA	y	No embolism or atheroma	1887
43	41-50	f	right	PCA	n	Arteries free of atheroma	1887
49	41-50	f	undefined	CBAN	y	Embolic (endocarditis)	1887
60	51-60	f	left	MCA	y	no information available	1887
			left	VA	n	Arteriosclerosis	1887
			undefined	VA		Arteriosclerosis	1887
			undefined	VA		Arteriosclerosis	1887
53	51-60	f	midline	BA	y	no information available	1888
26	21-30	m	midline	BA	n	Septic endocarditis	1889
43	41-50	m	midline	AcomA	n	no information available	1889
51	51-60	m	midline	AcomA	y	Arteries free of atheroma	1889
56	51-60	f	midline	AcomA	y	Arteriosclerosis	1889
6	6-10.	m	right	VA	y	Septic embolus	1890
15	11-15.	m	right	PCA	n	Septic embolus endocarditis	1890
15	11-15.	m	right	MCA	n	Septic embolus endocarditis	1890
15	11-15.	m	right	MCA	n	Septic embolus endocarditis	1890
15	11-15.	f	bilateral	ICA	y	Septic embolus endocarditis	1890
15	11-15.	f	right	MCA	y	Septic embolus endocarditis	1890
16	16-20	f	right	MCA	y	Septic embolus	1890
17	16-20	m	left	ICA	n	Septic embolus endocarditis	1890
18	16-20	m	right	MCA	y	Septic embolus	1890
25	21-30	f	right	MCA	n	Septic embolus endocarditis	1890
25	21-30	m	left	MCA	n	Septic embolus endocarditis	1890
25	21-30	f	left	MCA	y	Atheroma	1890
25	21-30	f	right	MCA	y	Septic embolus endocarditis	1890
25	21-30	m	right	MCA	y	Septic embolus endocarditis	1890
31	31-40	m	right	MCA	y	Septic embolus	1890
35	31-40	f	left	MCA	n	Septic embolus endocarditis	1890
35	31-40	m	left	MCA	y	Atheroma	1890
45	41-50	f	left	MCA	y	Atheroma	1890
45	41-50	m	left	MCA	y	Atheroma	1890
50	41-50	m	left	MCA	y	Septic embolus	1890
56	51-60	m	right	ICA	n	Atheroma	1890
66	61-70	m	right	ICA	n	Atheroma	1890
60	51-60	f	midline	BA	n	Atheroma	1891
35	31-40	m	midline	BA	y	Other vessels healthy	1892
47	41-50	m	left	MCA	n	No atheroma	1893
7	6-10.	m	midline	BA	y	no information available	1894
10	6-10.	f	left	VA	y	no information available	1894
14	11-15.	m	left	VA	y	no information available	1894
25	21-30	m	midline	BA	y	no information available	1894
26	21-30	f	right	ICA	y	Soft arteries	1894
26	21-30	m	right	ICA	y	no information available	1894
28	21-30	f	left	MCA	y	no information available	1894
28	21-30	m	midline	AcomA	y	no information available	1894
29	21-30	f	left	MCA	y	no information available	1894
30	21-30	f	right	MCA	y	no information available	1894
31	31-40	m	midline	AcomA	y	no information available	1894
32	31-40	f	left	MCA	y	no information available	1894
32	31-40	f	midline	BA	y	no information available	1894
32	31-40	m	midline	BA	y	no information available	1894
36	31-40	f	midline	PcomA	y	no information available	1894
36	31-40	m	left	ACA	y	no information available	1894
40	31-40	f	midline	BA	y	no information available	1894
40	31-40	m	midline	AcomA	y	no information available	1894
41	41-50	m	right	VA	y	no information available	1894
42	41-50	f	left	ICA	y	no information available	1894
42	41-50	m	left	MCA	y	no information available	1894
42	41-50	m	midline	BA	y	no information available	1894
43	41-50	f	right	ICA	y	no information available	1894
43	41-50	m	left	VA	y	no information available	1894
43	41-50	m	left	MCA	y	no information available	1894
43	41-50	m	right	MCA	y	no information available	1894
43	41-50	m	undefined	CBAN	y	no information available	1894
44	41-50	f	midline	AcomA	y	no information available	1894
45	41-50	f	left	MCA	y	no information available	1894
45	41-50	f	midline	AcomA	y	no information available	1894
45	41-50	m	left	ICA	y	no information available	1894
46	41-50	f	midline	BA	y	no information available	1894
46	41-50	m	right	MCA	y	no information available	1894
46	41-50	m	right	MCA	y	no information available	1894
48	41-50	f	right	ICA	y	no information available	1894
48	41-50	f	right	ICA	y	no information available	1894
49	41-50	f	left	VA	y	no information available	1894
49	41-50	f	midline	PcomA	y	no information available	1894
50	41-50	f	right	MCA	y	no information available	1894
50	41-50	m	left	MCA	y	no information available	1894
51	51-60	f	right	MCA	y	no information available	1894
52	51-60	f	left	MCA	y	no information available	1894
53	51-60	f	left	MCA	y	no information available	1894
53	51-60	f	midline	AcomA	y	no information available	1894
54	51-60	f	midline	AcomA	y	no information available	1894
54	51-60	m	right	MCA	y	no information available	1894
55	51-60	f	right	ICA	y	no information available	1894
55	51-60	m	left	VA	y	no information available	1894
55	51-60	m	midline	BA	y	no information available	1894
56	51-60	f	left	MCA	y	no information available	1894
56	51-60	f	right	MCA	y	no information available	1894
57	51-60	f	right	ACA	y	no information available	1894
57	51-60	f	midline	AcomA	y	no information available	1894
60	51-60	f	left	VA	y	no information available	1894
60	51-60	f	left	ACA	y	no information available	1894
60	51-60	f	left	ACA	y	no information available	1894
60	51-60	f	left	MCA	y	no information available	1894
61	61-70	f	midline	BA	y	no information available	1894
61	61-70	m	right	ICA	y	no information available	1894
62	61-70	f	midline	AcomA	y	no information available	1894
63	61-70	f	left	ACA	y	no information available	1894
63	61-70	f	midline	AcomA	y	no information available	1894
64	61-70	f	left	ICA	y	no information available	1894
64	61-70	f	midline	AcomA	y	no information available	1894
65	61-70	f	left	ICA	y	no information available	1894
67	61-70	f	left	ICA	y	no information available	1894
67	61-70	f	right	ICA	y	no information available	1894
69	61-70	f	left	ICA	y	no information available	1894
70	61-70	f	right	ICA	y	no information available	1894
72	71-80	f	left	VA	y	no information available	1894
72	71-80	f	right	ICA	y	no information available	1894
73	71-80	f	left	MCA	y	no information available	1894
73	71-80	f	right	VA	y	no information available	1894
73	71-80	f	right	VA	y	no information available	1894
73	71-80	f	midline	AcomA	y	no information available	1894
79	71-80	f	midline	BA	y	no information available	1894
80	71-80	f	right	ACA	y	no information available	1894
81	81-100	f	left	MCA	y	no information available	1894
86	81-100	m	midline	AcomA	y	no information available	1894
		f	midline	CBAN	y	no information available	1894
21	21-30	m	right	ICA	y	other vessels healthy	1895
29	21-30	m	midline	BA	y	no information available	1895
34	31-40	f	left	ICA	y	Wall of aneurysm had two patches of atheroma	1895
40	31-40	m	midline	BA	n	no information available	1897
47	41-50	f	right	MCA	y	no information available	1897
50	41-50	f	left	MCA	y	no information available	1897
53	51-60	m	left	MCA	y	no information available	1897
69	61-70	f	bilateral	ICA	n	no information available	1897
28	21-30	m	midline	BA	n	no information available	1898
54	51-60	m	midline	BA	n	no information available	1898
70	61-70	f	right	MCA	y	Extensive sclerosis with atheromatous plaques	1898
29	21-30	m	midline	BA	n	Syphilitic	1899
68	61-70	m	left	VA	n	Vessels atheromatous	1900
10	6-10.	m	left	pial	y	Embolic (endocarditis)	1901
11	11-15.	f	right	pial	y	Embolic (endocarditis)	1901
27	21-30	f	left	MCA	y	normal vessels	1901
28	21-30	m	midline	BA	y	no information available	1901
32	31-40	f	right	MCA	y	Embolic (endocarditis)	1901
50	41-50	f	right	MCA	y	Atheroma	1901
76	71-80	f	right	MCA	y	no information available	1901
29	21-30	f	right	PcomA	y	normal vessels	1902
34	31-40	m	undefined	CBAN	y	Syphilis	1902
45	41-50	f	left	ICA	y	Wall of left internal carotid artery thickened	1902
22	21-30	f	right	ICA	y	healthy	1903
39	31-40	f	right	MCA	y	Line of atheroma at point of aneurysm	1903
64	61-70	f	right	PcomA	y	Syphilis	1903
27	21-30	m	midline	AcomA	y	Walls of other arteries healthy	1904
40	31-40	f	right	ICA	y	no information available	1904
65	61-70	f	right	ACA	n	Atheroma	1904
70	61-70	f	midline	BA	y	Atheroma	1904
86	81-100	m	bilateral	ICA	n	no information available	1904
87	81-100	f	right	ICA	n	Atheroma	1904
40	31-40	m	midline	BA	n	Syphilis	1905
42	41-50	f	right	PcomA	y	Marked sclerosis	1905
50	41-50	m	right	VA	n	Localized syphilitic periarteritis of aneurysm	1905
51	51-60	f	right	VA	y	no information available	1905
		m	midline	BA	n	Syphilis	1905
6	6-10.	f	left	MCA	y	Mycotic (staphylococcic endocarditis)	1906
28	21-30	m	midline	BA	y	no information available	1906
69	61-70	f	bilateral	VA	n	Arteriosclerosis	1906
			bilateral	ICA	y	no information available	1906
14	11-15.	m	left	BA	n	no information available	1907
40	31-40	m	left	MCA	y	Vessels normal	1907
48	41-50	f	left	ICA	n	no atheroma	1907
50	41-50	f	left	MCA	y	Arteries healthy	1907
51	51-60	m	midline	AcomA	y	no information available	1907
55	51-60	f	bilateral	MCA	y	no information available	1907
61	61-70	f	left	ICA	y	no information available	1907
63	61-70	f	midline	AcomA	n	no information available	1907
65	61-70	f	left	VA	n	Basilar artery tortuous and diseased	1907
68	61-70	m	midline	BA	y	no information available	1907
84	81-100	f	left	ICA	n	no information available	1907
		f	right	ICA	n	no information available	1907
			left	ICA	n	no information available	1907
28	21-30	m	left	AcomA	y	Irregular, cartilagi nous thickening of arteries at base	1908
65	61-70	m	right	MCA	n	Atheroma	1908
30	21-30	m	left	ACA	y	Thickening: syphi litic endarteritis obliterans	1909
27	21-30	m	midline	BA	y	Other arteries normal	1910
44	41-50	f	right	MCA	y	Arteriosclerosis	1910
57	51-60	m	bilateral	VA	n	no information available	1910
64	61-70	m	left	MCA	y	Arteriosclerosis	1910
		f	left	VA	n	Thick and hard	1910
25	21-30	f	right	AICA	y	Thickening of vessels	1911
36	31-40	f	left	PCA	n	Aneurysm congenital	1911
37	31-40	m	right	ICA	n	no information available	1911
42	41-50	f	right	ICA	y	no information available	1911
42	41-50	m	left	VA	y	Both cerebral arteries thickened	1911
53	51-60	m	left	MCA	n	Syphilis	1911
62	61-70	f	left	ICA	y	no information available	1911
		m	midline	BA	y	Healthy vessels	1911
21	21-30	f	right	ACA	y	Aneurysm congenital	1912
22	21-30	m	right	MCA	y	Embolic (endocarditis)	1912
25	21-30	f	right	AICA	y	Aneurysm congenital	1912
31	31-40	m	undefined	CBAN	n	No arteriosclerosis	1912
32	31-40	m	left	MCA	y	Aneurysm congenital	1912
36	31-40	f	left	PICA	y	Walls healthy (probably embolic)	1912
37	31-40	f	right	PCA	y	Embolic (endocarditis)	1912
37	31-40	m	left	MCA	y	Aneurysm congenital	1912
38	31-40	f	midline	AcomA	y	Aneurysm congenital	1912
38	31-40	m	right	VA	y	Aneurysm congenital	1912
40	31-40	f	left	MCA	y	Embolic (endocarditis)	1912
42	41-50	f	left	ICA	y	Aneurysm congenital	1912
42	41-50	m	left	MCA	y	Embolic (endocarditis)	1912
42	41-50	m	left	VA	y	Vessels somewhatthickened; "congenital" (?)	1912
44	41-50	m	right	MCA	y	Arteriosclerosis	1912
48	41-50	f	left	MCA	y	Aneurysm congenital	1912
51	51-60	f	left	ACA	y	Syphilitic endarteritis of cerebral arteries	1912

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52	51-60	m	right	MCA	y	Syphilitic endarteritis obliterans of cerebral vessels	1912
55	51-60	m	left	ICA	n	no information available	1912
56	51-60	f	midline	BA	y	Aneurysm congenital	1912
56	51-60	f	left	PICA	y	Aneurysm congenital	1912
57	51-60	f	right	MCA	y	Arteries soft	1912
63	61-70	f	right	MCA	y	Arteriosclerosis	1912
6	6-10.	f	right	PICA	y	Atheroma	1913
12	11-15.	m	left	MCA	y	no information available	1913
18	16-20	m	left	PCA	y	Aneurysm congenital	1913
30	21-30	f	right	PcomA	y	No arteriosclerosis	1913
31	31-40	f	right	VA	n	Syphilis	1913
33	31-40	m	undefined	CBAN	y	no information available	1913
36	31-40	m	right	PCA	y	Syphilitic gummatous arteritis	1913
37	31-40	m	right	VA	n	Endarteritis	1913
40	31-40	f	left	ACA	y	Aneurysm congenital	1913
41	41-50	m	left	ICA	n	no information available	1913
42	41-50	f	left	MCA	y	Small sclerotic plaques	1913
42	41-50	m	right	AICA	y	Soft vessels	1913
56	51-60	m	undefined	CBAN	y	Small grayish white flecks on vessels	1913
58	51-60	f	right	MCA	y	Only slight thickening	1913
72	71-80	m	right	MCA	y	Arteriosclerosis	1913
72	71-80	m	right	MCA	y	Marked arteriosclerosis	1913
		f	right	ICA	y	Atheroma	1913
57	51-60	m	midline	BA	y	no information available	1914
40	31-40	f	right	VA	y	proliferative endocarditis	1915
50	41-50	m	left	AcomA	y	embolism (endocarditis)	1915
		m	left	PICA	y	no information available	1915
7	6-10.	f	right	MCA	y	embolic	1916
15	11-15.	f	left	ICA	y	embolic	1916
16	16-20	f	right	MCA	y	embolic	1916
16	16-20	m	left	MCA	y	embolic	1916
19	16-20	m	left	PcomA	y	healthy artery	1916
22	21-30	m	right	MCA	n	embolic	1916
22	21-30	m	left	AcomA	y	conjenital aneurysm	1916
22	21-30	m	right	MCA	y	conjenital aneurysm	1916
28	21-30	m	left	ICA	y	conjenital aneurysm	1916
31	31-40	m	right	MCA	y	embolic	1916
36	31-40	f	left	PcomA	y	slight arterial degeneration	1916
36	31-40	m	left	ICA	y	Atheroma	1916
36	31-40	m	left	MCA	y	embolic	1916
40	31-40	f	right	PcomA	y	no information available	1916
40	31-40	m	right	ICA	y	healthy artery	1916
41	41-50	m	right	AcomA	n	no atheroma	1916
41	41-50	m	right	ACA	y	embolic	1916
42	41-50	f	left	PICA	y	no atheroma	1916
44	41-50	f	left	AcomA	y	no information available	1916
46	41-50	f	right	AcomA	y	arterial degeneration	1916
47	41-50	m	right	ICA	n	no information available	1916
48	41-50	f	right	MCA	n	no information available	1916
48	41-50	f	right	MCA	y	arterial degeneration	1916
49	41-50	f	left	AcomA	y	Atheroma	1916
49	41-50	m	left	AcomA	y	no information available	1916
50	41-50	m	right	AcomA	y	no information available	1916
51	51-60	m	right	MCA	y	Atheroma	1916
53	51-60	m	right	MCA	n	no information available	1916
53	51-60	m	left	AcomA	y	Arteriosclerosis	1916
55	51-60	m	right	AcomA	y	no information available	1916
58	51-60	f	right	ICA	y	conjenital aneurysm	1916
60	51-60	f	right	MCA	y	embolic	1916
60	51-60	m	right	MCA	y	Atheroma	1916
67	61-70	f	left	MCA	y	embolic	1916
70	61-70	f	left	ICA	n	no information available	1916
72	71-80	f	left	AcomA	y	arterial degeneration	1916
75	71-80	m	undefined	CBAN	n	no information available	1916
86	81-100	m	right	MCA	n	no information available	1916
			left	ACA	n	embolic	1916
			midline	BA	n	embolic	1916
			undefined	CBAN	n	embolic	1916
			left	MCA	n	no information available	1916
		m	left	ACA	y	embolic	1916
		m	right	MCA	y	embolic	1916
12	11-15.	f	right	AcomA	y	vessel healthy	1917
32	31-40	f	bilateral	ICA	y	no information available	1917
47	41-50	m	left	VA	y	vessel soft	1917
52	51-60	f	right	ICA	y	no information available	1917
53	51-60	m	midline	BA	n	Arteriosclerosis	1917
21	21-30	m	right	MCA	y	no information available	1918
26	21-30	f	right	ICA	y	no information available	1918
53	51-60	f	left	MCA	y	Arteriosclerosis	1918
54	51-60	m	left	PCA	y	no information available	1918
87	81-100	f	right	MCA	y	other vessel normal	1918
2	0-5.	m	left	MCA	y	Focal areas of intimai thickening	1919
18	16-20	m	bilateral	MCA	y	Vessels soft and thin	1919
27	21-30	m	bilateral	MCA	y	No trace of syphilis or arteriosclerosis; microscopically a decrease in elastic fibers in media of vessels	1919
28	21-30	m	right	VA	y	Slight intimai thickening of other vessels	1919
35	31-40	m	right	MCA	y	atherosclerosis	1919
36	31-40	f	right	PcomA	y	Vessels soft	1919
39	31-40	f	left	AcomA	y	Scattered patches of intimai thickening	1919
42	41-50	m	left	MCA	y	Arteriosclerosis	1919
45	41-50	m	left	MCA	y	atherosclerosis	1919
53	51-60	m	midline	BA	y	Arteriosclerosis	1919
53	51-60	m	left	PcomA	y	Scattered patches of intimai thickening	1919
55	51-60	m	midline	BA	y	Vessels thickened with plaques	1919
56	51-60	m	right	PcomA	y	Scattered plaques	1919
68	61-70	f	left	AcomA	y	Marked thickening of vessels	1919
			right	MCA	y	Scattered thickening	1919
			midline	AcomA	y	Scattered yellow patches on intima	1919
28	21-30	m	midline	AcomA	y	no information available	1920
29	21-30	f	midline	AcomA	y	no information available	1920
36	31-40	m	midline	BA	n	no information available	1920
37	31-40	f	midline	AcomA	y	no information available	1920
50	41-50	f	midline	AcomA	y	no information available	1920
55	51-60	m	midline	AcomA	y	Sclerosis of cerebral arteries	1920
56	51-60	f	right	AcomA	y	no information available	1920
67	61-70	f	midline	AcomA	y	no information available	1920
9	6-10.	m	left	PCA	y	nfected emboius; other vessels normal	1921
13	11-15.	m	midline	AcomA	y	no information available	1921
20	16-20	m	undefined	CBAN	y	no information available	1921
27	21-30	f	midline	AcomA	y	Atheroma	1921
37	31-40	f	left	AcomA	n	Atheroma	1921
37	31-40	m	left	AcomA	y	Medial sclerosis and Ibid. intimai thickening	1921
39	31-40		undefined	CBAN	y	Arteriosclerosis	1921
44	41-50	m	left	AcomA	y	Infected emboius; slight intimai thickening of other vessels	1921
44	41-50	m	left	AcomA	y	Other vessels normal	1921
46	41-50	f	midline	AcomA	y	Atheroma	1921
46	41-50	m	left	AcomA	y	Atheroma	1921
50	41-50	m	right	VA	n	no information available	1921
52	51-60	f	left	AcomA	y	Atheroma	1921
61	61-70		bilateral	VA	n	no information available	1921
61	61-70	f	midline	AcomA	y	Atheroma	1921
13	11-15.	m	bilateral	MCA	y	Coarctation of aorta	1922
15	11-15.	f	bilateral	ICA	n	no information available	1922
36	31-40	m	midline	BA	n	no information available	1922
39	31-40	m	midline	AcomA	y	Embolism (endocarditis)	1922
46	41-50	m	midline	BA	n	no information available	1922
50	41-50	f	right	ICA	y	Arteriosclerosis	1922
54	51-60	m	left	VA	n	Arteriosclerosis	1922
16	16-20	f	left	MCA	y	Mycotic embolism	1923
18	16-20	f	left	AcomA	y	Mycotic embolism	1923
22	21-30	m	right	MCA	y	Embolie (endocarditis)	1923
22	21-30	m	left	PICA	y	no information available	1923
24	21-30	m	right	MCA	y	Embolie (endocarditis)	1923
25	21-30	m	undefined	CBAN	y	no information available	1923
29	21-30	m	left	MCA	y	Embolie (endocarditis)	1923
29	21-30	m	left	MCA	y	Embolie (endocarditis)	1923
31	31-40	m	right	MCA	y	Embolie (endocarditis)	1923
33	31-40	m	left	MCA	n	Mycotic embolism	1923
36	31-40	f	left	ICA	y	no information available	1923
36	31-40	m	right	ICA	y	no information available	1923
42	41-50	f	midline	AcomA	y	Embolie (endocarditis)	1923
43	41-50	f	right	MCA	y	Arteriosclerosis	1923
45	41-50	f	undefined	CBAN	n	no information available	1923
45	41-50	f	left	ICA	y	Arteriosclerosis	1923
49	41-50	m	midline	AcomA	y	no information available	1923
50	41-50	f	left	ICA	n	Arteriosclerosis	1923
52	51-60	f	right	ICA	n	no information available	1923
52	51-60	f	midline	AcomA	y	Arteriosclerosis	1923
52	51-60	f	right	ICA	y	no information available	1923
55	51-60	f	right	PcomA	y	Arteriosclerosis	1923
56	51-60	f	right	MCA	y	Arteriosclerosis	1923
57	51-60	f	left	ICA	n	Syphilis and arterio sclerosis	1923
57	51-60		right	ICA	n	Arteriosclerosis	1923
60	51-60	f	left	ICA	y	Arteriosclerosis	1923
61	61-70	f	right	ICA	y	Arteriosclerosis	1923
64	61-70	f	midline	AcomA	n	Arteriosclerosis	1923
64	61-70	f	left	PCA	y	Arteriosclerosis	1923
65	61-70	f	left	ICA	y	no information available	1923
69	61-70	f	left	PcomA	y	Arteriosclerosis	1923
70	61-70	f	bilateral	MCA	n	Arteriosclerosis	1923
70	61-70	f	left	MCA	y	Arteriosclerosis	1923
70	61-70	f	right	PCA	y	Arteriosclerosis	1923
74	71-80	m	left	AcomA	n	Arteriosclerosis	1923
75	71-80	f	left	PcomA	n	Arteriosclerosis	1923
84	81-100	f	right	MCA	y	Embolie (endocarditis)	1923
24	21-30	m	right	AcomA	y	Arteriosclerosis	1924
25	21-30	m	right	MCA	y	No atheroma	1924
29	21-30	f	right	ICA	y	Healthy vessels	1924
29	21-30	f	right	ICA	y	Healthy vessels	1924
30	21-30	m	right	ICA	y	healthy vessels	1924
30	21-30	m	midline	BA	n	Gummatous arteritis	1924
30	21-30	f	left	AcomA	y	Arteriosclerosis	1924
41	41-50	f	left	ICA	y	Endocarditis or arteriosclerosis	1924
41	41-50	f	left	AcomA	y	Internal sclerosis (endocarditis)	1924
43	41-50	f	right	ICA	y	no information available	1924
47	41-50	m	midline	BA	n	no information available	1924
49	41-50	m	right	AcomA	y	Arteriosclerosis	1924
60	51-60	m	right	ICA	y	no information available	1924
			right	PcomA	y	Atheroma	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	ICA		no information available	1924
		f	left	ICA		no information available	1924
		f	left	ICA		no information available	1924
		f	left	AcomA		no information available	1924
		f	left	AcomA		no information available	1924
		f	left	PcomA		no information available	1924
		f	left	PcomA		no information available	1924
		f	left	PcomA		no information available	1924
		f	left	PcomA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	ICA		no information available	1924
		f	right	AcomA		no information available	1924
		f	right	AcomA		no information available	1924
		f	right	AcomA		no information available	1924
		f	right	VA		no information available	1924
		f	right	PcomA		no information available	1924
		f	right	ICA		no information available	1924
		f	midline	BA		no information available	1924
		f	midline	AcomA		no information available	1924
		f	midline	AcomA		no information available	1924
		m	left	MCA		no information available	1924

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		m	left	MCA		no information available		1924
		m	left	AcomA		no information available		1924
		m	left	AcomA		no information available		1924
		m	left	AcomA		no information available		1924
		m	left	AcomA		no information available		1924
		m	left	VA		no information available		1924
		m	left	VA		no information available		1924
		m	left	PICA		no information available		1924
		m	right	PICA		no information available		1924
		m	midline	BA		no information available		1924
		m	midline	BA		no information available		1924
		m	midline	AcomA		no information available		1924
		m	midline	AcomA		no information available		1924
		m	midline	AcomA		no information available		1924
		m	midline	AcomA		no information available		1924
		m	midline	AcomA		no information available		1924
		m	midline	AcomA		no information available		1924
7	6-10.	m	right	ICA	n	Infected thrombus		1925
17	16-20	m	midline	BA	y	Congenital aneurysm		1925
21	21-30	m	right	MCA	y	no information available		1925
23	21-30	m	midline	BA	y	no information available		1925
26	21-30	m	left	ICA	y	no information available		1925
32	31-40	m	left	MCA	y	no information available		1925
35	31-40	m	right	ICA	n	Mycotic embolus (endocarditis)		1925
50	41-50	m	left	VA	y	no information available		1925
			midline	BA	n	no information available		1925
15	11-15.	f	right	AcomA	y	Healthy vessels		1926
15	11-15.	m	left	MCA	y	Vessels healthy		1926
15	11-15.	m	midline	BA	y	Vessels healthy		1926
16	16-20	f	bilateral	MCA	y	Vessels healthy		1926
16	16-20	m	left	MCA	y	Vessels healthy		1926
17	16-20	m	left	MCA	y	Healthy vessels		1926
20	16-20	m	left	MCA	y	Aneurysm congenital		1926
20	16-20	m	midline	BA	y	Embolic		1926
21	21-30	m	right	ICA	y	Congenital aneurysm		1926
23	21-30	f	undefined	CBAN	n	no information available		1926
23	21-30	m	right	PcomA	n	Atheroma		1926
23	21-30	f	left	MCA	y	no information available		1926
23	21-30	m	right	MCA	y	no information available		1926
23	21-30	m	right	MCA	y	no information available		1926
26	21-30	m	undefined	CBAN	n	Aneurysm seen at operation		1926
26	21-30	f	midline	BA	y	Vessels healthy		1926
27	21-30	m	right	MCA	y	Healthy vessels		1926
28	21-30	m	right	MCA	y	Healthy vessels		1926
30	21-30	f	midline	AcomA	y	Vessels healthy		1926
32	31-40	f	right	ICA	n	no information available		1926
32	31-40	f	left	ICA	y	no information available		1926
32	31-40	f	left	AcomA	y	Vessels healthy		1926
34	31-40	m	left	ICA	y	no information available		1926
35	31-40	f	right	AcomA	y	Vessels not diseased		1926
35	31-40	m	left	MCA	y	Vessels healthy		1926
36	31-40	m	left	PcomA	n	Syphilitic		1926
38	31-40	f	right	AcomA	y	Vessels healthy		1926
38	31-40	m	midline	AcomA	y	Healthy vessels		1926
39	31-40	m	left	MCA	y	Healthy vessels		1926
40	31-40	f	left	VA	n	Atheroma		1926
40	31-40	f	right	VA	n	Atheroma		1926
40	31-40	m	left	AcomA	n	no information available		1926
41	41-50	f	bilateral	MCA	y	Healthy vessels		1926
41	41-50	f	bilateral	MCA	y	Vessels healthy		1926
41	41-50	m	right	AcomA	y	Vessels healthy		1926
42	41-50	m	left	MCA	y	Arteriosclerosis		1926
42	41-50	m	midline	BA	y	Atheroma		1926
45	41-50	f	right	ICA	y	Arteriosclerosis		1926
45	41-50	f	left	ICA	y	no information available		1926
45	41-50	m	right	AcomA	y	Healthy vessels		1926
45	41-50	m	right	MCA	y	Healthy vessels		1926
46	41-50	f	right	MCA	y	Vessels healthy		1926
46	41-50	m	right	MCA	y	Vessels healthy		1926
47	41-50	m	left	AcomA	y	Vessels healthy		1926
48	41-50	f	midline	AcomA	y	Healthy vessels		1926
49	41-50	f	midline	AcomA	y	Arteriosclerosis		1926
50	41-50	m	left	MCA	y	Atheroma		1926
52	51-60	f	midline	AcomA	y	Atheroma		1926
52	51-60	f	right	ICA	y	Many atheromatous beads on other vessels		1926
52	51-60	f	right	ICA	y	no information available		1926
52	51-60	m	left	MCA	y	Arteriosclerosis		1926
52	51-60	m	midline	BA	y	no information available		1926
53	51-60	m	left	AcomA	y	Atheroma		1926
55	51-60	f	left	MCA	y	Atheroma		1926
56	51-60	f	left	PCA	y	Arteriosclerosis		1926
58	51-60	f	right	ICA	n	Aneurysm seen at operation		1926
60	51-60	m	right	AcomA	y	Vessels healthy		1926
62	61-70	f	left	MCA	y	Atheroma		1926
64	61-70	m	left	MCA	y	Atheroma		1926
69	61-70	f	right	MCA	y	Atheroma		1926
69	61-70	f	bilateral	PCA	y	no information available		1926
72	71-80	m	right	AcomA	y	Arteriosclerosis		1926
73	71-80	f	right	ICA	y	Many sclerotic plaques		1926
11	11-15.	f	midline	AcomA	y	Congenital aneurysm		1927
20	16-20	f	left	MCA	y	Congenital" aneurysm (coarctationof aorta)		1927
30	21-30	f	midline	BA	n	no information available		1927
30	21-30	f	left	PcomA	n	Vessels slightly thickened		1927
34	31-40	m	right	PCA	y	Normal vessels		1927
39	31-40	f	left	PcomA	y	Thickening of intima in basilar artery		1927
40	31-40	m	left	MCA	y	"Congenital" aneurysm (coarctation of aorta)		1927
42	41-50	f	midline	AcomA	y	no information available		1927
42	41-50	m	right	AcomA	y	Congenital" aneurysm		1927
42	41-50	m	bilateral	ICA	y	No sifter vascular disease		1927
52	51-60	f	left	AcomA	y	no information available		1927
52	51-60	f	left	ICA	y	Small foci of early calcification		1927
69	61-70	f	left	MCA	y	no information available		1927
3	0-5.	f	left	MCA	y	no information available		1928

		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	ICA	y	no information available	1928
		m	left	PCA	y	no information available	1928
		m	left	PCA	y	no information available	1928
		m	left	PCA	y	no information available	1928
		m	right	VA	y	no information available	1928
		m	right	ICA	y	no information available	1928
		m	right	PcomA	y	no information available	1928
		m	right	AICA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
30	21-30	f	right	PcomA	y	No other pathologic changes	1929
32	31-40	m	undefined	CBAN	y	no information available	1929
33	31-40	m	left	MCA	y	no information available	1929
34	31-40	f	left	ICA	y	no information available	1929
47	41-50	f	right	PcomA	y	Arteriosclerosis	1929
59	51-60	f	left	ICA	y	Arteriosclerosis	1929
60	51-60	m	midline	BA	y	Thickened walls	1929
61	61-70	m	right	ICA	y	no information available	1929
8	6-10.	m	bilateral	PCA	y	Congenital aneurysm	1930
21	21-30	f	left	MCA	y	Congenital aneurysm	1930
23	21-30	f	right	ICA	y	no information available	1930
24	21-30	f	right	AcomA	y	Congenital aneurysm	1930
28	21-30	f	right	MCA	y	Congenital aneurysm	1930
28	21-30	f	left	MCA	y	no information available	1930
32	31-40	m	left	MCA	y	Congenital aneurysm	1930
33	31-40	m	right	AcomA	y	Congenital aneurysm	1930
49	41-50	m	left	AcomA	y	no information available	1930
51	51-60	f	right	MCA	y	Healthy vessels	1930
77	71-80	f	midline	BA	n	Atheroma	1930
11	11-15.	m	left	MCA	y	Congenital aneurysm	1931
15	11-15.	f	left	PcomA	y	no information available	1931
20	16-20	f	right	ICA	y	Congenital aneurysm	1931
23	21-30	f	left	AcomA	y	Congenital aneurysm	1931
24	21-30	m	right	MCA	y	Congenital aneurysm	1931
26	21-30	m	right	MCA	y	Congenital aneurysm	1931
27	21-30	m	midline	BA	y	Congenital aneurysm	1931
27	21-30	m	right	PcomA	y	no information available	1931
28	21-30	f	left	MCA	y	Congenital aneurysm	1931
28	21-30	m	left	PcomA	y	no information available	1931
29	21-30	f	right	ICA	y	No arteriosclerosis	1931
29	21-30	m	right	AcomA	y	Yellow plaques on Ibid,intima at bifurcation points; (endocarditis)	1931
31	31-40	f	right	PcomA	y	Healthy vessels	1931
31	31-40	m	right	MCA	y	no information available	1931
33	31-40	f	midline	AcomA	y	Congenital aneurysm	1931
34	31-40	m	bilateral	PCA	y	Calcareous deposits	1931
38	31-40	m	right	ICA	y	Arteriosclerosis	1931
40	31-40	f	right	ICA	y	Congenital aneurysm	1931
40	31-40	f	left	ICA	y	no information available	1931
44	41-50	f	left	AcomA	y	Slight evidence of arteriosclerosis	1931
46	41-50	f	right	MCA	y	Arteriosclerosis	1931
46	41-50	f	left	PcomA	y	Few yellow plaques on basilar artery	1931
49	41-50	f	left	ICA	y	Arteriosclerosis	1931
49	41-50	m	midline	BA	y	Very sclerotic	1931
50	41-50	f	left	VA	n	no information available	1931
52	51-60	m	left	MCA	y	Healthy vessels	1931
53	51-60	f	right	MCA	y	Congenital aneurysm	1931
55	51-60	m	left	MCA	y	Arteriosclerosis	1931
56	51-60	m	right	VA	y	no information available	1931
58	51-60	f	left	ICA	y	no information available	1931
60	51-60	f	right	PcomA	y	Arteriosclerosis	1931
64	61-70	f	left	ICA	n	Arteriosclerosis	1931
64	61-70	f	left	MCA	y	Arteriosclerosis	1931
64	61-70	f	right	PcomA	y	Some thickening of Ibid. intima, probably of infectious origin	1931
66	61-70	f	right	MCA	y	Arteriosclerosis	1931
66	61-70	m	midline	BA	y	Arteriosclerosis	1931
70	61-70	m	left	ICA	y	Arteriosclerosis	1931
72	71-80	f	midline	AcomA	y	Arteriosclerosis	1931
72	71-80	f	left	AcomA	y	Arteriosclerosis	1931
75	71-80	m	midline	BA	n	no information available	1931
			right	MCA	y	Arteriosclerosis	1931
6	6-10.	f	right	AcomA	y	other vessels normal	1932
17	16-20	m	midline	BA	n	Changes of early arteriosclerosis	1932
19	16-20	f	left	MCA	y	Mycotic (endocarditis)	1932
19	16-20	f	midline	AcomA	y	no information available	1932
20	16-20	f	right	MCA	y	no information available	1932
24	21-30	m	midline	BA	y	Mycotic	1932
25	21-30	f	right	PcomA	y	No other abnormalities of vessels	1932
25	21-30	m	left	MCA	y	Congenital aneurysm	1932
29	21-30	m	right	PcomA	y	no information available	1932
30	21-30	f	left	PCA	n	Arteriosclerosis	1932
30	21-30	f	bilateral	MCA	y	Congenital aneurysm	1932
31	31-40	m	left	AcomA	y	Diffuse degenerative changes in all three coats	1932
35	31-40	m	bilateral	MCA	y	Arteriosclerosis	1932
36	31-40	f	left	PcomA	y	Arteriosclerosis	1932
40	31-40	m	midline	BA	y	Arteriosclerosis	1932
41	41-50	f	bilateral	MCA	y	Congenital aneurysm	1932
43	41-50		midline	BA	n	Atheroma	1932
43	41-50	m	left	PcomA	y	Arteriosclerosis	1932
45	41-50		midline	AcomA	n	Arteriosclerosis	1932
47	41-50	m	midline	BA	y	no information available	1932
52	51-60	m	left	AcomA	y	Congenital aneurysm	1932
54	51-60	f	right	MCA	y	Pronounced degenerative changes in all coats	1932
60	51-60	m	left	AcomA	y	Arteriosclerosis	1932
61	61-70	m	midline	BA	n	Arteriosclerosis	1932
61	61-70	f	left	PcomA	y	Arteriosclerosis	1932
61	61-70	m	left	MCA	y	Basilar artery arteriosclerotic	1932
67	61-70	m	right	BA	y	no information available	1932
68	61-70	m	undefined	CBAN	y	Arteriosclerosis	1932
			bilateral	MCA	y	no information available	1932
			bilateral	MCA	y	no information available	1932
			midline	AcomA	y	no information available	1932
			midline	AcomA	y	no information available	1932
20	16-20	f	left	ICA	y	Congenital aneurysm	1933
24	21-30	m	left	ICA	y	no information available	1933
27	21-30	m	midline	BA	y	No other microscopic changes; Heubner's arteritis	1933
28	21-30	f	right	PCA	y	infection	1933
28	21-30	m	left	MCA	y	Localized areas of fat absorption	1933
29	21-30	m	right	AcomA	y	Congenital aneurysm	1933
29	21-30	m	right	AcomA	y	Congenital aneurysm	1933
35	31-40	f	undefined	CBAN	n	no information available	1933
36	31-40	f	left	AcomA	y	no information available	1933
39	31-40	f	undefined	CBAN	y	no information available	1933
40	31-40	m	midline	AcomA	n	Arteriosclerosis	1933
40	31-40	m	right	AcomA	y	no information available	1933
42	41-50	m	left	MCA	y	Arteriosclerosis	1933
45	41-50	f	left	ICA	y	no information available	1933
47	41-50	f	left	PcomA	y	no information available	1933
47	41-50	m	right	ICA	y	Arteriosclerosis	1933
47	41-50	m	midline	AcomA	y	Arteriosclerosis	1933
51	51-60	f	left	ICA	y	Vessels degenerated	1933
53	51-60	m	left	ICA	n	Arteriosclerosis	1933
56	51-60	f	right	MCA	y	Extensive atheroma	1933
57	51-60	m	left	ICA	n	Arteriosclerosis	1933
58	51-60	m	right	AcomA	n	Arteriosclerosis	1933
67	61-70	m	left	ICA	n	Arteriosclerosis	1933
67	61-70	m	right	ICA	y	Cerebral vessels thin and smooth	1933
69	61-70	f	right	MCA	n	Arteriosclerosis	1933
75	71-80	m	left	ICA	n	Arteriosclerosis	1933
76	71-80	m	right	AcomA	n	Arteriosclerosis	1933
83	81-100	m	right	AcomA	n	no information available	1933
		m	right	MCA	y	Congenital aneurysm	1933
24	21-30	f	right	ICA	y	Healthy vessels	1934
26	21-30	m	left	MCA	y	Healthy vessels	1934
31	31-40	f	right	ICA	y	other vessels normal	1934
37	31-40	f	right	PcomA	y	no information available	1934
38	31-40	f	left	MCA	y	conjenital aneurysm	1934
40	31-40	f	right	MCA	y	Atheromatous	1934
42	41-50	m	midline	AcomA	y	Congenital aneurysm	1934
42	41-50	m	midline	AcomA	y	Healthy vessels	1934
42	41-50	m	midline	AcomA	y	no information available	1934
43	41-50	f	left	MCA	y	Arteriosclerosis	1934
43	41-50	m	right	AcomA	y	conjenital aneurysm	1934
47	41-50	f	right	MCA	y	no information available	1934
49	41-50	m	left	AcomA	y	conjenital aneurysm	1934
50	41-50	m	right	ICA	y	No arteriosclerosis	1934
51	51-60	m	right	ICA	y	No arteriosclerosis	1934
53	51-60	m	right	ICA	n	Healthy vessels	1934
53	51-60	f	right	PCA	y	Healthy vessels	1934
53	51-60	m	left	MCA	y	Arteriosclerosis	1934
54	51-60	m	right	ICA	y	Arteriosclerosis	1934
55	51-60	f	right	ICA	n	Normal vessels	1934
55	51-60	f	right	PcomA	y	Arteriosclerosis	1934
57	51-60	f	right	ICA	y	No arteriosclerosis	1934
59	51-60	f	right	MCA	y	no information available	1934
60	51-60	m	left	MCA	y	Healthy vessels	1934
62	61-70	f	right	ICA	y	Arteriosclerosis	1934
64	61-70	f	right	ICA	y	Normal vessels	1934
89	81-100	f	right	ICA	y	Healthy vessels	1934
33	31-40	f	midline	BA	y	conjenital aneurysm	1935
38	31-40	m	right	MCA	y	Healthy vessels	1935
43	41-50	f	right	ICA	n	no information available	1935
44	41-50	m	left	ICA	y	no information available	1935
64	61-70	f	right	PcomA	y	no information available	1935

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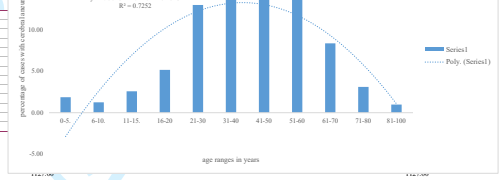
20	16-20	f	right	PcomA	y	syphilis	1936
22	21-30	m	right	MCA	y	Wall of aneurysm showed diffuse inflam mation, of mycotic origin	1936
28	21-30	m	left	MCA	y	no information available	1936
31	31-40	f	left	ICA	n	no information available	1936
31	31-40	m	right	MCA	y	Atheroma	1936
31	31-40	m	right	ICA	y	no information available	1936
39	31-40	f	left	ICA	y	Inflammation of intima	1936
44	41-50	f	left	AcomA	y	Arteries covered with yellow plaques; seen at operation	1936
45	41-50	f	right	VA	y	no information available	1936
46	41-50	f	right	ICA	y	no information available	1936
48	41-50	m	right	ICA	y	no information available	1936
50	41-50	f	midline	AcomA	y	no information available	1936
53	51-60	m	left	ICA	y	Arteriosclerosis	1936
57	51-60	m	left	ICA	n	no information available	1936
58	51-60	m	undefined	CBAN	n	no information available	1936
61	61-70	m	left	PcomA	y	Atheroma	1936
65	61-70	m	right	MCA	n	conjenital aneurysm	1936
74	71-80	m	midline	AcomA	y	Atheroma	1936
2	0-5.	m	right	VA	y	Congenital (?) narrow media	1937
6	6-10.	f	bilateral	MCA	y	Infective (endocarditis)	1937
8	6-10.	m	undefined	CBAN	y	No changes in wall: Herrman probably septic embolus	1937
20	16-20	f	undefined	CBAN	y	no information available	1937
20	16-20	m	undefined	CBAN	y	no information available	1937
23	21-30	m	left	ICA	n	Aneurysm seen at operation	1937
24	21-30	m	midline	BA	y	atherosclerotic, syphilitic aortitis	1937
26	21-30	f	right	ICA	y	Normal vessels	1937
28	21-30	m	undefined	CBAN	y	no information available	1937
29	21-30	f	right	PCA	y	no information available	1937
32	31-40	m	left	AcomA	y	no information available	1937
34	31-40	f	undefined	CBAN	n	no information available	1937
35	31-40	m	bilateral	VA	y	Syphilis	1937
36	31-40	f	right	AcomA	y	no information available	1937
36	31-40	m	undefined	CBAN	y	no information available	1937
37	31-40	m	left	AcomA	y	Atheroma	1937
38	31-40	f	midline	AcomA	y	Syphilis	1937
39	31-40	m	undefined	CBAN	y	no information available	1937
40	31-40	m	left	PICA	y	Few small atheroma- tous plaques: acellular, hyaiinized, thin media	1937
42	41-50	m	right	ICA	y	Normal vessels	1937
43	41-50	f	left	ICA	y	Thickening of wallof internal carotid artery	1937
44	41-50	f	undefined	CBAN	n	Aneurysm seen at operation	1937
44	41-50	m	midline	AcomA	n	no information available	1937
44	41-50	m	right	ICA	y	Arteriosclerosis	1937
46	41-50	f	undefined	CBAN	y	no information available	1937
48	41-50	f	undefined	CBAN	n	no information available	1937
49	41-50	f	bilateral	ICA	y	Syphilitic arteritis and atheroma	1937
49	41-50	m	undefined	CBAN	y	Atheroma	1937
49	41-50	m	right	MCA	y	Syphilitic arteritis and atheroma	1937
50	41-50	f	left	ICA	n	Aneurysm seen at operation	1937
50	41-50	m	midline	AcomA	y	Syphilis	1937
51	51-60	f	undefined	CBAN	n	no information available	1937
51	51-60	f	right	MCA	y	Syphilis	1937
53	51-60	f	right	ICA	n	Aneurysm seen at operation	1937
54	51-60	f	left	PcomA	y	Arteriosclerosis	1937
54	51-60	m	undefined	CBAN	y	no information available	1937
56	51-60	f	left	ICA	n	Aneurysm seen at operation	1937
58	51-60	f	right	AcomA	y	Arteriosclerosis	1937
58	51-60	m	undefined	CBAN	y	no information available	1937
61	61-70	f	undefined	CBAN	y	no information available	1937
62	61-70	f	right	AcomA	y	Atheroma	1937
62	61-70	f	undefined	CBAN	y	no information available	1937
62	61-70	m	undefined	CBAN	y	no information available	1937
63	61-70	f	midline	BA	y	no information available	1937
65	61-70	f	bilateral	PCA	y	Syphilis	1937
67	61-70	f	right	CBAN	n	Aneurysm seen at operation	1937
67	61-70	m	undefined	CBAN	y	no information available	1937
69	61-70	f	right	MCA	y	Syphilis	1937
71	71-80	m	undefined	CBAN	y	Atheroma	1937
72	71-80	f	left	PcomA	n	Atheroma	1937
73	71-80	f	midline	BA	n	Syphilis	1937
75	71-80	m	left	ICA	y	Arteriosclerosis	1937
75	71-80	m	midline	AcomA	y	Atheroma	1937
84	81-100	f	right	ICA	n	Arteriosclerosis	1937
		f	right	VA	y	Syphilis	1937
16	16-20	m	midline	AcomA	y	Embolic (endocarditis)	1937
33	31-40	m	right	AcomA	y	Vessel healthy	1937
38	31-40	f	right	MCA	y	Arteriosclerosis	1937
41	41-50	f	right	AcomA	y	Vessel healthy	1937
42	41-50	m	left	AcomA	y	Vessel healthy	1937
60	51-60	f	right	MCA	y		1937
62	61-70	f	midline	AcomA	y		1937
66	61-70	f	midline	AcomA	y		1937
31	31-40	m	midline	BA	y		1937



age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	asc ranae	192.00	17.04	17.04	
	0-5.	21.00	1.86	1.86	
	6-10.	14.00	1.24	1.24	
	11-15.	29.00	2.57	2.57	
	16-20	58.00	5.15	5.15	
	21-30	146.00	12.95	12.95	
	31-40	165.00	14.64	14.64	
	41-50	203.00	18.01	18.01	
	51-60	159.00	14.11	14.11	
	61-70	94.00	8.34	8.34	
	71-80	35.00	3.11	3.11	
	81-100	11.00	0.98	0.98	
	Total	1127.00	100.00	100.00	

occurrence of aneurysms in all age groups (15 months to 89 years), recorded from 1761 to 1938, (McDonald & Korb 1939)

		age	age range	sex	side	arteries	rupture	arterial con	year
all cases N	Valid	935.00	1127.00	1127.00				1127	1127.00
	Missing	192.00	0.00	0.00				0	0.00
Mean		41.69							1909.81
Median		41.00							1923.00
Mode		41.00							1928.00
Std. Deviation		17.69							28.33
Minimum		1.50							1761.00
Maximum		89.00							1938.00

sex

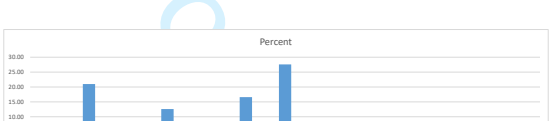
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		28.00	2.50	2.50	2.50
	f	573.00	50.80	50.80	53.30
	m	526.00	46.70	46.70	100.00
	Total	1127.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	33.00	2.90	2.90	2.90
	left	386.00	34.30	34.30	37.20
	midline	279.00	24.80	24.80	61.90
	right	367.00	32.60	32.60	94.50
	undefined	62.00	5.50	5.50	100.00
	Total	1127.00	100.00	100.00	

arteries- all cases of cerebral aneurysms in all age groups ≥15 months, recorded from 1761 to 1938, (McDonald CA, Korb M. Intracranial aneurysms. Archives of neurology and psychiatry (Chicago) 1939; 42(2): 298-328.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	22.00	2.00	2.00	2.00
	AcomA	237.00	21.00	21.00	23.00
	AICA	5.00	0.40	0.40	23.40
	BA	142.00	12.60	12.60	36.00
	CBAN	49.00	4.30	4.30	40.40
	ICA	187.00	16.60	16.60	57.00
	MCA	311.00	27.60	27.60	84.60
	PCA	33.00	2.90	2.90	87.50
	PcomA	61.00	5.40	5.40	92.90
	pial	2.00	0.20	0.20	93.10
	PICA	9.00	0.80	0.80	93.90
	SCA	2.00	0.20	0.20	94.10
	VA	67.00	5.90	5.90	100.00
	Total	1127.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		54.00	4.80	4.80	4.80
	n	198.00	17.60	17.60	22.40
	y	875.00	77.60	77.60	100.00
	Total	1127.00	100.00	100.00	

occurrence of aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

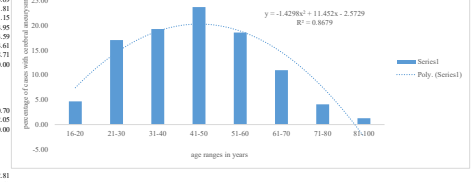
Statistics

		age	age range	sex	side	arteries	rupture	arterial con	year
N	Valid	853.00	853.00	853.00		853.00	853.00	853	853.00
	Missing	0.00	0.00	0.00		0.00	0.00	0	0.00
Mean		44.68							1907.90
Median		43.00							1919.00
Mode		41.00							1894.00
Std. Deviation		15.46							29.46
Minimum		18.00							1761.00
Maximum		89.00							1938.00
Percentiles	25	32.00							1894.00
	50	43.00							1919.00
	75	56.00							1929.00

Frequency Table = cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-20	40.00	4.69	4.69	4.69
	21-30	146.00	17.12	17.12	21.81
	31-40	165.00	19.34	19.34	41.15
	41-50	203.00	23.80	23.80	64.95
	51-60	159.00	18.64	18.64	83.59
	61-70	94.00	11.02	11.02	94.61
	71-80	35.00	4.10	4.10	98.71
	81-100	11.00	1.29	1.29	100.00
	Total	853.00	100.00	100.00	



sex = cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		6.00	0.70	0.70	0.70
	f	438.00	51.35	51.35	52.05
	m	409.00	47.95	47.95	100.00
	Total	853.00	100.00	100.00	

side involved- cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	24.00	2.81	2.81	2.81
	left	295.00	34.58	34.58	37.40
	midline	181.00	21.22	21.22	58.62
	right	305.00	35.76	35.76	94.37
	undefined	48.00	5.63	5.63	100.00
	Total	853.00	100.00	100.00	

arteries involved- cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	18.00	2.11	2.11	2.11

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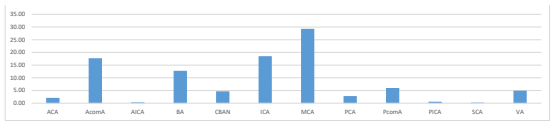
	AcomA	151.00	17.70	17.70
	AICA	3.00	0.35	0.35
	BA	109.00	12.78	12.78
	CBAN	40.00	4.69	4.69
	ICA	158.00	18.52	18.52
	MCA	250.00	29.31	29.31
	PCA	24.00	2.81	2.81
	PcomA	51.00	5.98	5.98
	PICA	5.00	0.59	0.59
	SCA	2.00	0.23	0.23
	VA	42.00	4.92	4.92
	Total	853.00	100.00	100.00



rupture- cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	170.00	19.93	19.93	19.93
	y	683.00	80.07	80.07	100.00
	Total	853.00	100.00	100.00	

cases of cerebral aneurysms in age groups less than 20 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial con	year
N	Valid	122.00	122.00	122.00	122.00	122.00	122.00	122	122.00
	Missing	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		13.46							1905.83
Median		15.00							1921.00
Mode		20.00							1928.00
Std. Deviation		5.88							30.63
Minimum		1.50							1814.00
Maximum		20.00							1978.00
Percentiles	25	8.00							1882.75
	50	15.00							1921.00
	75	18.00							1928.00

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5.	21.00	17.21	17.21	17.21
	11-15.	29.00	23.77	23.77	40.98
	16-20	58.00	47.54	47.54	88.52
	6-10.	14.00	11.48	11.48	100.00
	Total	122.00	100.00	100.00	

sex

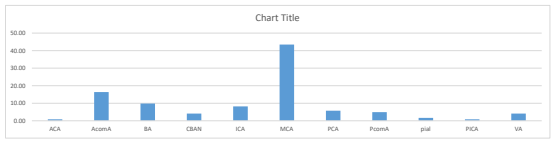
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	59.00	48.36	48.36	48.36
	m	63.00	51.64	51.64	100.00
	Total	122.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	7.00	5.74	5.74	5.74
	left	53.00	43.44	43.44	49.18
	midline	17.00	13.93	13.93	63.11
	right	38.00	31.15	31.15	94.26
	undefined	7.00	5.74	5.74	100.00
	Total	122.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	1.00	0.82	0.82	0.82
	AcomA	20.00	16.39	16.39	17.21
	BA	12.00	9.84	9.84	27.05
	CBAN	5.00	4.10	4.10	31.15
	ICA	10.00	8.20	8.20	39.34
	MCA	53.00	43.44	43.44	82.79
	PCA	7.00	5.74	5.74	88.52
	PcomA	6.00	4.92	4.92	93.44
	pial	2.00	1.64	1.64	95.08
	PICA	1.00	0.82	0.82	95.90
	VA	5.00	4.10	4.10	100.00
	Total	122.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	16.00	13.11	13.11	13.11
	y	106.00	86.89	86.89	100.00
	Total	122.00	100.00	100.00	

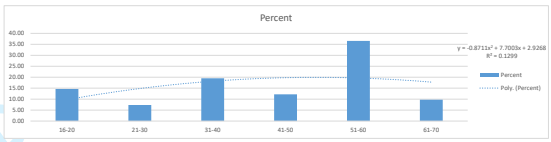
Frequency- cases of cerebral aneurysms in age >= 18 & year < 1850 up to 1761 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	41.00	41.00	41.00	41.00	41.00	41	41.00
	Missing	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		44.32						
Median		47.00						
Mode		20.00						
Std. Deviation		15.61						
Minimum		19.00						
Maximum		68.00						
Percentiles	25	33.50						
	50	47.00						
	75	59.00						

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	age range in years				
	16-20	6.00	14.63	14.63	14.63
	21-30	3.00	7.32	7.32	21.95
	31-40	8.00	19.51	19.51	41.46
	41-50	5.00	12.20	12.20	53.66
	51-60	15.00	36.59	36.59	90.24
	61-70	4.00	9.76	9.76	100.00
	Total	41.00	100.00	100.00	

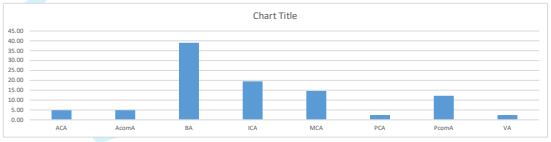


sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	16.00	39.02	39.02	39.02
	m	25.00	60.98	60.98	100.00
	Total	41.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	4.88	4.88	4.88
	left	10.00	24.39	24.39	29.27
	midline	18.00	43.90	43.90	73.17
	right	7.00	17.07	17.07	90.24
	undefined	4.00	9.76	9.76	100.00
	Total	41.00	100.00	100.00	



arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	2.00	4.88	4.88	4.88
	AcomA	2.00	4.88	4.88	9.76
	BA	16.00	39.02	39.02	48.78
	ICA	8.00	19.51	19.51	68.29
	MCA	6.00	14.63	14.63	82.93
	PCA	1.00	2.44	2.44	85.37
	PcomA	5.00	12.20	12.20	97.56
	VA	1.00	2.44	2.44	100.00
	Total	41.00	100.00	100.00	

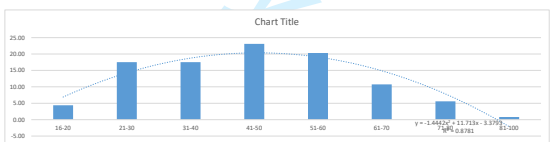
rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	8.00	19.51	19.51	19.51
	y	33.00	80.49	80.49	100.00
	Total	41.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in age >= 18 & year >= 1850 & year < 1900 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	251.00	251.00	251.00	251.00	251.00	251.00	251	251.00
	Missing	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		45.63							
Median		45.00							
Mode		40.00							
Std. Deviation		15.59							
Minimum		18.00							
Maximum		86.00							
Percentiles	25	34.00							
	50	45.00							
	75	56.00							

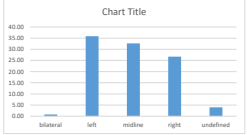


age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-20	11.00	4.38	4.38	4.38
	21-30	44.00	17.53	17.53	21.91
	31-40	44.00	17.53	17.53	39.44
	41-50	58.00	23.11	23.11	62.55
	51-60	51.00	20.32	20.32	82.87
	61-70	27.00	10.76	10.76	93.63
	71-80	14.00	5.58	5.58	99.20
	81-100	2.00	0.80	0.80	100.00
	Total	251.00	100.00	100.00	

sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1.00	0.40	0.40	0.40
	f	136.00	54.18	54.18	54.58
	m	114.00	45.42	45.42	100.00
	Total	251.00	100.00	100.00	

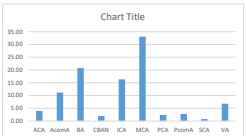


side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	0.80	0.80	0.80
	left	90.00	35.86	35.86	36.65
	midline	82.00	32.67	32.67	69.32
	right	67.00	26.69	26.69	96.02
	undefined	10.00	3.98	3.98	100.00
	Total	251.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	10.00	3.98	3.98	3.98
	AcomA	28.00	11.16	11.16	15.14
	BA	52.00	20.72	20.72	35.86
	CBAN	5.00	1.99	1.99	37.85
	ICA	41.00	16.33	16.33	54.18
	MCA	83.00	33.07	33.07	87.25
	PCA	6.00	2.39	2.39	89.64
	PcomA	7.00	2.79	2.79	92.43
	SCA	2.00	0.80	0.80	93.23
	VA	17.00	6.77	6.77	100.00
	Total	251.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	63.00	25.10	25.10	25.10
	y	188.00	74.90	74.90	100.00
	Total	251.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in age >= 18 & year 1900 to 1938 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	561.00	561.00	561.00	561.00	561.00	561.00	561	561.00
	Missing	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		44.27							

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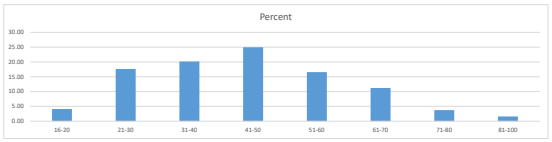
Median		42.00			
Mode		41.00			
Std. Deviation		15.39			
Minimum		18.00			
Maximum		89.00			
Percentiles	25	32.00			
	50	42.00			
	75	55.00			

age range

	age range	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-20	23.00	4.10	4.10	4.10
	21-30	99.00	17.65	17.65	21.75
	31-40	113.00	20.14	20.14	41.89
	41-50	140.00	24.96	24.96	66.84
	51-60	93.00	16.58	16.58	83.42
	61-70	63.00	11.23	11.23	94.65
	71-80	21.00	3.74	3.74	98.40
	81-100	9.00	1.60	1.60	100.00
	Total	561.00	100.00	100.00	



sex

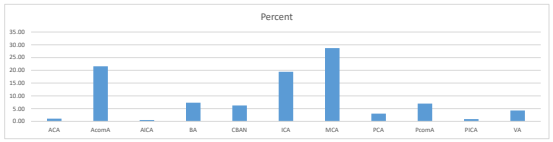
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5.00	0.89	0.89	0.89
	f	286.00	50.98	50.98	51.87
	m	270.00	48.13	48.13	100.00
	Total	561.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	20.00	3.57	3.57	3.57
	left	195.00	34.76	34.76	38.32
	midline	81.00	14.44	14.44	52.76
	right	231.00	41.18	41.18	93.94
	undefined	34.00	6.06	6.06	100.00
	Total	561.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	6.00	1.07	1.07	1.07
	AcomA	121.00	21.57	21.57	22.64
	AICA	3.00	0.53	0.53	23.17
	BA	41.00	7.31	7.31	30.48
	CBAN	35.00	6.24	6.24	36.72
	ICA	109.00	19.43	19.43	56.15
	MCA	161.00	28.70	28.70	84.85
	PCA	17.00	3.03	3.03	87.88
	PcomA	39.00	6.95	6.95	94.83
	PICA	5.00	0.89	0.89	95.72
	VA	24.00	4.28	4.28	100.00
	Total	561.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	99.00	17.65	17.65	17.65
	y	462.00	82.35	82.35	100.00
	Total	561.00	100.00	100.00	

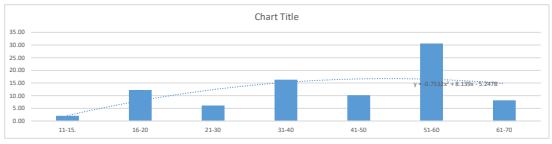
Frequency- cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year <1850 to 1761 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition	
N	Valid	42.00	49.00	49.00	49.00	49.00	49.00	49	49.00
	Missing	7.00	0.00	0.00	0.00		0.00	0	0.00
Mean		43.60							
Median		46.00							
Mode		20.00							
Std. Deviation		16.11							
Minimum		14.00							
Maximum		68.00							
Percentiles	25	31.75							
	50	46.00							
	75	59.00							

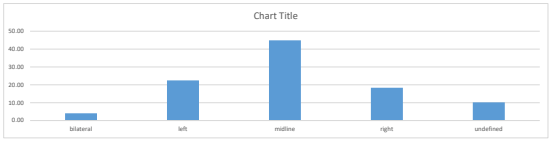
age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		7.00	14.29	14.29	14.29
	11-15.	1.00	2.04	2.04	16.33
	16-20	6.00	12.24	12.24	28.57
	21-30	3.00	6.12	6.12	34.69
	31-40	8.00	16.33	16.33	51.02
	41-50	5.00	10.20	10.20	61.22
	51-60	15.00	30.61	30.61	91.84
	61-70	4.00	8.16	8.16	100.00
	Total	49.00	100.00	100.00	



sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3.00	6.12	6.12	6.12
	f	16.00	32.65	32.65	38.78
	m	30.00	61.22	61.22	100.00
	Total	49.00	100.00	100.00	

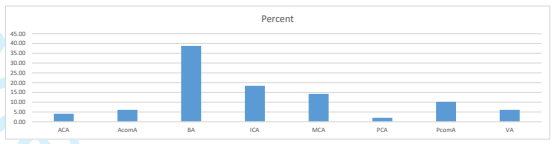


side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	4.08	4.08	4.08
	left	11.00	22.45	22.45	26.53
	midline	22.00	44.90	44.90	71.43
	right	9.00	18.37	18.37	89.80
	undefined	5.00	10.20	10.20	100.00
	Total	49.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	2.00	4.08	4.08	4.08
	AcomA	3.00	6.12	6.12	10.20
	BA	19.00	38.78	38.78	48.98
	ICA	9.00	18.37	18.37	67.35
	MCA	7.00	14.29	14.29	81.63
	PCA	1.00	2.04	2.04	83.67
	PcomA	5.00	10.20	10.20	93.88
	VA	3.00	6.12	6.12	100.00
	Total	49.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2.00	4.08	4.08	4.08
	n	13.00	26.53	26.53	30.61
	y	34.00	69.39	69.39	100.00
	Total	49.00	100.00	100.00	

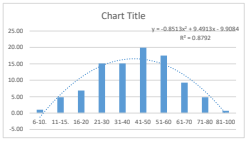
Frequency- cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year<1900 & year >= 1850 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition	
N	Valid	277.00	291.00	291.00	291.00	291.00	291.00	291	291.00
	Missing	14.00	0.00	0.00	0.00		0.00	0	0.00
Mean		42.67							
Median		43.00							
Mode		40.00							
Std. Deviation		17.50							
Minimum		6.00							
Maximum		86.00							
Percentiles	25	28.50							
	50	43.00							
	75	56.00							

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		14.00	4.81	4.81	4.81
	6-10.	3.00	1.03	1.03	85.22
	11-15.	14.00	4.81	4.81	9.62
	16-20	20.00	6.87	6.87	16.49
	21-30	44.00	15.12	15.12	31.62
	31-40	44.00	15.12	15.12	46.74
	41-50	58.00	19.93	19.93	66.67
	51-60	51.00	17.53	17.53	84.19
	61-70	27.00	9.28	9.28	94.50
	71-80	14.00	4.81	4.81	99.31
	81-100	2.00	0.69	0.69	100.00
	Total	291.00	100.00	100.00	



sex

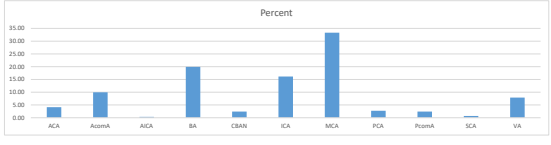
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5.00	1.72	1.72	1.72
	f	147.00	50.52	50.52	52.23
	m	139.00	47.77	47.77	100.00
	Total	291.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	3.00	1.03	1.03	1.03
	left	104.00	35.74	35.74	36.77
	midline	90.00	30.93	30.93	67.70
	right	78.00	26.80	26.80	94.50
	undefined	16.00	5.50	5.50	100.00
	Total	291.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	12.00	4.12	4.12	4.12
	AcomA	29.00	9.97	9.97	14.09
	AICA	1.00	0.34	0.34	14.43
	BA	58.00	19.93	19.93	34.36
	CBAN	7.00	2.41	2.41	36.77
	ICA	47.00	16.15	16.15	52.92
	MCA	97.00	33.33	33.33	86.25
	PCA	8.00	2.75	2.75	89.00
	PcomA	7.00	2.41	2.41	91.41
	SCA	2.00	0.69	0.69	92.10
	VA	23.00	7.90	7.90	100.00
	Total	291.00	100.00	100.00	



rupture

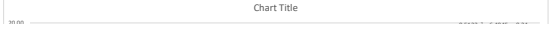
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3.00	1.03	1.03	1.03
	n	73.00	25.09	25.09	26.12
	y	215.00	73.88	73.88	100.00
	Total	291.00	100.00	100.00	

Cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year year>= 1900 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition	
N	Valid	616.00	787.00	787.00	787.00	787.00	787.00	787	787.00
	Missing	171.00	0.00	0.00	0.00		0.00	0	0.00
Mean		41.12							
Median		41.00							
Mode		41.00							
Std. Deviation		17.88							
Minimum		1.50							
Maximum		89.00							
Percentiles	25	29.00							
	50	41.00							
	75	53.00							

Frequency Table



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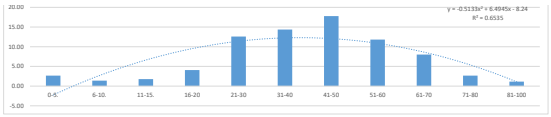
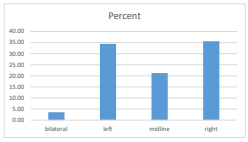
age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		171.00	21.73	21.73	21.73
	0-5.	21.00	2.67	2.67	24.40
	6-10.	11.00	1.40	1.40	88.18
	11-15.	14.00	1.78	1.78	26.18
	16-20	32.00	4.07	4.07	30.24
	21-30	99.00	12.58	12.58	42.82
	31-40	113.00	14.36	14.36	57.18
	41-50	140.00	17.79	17.79	74.97
	51-60	93.00	11.82	11.82	86.79
	61-70	63.00	8.01	8.01	96.19
	71-80	21.00	2.67	2.67	98.86
	81-100	9.00	1.14	1.14	100.00
	Total	787.00	100.00	100.00	



sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		20.00	2.54	2.54	2.54
	f	410.00	52.10	52.10	54.64
	m	357.00	45.36	45.36	100.00
	Total	787.00	100.00	100.00	

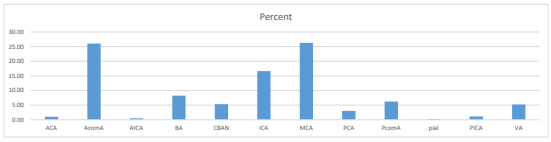


side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	sides				
	bilateral	28.00	3.56	3.56	3.56
	left	271.00	34.43	34.43	37.99
	midline	167.00	21.22	21.22	59.21
	right	280.00	35.58	35.58	94.79
	undefined	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	arteries involved				
	ACA	8.00	1.02	1.02	1.02
	AcomA	205.00	26.05	26.05	27.06
	AICA	4.00	0.51	0.51	27.57
	BA	65.00	8.26	8.26	35.83
	CBAN	42.00	5.34	5.34	41.17
	ICA	131.00	16.65	16.65	57.81
	MCA	207.00	26.30	26.30	84.12
	PCA	24.00	3.05	3.05	87.17
	PcomA	49.00	6.23	6.23	93.39
	pial	2.00	0.25	0.25	93.65
	PICA	9.00	1.14	1.14	94.79
	VA	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	



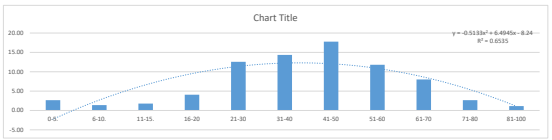
rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		49.00	6.23	6.23	6.23
	n	112.00	14.23	14.23	20.46
	y	626.00	79.54	79.54	100.00
	Total	787.00	100.00	100.00	

Cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year yearyear>= 1900 to 1938 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	616.00	787.00	787.00	787.00	787.00	787.00	787.00
	Missing	171.00	0.00	0.00	0.00	0.00	0.00	0 0.00
Mean		41.12						
Median		41.00						
Mode		41.00						
Std. Deviation		17.88						
Minimum		1.50						
Maximum		89.00						
Percentiles	25	29.00						
	50	41.00						
	75	53.00						

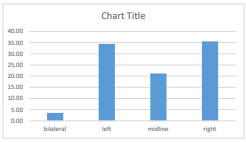


age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		171.00	21.73	21.73	21.73
	0-5.	21.00	2.67	2.67	24.40
	6-10.	11.00	1.40	1.40	88.18
	11-15.	14.00	1.78	1.78	26.18
	16-20	32.00	4.07	4.07	30.24
	21-30	99.00	12.58	12.58	42.82
	31-40	113.00	14.36	14.36	57.18
	41-50	140.00	17.79	17.79	74.97
	51-60	93.00	11.82	11.82	86.79
	61-70	63.00	8.01	8.01	96.19
	71-80	21.00	2.67	2.67	98.86
	81-100	9.00	1.14	1.14	100.00
	Total	787.00	100.00	100.00	

sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		20.00	2.54	2.54	2.54
	f	410.00	52.10	52.10	54.64
	m	357.00	45.36	45.36	100.00
	Total	787.00	100.00	100.00	

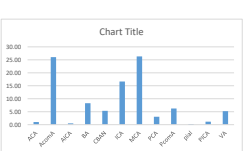


side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	28.00	3.56	3.56	3.56
	left	271.00	34.43	34.43	37.99
	midline	167.00	21.22	21.22	59.21
	right	280.00	35.58	35.58	94.79
	undefined	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	arteries involved				
	ACA	8.00	1.02	1.02	1.02
	AcomA	205.00	26.05	26.05	27.06
	AICA	4.00	0.51	0.51	27.57
	BA	65.00	8.26	8.26	35.83
	CBAN	42.00	5.34	5.34	41.17
	ICA	131.00	16.65	16.65	57.81
	MCA	207.00	26.30	26.30	84.12
	PCA	24.00	3.05	3.05	87.17
	PcomA	49.00	6.23	6.23	93.39
	pial	2.00	0.25	0.25	93.65
	PICA	9.00	1.14	1.14	94.79
	VA	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		49.00	6.23	6.23	6.23
	n	112.00	14.23	14.23	20.46
	y	626.00	79.54	79.54	100.00
	Total	787.00	100.00	100.00	

All 1127 cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year year>= 1761 to 1938 (McDonald & Korb 1939)

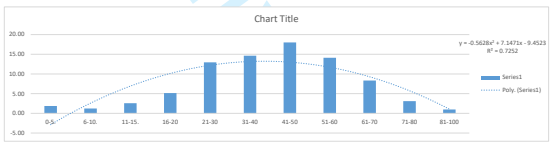
Statistics

		age	age range	sex	side	arteries	rupture	
N	Valid	935.00	1127.00	1127.00	1127.00	1127.00	1127.00	1127
	Missing	192.00	0.00	0.00	0.00	0.00	0.00	0
Mean		41.69						
Median		41.00						
Mode		41.00						
Std. Deviation		17.69						
Minimum		1.50						
Maximum		89.00						
Percentiles	25	29.00						
	50	41.00						
	75	54.00						

Frequency Table

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		192.00	17.04	17.04	17.04
	0-5.	21.00	1.86	1.86	18.90
	6-10.	14.00	1.24	1.24	87.58
	11-15.	29.00	2.57	2.57	21.47
	16-20	58.00	5.15	5.15	26.62
	21-30	146.00	12.95	12.95	39.57
	31-40	165.00	14.64	14.64	54.21
	41-50	203.00	18.01	18.01	72.23
	51-60	159.00	14.11	14.11	86.34
	61-70	94.00	8.34	8.34	95.92
	71-80	35.00	3.11	3.11	99.02
	81-100	11.00	0.98	0.98	100.00
	Total	1127.00	100.00	100.00	



sex

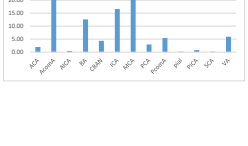
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		28.00	2.48	2.48	2.48
	f	573.00	50.84	50.84	53.33
	m	526.00	46.67	46.67	100.00
	Total	1127.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	33.00	2.93	2.93	2.93
	left	386.00	34.25	34.25	37.18
	midline	279.00	24.76	24.76	61.93
	right	367.00	32.56	32.56	94.50
	undefined	62.00	5.50	5.50	100.00
	Total	1127.00	100.00	100.00	

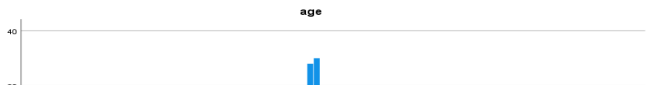
arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	arteries involved				
	ACA	22.00	1.95	1.95	1.95
	AcomA	237.00	21.03	21.03	22.98
	AICA	5.00	0.44	0.44	23.43
	BA	142.00	12.60	12.60	36.02
	CBAN	49.00	4.35	4.35	40.37
	ICA	187.00	16.59	16.59	56.97
	MCA	311.00	27.60	27.60	84.56
	PCA	33.00	2.93	2.93	87.49
	PcomA	61.00	5.41	5.41	92.90
	pial	2.00	0.18	0.18	93.08
	PICA	9.00	0.80	0.80	93.88
	SCA	2.00	0.18	0.18	94.06
	VA	67.00	5.94	5.94	100.00
	Total	1127.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		54.00	4.79	4.79	4.79
	n	198.00	17.57	17.57	22.36
	y	875.00	77.64	77.64	100.00
	Total	1127.00	100.00	100.00	



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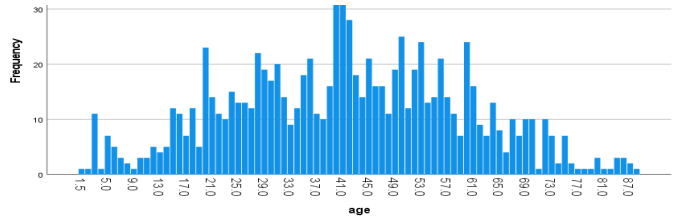

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4.00	1.00	0.10	0.10	1.50
5.00	7.00	0.60	0.70	2.20
6.00	5.00	0.40	0.50	2.80
7.00	3.00	0.30	0.30	3.10
8.00	2.00	0.20	0.20	3.30
9.00	1.00	0.10	0.10	3.40
10.00	3.00	0.30	0.30	3.70
11.00	3.00	0.30	0.30	4.10
12.00	5.00	0.40	0.50	4.60
13.00	4.00	0.40	0.40	5.00
14.00	5.00	0.40	0.50	5.60
15.00	12.00	1.10	1.30	6.80
16.00	11.00	1.00	1.20	8.00
17.00	7.00	0.60	0.70	8.80
18.00	12.00	1.10	1.30	10.10
19.00	5.00	0.40	0.50	10.60
20.00	23.00	2.00	2.50	13.00
21.00	14.00	1.20	1.50	14.50
22.00	11.00	1.00	1.20	15.70
23.00	10.00	0.90	1.10	16.80
24.00	15.00	1.30	1.60	18.40
25.00	13.00	1.20	1.40	19.80
26.00	13.00	1.20	1.40	21.20
27.00	12.00	1.10	1.30	22.50
28.00	22.00	2.00	2.40	24.80
29.00	19.00	1.70	2.00	26.80
30.00	17.00	1.50	1.80	28.70
31.00	20.00	1.80	2.10	30.80
32.00	14.00	1.20	1.50	32.30
33.00	9.00	0.80	1.00	33.30
34.00	12.00	1.10	1.30	34.50
35.00	18.00	1.60	1.90	36.50
36.00	21.00	1.90	2.20	38.70
37.00	11.00	1.00	1.20	39.90
38.00	10.00	0.90	1.10	41.00
39.00	16.00	1.40	1.70	42.70
40.00	34.00	3.00	3.60	46.30
41.00	35.00	3.10	3.70	50.10
42.00	28.00	2.50	3.00	53.00
43.00	18.00	1.60	1.90	55.00
44.00	14.00	1.20	1.50	56.50
45.00	21.00	1.90	2.20	58.70
46.00	16.00	1.40	1.70	60.40
47.00	16.00	1.40	1.70	62.10
48.00	11.00	1.00	1.20	63.30
49.00	19.00	1.70	2.00	65.30
50.00	25.00	2.20	2.70	68.00
51.00	12.00	1.10	1.30	69.30
52.00	19.00	1.70	2.00	71.30
53.00	24.00	2.10	2.60	73.90
54.00	13.00	1.20	1.40	75.30
55.00	14.00	1.20	1.50	76.80
56.00	21.00	1.90	2.20	79.00
57.00	14.00	1.20	1.50	80.50
58.00	11.00	1.00	1.20	81.70
59.00	7.00	0.60	0.70	82.50
60.00	24.00	2.10	2.60	85.00
61.00	16.00	1.40	1.70	86.70
62.00	9.00	0.80	1.00	87.70
63.00	7.00	0.60	0.70	88.40
64.00	13.00	1.20	1.40	89.80
65.00	8.00	0.70	0.90	90.70
66.00	4.00	0.40	0.40	91.10
67.00	10.00	0.90	1.10	92.20
68.00	7.00	0.60	0.70	92.90
69.00	10.00	0.90	1.10	94.00
70.00	10.00	0.90	1.10	95.10
71.00	1.00	0.10	0.10	95.20
72.00	10.00	0.90	1.10	96.30
73.00	7.00	0.60	0.70	97.00
74.00	2.00	0.20	0.20	97.20
75.00	7.00	0.60	0.70	98.00
76.00	2.00	0.20	0.20	98.20
77.00	1.00	0.10	0.10	98.30
78.00	1.00	0.10	0.10	98.40
79.00	1.00	0.10	0.10	98.50
80.00	3.00	0.30	0.30	98.80
81.00	1.00	0.10	0.10	98.90
83.00	1.00	0.10	0.10	99.00
84.00	3.00	0.30	0.30	99.40
86.00	3.00	0.30	0.30	99.70
87.00	2.00	0.20	0.20	99.90
89.00	1.00	0.10	0.10	100.00
	Total	935.00	83.00	100.00
Missing	System	192.00	17.00	
Total		1127.00	100.00	

Age in years	Frequency
1.50	1.00
2.00	1.00
3.00	11.00
4.00	1.00
5.00	7.00
6.00	5.00
7.00	3.00
8.00	2.00
9.00	1.00
10.00	3.00
11.00	3.00
12.00	5.00
13.00	4.00
14.00	5.00
15.00	12.00
16.00	11.00
17.00	7.00
18.00	12.00
19.00	5.00
20.00	23.00
21.00	14.00
22.00	11.00
23.00	10.00
24.00	15.00
25.00	13.00
26.00	13.00
27.00	12.00
28.00	22.00
29.00	19.00
30.00	17.00
31.00	20.00
32.00	14.00
33.00	9.00
34.00	12.00
35.00	18.00
36.00	21.00
37.00	11.00
38.00	10.00
39.00	16.00
40.00	34.00
41.00	35.00
42.00	28.00
43.00	18.00
44.00	14.00
45.00	21.00
46.00	16.00
47.00	16.00
48.00	11.00
49.00	19.00
50.00	25.00
51.00	12.00
52.00	19.00
53.00	24.00
54.00	13.00
55.00	14.00
56.00	21.00
57.00	14.00
58.00	11.00
59.00	7.00
60.00	24.00
61.00	16.00
62.00	9.00
63.00	7.00
64.00	13.00
65.00	8.00
66.00	4.00
67.00	10.00
68.00	7.00
69.00	10.00
70.00	10.00
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73.00	7.00
74.00	2.00
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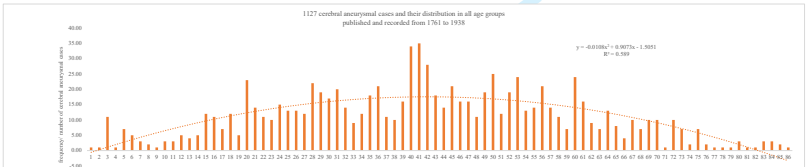
77.00	1.00
78.00	1.00
79.00	1.00
80.00	3.00
81.00	1.00
83.00	1.00
84.00	3.00
86.00	3.00
87.00	2.00
89.00	1.00



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Supplementary file 2: contains type 2 data: The Human Ethics permit (approval number: H2014-176, Research Ethics Committee, Office of Research Ethics, Compliance and Integrity, Faculty of Health Sciences, University of Adelaide) granted permission to access and use the deidentified data set from the Carestream data registry system (Vue-RIS-version-11·0·14·35) for research

Manuscript title: The trend of cerebral aneurysms over the past two centuries: Need for early screening - An observational study.

Type 2 data were Cerebral computed tomography angiography images obtained from 173 randomly selected patients, who visited the Royal Adelaide Hospital (RAH) between January 2011 and December 2019 for a variety of cranial pathologies

Abbreviations: cases with cerebral aneurysms=y, cases without cerebral aneurysms=n; cases without cerebral aneurysms = n; cases with cerebral aneurysms = n; aneurysmal only cases = y, cases without aneurysms = n; AcomAC An = aneurysms at anterior communicating artery; n= no, y=yes

complex (AcomAC) region, y=yes and n=no; aneurysms elsewhere otherthan in the AcomAC region, y = yes and n=no; aneurysms elsewhere otherthan in the AcomAC region = y = yes and n=no; rt ICA an = aneurysms in right internal carotid artery (rt ICA) region; rt MCA an = aneurysms in right middle cerebral artery region;

rt ICA + MCA an = aneurysms in right internal carotid and middle cerebral arterial region; lft ICA an = aneurysms in left internal carotid artery (lft ICA) region; lft MCA an =aneurysms in left middle cerebral artery region; lft ICA + MCA an =aneurysms in left internal carotid and middle cerebral arterial region;

right P2 an =aneurysm in the 2nd part of right posterior cerebral artery; left P2 an =aneurysm in the 2nd part of the left posterior cerebral artery; VB an = aneurysm in vertebro basilarregion; rt PICA an = aneurysms in the right posterior inferior cerebellar (rt PICA) region;

lft PICA an = aneurysms in the left posterior inferior cerebellar (lft PICA) region; rt VA an =aneurysms in the right vertebral artery (rt VA); BA an =aneurysms in the basilar artery region; rt SCA = aneurysms in the right superior cerebellar region; lft SCA an =aneurysms in the left superior cerebellar region

age range	Sex	cases with cerebral aneurysms=y,	cases without cereb	aneurysmal only cases =	AcomAC An	aneurysms elsewhere otherthan in the AcomAC region = y =	rt ICA an	rt MCA an :	rt ICA + MCA an	lft ICA an :	lft MCA an	lft ICA + MCA an =	right P2 an	left P2 an	VB an	rt PICA an	lft PICA an	rt VA an =	lft VA an =	BA an =an	rt SCA an	lft SCA =aneurysms in the left superior cerebellar region
15-20	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
15-20	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
31-40	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
31-40	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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61-70	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
61-70	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
61-70	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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71-80	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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71-80	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
71-80	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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81-100	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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21-30	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
21-30	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
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31-40	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
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31-40	m	y	n	y	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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41-50	m	y	n	y	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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51-60	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
51-60	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
51-60	m	y	n	y	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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51-60	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
51-60	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
51-60	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
51-60	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
51-60	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	f	y	n	y	n	y	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n
61-70	m	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	f	y	n	y	n	y	n	y	n	n	y	y	n	n	y	n	n	n	n	n	n	y
61-70	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	f	y	n	y	n	y	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n
61-70	m	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	f	y	n	y	n	y	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n
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61-70	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
61-70	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
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71-80	m	y	n	y	n	y	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n
71-80	f	y	n	y	n	y	n	n	n	n	n	n	n	n	y	n	n	n	n	n	n	n
71-80	f	y	n	y	n	y	n	y	n	n	y	y	n	n	n	n	n	n	n	n	n	n
71-80	m	y	n	y	n	y	n	y	n	n	y	y	n	n	y	n	n	n	y	n	n	n

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| | | |

Valid	n	102.00	100.00	100.00	100.00

lft SCA an

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	101.00	99.02	99.02	99.02
	v	1.00	0.98	0.98	100.00
	Total	102.00	100.00	100.00	

age range- patients with (n=102) and without aneurysms (n=71) included in the study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-20	3.00	1.70	1.70	1.70
	21-30	7.00	4.00	4.00	5.80
	31-40	8	4.6	4.6	10.4
	41-50	27	15.6	15.6	26
	51-60	36	20.8	20.8	46.8
	61-70	51	29.5	29.5	76.3
	71-80	27	15.6	15.6	91.9
	81-100	14	8.1	8.1	100
	Total	173	100	100	

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	90	52	52	52
	m	83	48	48	100
	Total	173	100	100	

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

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Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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The trend of cerebral aneurysms over the past two centuries: Need for early screening - An observational study

Authors

Arjun Burlakoti[1,2*], Jaliya Kumaratilake[2], Jamie Taylor[3] and Maciej Henneberg[2,4]

[1]UniSA Allied Health and Human Performance, University of South Australia, Adelaide, Australia

[2]School of Biomedicine, Faculty of Health and Medical Sciences, University of Adelaide, Adelaide, Australia

[3]Royal Adelaide Hospital, South Australia Medical Imaging, Adelaide, Australia

[4]Institute of Evolutionary Medicine, The University of Zurich, Zurich, Switzerland

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*Corresponding author's mailing address:

Email: Arjun.Burlakoti@unisa.edu.au, ORCiD = https://orcid.org/0000-0001-9317-6352, Office Phone: +61-08 8302 1206, UniSA Allied Health and Human Performance, University of South Australia, GPO Box: 2471, Adelaide 5001 Australia

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Abstract

Objective

Cerebral aneurysms (CAs) are linked to variations in the cerebral basal arterial network (CBAN). This study aimed to find the optimal age for screening to detect brain arterial variations and predict aneurysms before rupture.

Design

An observational, quantitative, and retrospective research.

Setting

The study analyzed 1127-cases of CAs published from 1761 to 1938. Additionally, Computed Tomography Angiography images of 173-patients at the Royal Adelaide Hospital (RAH), South Australia between 2011 and 2019 were examined for the presence and the location of aneurysms in CBAN.

Participants

The data were collected from patients at RAH and 407-published sources, including males and females across the entire age range, up to 100 years old.

Outcome measures and results

Data, CAs cases, from 1761 to 1938 included (526-males, 573-females, and 28-unknown sexes). The age of these patients varied from 18 months to 89-years (mean age=42, SD=18). Approximately 11.5% of the CAs occurred in patients less than 20-years old. Among the 1078 aneurysms whose location was reported, 76% were located in the internal carotid (IC), middle cerebral (MC), and anterior communicating artery complex (AcomAC) regions, while the remaining 24% were in the vertebrobasilar (VB) region. Among 173-patients from the RAH aged between 18 and 100 years, (male=83 and female=90, mean age=60, SD=16), 94% of the CAs were found in the IC, MC, and AcomAC regions. The pattern of aneurysm occurrence, as indicated by values at the 25th, 50th, and 75th percentiles, along with the minimum and maximum patient ages, has remained consistent from 1761 to 2019.

Conclusion

The distribution pattern of cerebral aneurysms in relation to sex, age and locations in the CBAN, remained steady over the last 260-years resulting in risk of strokes early in life. Therefore, early screening for CBAN segment variations is advised for stroke prevention if possible.

Key words

Subarachnoid haemorrhage; Childhood Aneurysm; Stroke; Hemodynamics; Cerebral Arteries.

Strengths and limitations of this study:

- To our knowledge, the patterns of distribution and trends of occurrence of cerebral aneurysms have not been systematically studied over the past 260 years.
- The prevalence of cerebral aneurysms in every 50 to 100 years has been investigated for the first time.
- Aneurysms can develop at any age in the presence of variations in cerebral basal arterial network (CBAN). Early detection of variations in CBAN in infant using non-invasive the Doppler ultrasound technique is recommended and continuing screening regularly as needed.
- Reported cases from the tertiary medical centres and 407 papers published over the past 260 years may not represent the general population precisely.
- This investigation is not a continuous study.

Funding

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Not applicable, none

Competing interests

None declared. All authors have nothing to disclose.

Introduction

Anatomical variations among components of the cerebral basal arterial network (CBAN) in addition to the trauma, infection, spontaneous dissections, and collagen disorders, have been linked to the formation of cerebral aneurysms (CAs)[1,2,3] and such variations develop during the period of embryonic life.[2] The period taken for the development of CAs may vary among individuals and once formed they may enlarge, compress the surrounding tissues, and rupture leading to subarachnoid haemorrhage (SAH).[3]

Cerebral aneurysms of all sizes have been observed to cause SAH in adults[4] (incidence 6-10/100000), however, they also occur in the age group 0-20 years (incidence rate=1.4-2 per 100000).[5-7] It is not clear that the occurrence of anatomical variation-related aneurysms is limited to any specific age. The management of complicated CAs is costly and the CAs can leave permanent disabilities or even become fatal costing millions of dollars to families and governments.[7-12] The majority of childhood SAH (i.e., incidence 1.4-2 per 100000 children) are caused by the pre-existing cerebral aneurysms.[13] About 5% of the total cerebral aneurysmal cases diagnosed in the clinical setup were in the age group 0 to 19 years and the incidence of childhood SAH is significantly greater in the older age children.[13] The clinical manifestation of aneurysmal cases seen later in life might be the consequence of aneurysms that developed in early childhood. Therefore, this study aims to review cases of CAs using data collected from a tertiary medical center (Royal Adelaide Hospital - South Australia) and published sources to investigate the recent pattern of CAs and how it has changed over the past 260 years. The null hypothesis is that the advancement of medical science did not lead to a reduction in the prevalence of aneurysms by age.

Material and method

Study design, and setting

Two types of data were used in this study.

Type-1 data are composed of 1127 cerebral aneurysmal cases that were published in the 407 papers from 1761 to 1938, as compiled by McDonald and, Korb.[14] These CAs were identified at autopsy and included patients of all ages (average age=41.7 years, mode age=41, median age=41, SD=17.7, age range 1.5 to 89 years) (Supplementary File 1and Supplementary Table 1).

Type-2 data were Cerebral Computed Tomography Angiography (CTA) images obtained from 173 randomly selected patients, who visited the Royal Adelaide Hospital (RAH), South Australia, between January 2011 and December 2019 for a variety of cranial pathologies; their age ranged from 18 to 100 years, males = 83, female = 90, mean age=60 years, median age=62 years, mode age=61, SD=15.72) with (n=102) or without (n=71) aneurysms (Supplementary Table 1 and Supplementary File 2). These images were anonymised, stored in the Carestream data registry system and the patients have given their consent to use their clinical information for research activities. The consent documents taken from each patient were not provided to the researchers to ensure privacy. The Human Ethics permit (approval number: H2014-176, Research Ethics Committee, Office of Research Ethics, Compliance and Integrity, Faculty of Health Sciences, University of Adelaide) granted permission to access and use the deidentified data set from the Carestream data registry system (Vue-RIS-version-11.0.14.35) for research. Thus, the research materials used in this study comprised 1229 observed cases of CAs that spread across all age groups, spanning a period of approximately 260 years.

Data sources and size

Type-1 data: A range of variables (such as, the year CAs was detected, age, sex, location of the aneurysm) related to 1127 cases of CAs reported in publications from 1761 to 1938,[14] were transferred into an excel data

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file, rearranged and subjected to analysis (Supplementary File 1). Type-2 data: The cerebral CTA of 173-patients recorded from 2011 to 2019 in RAH were accessed to study the presence and absence of CAs in different locations of CBAN based on diagnoses made by clinicians. Some cases had multiple aneurysms located in the various segments of CBAN (Supplementary File 2).

The above cases of CAs were grouped into age ranges 0-5, 6-10, 11-15, 16–20, 21–30, 31–40, 41–50, 51–60, 61–70, 71–80, and over 81 years and transferred into the SPSS v. 25 software, for analyses (Supplementary File 1). The observation error has been tested by repeating the observation of the location of CAs in the cerebral CTA images in 20-cases, a month after the first study. There was 100% agreement of repeated observations with those of the first one. The sites of the formation of aneurysms were recorded as the left and right, internal carotid artery (ICA), middle cerebral artery (MCA), anterior cerebral artery (ACA), anterior communicating artery complex (AcomAC), posterior communicating artery (PcomA), posterior cerebral artery (PCA), vertebral artery (VA), basilar artery (BA), posterior inferior cerebellar artery (PICA), anterior inferior cerebellar artery (AICA), superior cerebellar (SCA) and pial arterial regions. In some cases, the areas of location of aneurysms seemed not to have been mentioned and those cases were tabulated under the heading of 'aneurysms located in CBAN (CBAN-an)'. Overall, the locations of nearly 1229 aneurysmal cases from both data sets were broadly divided into four categories: central and bilateral, left and right (Figure 1) before being plotted in the bar charts to study the location and distribution trends of aneurysms in the arterial network over the past 260-years (Figure 2). The aneurysms located in the AcomAC, and basilar arterial regions were classified as the central group of aneurysms. Additionally, in a few cases aneurysms were located simultaneously on left and right sides and those cases were grouped as 'bilateral' (Supplementary File 1 and Supplementary File 2 and Figure 1).

Statistical methods

Data were analysed using Excel and Statistical Package for the Social Sciences (SPSS-IBM, version-25) program (e.g., descriptive, and Chi squared tests). The p values less than 0.05 were considered as statistically significant.

Patient and public involvement

Involving patients was challenging for conducting and planning this research, since researchers were allowed the access only to anonymised raw data recorded in the database. As per the ethics permit (details in the method section), we accessed retrospective anonymized data, precluding patient involvement in research planning and execution. The shared outcome of this study will be informed to the public, families and patients who attend medical centres for various clinical visits, through a series of meetings, seminars, and media releases.

Findings

This study reviewed 1127 aneurysmal cases of patients of all ages from a total of 407 published articles prior to the year 1939. The ages of these patients (male=526, female=573, unknown sex=28) ranged from 18 months to 89 years of age with an average of 41.70 years, mode of 41 years and median of 41 years (SD=17.7) (Supplementary Table 1, Figure 2a, Figure 2b, Figure 2c and Supplementary File 1). The second group of patients with CAs (44 males and 58 females, and n=102) from the RAH (2011 to 2019) with the age range 18-100 years showed that the most common age for diagnosis or complication of CAs ranged from 31-60 years with the calculated mean, median, mode, and standard deviation (SD), 57.60, 60.00, 48.00, and 13.12 years, respectively (Figure 2d and Supplementary-Figure 1). Analysis of both sets of data revealed that the majority of the patients who presented with complicated aneurysms were in their 3rd to 6th decades of life (Supplementary Table 1).

The most important aspect of the two sets of data was the wide age range of occurrence of CAs and the fact that some of the complicated aneurysmal cases appeared at an early age (Figure 2a, Figure 2b, Supplementary File 1). A separate analysis was conducted for 853 out of the 1127 cases of CAs recorded before 1938 (male=409, female=438, unknown sex=6), specifically focusing on the age range of 18 to 89 years to align the age groups with the RAH recorded data from 2011 to 2019 (Supplementary Table 1, Figure 2c and Figure 2d). The similarities of standard deviation (15.45) of those 853 cases (from 1761-1938) and the cases that were recorded from 2011 to 2019 in RAH (13.12 years) validated the comparability of our data and the findings

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(Supplementary Table 1). The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed ages of patients with aneurysms, remained relatively stable from 1761 to 1938 (Figure 3a). Some of these percentile values increased slightly as life expectancy extended from 1761 to the 21st century (Figure 3b). Therefore, the SD, and age distribution of adult patients with ruptured or diagnosed CAs presented in the 2011-2019 dataset were consistent with those cases reported before 1938, indicating persistence of a pattern (Table 1, Figure 2 and 3). Specifically, aneurysms are being frequently diagnosed in individuals aged 30 to 60 years, and this age range has remained relatively unchanged over the past 260 years (Table 1, Figures 2, and 3). Forty nine out of 1127 cases recorded across 407 publications from 1761 to 1938 seemed not to have information about the location of aneurysms in the CBAN, however, 818 out of 1078 identified aneurysms (76%), were in the ICA, MCA and AcomAC regions and rest of them were in the vertebrobasilar region (Supplementary File 1). The location and distribution pattern aneurysms from 102 patients recorded in RAH was consistent with 1078 cases recorded from 1761 to 1938 (Supplementary Files 1 and 2, and Figure 1).

In the type 2 dataset, a total of 135 aneurysms were identified in 102 individuals, with ages ranging from 18 to 83 years, across various components of CBAN (Figure 2d and Supplementary File 2). Among these aneurysms, 38(28.14%) were detected in the right MCA region, while 17(12.6%) were in the right ICA region. In comparison, the left MCA and ICA regions had 27(20%) and 12(8%) aneurysms, respectively, which appeared to be lower in number compared to the right MCA and ICA regions. When considering the distribution of aneurysms based on territory, 55 out of 135 aneurysms (40.74%) in 50 patients were found in the right ICA and MCA territories, whereas 39 out of 135 aneurysms (28.88%) in 37 patients were detected in the left ICA and MCA regions (Supplementary File 2). Out of the 102 individuals with aneurysmal cases included in the study, 33 (24.44%) had aneurysms located in the anterior communicating artery (AcomAC) region, accounting for 33 out of the total 135 aneurysms. An additional 5.9% of the total aneurysms (8 out of 135 aneurysms) were found in the vertebral and basilar arterial regions, as indicated in the Supplementary File 2. A majority of the CAs, 127 out of the total 135 (94% of the total), were in the MCA, ICA, and AComAC regions (Supplementary File 2). Some cases had multiple aneurysms, for example, 2 cases had right ICA and MCA aneurysms, while 10 cases had left ICA and MCA aneurysms (Supplementary File 2).

There were no significant differences between male and female patients affected with CAs in all 1229 cases analysed in those two data sets (Chi-Squared statistic=0.83, $p \geq 0.36$) (Table 1). The sex, age of occurrence and location of CAs appear to have remained steady over the past 260 years across all age groups (Table 1 and Supplementary Table 1, and Figure 3). The mode, mean, and median age and SD of patients with ruptured or diagnosed CAs studied from 2011 to 2019 in RAH matched well with the cerebral aneurysmal cases recorded in the past considering the difference in life expectancy between the two time periods studied (1761-1938 and 2011-2019) (Figures 3 and Table 1).

Figure 1- about here

Figure 2 - about here

Figure 3 - about here

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Table 1 - Prevalence of cerebral aneurysms in males and females: a comparison of the recent hospital-based data recorded in RAH from 2011 to 2019 with the autopsy data published before from 1761 to 1938.

Sex	N=173, cases with or without cerebral aneurysms recorded in RAH from 2011 to 2019.	1127 aneurysm cases (from 1761 to 1938) recorded in 407 publications.[14]
Sex not defined	0	28
Female	90	573
Male	83	526
Female to male sex ratio	1.08	1.09

Legend- RAH = royal Adelaide hospital, 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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Discussion

The age and locations at which CAs occur in the CBAN has not changed over past 260 years (Figures 1, 2 and 3, Table 1 and Table 1) despite the life expectancy has increased over time worldwide and the progress in medicine. In the past people had shorter life span on average, and yet the CAs occurred at the same ages as they do now.[15] The life expectancy recorded at below 50 years in 1940 and even below 40 years in 1850 was way lower compared to the one recorded above 80 years of age since the year 2000 in Australia.[15] A separate analysis was done for 853 out of the 1127 CAs recorded[14] before 1938 focusing on the age range of 18 to 89 years to align the age group with the currently RAH recorded data from 2011 to 2019, since there were no aneurysmal cases of children (age<18years) in the RAH dataset. In Adelaide there is a separate hospital for children where aneurysmal cases would have been treated, but the authors had no access to these data (Supplementary file 2). Royal Adelaide Hospital is a general hospital, thus individuals of 18 years and less are not admitted. Current study compared the cases of CAs diagnosed by CTA imaging technique (from 2011-2019) with those verified by surgery and autopsy[14], since there were no cerebral angiogram facilities in early years (i.e., before 1938). The cases of aneurysms are commonly diagnosed, when the patients are presented at medical centres after attacks of stroke.[16] Cerebral aneurysms in the past seemed to be ruptured and complicated as early as 18 months of age and as late as 89 years of age with a wide range of age (Supplementary File 1). The findings suggested that the change in lifestyle nor medical practice had no effect at the age/time of formation of CAs in general population. Clinical investigation of lipid profiles in patients commenced after 1950,[17] and they started attributing arterial diseases and aneurysms to the hyperlipidaemia, however, the manifestation of occurrence of aneurysms by age in the past 260 years seems not to be different from the current age of occurrence. Although the lifestyle and the external influences, including medical practice, changed over more than two centuries, aneurysms still occur at approximately the same age. Therefore, aneurysms occur and rupture on their own internal circumstances and are not related to the diet, environmental, and external factors.[18] The most likely internal factor is the severity of the variation on the segments of CBAN that adversely affects the hemodynamics resulting in the formation of aneurysms.[1,19] The condition of the arterial wall should not have changed over the last 260 years and that seems to be less significant than the variation in the components of CBAN. The segmental and communicating arteries play a crucial role in dampening the systolic pressure within the CBAN and reducing the likelihood of aneurysm formation.[1,19] The severity of arterial variation can have negative effects on the blood flow dynamics through the variant segment of the component of the CBAN.[1,19] The incidence of CAs is about 3.3% in the general population and may not be diagnosed, until they get enlarged as the size of the aneurysm <3mm in diameter can be missed.[20] Imaizumi and colleagues found that the prevalence rate of CAs was 4.32% in Japan.[12] The incidence rate of CAs in childhood (age <18 years) has been reported to be 0.5- 4.6%, which is almost as common as the incidence rate observed among adults.[13] Treating cases of CAs with a diameter less than 3 mm requires careful consideration, as pre-existing small aneurysms of ≤ 3 mm could rupture, resulting in spontaneous SAH.[21] The majority of CAs are detected only when they cause a stroke or other pathological effect (e.g., compression of the optic tract).[4] Individuals older than 18 years are no longer considered children.[6,13]

Most of the symptomatic cases of CAs in the paediatric age group were observed in older children (15 + years) [13], and only complicated cases of CAs were generally diagnosed and reported.[22,23] If the incidence of childhood CAs described (ranges from 0.17 to 4.6%),[24] is corrected for number of years lived, it would be 18.4% of the total aneurysmal cases amongst adults. The adult patients included in CAs studies ideally have an age range of 18-years and above, which can include individuals up to the age of 100 years.[12,15] In contrast, the childhood group included in aneurysmal studies typically ranges from birth up to 18-years of age and a few studies have categorized patients who are 18-years or older under the adult group.[6,13] When the age range, 0-18 years and 19- 100 years is considered, the incidence of childhood CAs, that should be multiplied by 5 times to correct for the number of years lived, can be comparable to that in adults because the childhood period of life is much shorter than the adulthood. Therefore, the age range of adult group (≥20 years up to 100 years) included in the CAs and stroke studies would be about five times more than the age range of children (i.e., ≤18 years).[22,23] That means adults have 5 times more years to develop CAs compared to children. Therefore, the incidence of childhood CAs per year is almost equivalent to adult.[21,25] Hence, CAs could develop in early childhood in the presence of a significantly variant component of cerebral arterial anatomy,[1,2] and it could

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take years for them to balloon before becoming symptomatic and being observed in a tertiary medical center. The overall pattern of location and distribution of childhood CAs was similar to adult as they commonly occurred in ICA, MCA and AcomAC regions.[3] Therefore the development of CAs is not age related and found to be prevalent in all age ranges.[10,12,13,26] Cerebral aneurysms may not always be associated to the advanced age, history of smoking, drinking alcohol but start forming as early as in the childhood in the presence of variant components of cranial blood vessels.[27] The mean age at which people were affected by cerebral aneurysms was reported to be 55 to 57 years of age in a study conducted using 1085 aneurysmal cases from 2008 to 2016.[28] There are a few reports of CAs published between 1938 and 2011 that could have been compiled for statistical analyses. However, their inclusion into this study, would not have changed its basic conclusions: i.e., large age range and no change through time in the occurrence of CAs.

Transcranial Doppler has been found to be effective in studying brain vessels[26,29] in infants and can be incorporated as a screening tool to detect variant intracranial vessels that could predispose them to the development of cerebral aneurysms later in life. Ultrasonographic (USG) video screening, involving the placement of the probe in the fontanelles of babies before they close, for variant cerebral arteries, might be introduced as a routine procedure due to its safety.[29] For example, individuals with a diameter ratio greater than 1.4 between the proximal segment of left and right ACA have a 27-fold increased risk of developing cerebral aneurysms in the AcomAC region.[1] The ACA asymmetry can be measured by placing USG probes in a baby's fontanelles, in a simple clinical setup before the fontanelles fuse. Parents of children found to have variations in CBAN could be advised to schedule follow-up brain 'Magnetic Resonance Angiography' scans at specific intervals, such as every 5 years, especially if a more affordable technology for detecting brain aneurysms becomes available. The estimated cost of a single stroke is approximately $300,000 in Australia.[9] With a haemorrhagic stroke incidence of 10 per 100,000 the total cost amounts to $45 million per year in a city the size of Adelaide[1], South Australia, which has a population of 1.5 million. Regular screening for individuals with significantly variant brain arteries identified, representing 50% of the population, once every 5 years, and assuming the cost of a single computed tomography angiography or magnetic resonance angiogram is about $100 each, the total screening cost would be $1.5 million per year, that means 30 times reduction in cost of strokes. Additionally, the government would receive millions of dollars in return as tax revenue from working individuals who would survive with little to no disability from potential strokes resulting from aneurysms. This study was not designed to examine the characteristics of aneurysms, but the focus was on the distribution of aneurysms in different segments of CBAN, trend of occurrence of aneurysms over the past 260-years, and the comparison of cerebral aneurysms in all age ranges.

Limitations:

The insufficient data on the lack of personal and family history, history of smoking, lipid profile, and blood pressure are limitations of this study. A larger survey and a prospective study could be conducted. A prospective study could involve using ultrasound techniques to identify variations in brain vessels among infants.

Conclusion

Brain arterial aneurysms can develop early in the presence of variant arterial components. Screening children under 24 months using transcranial ultrasonography for variant cerebral arteries may be practical. Those with variations should undergo periodic tests for aneurysms, aiming to prevent haemorrhagic strokes.

Data sharing statement

Additional data are available by emailing Arjun.Burlakoti@unisa.edu.au

Funding

None

ORCID iD

Arjun Burlakoti http://orcid.org/0000-0001-9317-6352

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Author contribution statement

Arjun Burlakoti- conceived the idea, collected, and analysed both sets of data, took pictures, recorded videos, contributed to conceptualization, prepared and drafted the manuscript.

Jaliya Kumaratilake- conceived the idea, contributed to the concept, aided in data interpretation, editing and the revision of the manuscript and approving the article.

Jamie Taylor- conceived the idea, contributed to the concept, aided in data interpretation, editing and the revision of the manuscript and approving the article.

Maciej Henneberg- conceived the idea, masterminded, and helped in statistics, data analysis and interpretation, editing and approving the article.

Ethical Approval Statement

The University of Adelaide, Human Research Ethics Board granted permission to access and use data for this research project (Ethics Approval Number: H2014-176).

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Figure legend -

Figure 1 - Comparison of the location of cerebral aneurysms between Royal Adelaide Hospital sample (2011 to 2019) (n=135 CAs from 102 patients, orange colour) with those recorded in 407 publications[14] (1761 to 1938) (n=1127 CAs, blue colour). CAs=cerebral aneurysms, 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

Figure 2 - Figures displaying the distribution patterns of cerebral aneurysms in different age groups recorded from 1761 to 1938 and from 2011 to 2019. A polynomial regression lines show the number and distribution of cerebral aneurysm cases across all age groups. a) The distribution of cerebral aneurysmal cases (n=1127) in various age group, recorded from 1761 to 1938.[14] b) The frequency of cerebral aneurysmal cases and their distribution (n=1127) across all age groups recorded[14] from 1761 to 1938. c) Age (≥18 years) related distribution of individuals affected with cerebral aneurysms over the past 260 years (1761 – 1938) (n=853), recorded[14] from 1761 to 1938, and d) Age (18-100 years) related prevalence (%) of cerebral aneurysms in RAH sample from 2011 to 2019 (n=102). The peak prevalence occurred between 31-60 years ($p<0.001$). RAH= Royal Adelaide Hospital. RAH= Royal Adelaide Hospital and 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

Figure 3: Comparison figures showing the trend of occurrence of cerebral aneurysms at different age group (n=1127) from 1761 to 2019. (a)The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed all ages of patients with aneurysms, from 1761 to 1938[14]; b) The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed patients with >18 years of age with aneurysms, recorded from 1761 to 1938[14] and 2011 to 2019 in RAH. RAH = Royal Adelaide Hospital, 14 =Data from: McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328

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Table 1 - Prevalence of cerebral aneurysms in males and females: a comparison of the recent hospital-based data recorded in RAH from 2011 to 2019 with the autopsy data published before from 1761 to 1938.

Sex	N=173, cases with or without cerebral aneurysms recorded in RAH from 2011 to 2019.	1127 aneurysm cases (from 1761 to 1938) recorded in 407 publications.[14]
Sex not defined	0	28
Female	90	573
Male	83	526
Female to male sex ratio	1.08	1.09

Legend- RAH = royal Adelaide hospital, 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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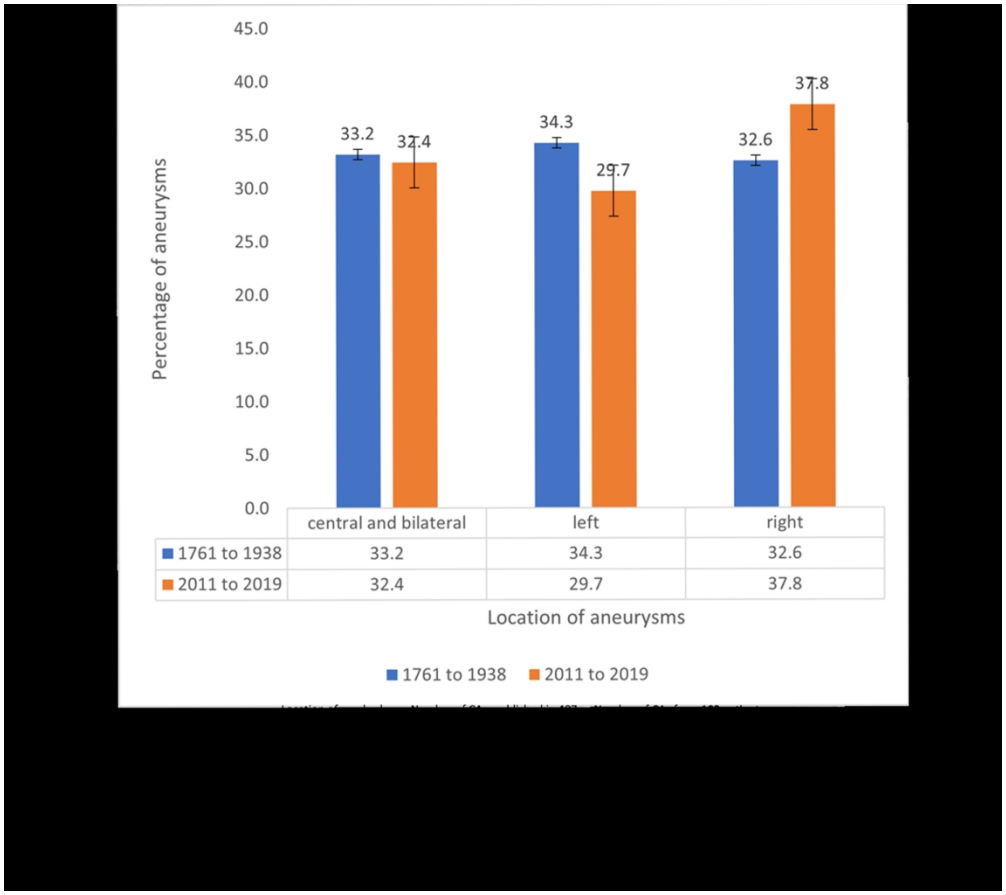

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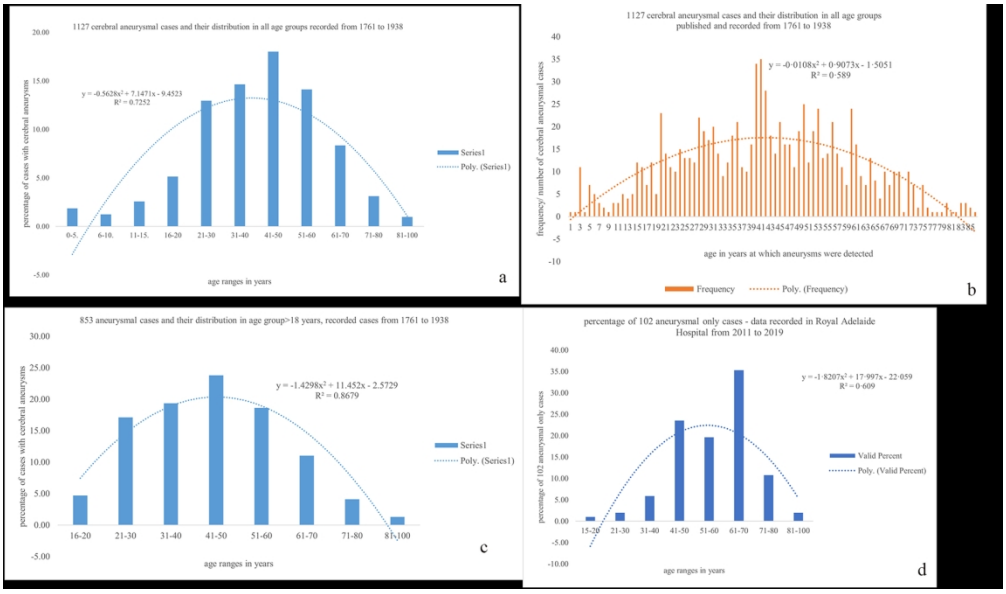

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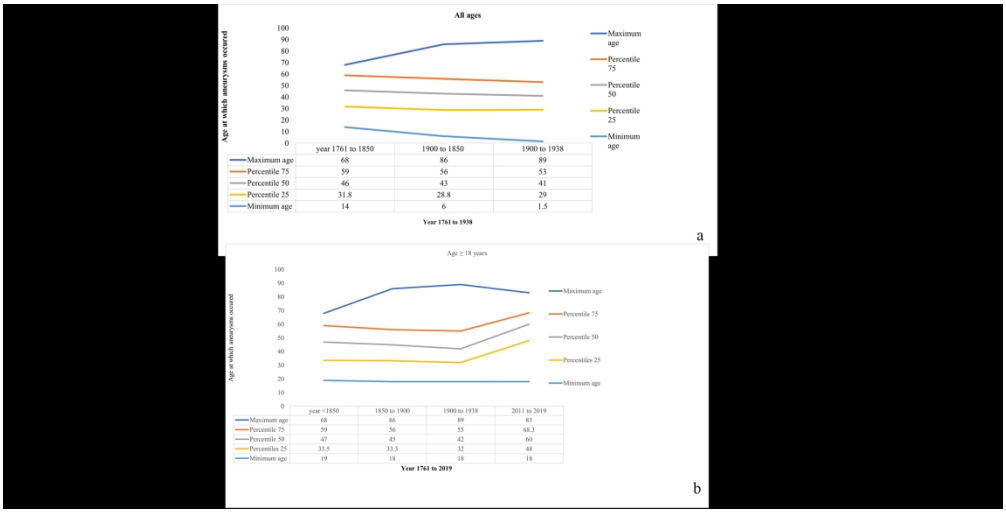

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Supplementary file 1: contains type 1 data

Manuscript title: The bread of cerebral aneurysms over the past two centuries: Need for early screening - An observational study.

Abbreviations: PcomA= posterior communicating artery, ICA=internal carotid artery, BA=basilar artery, AcomA=anterior communicating artery, MCA=middle cerebral artery, ACA=anterior cerebral artery, PCA=posterior cerebralral artery, SCA=superior cerebellar artery, AICA=anterior inferior cerebellar artery, VA=vertebral artery, CBAN=cerebral basal arterial network (artery involved not known), PICA=posterior inferior cerebellar artery. McDonald & Korb 1939=McDonald CA, Korb M. Intracranial aneurysms. Archives of neurology and psychiatry (Chicago) 1939; 42(2): 298-328.)

age in years	age range in years	sex, m=male, f=female	side affected	arteries involved	status of aneurysms; ruptured=y, not ruptured=n	arterial condition	year of aneurysm detected
60	51-60	m	bilateral	PcomA	n	Vessels rigid, with deposit on inner lining	1761
52	51-60	f	undefined	ICA	y	no information available	1778
64	61-70	f	bilateral	ICA	n	no information available	1779
20	16-20	f	midline	BA	y	no information available	1814
20	16-20	f	midline	BA	y	no information available	1815
57	51-60	m	midline	AcomA	y	Calcareous deposits on coats of vessels	1825
57	51-60	m	right	ACA	y	Coats of aneurysm thick	1825
		m	midline	AcomA	y	not available	1825
59	51-60	f	midline	AcomA	y	no information available	1826
59	51-60	m	midline	BA	y	Middle layer of sac, cartilaginous	1826
		m	right	MCA		no information available	1826
19	16-20	m	left	MCA	y	no information available	1827
39	31-40	f	left	PcomA	y	no information available	1827
45	41-50	m	left	MCA	y	no information available	1827
35	31-40	m	midline	BA	n	Carotid and vertebral arteries normal	1828
21	21-30	f	midline	BA	y	Calcareous deposits on vessels	1829
24	21-30	m	left	VA	y	Arteries diseased, in some places cartilaginous	1829
			midline	BA		Coats of vessels cartilaginous	1829
60	51-60	m	right	MCA	y	wall thin but firm	1831
63	61-70	f	left	MCA	y	No bone or other appearance of disease	1831
60	51-60	m	right	MCA	y	Sac with thin, firm parietes	1832
42	41-50	f	right	ICA	y	no information available	1833
54	51-60	m	midline	BA	y	no information available	1833
28	21-30	f	left	ACA	n	middle layer thick	1834
			left	ICA	n	no information available	1834
			right	VA	n	no information available	1835
68	61-70	m	midline	BA	n	Yellow plaques on surface	1836
20	16-20	f	midline	BA	n	no information available	1837
59	51-60	m	midline	BA	y	Middle layer of artery cartilaginous	1837
60	51-60	m	undefined	ICA	y	no information available	1837
35	31-40	m	right	MCA	y	other vessels normal	1839
14	11-15.	m	midline	BA	n	Middle layer of wall thickened	1842
20	16-20	f	undefined	PCA	n	no information available	1842
49	41-50	m	left	ICA	y	Vessels thickened	1842
41	41-50	m	midline	BA	y	Arteries atheromatous	1844
54	51-60	m	midline	BA	n	no information available	1844
20	16-20	f	right	PcomA	y	no information available	1846
47	41-50	m	midline	BA	y	no information available	1846
58	51-60	m	midline	BA	y	na	1846
58	51-60	m	midline	BA	y	no information available	1846
62	61-70	f	right	PcomA	y	no information available	1846
34	31-40	m	left	PcomA	y	no information available	1847
35	31-40	m	left	ICA	y	no information available	1847
52	51-60	f	left	ICA	y	healthy arteries	1848
		m	midline	BA	n	no information available	1848
33	31-40	m	midline	BA	y	no information available	1849
35	31-40	m	midline	BA	y	Other arteries healthy	1849
39	31-40	f	undefined	ICA	y	No calcareous deposit in cerebral vessels	1849
		m	undefined	VA	n	Calcareous deposit in wall of sac	1849
18	16-20	f	left	PcomA	y	No fatty atheromatous changes in arteries	1850
30	21-30	m	midline	BA	y	Other vessels without changes	1850
70	61-70	f	left	ICA	n	no information available	1850
20	16-20	f	undefined	PCA	n	no information available	1851
21	21-30	f	midline	AcomA	n	no information available	1851
35	31-40	m	left	MCA	y	no information available	1851
38	31-40	m	midline	BA	n	no information available	1851
45	41-50	m	midline	BA	n	no information available	1851
65	61-70	m	undefined	ICA	n	no information available	1851
		m	midline	BA	n	no information available	1851
		m	midline	BA	n	no information available	1851
		f	undefined	MCA	y	no information available	1851
53	51-60	f	midline	BA	y	no information available	1855
56	51-60	m	right	PCA	y	no information available	1855
57	51-60	m	right	MCA	n	Vessels very atheromatous	1855
70	61-70	f	midline	BA	n	no information available	1855
		m	left	MCA	y	Arteries not atheromatous	1855
35	31-40	m	midline	BA	n	no information available	1856
40	31-40	f	left	PCA	n	Vessels thin but healthy	1856
52	51-60	f	right	ICA	y	Middle coat thickened	1857
47	41-50	f	left	ICA	y	no information available	1858
54	51-60	m	midline	BA	n	Vertebral arteries thickened	1858
56	51-60	m	right	SCA	n	Atheroma	1858
60	51-60	f	midline	AcomA	y	Vessels thickened and rigid	1858
17	16-20	f	left	MCA	y	Embolic	1859
30	21-30	f	left	MCA	y	no information available	1859
34	31-40	m	midline	BA	y	Healthy vessels	1859
35	31-40	f	left	ACA	y	Healthy vessels	1859
43	41-50	f	midline	BA	y	Atheroma	1859
58	51-60	m	left	MCA	y	Atheroma	1859
16	16-20	m	left	ICA	n	no information available	1860
24	21-30	f	midline	BA	y	embolic	1860
47	41-50	f	midline	BA	n	Plates in coats of aneurysm	1860
24	21-30	m	right	MCA	y	Walls of sac calcareous	1861
14	11-15.	m	left	MCA	y	Walls of sack thick and atheromatous no disease of other vessels	1862
42	41-50	m	midline	BA	y	Vessels otherwise healthy	1862
48	41-50	f	midline	BA	n	no information available	1862
56	51-60	m	midline	BA	n	Atheroma	1862
68	61-70	m	left	MCA	y	Wall of sac hard and cretaceous	1862
80	71-80	f	midline	AcomA	n	healthy vessels	1862
28	21-30	m	midline	BA	y	Healthy vessels	1864
37	31-40	m	midline	BA	y	Other vessels slightly atheromatous	1864
			undefined	AICA		Atheroma	1864
16	16-20	m	left	ICA	n	Vessels healthy	1865
24	21-30	m	left	MCA	y	Soft arteries	1865
39	31-40	m	midline	BA	y	No atheroma	1865
43	41-50	f	left	ICA	y	Walls atheromatous	1865
46	41-50	f	left	ACA	n	Vessels very atheromatous	1865
49	41-50	f	midline	AcomA	y	Other arteries healthy	1865
51	51-60	f	midline	BA	y	Arteries not diseased	1865
53	51-60	m	left	MCA	y	Walls not atheromatous	1865
59	51-60	f	right	MCA	y	no information available	1865
		m	left	ACA	y	no information available	1865
21	21-30	f	left	MCA	y	No disease of vessels	1866
61	61-70	f	left	VA	y	no information available	1866
27	21-30	f	left	ICA	y	Arteries thickened	1867
29	21-30	f	left	MCA	y	no information available	1867
78	71-80	f	right	MCA	y	No atheroma	1867
13	11-15.	m	right	MCA	y	Rest of arteries healthy	1868
24	21-30	f	left	ICA	y	no information available	1868
34	31-40	f	left	MCA	n	Walls of aneurysmatheromatous; vessels at base not diseased	1868
36	31-40	f	midline	BA	y	Old endocarditis; questionable embolic origin	1868
40	31-40	m	left	ACA	y	Small atheromatous patches on wall	1868
40	31-40	m	left	MCA	y	Vessels normal	1868
50	41-50	f	left	MCA	n	Thick and opaque, but not materially diseased	1868
53	51-60	f	left	PcomA	y	Slightly atheromatous	1868
56	51-60	f	right	MCA	n	Arteries sclerotic, with atheromatous plates	1868
56	51-60	m	left	MCA	n	Vessels very atheromatous	1868
59	51-60	f	midline	BA	y	Atheroma	1868
60	51-60	f	right	MCA	y	Vessels very atheromatous	1868
14	11-15.	m	left	ICA	y	Other vessels healthy	1869
19	16-20	m	left	VA	y	no information available	1869
28	21-30	m	left	MCA	y	no information available	1869
41	41-50	f	right	MCA	y	no information available	1869
48	41-50	f	left	MCA	y	Atheroma	1869
56	51-60	m	right	ICA	y	Several patches ofdegeneration onbasilar artery	1869
61	61-70	f	midline	BA	n	Vessels atheromatous	1869
12	11-15.	f	right	MCA	y	Embolic occlusion (endocarditis)	1870
13	11-15.	m	right	MCA	y	Other vessels healthy; embolic origin of aneurysm	1870
15	11-15.	m	right	MCA	y	Embolic origin	1870
17	16-20	f	left	ACA	y	Vessels healthy	1870
20	16-20	m	right	MCA	y	Embolic origin	1870
26	21-30	f	left	MCA	n	Vessel plugged by yellow fibrin (vegetations on aortic valves)	1870
26	21-30	m	midline	BA	n	Remaining vessels healthy	1870
26	21-30	f	right	MCA	y	Syphilitic lesions	1870
35	31-40	m	undefined	PCA	n	no information available	1870
37	31-40	m	midline	BA	y	Calcareous degeneration of coats of vessel	1870
49	41-50	m	midline	BA	y	no information available	1870
50	41-50	f	left	PCA	y	Slight atheromatous patches	1870
60	51-60	m	left	VA	y	Vessels diseased	1870
67	61-70	m	right	VA	y	Atheroma	1870
54	51-60	m	midline	AcomA	y	Atheromatous	1871
		f	left	MCA	y	Arteries at base highly Atheromatous	1871
29	21-30	m	midline	BA	n	Other arteries at base atheromatous	1872
45	41-50	m	left	VA	y	Slight atheromatous changes	1872
61	61-70	f	midline	BA	y	Vessels atheromatous	1872
20	16-20	f	right	PcomA	y	Embolic	1873
20	16-20	m	undefined	CBAN	y	Embolic	1873
24	21-30	m	undefined	CBAN	y	Embolic arachnoiditis	1873
27	21-30	m	undefined	CBAN	y	Perforated embolized wall of small arach noid artery	1873
40	31-40	m	right	MCA	y	Embolic	1873
68	61-70	m	midline	AcomA	n	W alls trick ; other vessels healthy	1873
		m	midline	BA	n	Vessels thickened	1874
24	21-30	m	undefined	ICA	n	no information available	1875
33	31-40	m	left	ICA	n	Marked arteriosclerosis	1875
40	31-40	f	right	ICA	n	Walls of sac partly calcified	1875
43	41-50	m	right	MCA	y	no information available	1875
45	41-50	m	midline	AcomA	y	Arteries slightly atheromatous	1875
45	41-50	m	left	MCA	y	Vessels normal	1875
46	41-50	m	bilateral	ICA	n	Intimai arteriosclerosis	1875
53	51-60	f	left	ICA	y	Walls thick and atheromatous	1875
56	51-60	m	left	VA	n	no information available	1875
60	51-60	f	undefined	SCA	y	Intense atheroma of vessels	1875
69	61-70	f	midline	AcomA	n	Vessels atheromatous	1875
34	31-40	f	right	MCA	y	no information available	1876
34	31-40	m	left	MCA	y	no information available	1876
41	41-50	m	midline	AcomA	y	Rest of arteries free of atheroma	1876
50	41-50	f	right	MCA	y	Atheroma	1876
63	61-70	f	right	ICA	y	no information available	1876
16	16-20	m	midline	BA	y	no information available	1877
18	16-20	f	right	MCA	n	no information available	1877
20	16-20	m	midline	AcomA	y	No other disease of vessels	1877
22	21-30	f	left	ICA	n	Vessels healthy, probably embolic	1877
40	31-40	f	right	MCA	y	Healthy vessels	1877
40	31-40	m	left	MCA	y	Vessels at base healthy	1877
42	41-50	m	right	MCA	y	Arteries tortuous andsmall in caliber; deposits of calcareous degeneration	1877
53	51-60	f	midline	BA	n	no information available	1877
12	11-15.	m	right	PCA	y	Embolic (endocarditis)	1878
30	21-30	m	left	ICA	n	Thickening of vessels , with syphilitic infil tration of small cells	1878
47	41-50	f	right	MCA	y	Very atheromatous	1878
50	41-50	m	right	ACA	n	All arteries and aneurysm white and opaque;microscopic syphilitic changes of Heubner	1878
72	71-80	f	left	MCA	y	Vessels atheromatous	1878
20	16-20	m	left	MCA	y	Not atheromatous	1880
36	31-40	m	left	VA	y	Thickened walls: endarteritis	1880
39	31-40	m	right	MCA	y	no information available	1880
40	31-40	f	midline	AcomA	y	Atheroma	1880
44	41-50	m	midline	BA	y	no information available	1880
55	51-60		left	MCA	n	Stiff and atheromatous	1880
57	51-60	m	midline	BA	y	Atheromatous vessels at base	1880
75	71-80	f	midline	BA	n	Atheiomatous	1880
12	11-15.	m	left	MCA	y	Wall of sac atheroma tous; other vessels healthy	1881
40	31-40	f	left	PcomA	y	Healthy vessels	1881
44	41-50	m	midline	BA	y	no information available	1881
50	41-50	f	midline	AcomA	y	no information available	1881
73	71-80	f	right	ICA	n	Very atheromatous	1881
80	71-80	f	right	PcomA	n	Wall thickened	1881
16	16-20	m	midline	BA	y	no information available	1882
17	16-20	m	midline	AcomA	y	Healthy	1883
40	31-40	m	midline	BA	n	Atheroma	1883
		f	undefined	ICA	y	no information available	1883
61	61-70	m	left	VA	n	Fatty degeneration of intima	1884
		m	undefined	CBAN	y	Embolic	1884
29	21-30	f	left	MCA	y	Atheroma	1885
40	31-40	m	left	MCA	n	Calcareous clot in sac	1885
23	21-30	f	left	ICA	y	Syphilitic	1886
22	21-30	f	left	ICA	n	Walls hard; no atheromatous degeneration	1886

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27	21-30	m	midline	BA	y	Syphilitic	1886
20	16-20	f	left	MCA	n	Embolic	1887
30	21-30	m	right	VA	y	Embolic (endocarditis)	1887
30	21-30	m	right	MCA	y	Embolic (endocarditis)	1887
31	31-40	m	right	ICA	n	no information available	1887
36	31-40	m	midline	BA	y	No embolism or atheroma	1887
40	31-40	f	right	MCA	y	No embolism or atheroma	1887
43	41-50	f	right	PCA	n	Arteries free of atheroma	1887
49	41-50	f	undefined	CBAN	y	Embolic (endocarditis)	1887
60	51-60	f	left	MCA	y	no information available	1887
			left	VA	n	Arteriosclerosis	1887
			undefined	VA		Arteriosclerosis	1887
			undefined	VA		Arteriosclerosis	1887
53	51-60	f	midline	BA	y	no information available	1888
26	21-30	m	midline	BA	n	Septic endocarditis	1889
43	41-50	m	midline	AcomA	n	no information available	1889
51	51-60	m	midline	AcomA	y	Arteries free of atheroma	1889
56	51-60	f	midline	AcomA	y	Arteriosclerosis	1889
6	6-10.	m	right	VA	y	Septic embolus	1890
15	11-15.	m	right	PCA	n	Septic embolus endocarditis	1890
15	11-15.	m	right	MCA	n	Septic embolus endocarditis	1890
15	11-15.	m	right	MCA	n	Septic embolus endocarditis	1890
15	11-15.	f	bilateral	ICA	y	Septic embolus endocarditis	1890
15	11-15.	f	right	MCA	y	Septic embolus endocarditis	1890
16	16-20	f	right	MCA	y	Septic embolus	1890
17	16-20	m	left	ICA	n	Septic embolus endocarditis	1890
18	16-20	m	right	MCA	y	Septic embolus	1890
25	21-30	f	right	MCA	n	Septic embolus endocarditis	1890
25	21-30	m	left	MCA	n	Septic embolus endocarditis	1890
25	21-30	f	left	MCA	y	Atheroma	1890
25	21-30	f	right	MCA	y	Septic embolus endocarditis	1890
25	21-30	m	right	MCA	y	Septic embolus endocarditis	1890
31	31-40	m	right	MCA	y	Septic embolus	1890
35	31-40	f	left	MCA	n	Septic embolus endocarditis	1890
35	31-40	m	left	MCA	y	Atheroma	1890
45	41-50	f	left	MCA	y	Atheroma	1890
45	41-50	m	left	MCA	y	Atheroma	1890
50	41-50	m	left	MCA	y	Septic embolus	1890
56	51-60	m	right	ICA	n	Atheroma	1890
66	61-70	m	right	ICA	n	Atheroma	1890
60	51-60	f	midline	BA	n	Atheroma	1891
35	31-40	m	midline	BA	y	Other vessels healthy	1892
47	41-50	m	left	MCA	n	No atheroma	1893
7	6-10.	m	midline	BA	y	no information available	1894
10	6-10.	f	left	VA	y	no information available	1894
14	11-15.	m	left	VA	y	no information available	1894
25	21-30	m	midline	BA	y	no information available	1894
26	21-30	f	right	ICA	y	Soft arteries	1894
26	21-30	m	right	ICA	y	no information available	1894
28	21-30	f	left	MCA	y	no information available	1894
28	21-30	m	midline	AcomA	y	no information available	1894
29	21-30	f	left	MCA	y	no information available	1894
30	21-30	f	right	MCA	y	no information available	1894
31	31-40	m	midline	AcomA	y	no information available	1894
32	31-40	f	left	MCA	y	no information available	1894
32	31-40	f	midline	BA	y	no information available	1894
32	31-40	m	midline	BA	y	no information available	1894
36	31-40	f	midline	PcomA	y	no information available	1894
36	31-40	m	left	ACA	y	no information available	1894
40	31-40	f	midline	BA	y	no information available	1894
40	31-40	m	midline	AcomA	y	no information available	1894
41	41-50	m	right	VA	y	no information available	1894
42	41-50	f	left	ICA	y	no information available	1894
42	41-50	m	left	MCA	y	no information available	1894
42	41-50	m	midline	BA	y	no information available	1894
43	41-50	f	right	ICA	y	no information available	1894
43	41-50	m	left	VA	y	no information available	1894
43	41-50	m	left	MCA	y	no information available	1894
43	41-50	m	right	MCA	y	no information available	1894
43	41-50	m	undefined	CBAN	y	no information available	1894
44	41-50	f	midline	AcomA	y	no information available	1894
45	41-50	f	left	MCA	y	no information available	1894
45	41-50	f	midline	AcomA	y	no information available	1894
45	41-50	m	left	ICA	y	no information available	1894
46	41-50	f	midline	BA	y	no information available	1894
46	41-50	m	right	MCA	y	no information available	1894
46	41-50	m	right	MCA	y	no information available	1894
48	41-50	f	right	ICA	y	no information available	1894
48	41-50	f	right	ICA	y	no information available	1894
49	41-50	f	left	VA	y	no information available	1894
49	41-50	f	midline	PcomA	y	no information available	1894
50	41-50	f	right	MCA	y	no information available	1894
50	41-50	m	left	MCA	y	no information available	1894
51	51-60	f	right	MCA	y	no information available	1894
52	51-60	f	left	MCA	y	no information available	1894
53	51-60	f	left	MCA	y	no information available	1894
53	51-60	f	midline	AcomA	y	no information available	1894
54	51-60	f	midline	AcomA	y	no information available	1894
54	51-60	m	right	MCA	y	no information available	1894
55	51-60	f	right	ICA	y	no information available	1894
55	51-60	m	left	VA	y	no information available	1894
55	51-60	m	midline	BA	y	no information available	1894
56	51-60	f	left	MCA	y	no information available	1894
56	51-60	f	right	MCA	y	no information available	1894
57	51-60	f	right	ACA	y	no information available	1894
57	51-60	f	midline	AcomA	y	no information available	1894
60	51-60	f	left	VA	y	no information available	1894
60	51-60	f	left	ACA	y	no information available	1894
60	51-60	f	left	ACA	y	no information available	1894
60	51-60	f	left	MCA	y	no information available	1894
61	61-70	f	midline	BA	y	no information available	1894
61	61-70	m	right	ICA	y	no information available	1894
62	61-70	f	midline	AcomA	y	no information available	1894
63	61-70	f	left	ACA	y	no information available	1894
63	61-70	f	midline	AcomA	y	no information available	1894
64	61-70	f	left	ICA	y	no information available	1894
64	61-70	f	midline	AcomA	y	no information available	1894
65	61-70	f	left	ICA	y	no information available	1894
67	61-70	f	left	ICA	y	no information available	1894
67	61-70	f	right	ICA	y	no information available	1894
69	61-70	f	left	ICA	y	no information available	1894
70	61-70	f	right	ICA	y	no information available	1894
72	71-80	f	left	VA	y	no information available	1894
72	71-80	f	right	ICA	y	no information available	1894
73	71-80	f	left	MCA	y	no information available	1894
73	71-80	f	right	VA	y	no information available	1894
73	71-80	f	right	VA	y	no information available	1894
73	71-80	f	midline	AcomA	y	no information available	1894
79	71-80	f	midline	BA	y	no information available	1894
80	71-80	f	right	ACA	y	no information available	1894
81	81-100	f	left	MCA	y	no information available	1894
86	81-100	m	midline	AcomA	y	no information available	1894
		f	midline	CBAN	y	no information available	1894
21	21-30	m	right	ICA	y	other vessels healthy	1895
29	21-30	m	midline	BA	y	no information available	1895
34	31-40	f	left	ICA	y	Wall of aneurysm had two patches of atheroma	1895
40	31-40	m	midline	BA	n	no information available	1897
47	41-50	f	right	MCA	y	no information available	1897
50	41-50	f	left	MCA	y	no information available	1897
53	51-60	m	left	MCA	y	no information available	1897
69	61-70	f	bilateral	ICA	n	no information available	1897
28	21-30	m	midline	BA	n	no information available	1898
54	51-60	m	midline	BA	n	no information available	1898
70	61-70	f	right	MCA	y	Extensive sclerosis with atheromatous plaques	1898
29	21-30	m	midline	BA	n	Syphilitic	1899
68	61-70	m	left	VA	n	Vessels atheromatous	1900
10	6-10.	m	left	pial	y	Embolic (endocarditis)	1901
11	11-15.	f	right	pial	y	Embolic (endocarditis)	1901
27	21-30	f	left	MCA	y	normal vessels	1901
28	21-30	m	midline	BA	y	no information available	1901
32	31-40	f	right	MCA	y	Embolic (endocarditis)	1901
50	41-50	f	right	MCA	y	Atheroma	1901
76	71-80	f	right	MCA	y	no information available	1901
29	21-30	f	right	PcomA	y	normal vessels	1902
34	31-40	m	undefined	CBAN	y	Syphilis	1902
45	41-50	f	left	ICA	y	Wall of left internal carotid artery thickened	1902
22	21-30	f	right	ICA	y	healthy	1903
39	31-40	f	right	MCA	y	Line of atheroma at point of aneurysm	1903
64	61-70	f	right	PcomA	y	Syphilis	1903
27	21-30	m	midline	AcomA	y	Walls of other arteries healthy	1904
40	31-40	f	right	ICA	y	no information available	1904
65	61-70	f	right	ACA	n	Atheroma	1904
70	61-70	f	midline	BA	y	Atheroma	1904
86	81-100	m	bilateral	ICA	n	no information available	1904
87	81-100	f	right	ICA	n	Atheroma	1904
40	31-40	m	midline	BA	n	Syphilis	1905
42	41-50	f	right	PcomA	y	Marked sclerosis	1905
50	41-50	m	right	VA	n	Localized syphilitic periarteritis of aneurysm	1905
51	51-60	f	right	VA	y	no information available	1905
		m	midline	BA	n	Syphilis	1905
6	6-10.	f	left	MCA	y	Mycotic (staphylococcic endocarditis)	1906
28	21-30	m	midline	BA	y	no information available	1906
69	61-70	f	bilateral	VA	n	Arteriosclerosis	1906
			bilateral	ICA	y	no information available	1906
14	11-15.	m	left	BA	n	no information available	1907
40	31-40	m	left	MCA	y	Vessels normal	1907
48	41-50	f	left	ICA	n	no atheroma	1907
50	41-50	f	left	MCA	y	Arteries healthy	1907
51	51-60	m	midline	AcomA	y	no information available	1907
55	51-60	f	bilateral	MCA	y	no information available	1907
61	61-70	f	left	ICA	y	no information available	1907
63	61-70	f	midline	AcomA	n	no information available	1907
65	61-70	f	left	VA	n	Basilar artery tortuous and diseased	1907
68	61-70	m	midline	BA	y	no information available	1907
84	81-100	f	left	ICA	n	no information available	1907
		f	right	ICA	n	no information available	1907
			left	ICA	n	no information available	1907
28	21-30	m	left	AcomA	y	Irregular, cartilagi nous thickening of arteries at base	1908
65	61-70	m	right	MCA	n	Atheroma	1908
30	21-30	m	left	ACA	y	Thickening: syphi litic endarteritis obliterans	1909
27	21-30	m	midline	BA	y	Other arteries normal	1910
44	41-50	f	right	MCA	y	Arteriosclerosis	1910
57	51-60	m	bilateral	VA	n	no information available	1910
64	61-70	m	left	MCA	y	Arteriosclerosis	1910
		f	left	VA	n	Thick and hard	1910
25	21-30	f	right	AICA	y	Thickening of vessels	1911
36	31-40	f	left	PCA	n	Aneurysm congenital	1911
37	31-40	m	right	ICA	n	no information available	1911
42	41-50	f	right	ICA	y	no information available	1911
42	41-50	m	left	VA	y	Both cerebral arteries thickened	1911
53	51-60	m	left	MCA	n	Syphilis	1911
62	61-70	f	left	ICA	y	no information available	1911
		m	midline	BA	y	Healthy vessels	1911
21	21-30	f	right	ACA	y	Aneurysm congenital	1912
22	21-30	m	right	MCA	y	Embolic (endocarditis)	1912
25	21-30	f	right	AICA	y	Aneurysm congenital	1912
31	31-40	m	undefined	CBAN	n	No arteriosclerosis	1912
32	31-40	m	left	MCA	y	Aneurysm congenital	1912
36	31-40	f	left	PICA	y	Walls healthy (probably embolic)	1912
37	31-40	f	right	PCA	y	Embolic (endocarditis)	1912
37	31-40	m	left	MCA	y	Aneurysm congenital	1912
38	31-40	f	midline	AcomA	y	Aneurysm congenital	1912
38	31-40	m	right	VA	y	Aneurysm congenital	1912
40	31-40	f	left	MCA	y	Embolic (endocarditis)	1912
42	41-50	f	left	ICA	y	Aneurysm congenital	1912
42	41-50	m	left	MCA	y	Embolic (endocarditis)	1912
42	41-50	m	left	VA	y	Vessels somewhatthickened; "congenital" (?)	1912
44	41-50	m	right	MCA	y	Arteriosclerosis	1912
48	41-50	f	left	MCA	y	Aneurysm congenital	1912
51	51-60	f	left	ACA	y	Syphilitic endarteritis of cerebral arteries	1912

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52	51-60	m	right	MCA	y	Syphilitic endarteritis obliterans of cerebral vessels	1912
55	51-60	m	left	ICA	n	no information available	1912
56	51-60	f	midline	BA	y	Aneurysm congenital	1912
56	51-60	f	left	PICA	y	Aneurysm congenital	1912
57	51-60	f	right	MCA	y	Arteries soft	1912
63	61-70	f	right	MCA	y	Arteriosclerosis	1912
6	6-10.	f	right	PICA	y	Atheroma	1913
12	11-15.	m	left	MCA	y	no information available	1913
18	16-20	m	left	PCA	y	Aneurysm congenital	1913
30	21-30	f	right	PcomA	y	No arteriosclerosis	1913
31	31-40	f	right	VA	n	Syphilis	1913
33	31-40	m	undefined	CBAN	y	no information available	1913
36	31-40	m	right	PCA	y	Syphilitic gummatous arteritis	1913
37	31-40	m	right	VA	n	Endarteritis	1913
40	31-40	f	left	ACA	y	Aneurysm congenital	1913
41	41-50	m	left	ICA	n	no information available	1913
42	41-50	f	left	MCA	y	Small sclerotic plaques	1913
42	41-50	m	right	AICA	y	Soft vessels	1913
56	51-60	m	undefined	CBAN	y	Small grayish white flecks on vessels	1913
58	51-60	f	right	MCA	y	Only slight thickening	1913
72	71-80	m	right	MCA	y	Arteriosclerosis	1913
72	71-80	m	right	MCA	y	Marked arteriosclerosis	1913
		f	right	ICA	y	Atheroma	1913
57	51-60	m	midline	BA	y	no information available	1914
40	31-40	f	right	VA	y	proliferative endocarditis	1915
50	41-50	m	left	AcomA	y	embolism (endocarditis)	1915
		m	left	PICA	y	no information available	1915
7	6-10.	f	right	MCA	y	embolic	1916
15	11-15.	f	left	ICA	y	embolic	1916
16	16-20	f	right	MCA	y	embolic	1916
16	16-20	m	left	MCA	y	embolic	1916
19	16-20	m	left	PcomA	y	healthy artery	1916
22	21-30	m	right	MCA	n	embolic	1916
22	21-30	m	left	AcomA	y	conjenital aneurysm	1916
22	21-30	m	right	MCA	y	conjenital aneurysm	1916
28	21-30	m	left	ICA	y	conjenital aneurysm	1916
31	31-40	m	right	MCA	y	embolic	1916
36	31-40	f	left	PcomA	y	slight arterial degeneration	1916
36	31-40	m	left	ICA	y	Atheroma	1916
36	31-40	m	left	MCA	y	embolic	1916
40	31-40	f	right	PcomA	y	no information available	1916
40	31-40	m	right	ICA	y	healthy artery	1916
41	41-50	m	right	AcomA	n	no atheroma	1916
41	41-50	m	right	ACA	y	embolic	1916
42	41-50	f	left	PICA	y	no atheroma	1916
44	41-50	f	left	AcomA	y	no information available	1916
46	41-50	f	right	AcomA	y	arterial degeneration	1916
47	41-50	m	right	ICA	n	no information available	1916
48	41-50	f	right	MCA	n	no information available	1916
48	41-50	f	right	MCA	y	arterial degeneration	1916
49	41-50	f	left	AcomA	y	Atheroma	1916
49	41-50	m	left	AcomA	y	no information available	1916
50	41-50	m	right	AcomA	y	no information available	1916
51	51-60	m	right	MCA	y	Atheroma	1916
53	51-60	m	right	MCA	n	no information available	1916
53	51-60	m	left	AcomA	y	Arteriosclerosis	1916
55	51-60	m	right	AcomA	y	no information available	1916
58	51-60	f	right	ICA	y	conjenital aneurysm	1916
60	51-60	f	right	MCA	y	embolic	1916
60	51-60	m	right	MCA	y	Atheroma	1916
67	61-70	f	left	MCA	y	embolic	1916
70	61-70	f	left	ICA	n	no information available	1916
72	71-80	f	left	AcomA	y	arterial degeneration	1916
75	71-80	m	undefined	CBAN	n	no information available	1916
86	81-100	m	right	MCA	n	no information available	1916
			left	ACA	n	embolic	1916
			midline	BA	n	embolic	1916
			undefined	CBAN	n	embolic	1916
			left	MCA	n	no information available	1916
		m	left	ACA	y	embolic	1916
		m	right	MCA	y	embolic	1916
12	11-15.	f	right	AcomA	y	vessel healthy	1917
32	31-40	f	bilateral	ICA	y	no information available	1917
47	41-50	m	left	VA	y	vessel soft	1917
52	51-60	f	right	ICA	y	no information available	1917
53	51-60	m	midline	BA	n	Arteriosclerosis	1917
21	21-30	m	right	MCA	y	no information available	1918
26	21-30	f	right	ICA	y	no information available	1918
53	51-60	f	left	MCA	y	Arteriosclerosis	1918
54	51-60	m	left	PCA	y	no information available	1918
87	81-100	f	right	MCA	y	other vessel normal	1918
2	0-5.	m	left	MCA	y	Focal areas of intimai thickening	1919
18	16-20	m	bilateral	MCA	y	Vessels soft and thin	1919
27	21-30	m	bilateral	MCA	y	No trace of syphilis or arteriosclerosis; microscopically a decrease in elastic fibers in media of vessels	1919
28	21-30	m	right	VA	y	Slight intimai thickening of other vessels	1919
35	31-40	m	right	MCA	y	atherosclerosis	1919
36	31-40	f	right	PcomA	y	Vessels soft	1919
39	31-40	f	left	AcomA	y	Scattered patches of intimai thickening	1919
42	41-50	m	left	MCA	y	Arteriosclerosis	1919
45	41-50	m	left	MCA	y	atherosclerosis	1919
53	51-60	m	midline	BA	y	Arteriosclerosis	1919
53	51-60	m	left	PcomA	y	Scattered patches of intimai thickening	1919
55	51-60	m	midline	BA	y	Vessels thickened with plaques	1919
56	51-60	m	right	PcomA	y	Scattered plaques	1919
68	61-70	f	left	AcomA	y	Marked thickening of vessels	1919
			right	MCA	y	Scattered thickening	1919
			midline	AcomA	y	Scattered yellow patches on intima	1919
28	21-30	m	midline	AcomA	y	no information available	1920
29	21-30	f	midline	AcomA	y	no information available	1920
36	31-40	m	midline	BA	n	no information available	1920
37	31-40	f	midline	AcomA	y	no information available	1920
50	41-50	f	midline	AcomA	y	no information available	1920
55	51-60	m	midline	AcomA	y	Sclerosis of cerebral arteries	1920
56	51-60	f	right	AcomA	y	no information available	1920
67	61-70	f	midline	AcomA	y	no information available	1920
9	6-10.	m	left	PCA	y	nfected emboius; other vessels normal	1921
13	11-15.	m	midline	AcomA	y	no information available	1921
20	16-20	m	undefined	CBAN	y	no information available	1921
27	21-30	f	midline	AcomA	y	Atheroma	1921
37	31-40	f	left	AcomA	n	Atheroma	1921
37	31-40	m	left	AcomA	y	Medial sclerosis and Ihd. intimai thickening	1921
39	31-40		undefined	CBAN	y	Arteriosclerosis	1921
44	41-50	m	left	AcomA	y	Infected emboius; slight intimai thickening of other vessels	1921
44	41-50	m	left	AcomA	y	Other vessels normal	1921
46	41-50	f	midline	AcomA	y	Atheroma	1921
46	41-50	m	left	AcomA	y	Atheroma	1921
50	41-50	m	right	VA	n	no information available	1921
52	51-60	f	left	AcomA	y	Atheroma	1921
61	61-70		bilateral	VA	n	no information available	1921
61	61-70	f	midline	AcomA	y	Atheroma	1921
13	11-15.	m	bilateral	MCA	y	Coarctation of aorta	1922
15	11-15.	f	bilateral	ICA	n	no information available	1922
36	31-40	m	midline	BA	n	no information available	1922
39	31-40	m	midline	AcomA	y	Embolism (endocarditis)	1922
46	41-50	m	midline	BA	n	no information available	1922
50	41-50	f	right	ICA	y	Arteriosclerosis	1922
54	51-60	m	left	VA	n	Arteriosclerosis	1922
16	16-20	f	left	MCA	y	Mycotic embolism	1923
18	16-20	f	left	AcomA	y	Mycotic embolism	1923
22	21-30	m	right	MCA	y	Embolie (endocarditis)	1923
22	21-30	m	left	PICA	y	no information available	1923
24	21-30	m	right	MCA	y	Embolie (endocarditis)	1923
25	21-30	m	undefined	CBAN	y	no information available	1923
29	21-30	m	left	MCA	y	Embolie (endocarditis)	1923
29	21-30	m	left	MCA	y	Embolie (endocarditis)	1923
31	31-40	m	right	MCA	y	Embolie (endocarditis)	1923
33	31-40	m	left	MCA	n	Mycotic embolism	1923
36	31-40	f	left	ICA	y	no information available	1923
36	31-40	m	right	ICA	y	no information available	1923
42	41-50	f	midline	AcomA	y	Embolie (endocarditis)	1923
43	41-50	f	right	MCA	y	Arteriosclerosis	1923
45	41-50	f	undefined	CBAN	n	no information available	1923
45	41-50	f	left	ICA	y	Arteriosclerosis	1923
49	41-50	m	midline	AcomA	y	no information available	1923
50	41-50	f	left	ICA	n	Arteriosclerosis	1923
52	51-60	f	right	ICA	n	no information available	1923
52	51-60	f	midline	AcomA	y	Arteriosclerosis	1923
52	51-60	f	right	ICA	y	no information available	1923
55	51-60	f	right	PcomA	y	Arteriosclerosis	1923
56	51-60	f	right	MCA	y	Arteriosclerosis	1923
57	51-60	f	left	ICA	n	Syphilis and arterio sclerosis	1923
57	51-60		right	ICA	n	Arteriosclerosis	1923
60	51-60	f	left	ICA	y	Arteriosclerosis	1923
61	61-70	f	right	ICA	y	Arteriosclerosis	1923
64	61-70	f	midline	AcomA	n	Arteriosclerosis	1923
64	61-70	f	left	PCA	y	Arteriosclerosis	1923
65	61-70	f	left	ICA	y	no information available	1923
69	61-70	f	left	PcomA	y	Arteriosclerosis	1923
70	61-70	f	bilateral	MCA	n	Arteriosclerosis	1923
70	61-70	f	left	MCA	y	Arteriosclerosis	1923
70	61-70	f	right	PCA	y	Arteriosclerosis	1923
74	71-80	m	left	AcomA	n	Arteriosclerosis	1923
75	71-80	f	left	PcomA	n	Arteriosclerosis	1923
84	81-100	f	right	MCA	y	Embolie (endocarditis)	1923
24	21-30	m	right	AcomA	y	Arteriosclerosis	1924
25	21-30	m	right	MCA	y	No atheroma	1924
29	21-30	f	right	ICA	y	Healthy vessels	1924
29	21-30	f	right	ICA	y	Healthy vessels	1924
29	21-30	m	right	ICA	y	healthy vessels	1924
30	21-30	m	midline	BA	n	Gummatous arteritis	1924
30	21-30	f	left	AcomA	y	Arteriosclerosis	1924
41	41-50	f	left	ICA	y	Endocarditis or arteriosclerosis	1924
41	41-50	f	left	AcomA	y	Internal sclerosis (endocarditis)	1924
43	41-50	f	right	ICA	y	no information available	1924
47	41-50	m	midline	BA	n	no information available	1924
49	41-50	m	right	AcomA	y	Arteriosclerosis	1924
60	51-60	m	right	ICA	y	no information available	1924
			right	PcomA	y	Atheroma	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	MCA		no information available	1924
		f	left	ICA		no information available	1924
		f	left	ICA		no information available	1924
		f	left	ICA		no information available	1924
		f	left	AcomA		no information available	1924
		f	left	AcomA		no information available	1924
		f	left	PcomA		no information available	1924
		f	left	PcomA		no information available	1924
		f	left	PcomA		no information available	1924
		f	left	PcomA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	MCA		no information available	1924
		f	right	ICA		no information available	1924
		f	right	AcomA		no information available	1924
		f	right	AcomA		no information available	1924
		f	right	AcomA		no information available	1924
		f	right	VA		no information available	1924
		f	right	PcomA		no information available	1924
		f	right	ICA		no information available	1924
		f	midline	BA		no information available	1924
		f	midline	AcomA		no information available	1924
		f	midline	AcomA		no information available	1924
		m	left	MCA		no information available	1924

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		m	left	MCA		no information available	1924		
		m	left	AcomA		no information available	1924		
		m	left	AcomA		no information available	1924		
		m	left	AcomA		no information available	1924		
		m	left	AcomA		no information available	1924		
		m	left	VA		no information available	1924		
		m	left	VA		no information available	1924		
		m	left	PICA		no information available	1924		
		m	right	PICA		no information available	1924		
		m	midline	BA		no information available	1924		
		m	midline	BA		no information available	1924		
		m	midline	AcomA		no information available	1924		
		m	midline	AcomA		no information available	1924		
		m	midline	AcomA		no information available	1924		
		m	midline	AcomA		no information available	1924		
		m	midline	AcomA		no information available	1924		
		m	midline	AcomA		no information available	1924		
7	6-10.	m	right	ICA	n	Infected thrombus	1925		
17	16-20	m	midline	BA	y	Congenital aneurysm	1925		
21	21-30	m	right	MCA	y	no information available	1925		
23	21-30	m	midline	BA	y	no information available	1925		
26	21-30	m	left	ICA	y	no information available	1925		
32	31-40	m	left	MCA	y	no information available	1925		
35	31-40	m	right	ICA	n	Mycotic embolus (endocarditis)	1925		
50	41-50	m	left	VA	y	no information available	1925		
			midline	BA	n	no information available	1925		
15	11-15.	f	right	AcomA	y	Healthy vessels	1926		
15	11-15.	m	left	MCA	y	Vessels healthy	1926		
15	11-15.	m	midline	BA	y	Vessels healthy	1926		
16	16-20	f	bilateral	MCA	y	Vessels healthy	1926		
16	16-20	m	left	MCA	y	Vessels healthy	1926		
17	16-20	m	left	MCA	y	Healthy vessels	1926		
20	16-20	m	left	MCA	y	Aneurysm congenital	1926		
20	16-20	m	midline	BA	y	Embolie	1926		
21	21-30	m	right	ICA	y	Congenital aneurysm	1926		
23	21-30	f	undefined	CBAN	n	no information available	1926		
23	21-30	m	right	PcomA	n	Atheroma	1926		
23	21-30	f	left	MCA	y	no information available	1926		
23	21-30	m	right	MCA	y	no information available	1926		
23	21-30	m	right	MCA	y	no information available	1926		
26	21-30	m	undefined	CBAN	n	Aneurysm seen at operation	1926		
26	21-30	f	midline	BA	y	Vessels healthy	1926		
27	21-30	m	right	MCA	y	Healthy vessels	1926		
28	21-30	m	right	MCA	y	Healthy vessels	1926		
30	21-30	f	midline	AcomA	y	Vessels healthy	1926		
32	31-40	f	right	ICA	n	no information available	1926		
32	31-40	f	left	ICA	y	no information available	1926		
32	31-40	f	left	AcomA	y	Vessels healthy	1926		
34	31-40	m	left	ICA	y	no information available	1926		
35	31-40	f	right	AcomA	y	Vessels not diseased	1926		
35	31-40	m	left	MCA	y	Vessels healthy	1926		
36	31-40	m	left	PcomA	n	Syphilitic	1926		
38	31-40	f	right	AcomA	y	Vessels healthy	1926		
38	31-40	m	midline	AcomA	y	Healthy vessels	1926		
39	31-40	m	left	MCA	y	Healthy vessels	1926		
40	31-40	f	left	VA	n	Atheroma	1926		
40	31-40	f	right	VA	n	Atheroma	1926		
40	31-40	m	left	AcomA	n	no information available	1926		
41	41-50	f	bilateral	MCA	y	Healthy vessels	1926		
41	41-50	f	bilateral	MCA	y	Vessels healthy	1926		
41	41-50	m	right	AcomA	y	Vessels healthy	1926		
42	41-50	m	left	MCA	y	Arteriosclerosis	1926		
42	41-50	m	midline	BA	y	Atheroma	1926		
45	41-50	f	right	ICA	y	Arteriosclerosis	1926		
45	41-50	f	left	ICA	y	no information available	1926		
45	41-50	m	right	AcomA	y	Healthy vessels	1926		
45	41-50	m	right	MCA	y	Healthy vessels	1926		
46	41-50	f	right	MCA	y	Vessels healthy	1926		
46	41-50	m	right	MCA	y	Vessels healthy	1926		
47	41-50	m	left	AcomA	y	Vessels healthy	1926		
48	41-50	f	midline	AcomA	y	Healthy vessels	1926		
49	41-50	f	midline	AcomA	y	Arteriosclerosis	1926		
50	41-50	m	left	MCA	y	Atheroma	1926		
52	51-60	f	midline	AcomA	y	Atheroma	1926		
52	51-60	f	right	ICA	y	Many atheromatous beads on other vessels	1926		
52	51-60	f	right	ICA	y	no information available	1926		
52	51-60	m	left	MCA	y	Arteriosclerosis	1926		
52	51-60	m	midline	BA	y	no information available	1926		
53	51-60	m	left	AcomA	y	Atheroma	1926		
55	51-60	f	left	MCA	y	Atheroma	1926		
56	51-60	f	left	PCA	y	Arteriosclerosis	1926		
58	51-60	f	right	ICA	n	Aneurysm seen at operation	1926		
60	51-60	m	right	AcomA	y	Vessels healthy	1926		
62	61-70	f	left	MCA	y	Atheroma	1926		
64	61-70	m	left	MCA	y	Atheroma	1926		
69	61-70	f	right	MCA	y	Atheroma	1926		
69	61-70	f	bilateral	PCA	y	no information available	1926		
72	71-80	m	right	AcomA	y	Arteriosclerosis	1926		
73	71-80	f	right	ICA	y	Many sclerotic plaques	1926		
11	11-15.	f	midline	AcomA	y	Congenital aneurysm	1927		
20	16-20	f	left	MCA	y	Congenital" aneurysm (coarctationof aorta)	1927		
30	21-30	f	midline	BA	n	no information available	1927		
30	21-30	f	left	PcomA	n	Vessels slightly thickened	1927		
34	31-40	m	right	PCA	y	Normal vessels	1927		
39	31-40	f	left	PcomA	y	Thickening of intima in basilar artery	1927		
40	31-40	m	left	MCA	y	"Congenital" aneurysm (coarctation of aorta)	1927		
42	41-50	f	midline	AcomA	y	no information available	1927		
42	41-50	m	right	AcomA	y	Congenital" aneurysm	1927		
42	41-50	m	bilateral	ICA	y	No sifter vascular disease	1927		
52	51-60	f	left	AcomA	y	no information available	1927		
52	51-60	f	left	ICA	y	Small foci of early calcification	1927		
69	61-70	f	left	MCA	y	no information available	1927		
3	0-5.	f	left	MCA	y	no information available	1928

		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	AcomA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		f	midline	BA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	VA	y	no information available	1928
		m	left	ICA	y	no information available	1928
		m	left	PCA	y	no information available	1928
		m	left	PCA	y	no information available	1928
		m	left	PCA	y	no information available	1928
		m	right	VA	y	no information available	1928
		m	right	ICA	y	no information available	1928
		m	right	PcomA	y	no information available	1928
		m	right	AICA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	AcomA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	midline	BA	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
		m	undefined	CBAN	y	no information available	1928
30	21-30	f	right	PcomA	y	No other pathologic changes	1929
32	31-40	m	undefined	CBAN	y	no information available	1929
33	31-40	m	left	MCA	y	no information available	1929
34	31-40	f	left	ICA	y	no information available	1929
47	41-50	f	right	PcomA	y	Arteriosclerosis	1929
59	51-60	f	left	ICA	y	Arteriosclerosis	1929
60	51-60	m	midline	BA	y	Thickened walls	1929
61	61-70	m	right	ICA	y	no information available	1929
8	6-10.	m	bilateral	PCA	y	Congenital aneurysm	1930
21	21-30	f	left	MCA	y	Congenital aneurysm	1930
23	21-30	f	right	ICA	y	no information available	1930
24	21-30	f	right	AcomA	y	Congenital aneurysm	1930
28	21-30	f	right	MCA	y	Congenital aneurysm	1930
28	21-30	f	left	MCA	y	no information available	1930
32	31-40	m	left	MCA	y	Congenital aneurysm	1930
33	31-40	m	right	AcomA	y	Congenital aneurysm	1930
49	41-50	m	left	AcomA	y	no information available	1930
51	51-60	f	right	MCA	y	Healthy vessels	1930
77	71-80	f	midline	BA	n	Atheroma	1930
11	11-15.	m	left	MCA	y	Congenital aneurysm	1931
15	11-15.	f	left	PcomA	y	no information available	1931
20	16-20	f	right	ICA	y	Congenital aneurysm	1931
23	21-30	f	left	AcomA	y	Congenital aneurysm	1931
24	21-30	m	right	MCA	y	Congenital aneurysm	1931
26	21-30	m	right	MCA	y	Congenital aneurysm	1931
27	21-30	m	midline	BA	y	Congenital aneurysm	1931
27	21-30	m	right	PcomA	y	no information available	1931
28	21-30	f	left	MCA	y	Congenital aneurysm	1931
28	21-30	m	left	PcomA	y	no information available	1931
29	21-30	f	right	ICA	y	No arteriosclerosis	1931
29	21-30	m	right	AcomA	y	Yellow plaques on Ibid,intima at bifurcation points; (endocarditis)	1931
31	31-40	f	right	PcomA	y	Healthy vessels	1931
31	31-40	m	right	MCA	y	no information available	1931
33	31-40	f	midline	AcomA	y	Congenital aneurysm	1931
34	31-40	m	bilateral	PCA	y	Calcareous deposits	1931
38	31-40	m	right	ICA	y	Arteriosclerosis	1931
40	31-40	f	right	ICA	y	Congenital aneurysm	1931
40	31-40	f	left	ICA	y	no information available	1931
44	41-50	f	left	AcomA	y	Slight evidence of arteriosclerosis	1931
46	41-50	f	right	MCA	y	Arteriosclerosis	1931
46	41-50	f	left	PcomA	y	Few yellow plaques on basilar artery	1931
49	41-50	f	left	ICA	y	Arteriosclerosis	1931
49	41-50	m	midline	BA	y	Very sclerotic	1931
50	41-50	f	left	VA	n	no information available	1931
52	51-60	m	left	MCA	y	Healthy vessels	1931
53	51-60	f	right	MCA	y	Congenital aneurysm	1931
55	51-60	m	left	MCA	y	Arteriosclerosis	1931
56	51-60	m	right	VA	y	no information available	1931
58	51-60	f	left	ICA	y	no information available	1931
60	51-60	f	right	PcomA	y	Arteriosclerosis	1931
64	61-70	f	left	ICA	n	Arteriosclerosis	1931
64	61-70	f	left	MCA	y	Arteriosclerosis	1931
64	61-70	f	right	PcomA	y	Some thickening of Ibid. intima, probably of infectious origin	1931
66	61-70	f	right	MCA	y	Arteriosclerosis	1931
66	61-70	m	midline	BA	y	Arteriosclerosis	1931
70	61-70	m	left	ICA	y	Arteriosclerosis	1931
72	71-80	f	midline	AcomA	y	Arteriosclerosis	1931
72	71-80	f	left	AcomA	y	Arteriosclerosis	1931
75	71-80	m	midline	BA	n	no information available	1931
			right	MCA	y	Arteriosclerosis	1931
6	6-10.	f	right	AcomA	y	other vessels normal	1932
17	16-20	m	midline	BA	n	Changes of early arteriosclerosis	1932
19	16-20	f	left	MCA	y	Mycotic (endocarditis)	1932
19	16-20	f	midline	AcomA	y	no information available	1932
20	16-20	f	right	MCA	y	no information available	1932
24	21-30	m	midline	BA	y	Mycotic	1932
25	21-30	f	right	PcomA	y	No other abnormalities of vessels	1932
25	21-30	m	left	MCA	y	Congenital aneurysm	1932
29	21-30	m	right	PcomA	y	no information available	1932
30	21-30	f	left	PCA	n	Arteriosclerosis	1932
30	21-30	f	bilateral	MCA	y	Congenital aneurysm	1932
31	31-40	m	left	AcomA	y	Diffuse degenerative changes in all three coats	1932
35	31-40	m	bilateral	MCA	y	Arteriosclerosis	1932
36	31-40	f	left	PcomA	y	Arteriosclerosis	1932
40	31-40	m	midline	BA	y	Arteriosclerosis	1932
41	41-50	f	bilateral	MCA	y	Congenital aneurysm	1932
43	41-50		midline	BA	n	Atheroma	1932
43	41-50	m	left	PcomA	y	Arteriosclerosis	1932
45	41-50		midline	AcomA	n	Arteriosclerosis	1932
47	41-50	m	midline	BA	y	no information available	1932
52	51-60	m	left	AcomA	y	Congenital aneurysm	1932
54	51-60	f	right	MCA	y	Pronounced degenerative changes in all coats	1932
60	51-60	m	left	AcomA	y	Arteriosclerosis	1932
61	61-70	m	midline	BA	n	Arteriosclerosis	1932
61	61-70	f	left	PcomA	y	Arteriosclerosis	1932
61	61-70	m	left	MCA	y	Basilar artery arteriosclerotic	1932
67	61-70	m	right	BA	y	no information available	1932
68	61-70	m	undefined	CBAN	y	Arteriosclerosis	1932
			bilateral	MCA	y	no information available	1932
			bilateral	MCA	y	no information available	1932
			midline	AcomA	y	no information available	1932
			midline	AcomA	y	no information available	1932
20	16-20	f	left	ICA	y	Congenital aneurysm	1933
24	21-30	m	left	ICA	y	no information available	1933
27	21-30	m	midline	BA	y	No other microscopic changes; Heubner's arteritis	1933
28	21-30	f	right	PCA	y	infection	1933
28	21-30	m	left	MCA	y	Localized areas of fat absorption	1933
29	21-30	m	right	AcomA	y	Congenital aneurysm	1933
29	21-30	m	right	AcomA	y	Congenital aneurysm	1933
35	31-40	f	undefined	CBAN	n	no information available	1933
36	31-40	f	left	AcomA	y	no information available	1933
39	31-40	f	undefined	CBAN	y	no information available	1933
40	31-40	m	midline	AcomA	n	Arteriosclerosis	1933
40	31-40	m	right	AcomA	y	no information available	1933
42	41-50	m	left	MCA	y	Arteriosclerosis	1933
45	41-50	f	left	ICA	y	no information available	1933
47	41-50	f	left	PcomA	y	no information available	1933
47	41-50	m	right	ICA	y	Arteriosclerosis	1933
47	41-50	m	midline	AcomA	y	Arteriosclerosis	1933
51	51-60	f	left	ICA	y	Vessels degenerated	1933
53	51-60	m	left	ICA	n	Arteriosclerosis	1933
56	51-60	f	right	MCA	y	Extensive atheroma	1933
57	51-60	m	left	ICA	n	Arteriosclerosis	1933
58	51-60	m	right	AcomA	n	Arteriosclerosis	1933
67	61-70	m	left	ICA	n	Arteriosclerosis	1933
67	61-70	m	right	ICA	y	Cerebral vessels thin and smooth	1933
69	61-70	f	right	MCA	n	Arteriosclerosis	1933
75	71-80	m	left	ICA	n	Arteriosclerosis	1933
76	71-80	m	right	AcomA	n	Arteriosclerosis	1933
83	81-100	m	right	AcomA	n	no information available	1933
		m	right	MCA	y	Congenital aneurysm	1933
24	21-30	f	right	ICA	y	Healthy vessels	1934
26	21-30	m	left	MCA	y	Healthy vessels	1934
31	31-40	f	right	ICA	y	other vessels normal	1934
37	31-40	f	right	PcomA	y	no information available	1934
38	31-40	f	left	MCA	y	conjenital aneurysm	1934
40	31-40	f	right	MCA	y	Atheromatous	1934
42	41-50	m	midline	AcomA	y	Congenital aneurysm	1934
42	41-50	m	midline	AcomA	y	Healthy vessels	1934
42	41-50	m	midline	AcomA	y	no information available	1934
43	41-50	f	left	MCA	y	Arteriosclerosis	1934
43	41-50	m	right	AcomA	y	conjenital aneurysm	1934
47	41-50	f	right	MCA	y	no information available	1934
49	41-50	m	left	AcomA	y	conjenital aneurysm	1934
50	41-50	m	right	ICA	y	No arteriosclerosis	1934
51	51-60	m	right	ICA	y	No arteriosclerosis	1934
53	51-60	m	right	ICA	n	Healthy vessels	1934
53	51-60	f	right	PCA	y	Healthy vessels	1934
53	51-60	m	left	MCA	y	Arteriosclerosis	1934
54	51-60	m	right	ICA	y	Arteriosclerosis	1934
55	51-60	f	right	ICA	n	Normal vessels	1934
55	51-60	f	right	PcomA	y	Arteriosclerosis	1934
57	51-60	f	right	ICA	y	No arteriosclerosis	1934
59	51-60	f	right	MCA	y	no information available	1934
60	51-60	m	left	MCA	y	Healthy vessels	1934
62	61-70	f	right	ICA	y	Arteriosclerosis	1934
64	61-70	f	right	ICA	y	Normal vessels	1934
89	81-100	f	right	ICA	y	Healthy vessels	1934
33	31-40	f	midline	BA	y	conjenital aneurysm	1935
38	31-40	m	right	MCA	y	Healthy vessels	1935
43	41-50	f	right	ICA	n	no information available	1935
44	41-50	m	left	ICA	y	no information available	1935
64	61-70	f	right	PcomA	y	no information available	1935

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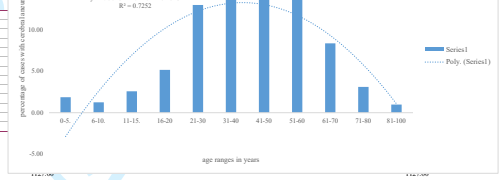
20	16-20	f	right	PcomA	y	syphilis	1936
22	21-30	m	right	MCA	y	Wall of aneurysm showed diffuse inflam mation, of mycotic origin	1936
28	21-30	m	left	MCA	y	no information available	1936
31	31-40	f	left	ICA	n	no information available	1936
31	31-40	m	right	MCA	y	Atheroma	1936
31	31-40	m	right	ICA	y	no information available	1936
39	31-40	f	left	ICA	y	Inflammation of intima	1936
44	41-50	f	left	AcomA	y	Arteries covered with yellow plaques; seen at operation	1936
45	41-50	f	right	VA	y	no information available	1936
46	41-50	f	right	ICA	y	no information available	1936
48	41-50	m	right	ICA	y	no information available	1936
50	41-50	f	midline	AcomA	y	no information available	1936
53	51-60	m	left	ICA	y	Arteriosclerosis	1936
57	51-60	m	left	ICA	n	no information available	1936
58	51-60	m	undefined	CBAN	n	no information available	1936
61	61-70	m	left	PcomA	y	Atheroma	1936
65	61-70	m	right	MCA	n	conjenital aneurysm	1936
74	71-80	m	midline	AcomA	y	Atheroma	1936
2	0-5.	m	right	VA	y	Congenital (?) narrow media	1937
6	6-10.	f	bilateral	MCA	y	Infective (endocarditis)	1937
8	6-10.	m	undefined	CBAN	y	No changes in wall: Herrman probably septic embolus	1937
20	16-20	f	undefined	CBAN	y	no information available	1937
20	16-20	m	undefined	CBAN	y	no information available	1937
23	21-30	m	left	ICA	n	Aneurysm seen at operation	1937
24	21-30	m	midline	BA	y	atherosclerotic, syphilitic aortitis	1937
26	21-30	f	right	ICA	y	Normal vessels	1937
28	21-30	m	undefined	CBAN	y	no information available	1937
29	21-30	f	right	PCA	y	no information available	1937
32	31-40	m	left	AcomA	y	no information available	1937
34	31-40	f	undefined	CBAN	n	no information available	1937
35	31-40	m	bilateral	VA	y	Syphilis	1937
36	31-40	f	right	AcomA	y	no information available	1937
36	31-40	m	undefined	CBAN	y	no information available	1937
37	31-40	m	left	AcomA	y	Atheroma	1937
38	31-40	f	midline	AcomA	y	Syphilis	1937
39	31-40	m	undefined	CBAN	y	no information available	1937
40	31-40	m	left	PICA	y	Few small atheroma- tous plaques: acellular, hyaiinized, thin media	1937
42	41-50	m	right	ICA	y	Normal vessels	1937
43	41-50	f	left	ICA	y	Thickening of wallof internal carotid artery	1937
44	41-50	f	undefined	CBAN	n	Aneurysm seen at operation	1937
44	41-50	m	midline	AcomA	n	no information available	1937
44	41-50	m	right	ICA	y	Arteriosclerosis	1937
46	41-50	f	undefined	CBAN	y	no information available	1937
48	41-50	f	undefined	CBAN	n	no information available	1937
49	41-50	f	bilateral	ICA	y	Syphilitic arteritis and atheroma	1937
49	41-50	m	undefined	CBAN	y	Atheroma	1937
49	41-50	m	right	MCA	y	Syphilitic arteritis and atheroma	1937
50	41-50	f	left	ICA	n	Aneurysm seen at operation	1937
50	41-50	m	midline	AcomA	y	Syphilis	1937
51	51-60	f	undefined	CBAN	n	no information available	1937
53	51-60	f	right	MCA	y	Syphilis	1937
53	51-60	f	right	ICA	n	Aneurysm seen at operation	1937
54	51-60	f	left	PcomA	y	Arteriosclerosis	1937
54	51-60	m	undefined	CBAN	y	no information available	1937
56	51-60	f	left	ICA	n	Aneurysm seen at operation	1937
58	51-60	f	right	AcomA	y	Arteriosclerosis	1937
58	51-60	m	undefined	CBAN	y	no information available	1937
61	61-70	f	undefined	CBAN	y	no information available	1937
62	61-70	f	right	AcomA	y	Atheroma	1937
62	61-70	f	undefined	CBAN	y	no information available	1937
62	61-70	m	undefined	CBAN	y	no information available	1937
63	61-70	f	midline	BA	y	no information available	1937
65	61-70	f	bilateral	PCA	y	Syphilis	1937
67	61-70	f	right	CBAN	n	Aneurysm seen at operation	1937
67	61-70	m	undefined	CBAN	y	no information available	1937
69	61-70	f	right	MCA	y	Syphilis	1937
71	71-80	m	undefined	CBAN	y	Atheroma	1937
72	71-80	f	left	PcomA	n	Atheroma	1937
73	71-80	f	midline	BA	n	Syphilis	1937
75	71-80	m	left	ICA	y	Arteriosclerosis	1937
75	71-80	m	midline	AcomA	y	Atheroma	1937
84	81-100	f	right	ICA	n	Arteriosclerosis	1937
		f	right	VA	y	Syphilis	1937
16	16-20	m	midline	AcomA	y	Embolic (endocarditis)	1937
33	31-40	m	right	AcomA	y	Vessel healthy	1937
38	31-40	f	right	MCA	y	Arteriosclerosis	1937
41	41-50	f	right	AcomA	y	Vessel healthy	1937
42	41-50	m	left	AcomA	y	Vessel healthy	1937
60	51-60	f	right	MCA	y	Vessel healthy	1937
62	61-70	f	midline	AcomA	y		1937
66	61-70	f	midline	AcomA	y		1937
31	31-40	m	midline	BA	y		1937



age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	asc ranae	192.00	17.04	17.04	
	0-5.	21.00	1.86	1.86	
	6-10.	14.00	1.24	1.24	
	11-15.	29.00	2.57	2.57	
	16-20	58.00	5.15	5.15	
	21-30	146.00	12.95	12.95	
	31-40	165.00	14.64	14.64	
	41-50	203.00	18.01	18.01	
	51-60	159.00	14.11	14.11	
	61-70	94.00	8.34	8.34	
	71-80	35.00	3.11	3.11	
	81-100	11.00	0.98	0.98	
	Total	1127.00	100.00	100.00	

occurrence of aneurysms in all age groups (15 months to 89 years), recorded from 1761 to 1938, (McDonald & Korb 1939)

		age	age range	sex	side		arterial con	year
all cases N	Valid	935.00	1127.00	1127.00		1127	1127.00	1127.00
	Missing	192.00	0.00	0.00		0	0.00	0.00
Mean		41.69						1909.81
Median		41.00						1923.00
Mode		41.00						1928.00
Std. Deviation		17.69						28.33
Minimum		1.50						1761.00
Maximum		89.00						1938.00

sex

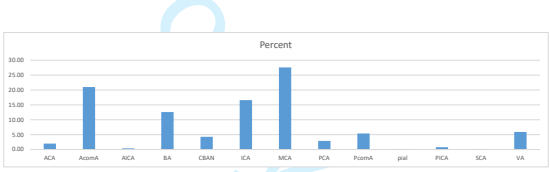
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		28.00	2.50	2.50	2.50
	f	573.00	50.80	50.80	53.30
	m	526.00	46.70	46.70	100.00
	Total	1127.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	33.00	2.90	2.90	2.90
	left	386.00	34.30	34.30	37.20
	midline	279.00	24.80	24.80	61.90
	right	367.00	32.60	32.60	94.50
	undefined	62.00	5.50	5.50	100.00
	Total	1127.00	100.00	100.00	

arteries- all cases of cerebral aneurysms in all age groups ≥15 months, recorded from 1761 to 1938, (McDonald CA, Korb M. Intracranial aneurysms. Archives of neurology and psychiatry (Chicago) 1939; 42(2): 298-328.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	22.00	2.00	2.00	2.00
	AcomA	237.00	21.00	21.00	23.00
	AICA	5.00	0.40	0.40	23.40
	BA	142.00	12.60	12.60	36.00
	CBAN	49.00	4.30	4.30	40.40
	ICA	187.00	16.60	16.60	57.00
	MCA	311.00	27.60	27.60	84.60
	PCA	33.00	2.90	2.90	87.50
	PcomA	61.00	5.40	5.40	92.90
	pial	2.00	0.20	0.20	93.10
	PICA	9.00	0.80	0.80	93.90
	SCA	2.00	0.20	0.20	94.10
	VA	67.00	5.90	5.90	100.00
	Total	1127.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		54.00	4.80	4.80	4.80
	n	198.00	17.60	17.60	22.40
	y	875.00	77.60	77.60	100.00
	Total	1127.00	100.00	100.00	

occurrence of aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

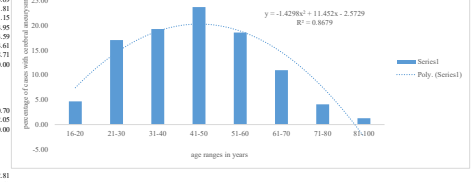
Statistics

		age	age range	sex	side	arteries	rupture	arterial con	year
N	Valid	853.00	853.00	853.00		853.00	853.00	853	853.00
	Missing	0.00	0.00	0.00		0.00	0.00	0	0.00
Mean		44.68							1907.90
Median		43.00							1919.00
Mode		41.00							1894.00
Std. Deviation		15.46							29.46
Minimum		18.00							1761.00
Maximum		89.00							1938.00
Percentiles	25	32.00							1894.00
	50	43.00							1919.00
	75	56.00							1929.00

Frequency Table = cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-20	40.00	4.69	4.69	4.69
	21-30	146.00	17.12	17.12	21.81
	31-40	165.00	19.34	19.34	41.15
	41-50	203.00	23.80	23.80	64.95
	51-60	159.00	18.64	18.64	83.59
	61-70	94.00	11.02	11.02	94.61
	71-80	35.00	4.10	4.10	98.71
	81-100	11.00	1.29	1.29	100.00
	Total	853.00	100.00	100.00	



sex = cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		6.00	0.70	0.70	0.70
	f	438.00	51.35	51.35	52.05
	m	409.00	47.95	47.95	100.00
	Total	853.00	100.00	100.00	

side involved- cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	24.00	2.81	2.81	2.81
	left	295.00	34.58	34.58	37.40
	midline	181.00	21.22	21.22	58.62
	right	305.00	35.76	35.76	94.37
	undefined	48.00	5.63	5.63	100.00
	Total	853.00	100.00	100.00	

arteries involved- cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	18.00	2.11	2.11	2.11

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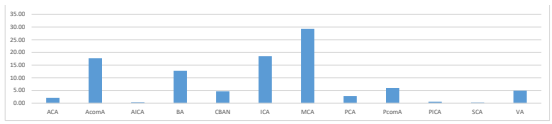
	AcomA	151.00	17.70	17.70
	AICA	3.00	0.35	0.35
	BA	109.00	12.78	12.78
	CBAN	40.00	4.69	4.69
	ICA	158.00	18.52	18.52
	MCA	250.00	29.31	29.31
	PCA	24.00	2.81	2.81
	PcomA	51.00	5.98	5.98
	PICA	5.00	0.59	0.59
	SCA	2.00	0.23	0.23
	VA	42.00	4.92	4.92
	Total	853.00	100.00	100.00



rupture- cases of cerebral aneurysms in age groups ≥18 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	170.00	19.93	19.93	19.93
	y	683.00	80.07	80.07	100.00
	Total	853.00	100.00	100.00	

cases of cerebral aneurysms in age groups less than 20 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial con	year
N	Valid	122.00	122.00	122.00	122.00	122.00	122.00	122	122.00
	Missing	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		13.46							1905.83
Median		15.00							1921.00
Mode		20.00							1928.00
Std. Deviation		5.88							30.63
Minimum		1.50							1814.00
Maximum		20.00							1978.00
Percentiles	25	8.00							1882.75
	50	15.00							1921.00
	75	18.00							1928.00

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5.	21.00	17.21	17.21	17.21
	11-15.	29.00	23.77	23.77	40.98
	16-20	58.00	47.54	47.54	88.52
	6-10.	14.00	11.48	11.48	100.00
	Total	122.00	100.00	100.00	

sex

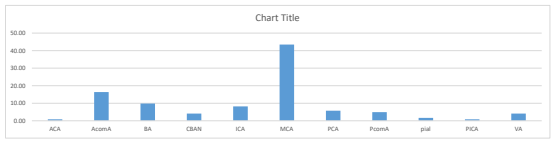
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	59.00	48.36	48.36	48.36
	m	63.00	51.64	51.64	100.00
	Total	122.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	7.00	5.74	5.74	5.74
	left	53.00	43.44	43.44	49.18
	midline	17.00	13.93	13.93	63.11
	right	38.00	31.15	31.15	94.26
	undefined	7.00	5.74	5.74	100.00
	Total	122.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	1.00	0.82	0.82	0.82
	AcomA	20.00	16.39	16.39	17.21
	BA	12.00	9.84	9.84	27.05
	CBAN	5.00	4.10	4.10	31.15
	ICA	10.00	8.20	8.20	39.34
	MCA	53.00	43.44	43.44	82.79
	PCA	7.00	5.74	5.74	88.52
	PcomA	6.00	4.92	4.92	93.44
	pial	2.00	1.64	1.64	95.08
	PICA	1.00	0.82	0.82	95.90
	VA	5.00	4.10	4.10	100.00
	Total	122.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	16.00	13.11	13.11	13.11
	y	106.00	86.89	86.89	100.00
	Total	122.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in age >= 18 & year < 1850 up to 1761 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	41.00	41.00	41.00	41.00	41.00	41.00	41
	Missing	0.00	0.00		0.00	0.00	0.00	0
Mean		44.32						
Median		47.00						
Mode		20.00						
Std. Deviation		15.61						
Minimum		19.00						
Maximum		68.00						
Percentiles	25	33.50						
	50	47.00						
	75	59.00						

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	age range in years				
	16-20	6.00	14.63	14.63	14.63
	21-30	3.00	7.32	7.32	21.95
	31-40	8.00	19.51	19.51	41.46
	41-50	5.00	12.20	12.20	53.66
	51-60	15.00	36.59	36.59	90.24
	61-70	4.00	9.76	9.76	100.00
	Total	41.00	100.00	100.00	

sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	16.00	39.02	39.02	39.02
	m	25.00	60.98	60.98	100.00
	Total	41.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	4.88	4.88	4.88
	left	10.00	24.39	24.39	29.27
	midline	18.00	43.90	43.90	73.17
	right	7.00	17.07	17.07	90.24
	undefined	4.00	9.76	9.76	100.00
	Total	41.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	2.00	4.88	4.88	4.88
	AcomA	2.00	4.88	4.88	9.76
	BA	16.00	39.02	39.02	48.78
	ICA	8.00	19.51	19.51	68.29
	MCA	6.00	14.63	14.63	82.93
	PCA	1.00	2.44	2.44	85.37
	PcomA	5.00	12.20	12.20	97.56
	VA	1.00	2.44	2.44	100.00
	Total	41.00	100.00	100.00	

rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	8.00	19.51	19.51	19.51
	y	33.00	80.49	80.49	100.00
	Total	41.00	100.00	100.00	

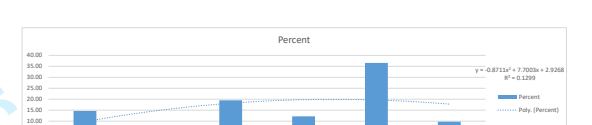
Frequency- cases of cerebral aneurysms in age >= 18 & year >= 1850 & year < 1900 (McDonald & Korb 1939)

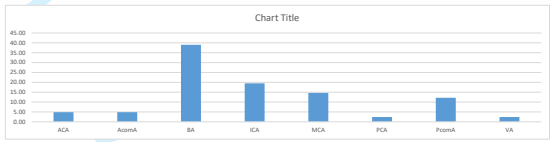
Statistics

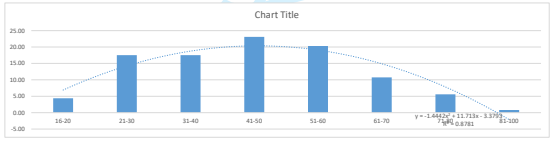
		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	251.00	251.00		251.00	251.00	251.00	251
	Missing	0.00	0.00		0.00	0.00	0.00	0
Mean		45.63						
Median		45.00						
Mode		40.00						
Std. Deviation		15.59						
Minimum		18.00						
Maximum		86.00						
Percentiles	25	34.00						
	50	45.00						
	75	56.00						

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-20	11.00	4.38	4.38	4.38
	21-30	44.00	17.53	17.53	21.91
	31-40	44.00	17.53	17.53	39.44
	41-50	58.00	23.11	23.11	62.55
	51-60	51.00	20.32	20.32	82.87
	61-70	27.00	10.76	10.76	93.63
	71-80	14.00	5.58	5.58	99.20
	81-100	2.00	0.80	0.80	100.00
	Total	251.00	100.00	100.00	

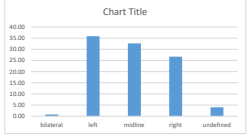






sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1.00	0.40	0.40	0.40
	f	136.00	54.18	54.18	54.58
	m	114.00	45.42	45.42	100.00
	Total	251.00	100.00	100.00	

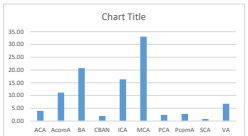


side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	0.80	0.80	0.80
	left	90.00	35.86	35.86	36.65
	midline	82.00	32.67	32.67	69.32
	right	67.00	26.69	26.69	96.02
	undefined	10.00	3.98	3.98	100.00
	Total	251.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	10.00	3.98	3.98	3.98
	AcomA	28.00	11.16	11.16	15.14
	BA	52.00	20.72	20.72	35.86
	CBAN	5.00	1.99	1.99	37.85
	ICA	41.00	16.33	16.33	54.18
	MCA	83.00	33.07	33.07	87.25
	PCA	6.00	2.39	2.39	89.64
	PcomA	7.00	2.79	2.79	92.43
	SCA	2.00	0.80	0.80	93.23
	VA	17.00	6.77	6.77	100.00
	Total	251.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	63.00	25.10	25.10	25.10
	y	188.00	74.90	74.90	100.00
	Total	251.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in age >= 18 & year 1900 to 1938 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	561.00	561.00		561.00	561.00	561.00	561
	Missing	0.00	0.00		0.00	0.00	0.00	0
Mean		44.27						

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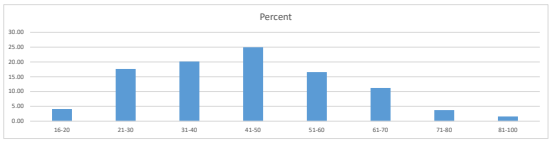
Median		42.00
Mode		41.00
Std. Deviation		15.39
Minimum		18.00
Maximum		89.00
Percentiles	25	32.00
	50	42.00
	75	55.00



age range

	age range	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-20	23.00	4.10	4.10	4.10
	21-30	99.00	17.65	17.65	21.75
	31-40	113.00	20.14	20.14	41.89
	41-50	140.00	24.96	24.96	66.84
	51-60	93.00	16.58	16.58	83.42
	61-70	63.00	11.23	11.23	94.65
	71-80	21.00	3.74	3.74	98.40
	81-100	9.00	1.60	1.60	100.00
	Total	561.00	100.00	100.00	

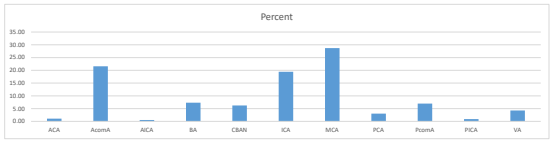
sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5.00	0.89	0.89	0.89
	f	286.00	50.98	50.98	51.87
	m	270.00	48.13	48.13	100.00
	Total	561.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	20.00	3.57	3.57	3.57
	left	195.00	34.76	34.76	38.32
	midline	81.00	14.44	14.44	52.76
	right	231.00	41.18	41.18	93.94
	undefined	34.00	6.06	6.06	100.00
	Total	561.00	100.00	100.00	

arteries



	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	6.00	1.07	1.07	1.07
	AcomA	121.00	21.57	21.57	22.64
	AICA	3.00	0.53	0.53	23.17
	BA	41.00	7.31	7.31	30.48
	CBAN	35.00	6.24	6.24	36.72
	ICA	109.00	19.43	19.43	56.15
	MCA	161.00	28.70	28.70	84.85
	PCA	17.00	3.03	3.03	87.88
	PcomA	39.00	6.95	6.95	94.83
	PICA	5.00	0.89	0.89	95.72
	VA	24.00	4.28	4.28	100.00
	Total	561.00	100.00	100.00	

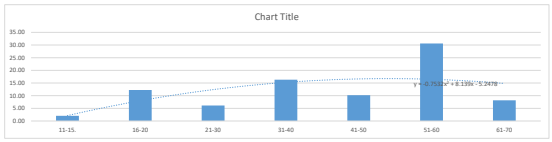
rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	99.00	17.65	17.65	17.65
	y	462.00	82.35	82.35	100.00
	Total	561.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year <1850 to 1761 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	42.00	49.00	49.00	49.00	49.00	49.00	49.00
	Missing	7.00	0.00	0.00	0.00	0.00	0.00	0 0.00
Mean		43.60						
Median		46.00						
Mode		20.00						
Std. Deviation		16.11						
Minimum		14.00						
Maximum		68.00						
Percentiles	25	31.75						
	50	46.00						
	75	59.00						

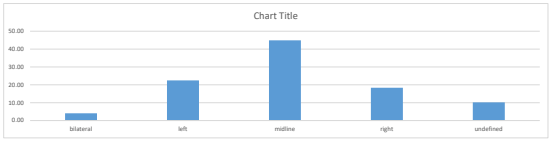


age range

	age range	Frequency	Percent	Valid Percent	Cumulative Percent
Valid		7.00	14.29	14.29	14.29
	11-15.	1.00	2.04	2.04	16.33
	16-20	6.00	12.24	12.24	28.57
	21-30	3.00	6.12	6.12	34.69
	31-40	8.00	16.33	16.33	51.02
	41-50	5.00	10.20	10.20	61.22
	51-60	15.00	30.61	30.61	91.84
	61-70	4.00	8.16	8.16	100.00
	Total	49.00	100.00	100.00	

sex

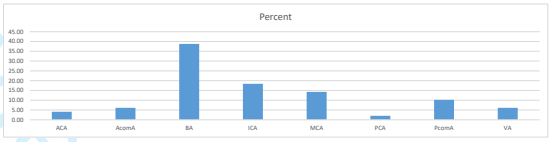
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3.00	6.12	6.12	6.12
	f	16.00	32.65	32.65	38.78
	m	30.00	61.22	61.22	100.00
	Total	49.00	100.00	100.00	



side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	4.08	4.08	4.08
	left	11.00	22.45	22.45	26.53
	midline	22.00	44.90	44.90	71.43
	right	9.00	18.37	18.37	89.80
	undefined	5.00	10.20	10.20	100.00
	Total	49.00	100.00	100.00	

arteries



	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	2.00	4.08	4.08	4.08
	AcomA	3.00	6.12	6.12	10.20
	BA	19.00	38.78	38.78	48.98
	ICA	9.00	18.37	18.37	67.35
	MCA	7.00	14.29	14.29	81.63
	PCA	1.00	2.04	2.04	83.67
	PcomA	5.00	10.20	10.20	93.88
	VA	3.00	6.12	6.12	100.00
	Total	49.00	100.00	100.00	

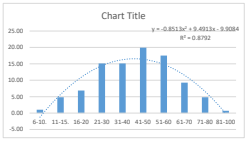
rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2.00	4.08	4.08	4.08
	n	13.00	26.53	26.53	30.61
	y	34.00	69.39	69.39	100.00
	Total	49.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year<1900 & year >= 1850 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	277.00	291.00	291.00	291.00	291.00	291.00	291 291.00
	Missing	14.00	0.00	0.00	0.00	0.00	0.00	0 0.00
Mean		42.67						
Median		43.00						
Mode		40.00						
Std. Deviation		17.50						
Minimum		6.00						
Maximum		86.00						
Percentiles	25	28.50						
	50	43.00						
	75	56.00						



age range

	age range	Frequency	Percent	Valid Percent	Cumulative Percent
Valid		14.00	4.81	4.81	4.81
	6-10.	3.00	1.03	1.03	85.22
	11-15.	14.00	4.81	4.81	9.62
	16-20	20.00	6.87	6.87	16.49
	21-30	44.00	15.12	15.12	31.62
	31-40	44.00	15.12	15.12	46.74
	41-50	58.00	19.93	19.93	66.67
	51-60	51.00	17.53	17.53	84.19
	61-70	27.00	9.28	9.28	94.50
	71-80	14.00	4.81	4.81	99.31
	81-100	2.00	0.69	0.69	100.00
	Total	291.00	100.00	100.00	

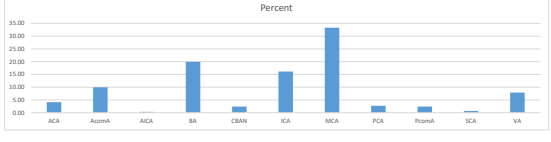
sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5.00	1.72	1.72	1.72
	f	147.00	50.52	50.52	52.23
	m	139.00	47.77	47.77	100.00
	Total	291.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	3.00	1.03	1.03	1.03
	left	104.00	35.74	35.74	36.77
	midline	90.00	30.93	30.93	67.70
	right	78.00	26.80	26.80	94.50
	undefined	16.00	5.50	5.50	100.00
	Total	291.00	100.00	100.00	

arteries



	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	12.00	4.12	4.12	4.12
	AcomA	29.00	9.97	9.97	14.09
	AICA	1.00	0.34	0.34	14.43
	BA	58.00	19.93	19.93	34.36
	CBAN	7.00	2.41	2.41	36.77
	ICA	47.00	16.15	16.15	52.92
	MCA	97.00	33.33	33.33	86.25
	PCA	8.00	2.75	2.75	89.00
	PcomA	7.00	2.41	2.41	91.41
	SCA	2.00	0.69	0.69	92.10
	VA	23.00	7.90	7.90	100.00
	Total	291.00	100.00	100.00	

rupture

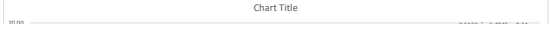
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3.00	1.03	1.03	1.03
	n	73.00	25.09	25.09	26.12
	y	215.00	73.88	73.88	100.00
	Total	291.00	100.00	100.00	

Cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year year>= 1900 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	616.00	787.00	787.00	787.00	787.00	787.00	787 787.00
	Missing	171.00	0.00	0.00		0.00	0.00	0 0.00
Mean		41.12						
Median		41.00						
Mode		41.00						
Std. Deviation		17.88						
Minimum		1.50						
Maximum		89.00						
Percentiles	25	29.00						
	50	41.00						
	75	53.00						

Frequency Table



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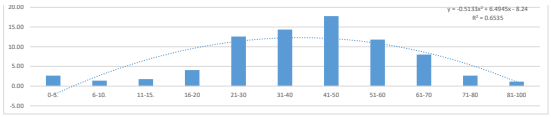
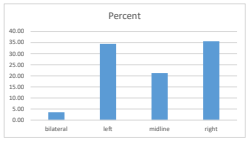
age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		171.00	21.73	21.73	21.73
	0-5.	21.00	2.67	2.67	24.40
	6-10.	11.00	1.40	1.40	88.18
	11-15.	14.00	1.78	1.78	26.18
	16-20	32.00	4.07	4.07	30.24
	21-30	99.00	12.58	12.58	42.82
	31-40	113.00	14.36	14.36	57.18
	41-50	140.00	17.79	17.79	74.97
	51-60	93.00	11.82	11.82	86.79
	61-70	63.00	8.01	8.01	96.19
	71-80	21.00	2.67	2.67	98.86
	81-100	9.00	1.14	1.14	100.00
	Total	787.00	100.00	100.00	



sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		20.00	2.54	2.54	2.54
	f	410.00	52.10	52.10	54.64
	m	357.00	45.36	45.36	100.00
	Total	787.00	100.00	100.00	

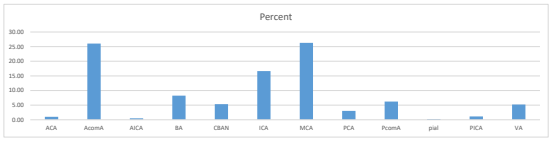


side

	sides	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	28.00	3.56	3.56	3.56
	left	271.00	34.43	34.43	37.99
	midline	167.00	21.22	21.22	59.21
	right	280.00	35.58	35.58	94.79
	undefined	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	8.00	1.02	1.02	1.02
	AcomA	205.00	26.05	26.05	27.06
	AICA	4.00	0.51	0.51	27.57
	BA	65.00	8.26	8.26	35.83
	CBAN	42.00	5.34	5.34	41.17
	ICA	131.00	16.65	16.65	57.81
	MCA	207.00	26.30	26.30	84.12
	PCA	24.00	3.05	3.05	87.17
	PcomA	49.00	6.23	6.23	93.39
	pial	2.00	0.25	0.25	93.65
	PICA	9.00	1.14	1.14	94.79
	VA	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	



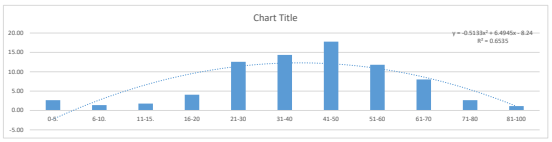
rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		49.00	6.23	6.23	6.23
	n	112.00	14.23	14.23	20.46
	y	626.00	79.54	79.54	100.00
	Total	787.00	100.00	100.00	

Cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year yearyear>= 1900 to 1938 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	616.00	787.00	787.00	787.00	787.00	787.00	787.00
	Missing	171.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean		41.12						
Median		41.00						
Mode		41.00						
Std. Deviation		17.88						
Minimum		1.50						
Maximum		89.00						
Percentiles	25	29.00						
	50	41.00						
	75	53.00						

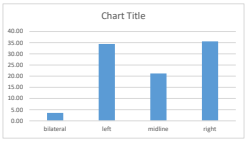


age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		171.00	21.73	21.73	21.73
	0-5.	21.00	2.67	2.67	24.40
	6-10.	11.00	1.40	1.40	88.18
	11-15.	14.00	1.78	1.78	26.18
	16-20	32.00	4.07	4.07	30.24
	21-30	99.00	12.58	12.58	42.82
	31-40	113.00	14.36	14.36	57.18
	41-50	140.00	17.79	17.79	74.97
	51-60	93.00	11.82	11.82	86.79
	61-70	63.00	8.01	8.01	96.19
	71-80	21.00	2.67	2.67	98.86
	81-100	9.00	1.14	1.14	100.00
	Total	787.00	100.00	100.00	

sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		20.00	2.54	2.54	2.54
	f	410.00	52.10	52.10	54.64
	m	357.00	45.36	45.36	100.00
	Total	787.00	100.00	100.00	

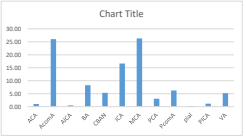


side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	28.00	3.56	3.56	3.56
	left	271.00	34.43	34.43	37.99
	midline	167.00	21.22	21.22	59.21
	right	280.00	35.58	35.58	94.79
	undefined	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	8.00	1.02	1.02	1.02
	AcomA	205.00	26.05	26.05	27.06
	AICA	4.00	0.51	0.51	27.57
	BA	65.00	8.26	8.26	35.83
	CBAN	42.00	5.34	5.34	41.17
	ICA	131.00	16.65	16.65	57.81
	MCA	207.00	26.30	26.30	84.12
	PCA	24.00	3.05	3.05	87.17
	PcomA	49.00	6.23	6.23	93.39
	pial	2.00	0.25	0.25	93.65
	PICA	9.00	1.14	1.14	94.79
	VA	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		49.00	6.23	6.23	6.23
	n	112.00	14.23	14.23	20.46
	y	626.00	79.54	79.54	100.00
	Total	787.00	100.00	100.00	

All 1127 cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year year>= 1761 to 1938 (McDonald & Korb 1939)

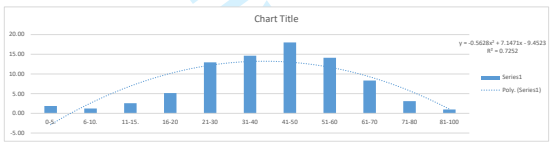
Statistics

		age	age range	sex	side	arteries	rupture	
N	Valid	935.00	1127.00	1127.00	1127.00	1127.00	1127.00	1127
	Missing	192.00	0.00	0.00	0.00	0.00	0.00	0
Mean		41.69						
Median		41.00						
Mode		41.00						
Std. Deviation		17.69						
Minimum		1.50						
Maximum		89.00						
Percentiles	25	29.00						
	50	41.00						
	75	54.00						

Frequency Table

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		192.00	17.04	17.04	17.04
	0-5.	21.00	1.86	1.86	18.90
	6-10.	14.00	1.24	1.24	87.58
	11-15.	29.00	2.57	2.57	21.47
	16-20	58.00	5.15	5.15	26.62
	21-30	146.00	12.95	12.95	39.57
	31-40	165.00	14.64	14.64	54.21
	41-50	203.00	18.01	18.01	72.23
	51-60	159.00	14.11	14.11	86.34
	61-70	94.00	8.34	8.34	95.92
	71-80	35.00	3.11	3.11	99.02
	81-100	11.00	0.98	0.98	100.00
	Total	1127.00	100.00	100.00	



sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		28.00	2.48	2.48	2.48
	f	573.00	50.84	50.84	53.33
	m	526.00	46.67	46.67	100.00
	Total	1127.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	33.00	2.93	2.93	2.93
	left	386.00	34.25	34.25	37.18
	midline	279.00	24.76	24.76	61.93
	right	367.00	32.56	32.56	94.50
	undefined	62.00	5.50	5.50	100.00
	Total	1127.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	22.00	1.95	1.95	1.95
	AcomA	237.00	21.03	21.03	22.98
	AICA	5.00	0.44	0.44	23.43
	BA	142.00	12.60	12.60	36.02
	CBAN	49.00	4.35	4.35	40.37
	ICA	187.00	16.59	16.59	56.97
	MCA	311.00	27.60	27.60	84.56
	PCA	33.00	2.93	2.93	87.49
	PcomA	61.00	5.41	5.41	92.90
	pial	2.00	0.18	0.18	93.08
	PICA	9.00	0.80	0.80	93.88
	SCA	2.00	0.18	0.18	94.06
	VA	67.00	5.94	5.94	100.00
	Total	1127.00	100.00	100.00	

rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		54.00	4.79	4.79	4.79
	n	198.00	17.57	17.57	22.36
	y	875.00	77.64	77.64	100.00
	Total	1127.00	100.00	100.00	

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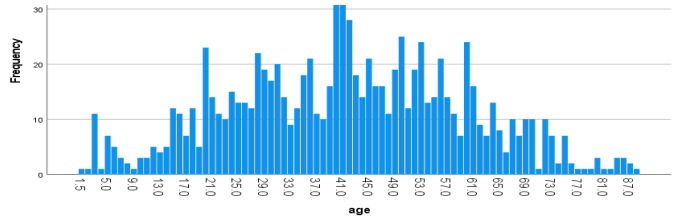

2.00	1.00	0.10	0.10	0.20
3.00	11.00	1.00	1.20	1.40
4.00	1.00	0.10	0.10	1.50
5.00	7.00	0.60	0.70	2.20
6.00	5.00	0.40	0.50	2.80
7.00	3.00	0.30	0.30	3.10
8.00	2.00	0.20	0.20	3.30
9.00	1.00	0.10	0.10	3.40
10.00	3.00	0.30	0.30	3.70
11.00	3.00	0.30	0.30	4.10
12.00	5.00	0.40	0.50	4.60
13.00	4.00	0.40	0.40	5.00
14.00	5.00	0.40	0.50	5.60
15.00	12.00	1.10	1.30	6.80
16.00	11.00	1.00	1.20	8.00
17.00	7.00	0.60	0.70	8.80
18.00	12.00	1.10	1.30	10.10
19.00	5.00	0.40	0.50	10.60
20.00	23.00	2.00	2.50	13.00
21.00	14.00	1.20	1.50	14.50
22.00	11.00	1.00	1.20	15.70
23.00	10.00	0.90	1.10	16.80
24.00	15.00	1.30	1.60	18.40
25.00	13.00	1.20	1.40	19.80
26.00	13.00	1.20	1.40	21.20
27.00	12.00	1.10	1.30	22.50
28.00	22.00	2.00	2.40	24.80
29.00	19.00	1.70	2.00	26.80
30.00	17.00	1.50	1.80	28.70
31.00	20.00	1.80	2.10	30.80
32.00	14.00	1.20	1.50	32.30
33.00	9.00	0.80	1.00	33.30
34.00	12.00	1.10	1.30	34.50
35.00	18.00	1.60	1.90	36.50
36.00	21.00	1.90	2.20	38.70
37.00	11.00	1.00	1.20	39.90
38.00	10.00	0.90	1.10	41.00
39.00	16.00	1.40	1.70	42.70
40.00	34.00	3.00	3.60	46.30
41.00	35.00	3.10	3.70	50.10
42.00	28.00	2.50	3.00	53.00
43.00	18.00	1.60	1.90	55.00
44.00	14.00	1.20	1.50	56.50
45.00	21.00	1.90	2.20	58.70
46.00	16.00	1.40	1.70	60.40
47.00	16.00	1.40	1.70	62.10
48.00	11.00	1.00	1.20	63.30
49.00	19.00	1.70	2.00	65.30
50.00	25.00	2.20	2.70	68.00
51.00	12.00	1.10	1.30	69.30
52.00	19.00	1.70	2.00	71.30
53.00	24.00	2.10	2.60	73.90
54.00	13.00	1.20	1.40	75.30
55.00	14.00	1.20	1.50	76.80
56.00	21.00	1.90	2.20	79.00
57.00	14.00	1.20	1.50	80.50
58.00	11.00	1.00	1.20	81.70
59.00	7.00	0.60	0.70	82.50
60.00	24.00	2.10	2.60	85.00
61.00	16.00	1.40	1.70	86.70
62.00	9.00	0.80	1.00	87.70
63.00	7.00	0.60	0.70	88.40
64.00	13.00	1.20	1.40	89.80
65.00	8.00	0.70	0.90	90.70
66.00	4.00	0.40	0.40	91.10
67.00	10.00	0.90	1.10	92.20
68.00	7.00	0.60	0.70	92.90
69.00	10.00	0.90	1.10	94.00
70.00	10.00	0.90	1.10	95.10
71.00	1.00	0.10	0.10	95.20
72.00	10.00	0.90	1.10	96.30
73.00	7.00	0.60	0.70	97.00
74.00	2.00	0.20	0.20	97.20
75.00	7.00	0.60	0.70	98.00
76.00	2.00	0.20	0.20	98.20
77.00	1.00	0.10	0.10	98.30
78.00	1.00	0.10	0.10	98.40
79.00	1.00	0.10	0.10	98.50
80.00	3.00	0.30	0.30	98.80
81.00	1.00	0.10	0.10	98.90
83.00	1.00	0.10	0.10	99.00
84.00	3.00	0.30	0.30	99.40
86.00	3.00	0.30	0.30	99.70
87.00	2.00	0.20	0.20	99.90
89.00	1.00	0.10	0.10	100.00
	Total	935.00	83.00	100.00
Missing	System	192.00	17.00	
Total		1127.00	100.00	

Age in years	Frequency
1.50	1.00
2.00	1.00
3.00	11.00
4.00	1.00
5.00	7.00
6.00	5.00
7.00	3.00
8.00	2.00
9.00	1.00
10.00	3.00
11.00	3.00
12.00	5.00
13.00	4.00
14.00	5.00
15.00	12.00
16.00	11.00
17.00	7.00
18.00	12.00
19.00	5.00
20.00	23.00
21.00	14.00
22.00	11.00
23.00	10.00
24.00	15.00
25.00	13.00
26.00	13.00
27.00	12.00
28.00	22.00
29.00	19.00
30.00	17.00
31.00	20.00
32.00	14.00
33.00	9.00
34.00	12.00
35.00	18.00
36.00	21.00
37.00	11.00
38.00	10.00
39.00	16.00
40.00	34.00
41.00	35.00
42.00	28.00
43.00	18.00
44.00	14.00
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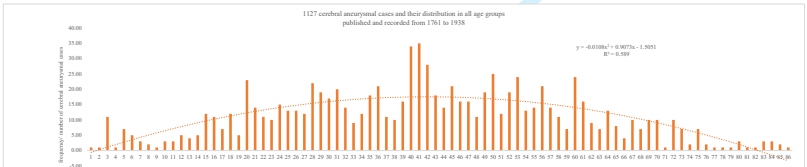

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Supplementary file 2: contains type 2 data: The Human Ethics permit (approval number: H2014-176, Research Ethics Committee, Office of Research Ethics, Compliance and Integrity, Faculty of Health Sciences, University of Adelaide) granted permission to access and use the deidentified data set from the Carestream data registry system (Vue-RIS-version-11·0·14·35) for research
Manuscript title: The trend of cerebral aneurysms over the past two centuries: Need for early screening - An observational study.
Type 2 data were Cerebral computed tomography angiography images obtained from 173 randomly selected patients, who visited the Royal Adelaide Hospital (RAH) between January 2011 and December 2019 for a variety of cranial pathologies
Abbreviations: cases with cerebral aneurysms=y, cases without cerebral aneurysms=n; cases without cerebral aneurysms = n; cases with cerebral aneurysms = n; aneurysmal only cases = y, cases without aneurysms = n; AcomAC An = aneurysms at anterior communicating artery; n= no, y=yes
complex (AcomAC) region, y=yes and n=no; aneurysms elsewhere otherthan in the AcomAC region, y = yes and n=no; aneurysms elsewhere otherthan in the AcomAC region = y = yes and n=no; rt ICA an = aneurysms in right internal carotid artery (rt ICA) region; rt MCA an = aneurysms in right middle cerebral artery region;
rt ICA + MCA an = aneurysms in right internal carotid and middle cerebral arterial region; lft ICA an = aneurysms in left internal carotid artery (lft ICA) region; lft MCA an =aneurysms in left middle cerebral artery region; lft ICA + MCA an =aneurysms in left internal carotid and middle cerebral arterial region;
right P2 an =aneurysm in the 2nd part of right posterior cerebral artery; left P2 an =aneurysm in the 2nd part of the left posterior cerebral artery; VB an = aneurysm in vertebro basilarregion; rt PICA an = aneurysms in the right posterior inferior cerebellar (rt PICA) region;
lft PICA an = aneurysms in the left posterior inferior cerebellar (lft PICA) region; rt VA an =aneurysms in the right vertebral artery (rt VA); BA an =aneurysms in the basilar artery region; rt SCA = aneurysms in the right superior cerebellar region; lft SCA an =aneurysms in the left superior cerebellar region

age range	Sex	cases with cerebral aneurysms=y,	cases without cereb	aneurysmal only cases =	AcomAC An	aneurysms elsewhere otherthan in the AcomAC region = y =	rt ICA an	rt MCA an	rt ICA + MCA an	lft ICA an	lft MCA an	lft ICA + MCA an =	right P2 an	left P2 an	VB an	rt PICA an	lft PICA an	rt VA an =	lft VA an =	BA an =an	rt SCA an	lft SCA =aneurysms in the left superior cerebellar region
15-20	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
15-20	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
31-40	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
31-40	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m

| | | |

Valid	n	102.00	100.00	100.00	100.00

lft SCA an

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	101.00	99.02	99.02	99.02
	v	1.00	0.98	0.98	100.00
	Total	102.00	100.00	100.00	

age range- patients with (n=102) and without aneurysms (n=71) included in the study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-20	3.00	1.70	1.70	1.70
	21-30	7.00	4.00	4.00	5.80
	31-40	8	4.6	4.6	10.4
	41-50	27	15.6	15.6	26
	51-60	36	20.8	20.8	46.8
	61-70	51	29.5	29.5	76.3
	71-80	27	15.6	15.6	91.9
	81-100	14	8.1	8.1	100
	Total	173	100	100	

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	90	52	52	52
	m	83	48	48	100
	Total	173	100	100	

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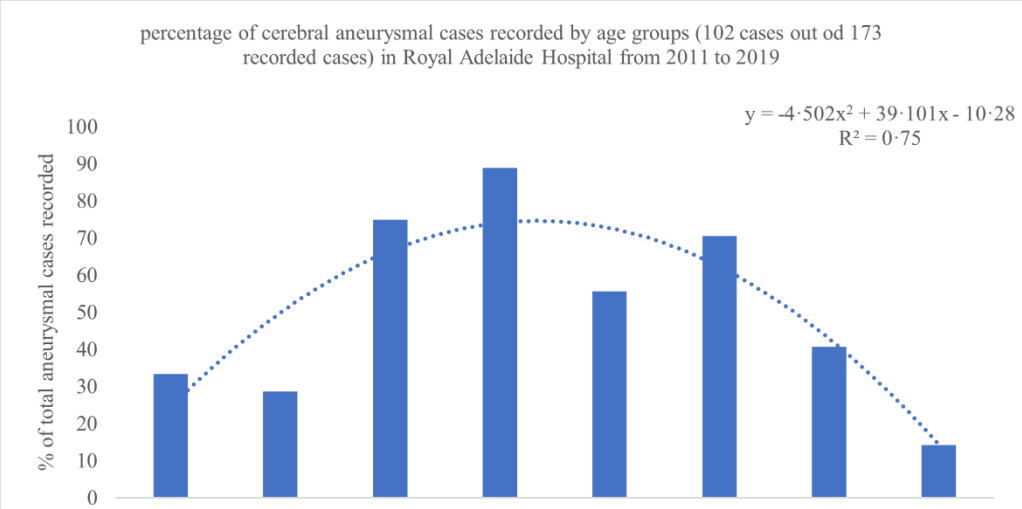

Supplementary Figure 1- The prevalence (%) of cerebral aneurysms observed over a broad age range (18-100 years, n=173, cases with aneurysms=102, cases without aneurysm=71), with a median of 62 years, a mean of 60 years, and a standard deviation of 15.75, is shown in the chart. The peak prevalence occurs between 31-60 years ($p<0.001$).

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Supplementary Table 1: Statistical parameters of distributions of aneurysmal cases reported from 1761-1938,[14] and recorded in RAH from 2011 to 2019.

		102 patients with cerebral aneurysmal aneurysms recorded in RAH from 2011 to 2019	1127 patients with cerebral aneurysms recorded in 407 publications - published from 1761 to 1938							
Statistics - all cases with cerebral aneurysms		age>18, 2011 to 2019	age>18 years, 1761 to 1938	age >= 18 & year < 1850	age >= 18 & year >= 1850 & year < 1900	age >= 18 & year >= 1900	all age, year <1850	all age, year < 1900 & year >= 1850	all ages, year >= 1900	all age group, all years, >400 publications
Age in years										
N	Valid	102	851	41	252	560	42	278	613	935
	Missing	0	0	0	0	0	7	14	171	192
Mean age		57.6	44.7	44.3	45.6	44.3	43.6	42.6	41.2	41.7
Median age		60.0	43.0	47.0	45.0	42.0	46.0	43.0	41.0	41.0
Mode age		48.0	41.0	20.0	40.0	41.0	20.0	40.0	41.0	41.0
Std. Deviation		13.1	15.5	15.6	15.6	15.4	16.1	17.5	17.9	17.7
Minimum age		18.0	18.0	19.0	18.0	18.0	14.0	6.0	1.5	1.5
Maximum age		83.0	89.0	68.0	86.0	89.0	68.0	86.0	89.0	89.0
Percentiles	25	48.0	32.0	33.5	33.3	32.0	31.8	28.8	29.0	29.0
	50	60.0	43.0	47.0	45.0	42.0	46.0	43.0	41.0	41.0
	75	68.3	56.0	59.0	56.0	55.0	59.0	56.0	53.0	54.0

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Legend: 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

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Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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The trend of cerebral aneurysms over the past two centuries: Need for early screening - An observational study

Authors

Arjun Burlakoti[1,2*], Jaliya Kumaratilake[2], Jamie Taylor[3] and Maciej Henneberg[2,4]

[1]UniSA Allied Health and Human Performance, University of South Australia, Adelaide, Australia

[2]School of Biomedicine, Faculty of Health and Medical Sciences, University of Adelaide, Adelaide, Australia

[3]Royal Adelaide Hospital, South Australia Medical Imaging, Adelaide, Australia

[4]Institute of Evolutionary Medicine, The University of Zurich, Zurich, Switzerland

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*Corresponding author's mailing address:

Email: Arjun.Burlakoti@unisa.edu.au, ORCiD = https://orcid.org/0000-0001-9317-6352, Office Phone: +61-08 8302 1206, UniSA Allied Health and Human Performance, University of South Australia, GPO Box: 2471, Adelaide 5001 Australia

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Abstract

Objective

Cerebral aneurysms (CAs) are linked to variations in the cerebral basal arterial network (CBAN). This study aimed to find the optimal age for screening to detect brain arterial variations and predict aneurysms before rupture.

Design

An observational, quantitative, and retrospective research.

Setting

The study analyzed 1127-cases of CAs published from 1761 to 1938. Additionally, Computed Tomography Angiography images of 173-patients at the Royal Adelaide Hospital (RAH), South Australia between 2011 and 2019 were examined for the presence and the location of aneurysms in CBAN.

Participants

The data were collected from patients at RAH and 407-published sources, including males and females across the entire age range, up to 100 years old.

Outcome measures and results

Data, CAs cases, from 1761 to 1938 included (526-males, 573-females, and 28-unknown sexes). The age of these patients varied from 18 months to 89-years (mean age=42, SD=18). Approximately 11.5% of the CAs occurred in patients less than 20-years old. Among the 1078 aneurysms whose location was reported, 76% were located in the internal carotid (IC), middle cerebral (MC), and anterior communicating artery complex (AcomAC) regions, while the remaining 24% were in the vertebrobasilar (VB) region. Among 173-patients from the RAH aged between 18 and 100 years, (male=83 and female=90, mean age=60, SD=16), 94% of the CAs were found in the IC, MC, and AcomAC regions. The pattern of aneurysm occurrence, as indicated by values at the 25th, 50th, and 75th percentiles, along with the minimum and maximum patient ages, has remained consistent from 1761 to 2019.

Conclusion

The distribution pattern of cerebral aneurysms in relation to sex, age and locations in the CBAN, remained steady over the last 260-years resulting in risk of strokes early in life. Therefore, early screening for CBAN segment variations is advised for stroke prevention if possible.

Key words

Subarachnoid haemorrhage; Childhood Aneurysm; Stroke; Hemodynamics; Cerebral Arteries.

Strengths and limitations of this study:

- To our knowledge, the patterns of distribution and trends of occurrence of cerebral aneurysms have not been systematically studied over the past 260 years.
- Aneurysms can develop at any age in the presence of variations in cerebral basal arterial network (CBAN). Early detection of variations in CBAN in infant using non-invasive the Doppler ultrasound technique is recommended and continuing screening regularly as needed.
- Reported cases from the tertiary medical centres and 407 papers published over the past 260 years may not represent the general population precisely.
- This investigation is not a continuous study.

Funding

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Not applicable, none

Competing interests

None declared. All authors have nothing to disclose.

Introduction

Anatomical variations among components of the cerebral basal arterial network (CBAN) in addition to the trauma, infection, spontaneous dissections, and collagen disorders, have been linked to the formation of cerebral aneurysms (CAs)[1,2,3] and such variations develop during the period of embryonic life.[2] The period taken for the development of CAs may vary among individuals and once formed they may enlarge, compress the surrounding tissues, and rupture leading to subarachnoid haemorrhage (SAH).[3]

Cerebral aneurysms of all sizes have been observed to cause SAH in adults[4] (incidence 6-10/100000), however, they also occur in the age group 0-20 years (incidence rate=1.4-2 per 100000).[5-7] It is not clear that the occurrence of anatomical variation-related aneurysms is limited to any specific age. The management of complicated CAs is costly and the CAs can leave permanent disabilities or even become fatal costing millions of dollars to families and governments.[7-12] The majority of childhood SAH (i.e., incidence 1.4-2 per 100000 children) are caused by the pre-existing cerebral aneurysms.[13] About 5% of the total cerebral aneurysmal cases diagnosed in the clinical setup were in the age group 0 to 19 years and the incidence of childhood SAH is significantly greater in the older age children.[13] The clinical manifestation of aneurysmal cases seen later in life might be the consequence of aneurysms that developed in early childhood. Therefore, this study aims to review cases of CAs using data collected from a tertiary medical center (Royal Adelaide Hospital - South Australia) and published sources to investigate the recent pattern of CAs and how it has changed over the past 260 years. The null hypothesis is that the advancement of medical science did not lead to a reduction in the prevalence of aneurysms by age.

Material and method

Study design, and setting

Two types of data were used in this study.

Type-1 data are composed of 1127 cerebral aneurysmal cases that were published in the 407 papers from 1761 to 1938, as compiled by McDonald and, Korb.[14] These CAs were identified at autopsy and included patients of all ages (average age=41.7 years, mode age=41, median age=41, SD=17.7, age range 1.5 to 89 years) (Supplementary File 1 and Supplementary File 2).

Type-2 data were Cerebral Computed Tomography Angiography (CTA) images obtained from 173 randomly selected patients, who visited the Royal Adelaide Hospital (RAH), South Australia, between January 2011 and December 2019 for a variety of cranial pathologies; their age ranged from 18 to 100 years, males = 83, female = 90, mean age=60 years, median age=62 years, mode age=61, SD=15.72) with (n=102) or without (n=71) aneurysms (Supplementary File 2 and Supplementary File 3). These images were anonymised, stored in the Carestream data registry system and the patients have given their consent to use their clinical information for research activities. The consent documents taken from each patient were not provided to the researchers to ensure privacy. The Human Ethics permit (approval number: H2014-176, Research Ethics Committee, Office of Research Ethics, Compliance and Integrity, Faculty of Health Sciences, University of Adelaide) granted permission to access and use the deidentified data set from the Carestream data registry system (Vue-RIS-version-11.0.14.35) for research. Thus, the research materials used in this study comprised 1229 observed cases of CAs that spread across all age groups, spanning a period of approximately 260 years.

Data sources and size

Type-1 data: A range of variables (such as, the year CAs was detected, age, sex, location of the aneurysm) related to 1127 cases of CAs reported in publications from 1761 to 1938,[14] were transferred into an excel data

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file, rearranged and subjected to analysis (Supplementary File 1). Type-2 data: The cerebral CTA of 173-patients recorded from 2011 to 2019 in RAH were accessed to study the presence and absence of CAs in different locations of CBAN based on diagnoses made by clinicians. Some cases had multiple aneurysms located in the various segments of CBAN (Supplementary File 3).

The above cases of CAs were grouped into age ranges 0-5, 6-10, 11-15, 16–20, 21–30, 31–40, 41–50, 51–60, 61–70, 71–80, and over 81 years and transferred into the SPSS v. 25 software, for analyses (Supplementary File 1). The observation error has been tested by repeating the observation of the location of CAs in the cerebral CTA images in 20-cases, a month after the first study. There was 100% agreement of repeated observations with those of the first one. The sites of the formation of aneurysms were recorded as the left and right, internal carotid artery (ICA), middle cerebral artery (MCA), anterior cerebral artery (ACA), anterior communicating artery complex (AcomAC), posterior communicating artery (PcomA), posterior cerebral artery (PCA), vertebral artery (VA), basilar artery (BA), posterior inferior cerebellar artery (PICA), anterior inferior cerebellar artery (AICA), superior cerebellar (SCA) and pial arterial regions. In some cases, the areas of location of aneurysms seemed not to have been mentioned and those cases were tabulated under the heading of 'aneurysms located in CBAN (CBAN-an)'. Overall, the locations of nearly 1229 aneurysmal cases from both data sets were broadly divided into four categories: central and bilateral, left and right (Figure 1) before being plotted in the bar charts to study the location and distribution trends of aneurysms in the arterial network over the past 260-years (Figure 2). The aneurysms located in the AcomAC, and basilar arterial regions were classified as the central group of aneurysms. Additionally, in a few cases aneurysms were located simultaneously on left and right sides and those cases were grouped as 'bilateral' (Supplementary File 1 and Supplementary File 3 and Figure 1).

Statistical methods

Data were analysed using Excel and Statistical Package for the Social Sciences (SPSS-IBM, version-25) program (e.g., descriptive, and Chi squared tests). The p values less than 0.05 were considered as statistically significant.

Patient and public involvement

Involving patients was challenging for conducting and planning this research, since researchers were allowed the access only to anonymised raw data recorded in the database. As per the ethics permit (details in the method section), we accessed retrospective anonymized data, precluding patient involvement in research planning and execution. The shared outcome of this study will be informed to the public, families and patients who attend medical centres for various clinical visits, through a series of meetings, seminars, and media releases.

Findings

This study reviewed 1127 aneurysmal cases of patients of all ages from a total of 407 published articles prior to the year 1939. The ages of these patients (male=526, female=573, unknown sex=28) ranged from 18 months to 89 years of age with an average of 41.70 years, mode of 41 years and median of 41 years (SD=17.7) (Supplementary File 2, Figure 2a, Figure 2b, Figure 2c and Supplementary File 1). The second group of patients with CAs (44 males and 58 females, and n=102) from the RAH (2011 to 2019) with the age range 18-100 years showed that the most common age for diagnosis or complication of CAs ranged from 31-60 years with the calculated mean, median, mode, and standard deviation (SD), 57.60, 60.00, 48.00, and 13.12 years, respectively (Figure 2d and Supplementary File 4). Analysis of both sets of data revealed that the majority of the patients who presented with complicated aneurysms were in their 3rd to 6th decades of life (Supplementary File2).

The most important aspect of the two sets of data was the wide age range of occurrence of CAs and the fact that some of the complicated aneurysmal cases appeared at an early age (Figure 2a, Figure 2b, Supplementary File 1). A separate analysis was conducted for 853 out of the 1127 cases of CAs recorded before 1938 (male=409, female=438, unknown sex=6), specifically focusing on the age range of 18 to 89 years to align the age groups with the RAH recorded data from 2011 to 2019 (Supplementary File 2, Figure 2c and Figure 2d). The similarities of standard deviation (15.45) of those 853 cases (from 1761-1938) and the cases that were recorded from 2011 to 2019 in RAH (13.12 years) validated the comparability of our data and the findings (Supplementary File 2). The values of the 25th, 50th, and 75th percentiles, as well as the minimum and

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maximum observed ages of patients with aneurysms, remained relatively stable from 1761 to 1938 (Figure 3a). Some of these percentile values increased slightly as life expectancy extended from 1761 to the 21st century (Figure 3b). Therefore, the SD, and age distribution of adult patients with ruptured or diagnosed CAs presented in the 2011-2019 dataset were consistent with those cases reported before 1938, indicating persistence of a pattern (Table 1, Figure 2 and 3). Specifically, aneurysms are being frequently diagnosed in individuals aged 30 to 60 years, and this age range has remained relatively unchanged over the past 260 years (Table 1, Figures 2, and 3). Forty nine out of 1127 cases recorded across 407 publications from 1761 to 1938 seemed not to have information about the location of aneurysms in the CBAN, however, 818 out of 1078 identified aneurysms (76%), were in the ICA, MCA and AcomAC regions and rest of them were in the vertebrobasilar region (Supplementary File 1). The location and distribution pattern aneurysms from 102 patients recorded in RAH was consistent with 1078 cases recorded from 1761 to 1938 (Supplementary File 1, Supplementary File 2, and Supplementary File 3).

In the type 2 dataset, a total of 135 aneurysms were identified in 102 individuals, with ages ranging from 18 to 83 years, across various components of CBAN (Figure 2d and Supplementary File 3). Among these aneurysms, 38(28.14%) were detected in the right MCA region, while 17(12.6%) were in the right ICA region. In comparison, the left MCA and ICA regions had 27(20%) and 12(8%) aneurysms, respectively, which appeared to be lower in number compared to the right MCA and ICA regions. When considering the distribution of aneurysms based on territory, 55 out of 135 aneurysms (40.74%) in 50 patients were found in the right ICA and MCA territories, whereas 39 out of 135 aneurysms (28.88%) in 37 patients were detected in the left ICA and MCA regions (Supplementary File 3). Out of the 102 individuals with aneurysmal cases included in the study, 33 (24.44%) had aneurysms located in the anterior communicating artery (AcomAC) region, accounting for 33 out of the total 135 aneurysms. An additional 5.9% of the total aneurysms (8 out of 135 aneurysms) were found in the vertebral and basilar arterial regions, as indicated in the Supplementary File 3. A majority of the CAs, 127 out of the total 135 (94% of the total), were in the MCA, ICA, and AComAC regions (Supplementary File 3). Some cases had multiple aneurysms, for example, 2 cases had right ICA and MCA aneurysms, while 10 cases had left ICA and MCA aneurysms (Supplementary File 3).

There were no significant differences between male and female patients affected with CAs in all 1229 cases analysed in those two data sets (Chi-Squared statistic=0.83, $p \geq 0.36$) (Table 1). The sex, age of occurrence and location of CAs appear to have remained steady over the past 260 years across all age groups (Table 1 and Supplementary File 2, and Figure 3). The mode, mean, and median age and SD of patients with ruptured or diagnosed CAs studied from 2011 to 2019 in RAH matched well with the cerebral aneurysmal cases recorded in the past considering the difference in life expectancy between the two time periods studied (1761-1938 and 2011-2019) (Figures 3 and Table 1).

Figure 1- about here

Figure 2 - about here

Figure 3 - about here

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Table 1 - Prevalence of cerebral aneurysms in males and females: a comparison of the recent hospital-based data recorded in RAH from 2011 to 2019 with the autopsy data published before from 1761 to 1938.

Sex	N=173, cases with or without cerebral aneurysms recorded in RAH from 2011 to 2019.	1127 aneurysm cases (from 1761 to 1938) recorded in 407 publications.[14]
Sex not defined	0	28
Female	90	573
Male	83	526
Female to male sex ratio	1.08	1.09

Legend- RAH = royal Adelaide hospital, 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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Discussion

The age and locations at which CAs occur in the CBAN has not changed over past 260 years (Figures 1, 2 and 3, Table 1 and Table 1) despite the life expectancy has increased over time worldwide and the progress in medicine. In the past people had shorter life span on average, and yet the CAs occurred at the same ages as they do now.[15] The life expectancy recorded at below 50 years in 1940 and even below 40 years in 1850 was way lower compared to the one recorded above 80 years of age since the year 2000 in Australia.[15] A separate analysis was done for 853 out of the 1127 CAs recorded[14] before 1938 focusing on the age range of 18 to 89 years to align the age group with the currently RAH recorded data from 2011 to 2019, since there were no aneurysmal cases of children (age<18years) in the RAH dataset. In Adelaide there is a separate hospital for children where aneurysmal cases would have been treated, but the authors had no access to these data (Supplementary File 3). Royal Adelaide Hospital is a general hospital, thus individuals of 18 years and less are not admitted. Current study compared the cases of CAs diagnosed by CTA imaging technique (from 2011-2019) with those verified by surgery and autopsy[14], since there were no cerebral angiogram facilities in early years (i.e., before 1938). The cases of aneurysms are commonly diagnosed, when the patients are presented at medical centres after attacks of stroke.[16] Cerebral aneurysms in the past seemed to be ruptured and complicated as early as 18 months of age and as late as 89 years of age with a wide range of age (Supplementary File 1). The findings suggested that the change in lifestyle nor medical practice had no effect at the age/time of formation of CAs in general population. Clinical investigation of lipid profiles in patients commenced after 1950,[17] and they started attributing arterial diseases and aneurysms to the hyperlipidaemia, however, the manifestation of occurrence of aneurysms by age in the past 260 years seems not to be different from the current age of occurrence. Although the lifestyle and the external influences, including medical practice, changed over more than two centuries, aneurysms still occur at approximately the same age. Therefore, aneurysms occur and rupture on their own internal circumstances and are not related to the diet, environmental, and external factors.[18] The most likely internal factor is the severity of the variation on the segments of CBAN that adversely affects the hemodynamics resulting in the formation of aneurysms.[1,19] The condition of the arterial wall should not have changed over the last 260 years and that seems to be less significant than the variation in the components of CBAN. The segmental and communicating arteries play a crucial role in dampening the systolic pressure within the CBAN and reducing the likelihood of aneurysm formation.[1,19] The severity of arterial variation can have negative effects on the blood flow dynamics through the variant segment of the component of the CBAN.[1,19] The incidence of CAs is about 3.3% in the general population and may not be diagnosed, until they get enlarged as the size of the aneurysm <3mm in diameter can be missed.[20] Imaizumi and colleagues found that the prevalence rate of CAs was 4.32% in Japan.[12] The incidence rate of CAs in childhood (age <18 years) has been reported to be 0.5- 4.6%, which is almost as common as the incidence rate observed among adults.[13] Treating cases of CAs with a diameter less than 3 mm requires careful consideration, as pre-existing small aneurysms of ≤ 3 mm could rupture, resulting in spontaneous SAH.[21] The majority of CAs are detected only when they cause a stroke or other pathological effect (e.g., compression of the optic tract).[4] Individuals older than 18 years are no longer considered children.[6,13]

Most of the symptomatic cases of CAs in the paediatric age group were observed in older children (15 + years) [13], and only complicated cases of CAs were generally diagnosed and reported.[22,23] If the incidence of childhood CAs described (ranges from 0.17 to 4.6%),[24] is corrected for number of years lived, it would be 18.4% of the total aneurysmal cases amongst adults. The adult patients included in CAs studies ideally have an age range of 18-years and above, which can include individuals up to the age of 100 years.[12,15] In contrast, the childhood group included in aneurysmal studies typically ranges from birth up to 18-years of age and a few studies have categorized patients who are 18-years or older under the adult group.[6,13] When the age range, 0-18 years and 19- 100 years is considered, the incidence of childhood CAs, that should be multiplied by 5 times to correct for the number of years lived, can be comparable to that in adults because the childhood period of life is much shorter than the adulthood. Therefore, the age range of adult group (≥20 years up to 100 years) included in the CAs and stroke studies would be about five times more than the age range of children (i.e., ≤18 years).[22,23] That means adults have 5 times more years to develop CAs compared to children. Therefore, the incidence of childhood CAs per year is almost equivalent to adult.[21,25] Hence, CAs could develop in early

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childhood in the presence of a significantly variant component of cerebral arterial anatomy,[1,2] and it could take years for them to balloon before becoming symptomatic and being observed in a tertiary medical center. The overall pattern of location and distribution of childhood CAs was similar to adult as they commonly occurred in ICA, MCA and AcomAC regions.[3] Therefore the development of CAs is not age related and found to be prevalent in all age ranges.[10,12,13,26] Cerebral aneurysms may not always be associated to the advanced age, history of smoking, drinking alcohol but start forming as early as in the childhood in the presence of variant components of cranial blood vessels.[27] The mean age at which people were affected by cerebral aneurysms was reported to be 55 to 57 years of age in a study conducted using 1085 aneurysmal cases from 2008 to 2016.[28] There are a few reports of CAs published between 1938 and 2011 that could have been compiled for statistical analyses. However, their inclusion into this study, would not have changed its basic conclusions: i.e., large age range and no change through time in the occurrence of CAs.

Ultrasonographic video screening by placing the probe in the fontanelles of babies before they close has been found to be safe and effective in studying brain vessels[26,29] and can be incorporated as a screening tool to detect variations in intracranial vessels that could predispose to the development of cerebral aneurysms later in life. One illustration of such possibility is that individuals with the left and right ACA proximal segment diameter ratio greater than 1.4 have a 27-fold increased risk of developing cerebral aneurysms in the AcomAC region.[1] Parents of children found to have variations in CBAN could be advised to schedule follow-up screening periodically, especially if a more affordable and convenient technology for detecting brain aneurysms becomes available. The current screening recommendation is based on the congenital variations of segments of CBAN, but such variations could occur later on life in cases of pathology like atherosclerosis and could cause aneurysms. Future studies to test the association of presence of anatomical variations in CBAN in infancy and future risk of both unruptured and ruptured intracranial aneurysms in adulthood are recommended.

The estimated cost of a single stroke is approximately $300,000 in Australia.[9] With a haemorrhagic stroke incidence of 10 per 100,000 the total cost amounts to $45 million per year in a city the size of Adelaide[1], South Australia, which has a population of 1.5 million. Regular screening for individuals with significantly variant brain arteries identified, representing 50% of the population, once every 5 years, and assuming the cost of a single computed tomography angiography or magnetic resonance angiogram is about $100 each, the total screening cost would be $1.5 million per year, that means 30 times reduction in cost of strokes. Additionally, the government would receive millions of dollars in return as tax revenue from working individuals who would survive with little to no disability from potential strokes resulting from aneurysms. This study was not designed to examine the characteristics of aneurysms, but the focus was on the distribution of aneurysms in different segments of CBAN, trend of occurrence of aneurysms over the past 260-years, and the comparison of cerebral aneurysms in all age ranges.

Limitations:

The insufficient data on the lack of personal and family history, history of smoking, lipid profile, and blood pressure are limitations of this study. A larger survey and a prospective study could be conducted. A prospective study could involve using ultrasound techniques to identify variations in brain vessels among infants.

Conclusion

Brain arterial aneurysms can develop early in the presence of variant arterial components. Screening children under 24 months using transcranial ultrasonography for variant cerebral arteries may be practical. Those with variations should undergo periodic tests for aneurysms, aiming to prevent some haemorrhagic strokes if an affordable and convenient technology for detecting brain aneurysms becomes available.

Data sharing statement

Additional data are available by emailing Arjun.Burlakoti@unisa.edu.au

Funding

None

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ORCID iD

Arjun Burlakoti http://orcid.org/0000-0001-9317-6352

Author contribution statement

Arjun Burlakoti- conceived the idea, collected, and analysed both sets of data, took pictures, recorded videos, contributed to conceptualization, prepared and drafted the manuscript.

Jaliya Kumaratilake- conceived the idea, contributed to the concept, aided in data interpretation, editing and the revision of the manuscript and approving the article.

Jamie Taylor- conceived the idea, contributed to the concept, aided in data interpretation, editing and the revision of the manuscript and approving the article.

Maciej Henneberg- conceived the idea, masterminded, and helped in statistics, data analysis and interpretation, editing and approving the article.

Ethical Approval Statement

The University of Adelaide, Human Research Ethics Board granted permission to access and use data for this research project (Ethics Approval Number: H2014-176).

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Figure legend -

Figure 1 - Comparison of the location of cerebral aneurysms between Royal Adelaide Hospital sample (2011 to 2019) (n=135 CAs from 102 patients, orange colour) with those recorded in 407 publications[14] (1761 to 1938) (n=1127 CAs, blue colour). CAs=cerebral aneurysms, 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

Figure 2 - Figures displaying the distribution patterns of cerebral aneurysms in different age groups recorded from 1761 to 1938 and from 2011 to 2019. A polynomial regression lines show the number and distribution of cerebral aneurysm cases across all age groups. a) The distribution of cerebral aneurysmal cases (n=1127) in various age group, recorded from 1761 to 1938.[14] b) The frequency of cerebral aneurysmal cases and their distribution (n=1127) across all age groups recorded[14] from 1761 to 1938. c) Age (≥18 years) related distribution of individuals affected with cerebral aneurysms over the past 260 years (1761 – 1938) (n=853), recorded[14] from 1761 to 1938, and d) Age (18-100 years) related prevalence (%) of cerebral aneurysms in RAH sample from 2011 to 2019 (n=102). The peak prevalence occurred between 31-60 years ($p<0.001$). RAH= Royal Adelaide Hospital. RAH= Royal Adelaide Hospital and 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

Figure 3: Comparison figures showing the trend of occurrence of cerebral aneurysms at different age group (n=1127) from 1761 to 2019. (a)The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed all ages of patients with aneurysms, from 1761 to 1938[14]; b) The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed patients with >18 years of age with aneurysms, recorded from 1761 to 1938[14] and 2011 to 2019 in RAH. RAH = Royal Adelaide Hospital, 14 =Data from: McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328

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Table 1 - Prevalence of cerebral aneurysms in males and females: a comparison of the recent hospital-based data recorded in RAH from 2011 to 2019 with the autopsy data published before from 1761 to 1938.

Sex	N=173, cases with or without cerebral aneurysms recorded in RAH from 2011 to 2019.	1127 aneurysm cases (from 1761 to 1938) recorded in 407 publications.[14]
Sex not defined	0	28
Female	90	573
Male	83	526
Female to male sex ratio	1.08	1.09

Legend- RAH = royal Adelaide hospital, 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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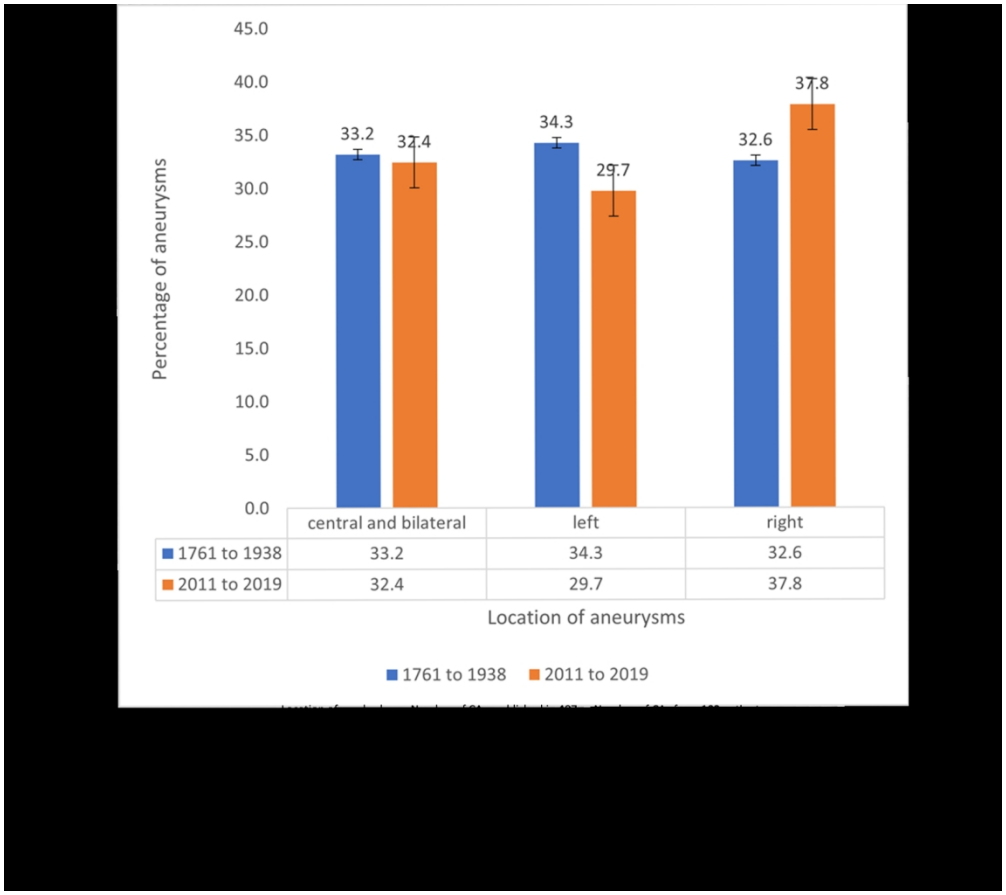

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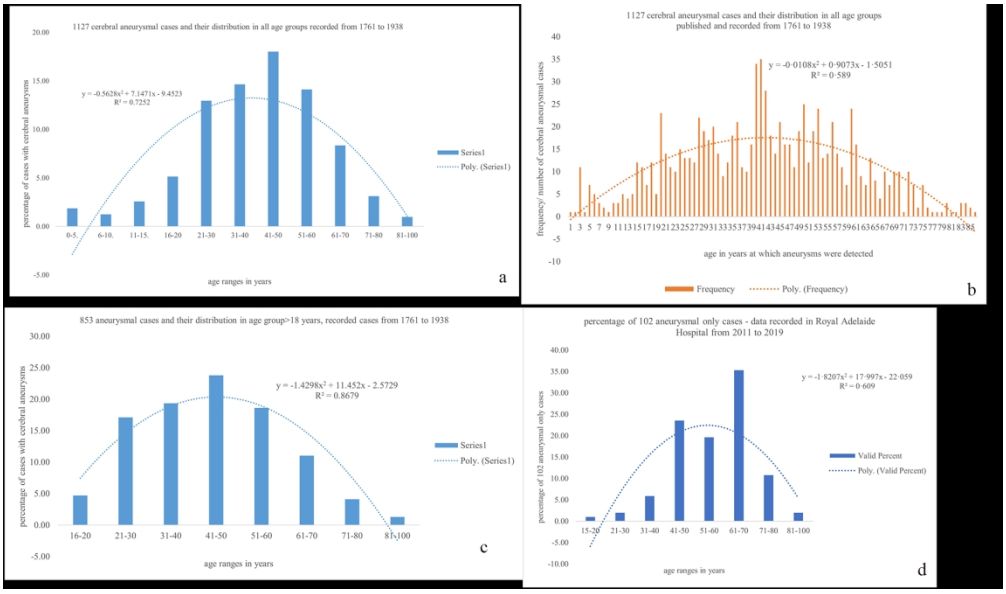

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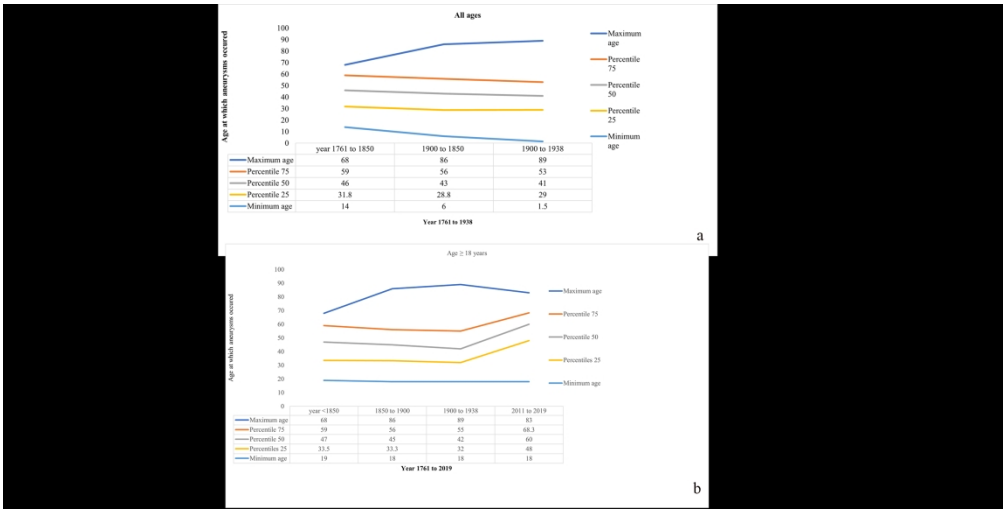

Figure 3: Comparison figures showing the trend of occurrence of cerebral aneurysms at different age groups (n=1127) from 1761 to 2019. (a)The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed all ages of patients with aneurysms, from 1761 to 1938[14]; b) The values of the 25th, 50th, and 75th percentiles, as well as the minimum and maximum observed patients with >18 years of age with aneurysms, recorded from 1761 to 193814 and 2011 to 2019 in RAH. RAH = Royal Adelaide Hospital, 14 =Data from: McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328

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Supplementary file 1: contains type 1 data

Manuscript title: The trend of cerebral aneurysms over the past two centuries: Need for early screening - An observational study.

Abbreviations: PcomA= posterior communicating artery, ICA=internal carotid artery, BA=basilar artery, AcomA=anterior communicating artery, MCA=middle cerebral artery, ACA=anterior cerebral artery, PCA=posterior cerebralral artery, SCA=superior cerebellar artery, AICA=anterior inferior cerebellar artery, VA=vertebral artery, CBAN=cerebral basal arterial network (artery involved not known), PICA=posterior inferior cerebellar artery. McDonald & Korb 1939=McDonald CA, Korb M. Intracranial aneurysms. Archives of neurology and psychiatry (Chicago) 1939; 42(2): 298-328.)

age in years	age range in years	sex, m=male, f=female	side affected	arteries involved	status of aneurysms: ruptured=y, not ruptured=n	arterial condition	year of aneurysm detected
60	51-60	m	bilateral	PcomA	n	Vessels rigid, with deposit on inner lining	1761
52	51-60	f	undefined	ICA	y	no information available	1778
64	61-70	f	bilateral	ICA	n	no information available	1779
20	16-20	f	midline	BA	y	no information available	1814
20	16-20	f	midline	BA	y	no information available	1815
57	51-60	m	midline	AcomA	y	Calcareous deposits on coats of vessels	1825
57	51-60	m	right	ACA	y	Coats of aneurysm thick	1825
		m	midline	AcomA	y	not available	1825
59	51-60	f	midline	AcomA	y	no information available	1826
59	51-60	m	midline	BA	y	Middle layer of sac, cartilaginous	1826
		m	right	MCA	y	no information available	1826
19	16-20	m	left	MCA	y	no information available	1827
39	31-40	f	left	PcomA	y	no information available	1827
45	41-50	m	left	MCA	y	no information available	1827
35	31-40	m	midline	BA	n	Carotid and vertebral arteries normal	1828
21	21-30	f	midline	BA	y	Calcareous deposits on vessels	1829
24	21-30	m	left	VA	y	Arteries diseased, in some places cartilaginous	1829
			midline	BA		Coats of vessels cartilaginous	1829
60	51-60	m	right	MCA	y	wall thin but firm	1831
63	61-70	f	left	MCA	y	No bone or other appearance of disease	1831
60	51-60	m	right	MCA	y	Sac with thin, firm parietes	1832
42	41-50	f	right	ICA	y	no information available	1833
54	51-60	m	midline	BA	y	no information available	1833
28	21-30	f	left	ACA	n	middle layer thick	1834
			left	ICA	n	no information available	1834
			right	VA	n	no information available	1835
68	61-70	m	midline	BA	n	Yellow plaques on surface	1836
20	16-20	f	midline	BA	n	no information available	1837
59	51-60	m	midline	BA	y	Middle layer of artery cartilaginous	1837
60	51-60	m	undefined	ICA	y	no information available	1837
35	31-40	m	right	MCA	y	other vessels normal	1839
14	13-15	m	midline	BA	n	Middle layer of wall thickened	1842
20	16-20	f	undefined	PCA	n	no information available	1842
49	41-50	m	left	ICA	y	Vessels thickened	1842
43	41-50	m	midline	BA	y	Arteries atheromatous	1844
54	51-60	m	midline	BA	n	no information available	1844
20	16-20	f	right	PcomA	y	no information available	1846
47	41-50	m	midline	BA	y	no information available	1846
58	51-60	m	midline	BA	y	na	1846
59	51-60	m	midline	BA	y	no information available	1846
62	61-70	f	right	PcomA	y	no information available	1846
34	31-40	m	left	PcomA	y	no information available	1847
35	31-40	m	left	ICA	y	no information available	1847
52	51-60	f	left	ICA	y	healthy arteries	1848
		m	midline	BA	n	no information available	1848
33	31-40	m	midline	BA	y	no information available	1849
35	31-40	m	midline	BA	y	Other arteries healthy	1849
39	31-40	f	undefined	ICA	y	No calcareous deposit in cerebral vessels	1849
		m	undefined	VA	n	Calcareous deposit in wall of sac	1849
18	16-20	f	left	PcomA	n	No fatty atheromatous changes in arteries	1850
30	21-30	m	midline	BA	y	Other vessels without changes	1850
70	61-70	f	left	ICA	n	no information available	1850
20	16-20	f	undefined	PCA	n	no information available	1851
21	21-30	f	midline	AcomA	n	no information available	1851
35	31-40	m	left	MCA	y	no information available	1851
38	31-40	m	midline	BA	n	no information available	1851
45	41-50	m	midline	BA	n	no information available	1851
65	61-70	m	undefined	ICA	n	no information available	1851
		m	midline	BA	n	no information available	1851
		m	midline	BA	n	no information available	1851
			undefined	MCA	y	no information available	1851
53	51-60	f	midline	BA	y	no information available	1855
56	51-60	m	right	PCA	y	no information available	1855
57	51-60	m	right	MCA	y	Vessels very atheromatous	1855
70	61-70	f	midline	BA	n	no information available	1855
		m	left	MCA	y	Arteries not atheromatous	1855
35	31-40	m	midline	BA	n	no information available	1856
40	31-40	f	left	PCA	n	Vessels thin but healthy	1856
52	51-60	f	right	ICA	y	Middle coat thickened	1857
47	41-50	f	left	ICA	y	no information available	1858
58	51-60	m	midline	BA	n	Vertebral arteries thickened	1858
56	51-60	m	right	SCA	n	Atheroma	1858
60	51-60	f	midline	AcomA	y	Vessels thickened and rigid	1858
17	16-20	f	left	MCA	y	Embolic	1859
30	21-30	f	left	MCA	y	no information available	1859
34	31-40	m	midline	BA	y	Healthy vessels	1859
35	31-40	f	left	ACA	y	Healthy vessels	1859
43	41-50	f	midline	BA	y	Atheroma	1859
58	51-60	m	left	MCA	y	Atheroma	1859
16	16-20	m	left	ICA	n	no information available	1860
24	21-30	f	midline	BA	y	embolic	1860
47	41-50	f	midline	BA	n	Plates in coats of aneurysm	1860
24	21-30	m	right	MCA	y	Walls of sac calcareous	1861
14	13-15	m	left	MCA	y	Walls of sack thick and atheromatous no disease of other vessels	1862
42	41-50	m	midline	BA	y	Vessels otherwise healthy	1862
48	41-50	f	midline	BA	n	no information available	1862
56	51-60	m	midline	BA	n	Atheroma	1862
68	61-70	m	left	MCA	y	Wall of sac hard and cretaceous	1862
80	71-80	f	midline	AcomA	n	healthy vessels	1862
28	21-30	m	midline	BA	y	Healthy vessels	1864
37	31-40	m	midline	BA	y	Other vessels slightly atheromatous	1864
			undefined	AICA		Atheroma	1864
16	16-20	m	left	ICA	n	Vessels healthy	1865
24	21-30	m	left	MCA	y	Soft arteries	1865
39	31-40	m	midline	BA	y	No atheroma	1865
43	41-50	f	left	ICA	y	Walls atheromatous	1865
46	41-50	f	left	ACA	n	Vessels very atheromatous	1865
49	41-50	f	midline	AcomA	y	Other arteries healthy	1865
51	51-60	f	midline	BA	y	Arteries not diseased	1865
53	51-60	m	left	MCA	y	Walls not atheromatous	1865
59	51-60	f	right	MCA	y	no information available	1865
		m	left	ACA	y	no information available	1865
21	21-30	f	left	MCA	y	No disease of vessels	1866
61	61-70	f	left	VA	y	no information available	1866
27	21-30	f	left	ICA	y	Arteries thickened	1867
20	21-30	f	left	MCA	y	no information available	1867
78	71-80	f	right	MCA	y	No atheroma	1867
13	13-15	m	right	MCA	y	Rest of arteries healthy	1868
24	21-30	f	left	ICA	y	no information available	1868
34	31-40	f	left	MCA	n	Walls of aneurysmatheromatous; vessels at base not diseased	1868
36	31-40	f	midline	BA	y	Old endocarditis; questionable embolic origin	1868
31	31-40	m	left	ACA	y	Small atheromatous patches on wall	1868
40	31-40	m	left	MCA	y	Vessels normal	1868
50	41-50	f	left	MCA	n	Thick and unsupple, but not materially diseased	1868
53	51-60	f	left	PcomA	y	Slightly atheromatous	1868
56	51-60	f	right	MCA	n	Arteries sclerotic, with atheromatous plates	1868
56	51-60	m	left	MCA	n	Vessels very atheromatous	1868
59	51-60	f	midline	BA	y	Atheroma	1868
60	51-60	f	right	MCA	y	Vessels very atheromatous	1868
14	13-15	m	left	ICA	y	Other vessels healthy	1869
19	16-20	m	left	VA	y	no information available	1869
28	21-30	m	left	MCA	y	no information available	1869
41	41-50	f	right	MCA	y	no information available	1869
48	41-50	f	left	MCA	y	Atheroma	1869
56	51-60	m	right	ICA	y	Several patches ofdegeneration onbasilar artery	1869
61	61-70	f	midline	BA	n	Vessels atheromatous	1869
12	13-15	f	right	MCA	y	Embolic mechanism (endocarditis)	1870
13	13-15	m	right	MCA	y	Other vessels healthy; embolic origin of aneurysm	1870
15	13-15	m	right	MCA	y	Embolic origin	1870
17	16-20	f	left	ACA	y	Vessels healthy	1870
20	16-20	m	right	MCA	y	Embolic origin	1870
26	21-30	f	left	MCA	n	Vessel plugged by yellow fibrin (vegetations on aortic valves)	1870
26	21-30	m	midline	BA	n	Remaining vessels healthy	1870
26	21-30	f	right	MCA	y	Syphilitic lesions	1870
35	31-40	m	undefined	PCA	n	no information available	1870
37	31-40	m	midline	BA	y	Calcareous degeneration of coats of vessel	1870
49	41-50	m	midline	BA	y	no information available	1870
50	41-50	f	left	PCA	y	Slight atheromatous patches	1870
60	51-60	m	left	VA	y	Vessels diseased	1870
67	61-70	m	right	VA	y	Atheroma	1870
54	51-60	m	midline	AcomA	y	Atheromatous	1871
		f	left	MCA	y	Arteries at base highly Atheromatous	1871
29	21-30	m	midline	BA	n	Other arteries at base atheromatous	1872
45	41-50	m	left	VA	y	Slight atheromatous changes	1872
61	61-70	f	midline	BA	y	Vessels atheromatous	1872
20	16-20	f	right	PcomA	y	Embolic	1873
20	16-20	m	undefined	CBAN	y	Embolic	1873
24	21-30	m	undefined	CBAN	y	Embolic arachnoiditis	1873
27	21-30	m	undefined	CBAN	y	Perforated embolized wall of small arach noid artery	1873
40	31-40	m	right	MCA	y	Embolic	1873
68	61-70	m	midline	AcomA	n	W alls tnick ; other vessels healthy	1873
		m	midline	BA	n	Vessels thickened	1874
24	21-30	m	undefined	ICA	n	no information available	1875
33	31-40	m	left	ICA	n	Marked arteriosclerosis	1875
40	31-40	f	right	ICA	n	Walls of sac partly calcified	1875
43	41-50	m	right	MCA	y	no information available	1875
45	41-50	m	midline	AcomA	y	Arteries slightly atheromatous	1875
45	41-50	m	left	MCA	y	Vessels normal	1875
48	41-50	m	bilateral	ICA	n	Intimal arteriosclerosis	1875
53	51-60	f	left	ICA	y	Walls thick and atheromatous	1875
56	51-60	m	left	VA	n	no information available	1875
60	51-60	f	undefined	SCA	y	Intense atheroma of vessels	1875
69	61-70	f	midline	AcomA	n	Vessels atheromatous	1875
34	31-40	f	right	MCA	y	no information available	1876
38	31-40	m	left	MCA	y	no information available	1876
41	41-50	m	midline	AcomA	y	Rest of arteries free of atheroma	1876
50	41-50	f	right	MCA	y	Atheroma	1876
63	61-70	f	right	ICA	y	no information available	1876
16	16-20	m	midline	BA	y	no information available	1877
18	16-20	f	right	MCA	n	no information available	1877
20	16-20	m	midline	AcomA	y	No other disease of vessels	1877
22	21-30	f	left	ICA	n	Vessels healthy, probably embolic	1877
40	31-40	f	right	MCA	y	Healthy vessels	1877
40	31-40	m	left	MCA	y	Vessels at base healthy	1877
42	41-50	m	right	MCA	y	Arteries tortuous andsmall in caliber; deposits of calcareous degeneration	1877
53	51-60	f	midline	BA	n	no information available	1877
12	13-15	m	right	PCA	y	Embolic (endocarditis)	1878
30	21-30	m	left	ICA	n	Thickening of vessels , with syphilitic infil tration of small cells	1878
47	41-50	f	right	MCA	y	Very atheromatous	1878
50	41-50	m	right	ACA	n	All arteries and aneurysm white and opaquemicroscopic syphilitic changes of Heubner	1878
72	71-80	f	left	MCA	y	Vessels atheromatous	1878
20	16-20	m	left	MCA	y	Not atheromatous	1880
36	31-40	m	left	VA	y	Thickened walls: endarteritis	1880
39	31-40	m	right	MCA	y	no information available	1880
40	31-40	f	midline	AcomA	y	Atheroma	1880
44	41-50	m	midline	BA	y	no information available	1880
55	51-60	f	left	MCA	n	Stiff and atheromatous	1880
57	51-60	m	midline	BA	y	Atheromatous vessels at base	1880
75	71-80	f	midline	BA	n	Atheromatous	1880
12	13-15	m	left	MCA	y	Wall of sac atheroma tous; other vessels healthy	1881
40	31-40	f	left	PcomA	y	Healthy vessels	1881
44	41-50	m	midline	BA	y	no information available	1881
50	41-50	f	midline	AcomA	y	no information available	1881
71	71-80	f	right	ICA	n	Very atheromatous	1881
80	71-80	f	right	PcomA	n	Wall thickened	1881
16	16-20	m	midline	BA	y	no information available	1882
17	16-20	m	midline	AcomA	y	Healthy	1883
40	31-40	m	midline	BA	n	Atheroma	1883
		f	undefined	ICA	y	no information available	1883
61	61-70	m	left	VA	n	Fatty degeneration of intima	1884
		m	undefined	CBAN	y	Embolic	1884
29	21-30	f	left	MCA	y	Atheroma	1885
40	31-40	m	left	MCA	n	Calcareous clot in sac	1885
23	21-30	f	left	ICA	y	Syphilitic	1886
22	21-30	f	left	ICA	n	Walls hard: no atheromatous degeneration	1886

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	27	21-30	m	midline	BA	y	Syphilitic	1886						
	20	16-20	f	left	MCA	n	Embolic	1887						
	30	21-30	m	right	VA	y	Embolic (endocarditis)	1887						
	30	21-30	m	right	MCA	y	Embolic (endocarditis)	1887						
	31	31-40	m	right	ICA	n	no information available	1887						
	36	31-40	m	midline	BA	y	No embolism or atheroma	1887						
	40	31-40	f	right	MCA	y	No embolism or atheroma	1887						
	43	41-50	f	right	PCA	n	Arteries free of atheroma	1887						
	49	41-50	f	undefined	CBAN	y	Embolic (endocarditis)	1887						
	60	51-60	f	left	MCA	y	no information available	1887						
				left	VA	n	Arteriosclerosis	1887						
				undefined	VA		Arteriosclerosis	1887						
				undefined	VA		Arteriosclerosis	1887						
	53	51-60	f	midline	BA	y	no information available	1888						
	26	21-30	m	midline	BA	n	Septic endocarditis	1889						
	43	41-50	m	midline	AcomA	n	no information available	1889						
	51	51-60	m	midline	AcomA	y	Arteries free of atheroma	1889						
	56	51-60	f	midline	AcomA	y	Arteriosclerosis	1889						
	6	6-10	m	right	VA	y	Septic embolus	1890						
	15	11-15	m	right	PCA	n	Septic embolus endocarditis	1890						
	15	11-15	m	right	MCA	n	Septic embolus endocarditis	1890						
	15	11-15	m	right	MCA	n	Septic embolus endocarditis	1890						
	15	11-15	f	bilateral	ICA	y	Septic embolus endocarditis	1890						
	15	11-15	f	right	MCA	y	Septic embolus endocarditis	1890						
	16	16-20	f	right	MCA	y	Septic embolus	1890						
	17	16-20	m	left	ICA	n	Septic embolus endocarditis	1890						
	18	16-20	m	right	MCA	y	Septic embolus	1890						
	25	21-30	f	right	MCA	n	Septic embolus endocarditis	1890						
	25	21-30	m	left	MCA	n	Septic embolus endocarditis	1890						
	25	21-30	f	left	MCA	y	Atheroma	1890						
	25	21-30	f	right	MCA	y	Septic embolus endocarditis	1890						
	25	21-30	m	right	MCA	y	Septic embolus endocarditis	1890						
	31	31-40	m	right	MCA	y	Septic embolus	1890						
	35	31-40	f	left	MCA	n	Septic embolus endocarditis	1890						
	35	31-40	m	left	MCA	y	Atheroma	1890						
	45	41-50	f	left	MCA	y	Atheroma	1890						
	45	41-50	m	left	MCA	y	Atheroma	1890						
	50	41-50	m	left	MCA	y	Septic embolus	1890						
	56	51-60	m	right	ICA	n	Atheroma	1890						
	66	61-70	m	right	ICA	n	Atheroma	1890						
	60	51-60	f	midline	BA	n	Atheroma	1891						
	35	31-40	m	midline	BA	y	Other vessels healthy	1892						
	47	41-50	m	left	MCA	n	No atheroma	1893						
	7	6-10	m	midline	BA	y	no information available	1894						
	10	6-10	f	left	VA	y	no information available	1894						
	14	11-15	m	left	VA	y	no information available	1894						
	25	21-30	m	midline	BA	y	no information available	1894						
	26	21-30	f	right	ICA	y	Soft arteries	1894						
	26	21-30	m	right	ICA	y	no information available	1894						
	28	21-30	f	left	MCA	y	no information available	1894						
	28	21-30	m	midline	AcomA	y	no information available	1894						
	29	21-30	m	left	MCA	y	no information available	1894						
	30	21-30	f	right	MCA	y	no information available	1894						
	31	31-40	m	midline	AcomA	y	no information available	1894						
	32	31-40	f	left	MCA	y	no information available	1894						
	32	31-40	f	midline	BA	y	no information available	1894						
	33	31-40	m	midline	BA	y	no information available	1894						
	36	31-40	f	midline	PcomA	y	no information available	1894						
	36	31-40	m	left	ACA	y	no information available	1894						
	40	31-40	m	midline	BA	y	no information available	1894						
	40	31-40	m	midline	AcomA	y	no information available	1894						
	41	41-50	m	right	VA	y	no information available	1894						
	42	41-50	f	left	ICA	y	no information available	1894						
	42	41-50	m	left	MCA	y	no information available	1894						
	42	41-50	m	midline	BA	y	no information available	1894						
	43	41-50	f	right	ICA	y	no information available	1894						
	43	41-50	m	left	VA	y	no information available	1894						
	43	41-50	m	left	MCA	y	no information available	1894						
	43	41-50	m	right	MCA	y	no information available	1894						
	43	41-50	m	undefined	CBAN	y	no information available	1894						
	44	41-50	f	midline	AcomA	y	no information available	1894						
	45	41-50	f	left	MCA	y	no information available	1894						
	45	41-50	f	midline	AcomA	y	no information available	1894						
	45	41-50	m	left	ICA	y	no information available	1894						
	46	41-50	f	midline	BA	y	no information available	1894						
	46	41-50	m	right	MCA	y	no information available	1894						
	46	41-50	m	right	MCA	y	no information available	1894						
	48	41-50	f	right	ICA	y	no information available	1894						
	48	41-50	f	right	ICA	y	no information available	1894						
	49	41-50	f	left	VA	y	no information available	1894						
	49	41-50	f	midline	PcomA	y	no information available	1894						
	50	41-50	f	right	MCA	y	no information available	1894						
	50	41-50	m	left	MCA	y	no information available	1894						
	51	51-60	f	right	MCA	y	no information available	1894						
	52	51-60	f	left	MCA	y	no information available	1894						
	53	51-60	f	left	MCA	y	no information available	1894						
	53	51-60	f	midline	AcomA	y	no information available	1894						
	54	51-60	f	midline	AcomA	y	no information available	1894						
	54	51-60	m	right	MCA	y	no information available	1894						
	55	51-60	f	right	ICA	y	no information available	1894						
	55	51-60	m	left	VA	y	no information available	1894						
	55	51-60	m	midline	BA	y	no information available	1894						
	56	51-60	f	left	MCA	y	no information available	1894						
	56	51-60	f	right	MCA	y	no information available	1894						
	57	51-60	f	right	ACA	y	no information available	1894						
	57	51-60	f	midline	AcomA	y	no information available	1894						
	60	51-60	f	left	VA	y	no information available	1894						
	60	51-60	f	left	ACA	y	no information available	1894						
	60	51-60	f	left	ACA	y	no information available	1894						
	60	51-60	f	left	MCA	y	no information available	1894						
	61	61-70	f	midline	BA	y	no information available	1894						
	63	61-70	m	right	ICA	y	no information available	1894						
	62	61-70	f	midline	AcomA	y	no information available	1894						
	63	61-70	f	left	ACA	y	no information available	1894						
	63	61-70	f	midline	AcomA	y	no information available	1894						
	64	61-70	f	left	ICA	y	no information available	1894						
	64	61-70	f	midline	AcomA	y	no information available	1894						
	66	61-70	f	left	ICA	y	no information available	1894						
	67	61-70	f	left	ICA	y	no information available	1894						
	67	61-70	f	right	ICA	y	no information available	1894						
	69	61-70	f	left	ICA	y	no information available	1894						
	70	61-70	f	right	ICA	y	no information available	1894						
	72	71-80	f	left	VA	y	no information available	1894						
	73	71-80	f	right	ICA	y	no information available	1894						
	71	71-80	f	left	MCA	y	no information available	1894						
	73	71-80	f	right	VA	y	no information available	1894						
	73	71-80	f	right	VA	y	no information available	1894						
	71	71-80	f	midline	AcomA	y	no information available	1894						
	79	71-80	f	midline	BA	y	no information available	1894						
	80	71-80	f	right	ACA	y	no information available	1894						
	81	81-100	f	left	MCA	y	no information available	1894						
	86	81-100	m	midline	AcomA	y	no information available	1894						
			f	midline	CBAN	y	no information available	1894						
	21	21-30	m	right	ICA	y	other vessels healthy	1895						
	29	21-30	m	midline	BA	y	no information available	1895						
	34	31-40	f	left	ICA	y	Wall of aneurysm had two patches of atheroma	1895						
	40	31-40	m	midline	BA	n	no information available	1897						
	47	41-50	f	right	MCA	y	no information available	1897						
	50	41-50	f	left	MCA	y	no information available	1897						
	53	51-60	m	left	MCA	y	no information available	1897						
	69	61-70	f	bilateral	ICA	n	no information available	1897						
	28	21-30	m	midline	BA	n	no information available	1898						
	54	51-60	m	midline	BA	n	no information available	1898						
	70	61-70	f	right	MCA	y	Extensive sclerosis with atheromatous plaques	1898						
	29	21-30	m	midline	BA	n	Syphilitic	1899						
	68	61-70	m	left	VA	n	Vessels atheromatous	1900						
	10	6-10	m	left	pial	y	Embolic (endocarditis)	1901						
	13	11-15	f	right	pial	y	Embolic (endocarditis)	1901						
	27	21-30	f	left	MCA	y	normal vessels	1901						
	28	21-30	m	midline	BA	y	no information available	1901						
	32	31-40	f	right	MCA	y	Embolic (endocarditis)	1901						
	50	41-50	f	right	MCA	y	Atheroma	1901						
	76	71-80	f	right	MCA	y	no information available	1901						
	29	21-30	f	right	PcomA	y	normal vessels	1902						
	34	31-40	m	undefined	CBAN	y	Syphilis	1902						
	44	41-50	f	left	ICA	y	Wall of left internal carotid artery thickened	1902						
	22	21-30	f	right	ICA	y	healthy	1903						
	39	31-40	f	right	MCA	y	Line of atheroma at point of aneurysm	1903						
	64	61-70	f	right	PcomA	y	Syphilis	1903						
	27	21-30	m	midline	AcomA	y	Walls of other arteries healthy	1904						
	40	31-40	f	right	ICA	y	no information available	1904						
	65	61-70	f	right	ACA	n	Atheroma	1904						
	70	61-70	f	midline	BA	y	Atheroma	1904						
	86	81-100	m	bilateral	ICA	n	no information available	1904						
	87	81-100	f	right	ICA	n	Atheroma	1904						
	40	31-40	m	midline	BA	n	Syphilis	1905						
	42	41-50	f	right	PcomA	y	Marked sclerosis	1905						
	45	41-50	m	right	VA	n	Localized syphilitic periarteritis of aneurysm	1905						
	51	51-60	f	right	VA	y	no information available	1905						
			m	midline	BA	n	Syphilis	1905						
	6	6-10	f	left	MCA	y	Mycotic (staphylococcic endocarditis)	1906						
	28	21-30	m	midline	BA	y	no information available	1906						
	69	61-70	f	bilateral	VA	n	Arteriosclerosis	1906						
			f	bilateral	ICA	y	no information available	1906						
	14	11-15	m	left	BA	n	no information available	1907						
	40	31-40	m	left	MCA	y	Vessels normal	1907						
	49	41-50	f	left	ICA	n	no atheroma	1907						
	50	41-50	f	left	MCA	y	Arteries healthy	1907						
	51	51-60	m	midline	AcomA	y	no information available	1907						
	55	51-60	f	bilateral	MCA	y	no information available	1907						
	61	61-70	f	left	ICA	y	no information available	1907						
	63	61-70	f	midline	AcomA	n	no information available	1907						
	65	61-70	f	left	VA	n	Basilar artery tortuous and diseased	1907						
	68	61-70	m	midline	BA	y	no information available	1907						
	84	81-100	f	left	ICA	n	no information available	1907						
			f	right	ICA	n	no information available	1907						
				left	ICA	n	no information available	1907						
	28	21-30	m	left	AcomA	y	Irregular, cartilagi nous thickening of arteries at base	1908						
	65	61-70	m	right	MCA	n	Atheroma	1908						
	30	21-30	m	left	ACA	y	Thickening: syphi litic endarteritis obliterans	1909						
	27	21-30	m	midline	BA	y	Other arteries normal	1910						
	44	41-50	f	right	MCA	y	Arteriosclerosis	1910						
	57	51-60	m	bilateral	VA	n	no information available	1910						
	64	61-70	m	left	MCA	y	Arteriosclerosis	1910						
			f	left	VA	n	Thick and hard	1910						
	25	21-30	f	right	AICA	y	Thickening of vessels	1911						
	36	31-40	f	left	PCA	n	Aneurysm congenital	1911						
	37	31-40	m	right	ICA	n	no information available	1911						
	42	41-50	f	right	ICA	y	no information available	1911						
	42	41-50	m	left	VA	y	Both cerebral arteries thickened	1911						
	53	51-60	m	left	MCA	n	Syphilis	1911						
	62	61-70	f	left	ICA	y	no information available	1911						
			m	midline	BA	y	Healthy vessels	1911						
	21	21-30	f	right	ACA	y	Aneurysm congenital	1912						
	22	21-30	m	right	MCA	y	Embolic (endocarditis)	1912						
	25	21-30	f	right	AICA	y	Aneurysm congenital	1912						
	31	31-40	m	undefined	CBAN	n	No arteriosclerosis	1912						
	32	31-40	m	left	MCA	y	Aneurysm congenital	1912						
	36	31-40	f	left	PICA	y	Walls healthy (probably embolic)	1912						
	37	31-40	f	right	PCA	y	Embolic (endocarditis)	1912						
	37	31-40	m	left	MCA	y	Aneurysm congenital	1912						
	38	31-40	f	midline	AcomA	y	Aneurysm congenital	1912						
	38	31-40	m	right	VA	y	Aneurysm congenital	1912						
	40	31-40	f	left	MCA	y	Embolic (endocarditis)	1912						
	42	41-50	f	left	ICA	y	Aneurysm congenital	1912						
	42	41-50	m	left	MCA	y	Embolic (endocarditis)	1912						
	42	41-50	m	left	VA	y	Vessels somewhatthickened; "congenital" (?)	1912						
	44	41-50	m	right	MCA	y	Arteriosclerosis	1912						
	48	41-50	f	left	MCA	y	Aneurysm congenital	1912						
	51	51-60	f	left	ACA	y	Syphilitic endarteritis of cerebral arteries	1912						

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52	51-60	m	right	MCA	y	Syphilitic endarteritis obliterans of cerebral vessels	1912					
55	51-60	m	left	ICA	n	no information available	1912					
56	51-60	f	midline	BA	y	Aneurysm congenital	1912					
56	51-60	f	left	PICA	y	Aneurysm congenital	1912					
57	51-60	f	right	MCA	y	Arteries soft	1912					
63	61-70	f	right	MCA	y	Arteriosclerosis	1912					
6	6-10.	f	right	PICA	y	Atheroma	1913					
12	11-15.	m	left	MCA	y	no information available	1913					
18	16-20	m	left	PCA	y	Aneurysm congenital	1913					
30	21-30	f	right	PcomA	y	No arteriosclerosis	1913					
31	31-40	f	right	VA	n	Syphilis	1913					
33	31-40	m	undefined	CBAN	y	no information available	1913					
36	31-40	m	right	PCA	y	Syphilitic gummatous arteritis	1913					
37	31-40	m	right	VA	n	Endarteritis	1913					
40	31-40	f	left	ACA	y	Aneurysm congenital	1913					
41	41-50	m	left	ICA	n	no information available	1913					
42	41-50	f	left	MCA	y	Small sclerotic plaques	1913					
42	41-50	m	right	AICA	y	Soft vessels	1913					
56	51-60	m	undefined	CBAN	y	Small grayish white flecks on vessels	1913					
58	51-60	f	right	MCA	y	Only slight thickening	1913					
72	71-80	m	right	MCA	y	Arteriosclerosis	1913					
72	71-80	m	right	MCA	y	Marked arteriosclerosis	1913					
		f	right	ICA	y	Atheroma	1913					
57	51-60	m	midline	BA	y	no information available	1914					
40	31-40	f	right	VA	y	proliferative endocarditis	1915					
50	41-50	m	left	AcomA	y	embolism (endocarditis)	1915					
		m	left	PICA	y	no information available	1915					
7	6-10.	f	right	MCA	y	embolic	1916					
15	11-15.	f	left	ICA	y	embolic	1916					
16	16-20	f	right	MCA	y	embolic	1916					
16	16-20	m	left	MCA	y	embolic	1916					
19	16-20	m	left	PcomA	y	healthy artery	1916					
22	21-30	m	right	MCA	n	embolic	1916					
22	21-30	m	left	AcomA	y	congenital aneurysm	1916					
22	21-30	m	right	MCA	y	congenital aneurysm	1916					
28	21-30	m	left	ICA	y	congenital aneurysm	1916					
31	31-40	m	right	MCA	y	embolic	1916					
36	31-40	f	left	PcomA	y	slight arterial degeneration	1916					
36	31-40	m	left	ICA	y	Atheroma	1916					
36	31-40	m	left	MCA	y	embolic	1916					
40	31-40	f	right	PcomA	y	no information available	1916					
40	31-40	m	right	ICA	y	healthy artery	1916					
41	41-50	m	right	AcomA	n	no atheroma	1916					
41	41-50	m	right	ACA	y	embolic	1916					
42	41-50	f	left	PICA	y	no atheroma	1916					
44	41-50	f	left	AcomA	y	no information available	1916					
46	41-50	f	right	AcomA	y	arterial degeneration	1916					
47	41-50	m	right	ICA	n	no information available	1916					
48	41-50	m	right	MCA	n	no information available	1916					
48	41-50	f	right	MCA	y	arterial degeneration	1916					
49	41-50	f	left	AcomA	y	Atheroma	1916					
49	41-50	m	left	AcomA	y	no information available	1916					
50	41-50	m	right	AcomA	y	no information available	1916					
51	51-60	m	right	MCA	y	Atheroma	1916					
53	51-60	m	right	MCA	n	no information available	1916					
53	51-60	m	left	AcomA	y	Arteriosclerosis	1916					
55	51-60	m	right	AcomA	y	no information available	1916					
58	51-60	f	right	ICA	y	congenital aneurysm	1916					
60	51-60	f	right	MCA	y	embolic	1916					
60	51-60	m	right	MCA	y	Atheroma	1916					
67	61-70	f	left	MCA	y	embolic	1916					
70	61-70	f	left	ICA	n	no information available	1916					
72	71-80	f	left	AcomA	y	arterial degeneration	1916					
75	71-80	m	undefined	CBAN	n	no information available	1916					
86	81-100	m	right	MCA	n	no information available	1916					
			left	ACA	n	embolic	1916					
			midline	BA	n	embolic	1916					
			undefined	CBAN	n	embolic	1916					
			left	MCA	n	no information available	1916					
		m	left	ACA	y	embolic	1916					
		m	right	MCA	y	embolic	1916					
12	11-15.	f	right	AcomA	y	vessel healthy	1917					
32	31-40	f	bilateral	ICA	y	no information available	1917					
47	41-50	m	left	VA	y	vessel soft	1917					
52	51-60	f	right	ICA	y	no information available	1917					
53	51-60	m	midline	BA	n	Arteriosclerosis	1917					
21	21-30	m	right	MCA	y	no information available	1918					
26	21-30	f	right	ICA	y	no information available	1918					
53	51-60	f	left	MCA	y	Arteriosclerosis	1918					
54	51-60	m	left	PCA	y	no information available	1918					
87	81-100	f	right	MCA	y	other vessel normal	1918					
2	0-5.	m	left	MCA	y	Focal areas of intimal thickening	1919					
18	16-20	m	bilateral	MCA	y	Vessels soft and thin	1919					
27	21-30	m	bilateral	MCA	y	No trace of syphilis or arteriosclerosis; microscopically a decrease in elastic fibers in media of vessels	1919					
28	21-30	m	right	VA	y	Slight intimal thickening of other vessels	1919					
35	31-40	m	right	MCA	y	atherosclerosis	1919					
36	31-40	f	right	PcomA	y	Vessels soft	1919					
39	31-40	f	left	AcomA	y	Scattered patches of intimal thickening	1919					
42	41-50	m	left	MCA	y	Arteriosclerosis	1919					
45	41-50	m	left	MCA	y	atherosclerosis	1919					
53	51-60	m	midline	BA	y	Arteriosclerosis	1919					
53	51-60	m	left	PcomA	y	Scattered patches of intimal thickening	1919					
55	51-60	m	midline	BA	y	Vessels thickened with plaques	1919					
56	51-60	m	right	PcomA	y	Scattered plaques	1919					
68	61-70	f	left	AcomA	y	Marked thickening of vessels	1919					
			right	MCA	y	Scattered thickening	1919					
			midline	AcomA	y	Scattered yellow patches on intima	1919					
28	21-30	m	midline	AcomA	y	no information available	1920					
29	21-30	f	midline	AcomA	y	no information available	1920					
36	31-40	m	midline	BA	n	no information available	1920					
37	31-40	f	midline	AcomA	y	no information available	1920					
50	41-50	f	midline	AcomA	y	no information available	1920					
55	51-60	m	midline	AcomA	y	Sclerosis of cerebral arteries	1920					
56	51-60	f	right	AcomA	y	no information available	1920					
67	61-70	f	midline	AcomA	y	no information available	1920					
9	6-10.	m	left	PCA	y	afected embolus; other vessels normal	1921					
13	11-15.	m	midline	AcomA	y	no information available	1921					
26	16-20	m	undefined	CBAN	y	no information available	1921					
27	21-30	f	midline	AcomA	y	Atheroma	1921					
37	31-40	f	left	AcomA	n	Atheroma	1921					
37	31-40	m	left	MCA	y	Medial sclerosis and Intd. intimal thickening	1921					
39	31-40	f	undefined	CBAN	y	Arteriosclerosis	1921					
44	41-50	m	left	AcomA	y	Infected embolus; slight intimal thickening of other vessels	1921					
44	41-50	m	left	AcomA	y	Other vessels normal	1921					
46	41-50	f	midline	AcomA	y	Atheroma	1921					
46	41-50	m	left	AcomA	y	Atheroma	1921					
51	41-50	m	right	VA	n	no information available	1921					
52	51-60	f	left	AcomA	y	Atheroma	1921					
61	61-70	f	bilateral	VA	n	no information available	1921					
61	61-70	f	midline	AcomA	y	Atheroma	1921					
13	11-15.	m	bilateral	MCA	y	Coarctation of aorta	1922					
15	11-15.	f	bilateral	ICA	n	no information available	1922					
38	31-40	m	midline	BA	n	no information available	1922					
39	31-40	m	midline	AcomA	y	Embolism (endocarditis)	1922					
46	41-50	m	midline	BA	n	no information available	1922					
53	41-50	m	right	ICA	y	Arteriosclerosis	1922					
54	51-60	m	left	VA	n	Arteriosclerosis	1922					
16	16-20	f	left	MCA	y	Mycotic embolism	1923					
18	16-20	f	left	AcomA	y	Mycotic embolism	1923					
22	21-30	m	right	MCA	y	Embolic (endocarditis)	1923					
22	21-30	m	left	PICA	y	no information available	1923					
24	21-30	m	right	MCA	y	Embolic (endocarditis)	1923					
25	21-30	m	undefined	CBAN	y	no information available	1923					
29	21-30	m	left	MCA	y	Embolic (endocarditis)	1923					
29	21-30	m	left	MCA	y	Embolic (endocarditis)	1923					
31	31-40	m	right	MCA	y	Embolic (endocarditis)	1923					
33	31-40	m	left	MCA	n	Mycotic embolism	1923					
36	31-40	f	left	ICA	y	no information available	1923					
36	31-40	m	right	ICA	y	no information available	1923					
42	41-50	f	midline	AcomA	y	Embolic (endocarditis)	1923					
43	41-50	f	right	MCA	y	Arteriosclerosis	1923					
45	41-50	f	undefined	CBAN	n	no information available	1923					
48	41-50	f	left	ICA	y	Arteriosclerosis	1923					
49	41-50	m	midline	AcomA	y	no information available	1923					
50	41-50	f	left	ICA	n	Arteriosclerosis	1923					
52	51-60	f	right	ICA	n	no information available	1923					
52	51-60	f	midline	AcomA	y	Arteriosclerosis	1923					
52	51-60	f	left	ICA	y	no information available	1923					
55	51-60	f	right	PcomA	y	Arteriosclerosis	1923					
56	51-60	f	right	MCA	y	Arteriosclerosis	1923					
57	51-60	f	left	ICA	n	Syphilis and arterio sclerosis	1923					
57	51-60	f	right	ICA	n	Arteriosclerosis	1923					
60	51-60	f	left	ICA	y	Arteriosclerosis	1923					
61	61-70	f	right	ICA	y	Arteriosclerosis	1923					
64	61-70	f	midline	AcomA	n	Arteriosclerosis	1923					
64	61-70	f	left	PCA	n	Arteriosclerosis	1923					
65	61-70	f	left	ICA	y	no information available	1923					
69	61-70	f	left	PcomA	y	Arteriosclerosis	1923					
70	61-70	f	bilateral	MCA	n	Arteriosclerosis	1923					
70	61-70	f	left	MCA	y	Arteriosclerosis	1923					
70	61-70	f	right	PCA	y	Arteriosclerosis	1923					
74	71-80	m	left	AcomA	n	Arteriosclerosis	1923					
75	71-80	f	left	PcomA	n	Arteriosclerosis	1923					
84	81-100	f	right	AcomA	y	Embolic (endocarditis)	1923					
24	21-30	m	right	AcomA	y	Arteriosclerosis	1924					
25	21-30	m	right	MCA	y	No atheroma	1924					
25	21-30	f	right	ICA	y	Healthy vessels	1924					
29	21-30	f	right	ICA	y	Healthy vessels	1924					
29	21-30	m	right	ICA	y	healthy vessels	1924					
30	21-30	m	midline	BA	n	Gummatous arteritis	1924					
30	21-30	f	left	AcomA	y	Arteriosclerosis	1924					
41	41-50	f	left	ICA	y	Endocarditis or arteriosclerosis	1924					
41	41-50	f	left	AcomA	y	Internal sclerosis (endocarditis)	1924					
43	41-50	f	right	ICA	y	no information available	1924					
47	41-50	m	midline	BA	n	no information available	1924					
49	41-50	m	right	AcomA	y	Arteriosclerosis	1924					
60	51-60	m	right	ICA	y	no information available	1924					
			right	PcomA	y	Atheroma	1924					
		f	left	MCA		no information available	1924					
		f	left	MCA		no information available	1924					
		f	left	MCA		no information available	1924					
		f	left	MCA		no information available	1924					
		f	left	MCA		no information available	1924					
		f	left	MCA		no information available	1924					
		f	left	MCA		no information available	1924					
		f	left	ICA		no information available	1924					
		f	left	ICA		no information available	1924					
		f	left	ICA		no information available	1924					
		f	left	AcomA		no information available	1924					
		f	left	AcomA		no information available	1924					
		f	left	PcomA		no information available	1924					
		f	left	PcomA		no information available	1924					
		f	left	PcomA		no information available	1924					
		f	right	MCA		no information available	1924					
		f	right	MCA		no information available	1924					
		f	right	MCA		no information available	1924					
		f	right	MCA		no information available	1924					
		f	right	MCA		no information available	1924					
		f	right	ICA		no information available	1924					
		f	right	AcomA		no information available	1924					
		f	right	AcomA		no information available	1924					
		f	right	AcomA		no information available	1924					
		f	right	VA		no information available	1924					
		f	right	PcomA		no information available	1924					
		f	right	ICA		no information available	1924					
		f	midline	BA		no information available	1924					
		f	midline	AcomA		no information available	1924					
		f	midline	AcomA		no information available	1924					
		m	left	MCA		no information available	1924					

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		m	left	MCA		no information available	1924						
		m	left	AcomA		no information available	1924						
		m	left	AcomA		no information available	1924						
		m	left	AcomA		no information available	1924						
		m	left	AcomA		no information available	1924						
		m	left	VA		no information available	1924						
		m	left	VA		no information available	1924						
		m	left	PICA		no information available	1924						
		m	right	PICA		no information available	1924						
		m	midline	BA		no information available	1924						
		m	midline	BA		no information available	1924						
		m	midline	AcomA		no information available	1924						
		m	midline	AcomA		no information available	1924						
		m	midline	AcomA		no information available	1924						
		m	midline	AcomA		no information available	1924						
		m	midline	AcomA		no information available	1924						
		m	midline	AcomA		no information available	1924						
7	6-10.	m	right	ICA	n	Infected thrombus	1925						
17	16-20	m	midline	BA	y	Congenital aneurysm	1925						
21	21-30	m	right	MCA	y	no information available	1925						
23	21-30	m	midline	BA	y	no information available	1925						
26	21-30	m	left	ICA	y	no information available	1925						
32	31-40	m	left	MCA	y	no information available	1925						
35	31-40	m	right	ICA	n	Mycotic embolus (endocarditis)	1925						
50	41-50	m	left	VA	y	no information available	1925						
			midline	BA	n	no information available	1925						
15	11-15.	f	right	AcomA	y	Healthy vessels	1926						
15	11-15.	m	left	MCA	y	Vessels healthy	1926						
15	11-15.	m	midline	BA	y	Vessels healthy	1926						
16	16-20	f	bilateral	MCA	y	Vessels healthy	1926						
16	16-20	m	left	MCA	y	Vessels healthy	1926						
17	16-20	m	left	MCA	y	Healthy vessels	1926						
20	16-20	m	left	MCA	y	Aneurysm congenital	1926						
20	16-20	m	midline	BA	y	Embolic	1926						
21	21-30	m	right	ICA	y	Congenital aneurysm	1926						
23	21-30	f	undefined	CBAN	n	no information available	1926						
23	21-30	m	right	PcomA	n	Atheroma	1926						
23	21-30	f	left	MCA	y	no information available	1926						
23	21-30	m	right	MCA	y	no information available	1926						
23	21-30	m	right	MCA	y	no information available	1926						
26	21-30	m	undefined	CBAN	n	Aneurysm seen at operation	1926						
26	21-30	f	midline	BA	y	Vessels healthy	1926						
27	21-30	m	right	MCA	y	Healthy vessels	1926						
28	21-30	m	right	MCA	y	Healthy vessels	1926						
30	21-30	f	midline	AcomA	y	Vessels healthy	1926						
32	31-40	f	right	ICA	n	no information available	1926						
32	31-40	f	left	ICA	y	no information available	1926						
32	31-40	f	left	AcomA	y	Vessels healthy	1926						
34	31-40	m	left	ICA	y	no information available	1926						
35	31-40	f	right	AcomA	y	Vessels not diseased	1926						
35	31-40	m	left	MCA	y	Vessels healthy	1926						
36	31-40	m	left	PcomA	n	Syphilitic	1926						
38	31-40	f	right	AcomA	y	Vessels healthy	1926						
38	31-40	m	midline	AcomA	y	Healthy vessels	1926						
39	31-40	m	left	MCA	y	Healthy vessels	1926						
40	31-40	f	left	VA	n	Atheroma	1926						
40	31-40	f	right	VA	n	Atheroma	1926						
40	31-40	m	left	AcomA	n	no information available	1926						
41	41-50	f	bilateral	MCA	y	Healthy vessels	1926						
41	41-50	f	bilateral	MCA	y	Vessels healthy	1926						
41	41-50	m	right	AcomA	y	Vessels healthy	1926						
42	41-50	m	left	MCA	y	Arteriosclerosis	1926						
42	41-50	m	midline	BA	y	Atheroma	1926						
45	41-50	f	right	ICA	y	Arteriosclerosis	1926						
45	41-50	f	left	ICA	y	no information available	1926						
45	41-50	m	right	AcomA	y	Healthy vessels	1926						
45	41-50	m	right	MCA	y	Healthy vessels	1926						
46	41-50	f	right	MCA	y	Vessels healthy	1926						
46	41-50	m	right	MCA	y	Vessels healthy	1926						
47	41-50	m	left	AcomA	y	Vessels healthy	1926						
48	41-50	f	midline	AcomA	y	Healthy vessels	1926						
49	41-50	f	midline	AcomA	y	Arteriosclerosis	1926						
50	41-50	m	left	MCA	y	Atheroma	1926						
52	51-60	f	midline	AcomA	y	Atheroma	1926						
52	51-60	f	right	ICA	y	Many atheromatous beads on other vessels	1926						
52	51-60	f	right	ICA	y	no information available	1926						
52	51-60	m	left	MCA	y	Arteriosclerosis	1926						
52	51-60	m	midline	BA	y	no information available	1926						
53	51-60	m	left	AcomA	y	Atheroma	1926						
55	51-60	f	left	MCA	y	Atheroma	1926						
56	51-60	f	left	PCA	y	Arteriosclerosis	1926						
58	51-60	f	right	ICA	n	Aneurysm seen at operation	1926						
60	51-60	m	right	AcomA	y	Vessels healthy	1926						
62	61-70	f	left	MCA	y	Atheroma	1926						
64	61-70	m	left	MCA	y	Atheroma	1926						
69	61-70	f	right	MCA	y	Atheroma	1926						
69	61-70	f	bilateral	PCA	y	no information available	1926						
72	71-80	m	right	AcomA	y	Arteriosclerosis	1926						
73	71-80	f	right	ICA	y	Many sclerotic plaques	1926						
11	11-15.	f	midline	AcomA	y	Congenital aneurysm	1927						
20	16-20	f	left	MCA	y	Congenital" aneurysm (coarctationof aorta)	1927						
30	21-30	f	midline	BA	n	no information available	1927						
30	21-30	f	left	PcomA	n	Vessels slightly thickened	1927						
34	31-40	m	right	PCA	y	Normal vessels	1927						
39	31-40	f	left	PcomA	y	Thickening of intima in basilar artery	1927						
40	31-40	m	left	MCA	y	"Congenital" aneurysm (coarctation of aorta)	1927						
42	41-50	f	midline	AcomA	y	no information available	1927						
42	41-50	m	right	AcomA	y	Congenital" aneurysm	1927						
42	41-50	m	bilateral	PCA	y	No other vascular disease	1927						
52	51-60	f	left	AcomA	y	no information available	1927						
52	51-60	f	left	ICA	y	Small foci of early calcification	1927						
69	61-70	f	left	MCA	y	no information available	1927						
1	0-5.	f	left	MCA	y	no information available	1928						
3

		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	AcomA	y	no information available	1928						
		f	midline	BA	y	no information available	1928						
		f	midline	BA	y	no information available	1928						
		f	midline	BA	y	no information available	1928						
		f	midline	BA	y	no information available	1928						
		f	midline	BA	y	no information available	1928						
		f	midline	BA	y	no information available	1928						
		f	midline	BA	y	no information available	1928						
		m	left	VA	y	no information available	1928						
		m	left	VA	y	no information available	1928						
		m	left	VA	y	no information available	1928						
		m	left	VA	y	no information available	1928						
		m	left	VA	y	no information available	1928						
		m	left	VA	y	no information available	1928						
		m	left	VA	y	no information available	1928						
		m	left	VA	y	no information available	1928						
		m	left	ICA	y	no information available	1928						
		m	left	PCA	y	no information available	1928						
		m	left	PCA	y	no information available	1928						
		m	left	PCA	y	no information available	1928						
		m	right	VA	y	no information available	1928						
		m	right	ICA	y	no information available	1928						
		m	right	PcomA	y	no information available	1928						
		m	right	AICA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	AcomA	y	no information available	1928						
		m	midline	BA	y	no information available	1928						
		m	midline	BA	y	no information available	1928						
		m	midline	BA	y	no information available	1928						
		m	midline	BA	y	no information available	1928						
		m	midline	BA	y	no information available	1928						
		m	midline	BA	y	no information available	1928						
		m	midline	BA	y	no information available	1928						
		m	undefined	CBAN	y	no information available	1928						
		m	undefined	CBAN	y	no information available	1928						
		m	undefined	CBAN	y	no information available	1928						
		m	undefined	CBAN	y	no information available	1928						
		m	undefined	CBAN	y	no information available	1928						
30	21-30	f	right	PcomA	y	No other pathologic changes	1929						
32	31-40	m	undefined	CBAN	y	no information available	1929						
33	31-40	m	left	MCA	y	no information available	1929						
34	31-40	f	left	ICA	y	no information available	1929						
47	41-50	f	right	PcomA	y	Arteriosclerosis	1929						
59	51-60	f	left	ICA	y	Arteriosclerosis	1929						
60	51-60	m	midline	BA	y	Thickened walls	1929						
61	61-70	m	right	ICA	y	no information available	1929						
8	6-10	m	bilateral	PCA	y	Congenital aneurysm	1930						
21	21-30	f	left	MCA	y	Congenital aneurysm	1930						
23	21-30	f	right	ICA	y	no information available	1930						
24	21-30	f	right	AcomA	y	Congenital aneurysm	1930						
28	21-30	f	right	MCA	y	Congenital aneurysm	1930						
28	21-30	f	left	MCA	y	no information available	1930						
32	31-40	m	left	MCA	y	Congenital aneurysm	1930						
33	31-40	m	right	AcomA	y	Congenital aneurysm	1930						
49	41-50	m	left	AcomA	y	no information available	1930						
53	51-60	f	right	MCA	y	Healthy vessels	1930						
77	71-80	f	midline	BA	n	Atheroma	1930						
11	11-15	m	left	MCA	y	Congenital aneurysm	1931						
15	11-15	f	left	PcomA	y	no information available	1931						
20	16-20	f	right	ICA	y	Congenital aneurysm	1931						
23	21-30	f	left	AcomA	y	Congenital aneurysm	1931						
24	21-30	m	right	MCA	y	Congenital aneurysm	1931						
26	21-30	m	right	MCA	y	Congenital aneurysm	1931						
27	21-30	m	midline	BA	y	Congenital aneurysm	1931						
27	21-30	m	right	PcomA	y	no information available	1931						
28	21-30	f	left	MCA	y	Congenital aneurysm	1931						
28	21-30	m	left	PcomA	y	no information available	1931						
29	21-30	f	right	ICA	y	No arteriosclerosis	1931						
29	21-30	m	right	AcomA	y	Yellow plaques on Bid,intima at bifurcation points; (endocarditis)	1931						
31	31-40	f	right	PcomA	y	Healthy vessels	1931						
31	31-40	m	right	MCA	y	no information available	1931						
33	31-40	f	midline	AcomA	y	Congenital aneurysm	1931						
34	31-40	m	bilateral	PCA	y	Calcareous deposits	1931						
38	31-40	m	right	ICA	y	Arteriosclerosis	1931						
40	31-40	f	right	ICA	y	Congenital aneurysm	1931						
40	31-40	f	left	ICA	y	no information available	1931						
44	41-50	f	left	AcomA	y	Slight evidence of arteriosclerosis	1931						
46	41-50	f	right	MCA	y	Arteriosclerosis	1931						
46	41-50	f	left	PcomA	y	Few yellow plaques on basilar artery	1931						
49	41-50	f	left	ICA	y	Arteriosclerosis	1931						
49	41-50	m	midline	BA	y	Very sclerotic	1931						
50	41-50	f	left	VA	n	no information available	1931						
52	51-60	m	left	MCA	y	Healthy vessels	1931						
53	51-60	f	right	MCA	y	Congenital aneurysm	1931						
55	51-60	m	left	MCA	y	Arteriosclerosis	1931						
56	51-60	m	right	VA	y	no information available	1931						
58	51-60	f	left	ICA	y	no information available	1931						
60	51-60	f	right	PcomA	y	Arteriosclerosis	1931						
64	61-70	f	left	ICA	n	Arteriosclerosis	1931						
64	61-70	f	left	MCA	y	Arteriosclerosis	1931						
64	61-70	f	right	PcomA	y	Some thickening of Bid. intima, probably of infectious origin	1931						
66	61-70	f	right	MCA	y	Arteriosclerosis	1931						
66	61-70	m	midline	BA	y	Arteriosclerosis	1931						
70	61-70	m	left	ICA	y	Arteriosclerosis	1931						
72	71-80	f	midline	AcomA	y	Arteriosclerosis	1931						
72	71-80	f	left	AcomA	y	Arteriosclerosis	1931						
75	71-80	m	midline	BA	n	no information available	1931						
			right	MCA	y	Arteriosclerosis	1931						
6	6-10	f	right	AcomA	y	other vessels normal	1932						
17	16-20	m	midline	BA	n	Changes of early arteriosclerosis	1932						
19	16-20	f	left	MCA	y	Mycotic (endocarditis)	1932						
19	16-20	f	midline	AcomA	y	no information available	1932						
20	16-20	f	right	MCA	y	no information available	1932						
24	21-30	m	midline	BA	y	Mycotic	1932						
25	21-30	f	right	PcomA	y	No other abnormalities of vessels	1932						
29	21-30	m	left	MCA	y	Congenital aneurysm	1932						
29	21-30	m	right	PcomA	y	no information available	1932						
30	21-30	f	left	PCA	n	Arteriosclerosis	1932						
30	21-30	f	bilateral	MCA	y	Congenital aneurysm	1932						
31	31-40	m	left	AcomA	y	Diffuse degenerative changes in all three coats	1932						
35	31-40	m	bilateral	MCA	y	Arteriosclerosis	1932						
36	31-40	f	left	PcomA	y	Arteriosclerosis	1932						
40	31-40	m	midline	BA	y	Arteriosclerosis	1932						
41	41-50	f	bilateral	MCA	y	Congenital aneurysm	1932						
43	41-50		midline	BA	n	Atheroma	1932						
43	41-50	m	left	PcomA	y	Arteriosclerosis	1932						
45	41-50		midline	AcomA	n	Arteriosclerosis	1932						
47	41-50	m	midline	BA	y	no information available	1932						
52	51-60	m	left	AcomA	y	Congenital aneurysm	1932						
54	51-60	f	right	MCA	y	Pronounced degenerative changes in all coats	1932						
60	51-60	m	left	AcomA	y	Arteriosclerosis	1932						
63	61-70	m	midline	BA	n	Arteriosclerosis	1932						
61	61-70	f	left	PcomA	y	Arteriosclerosis	1932						
61	61-70	m	left	MCA	y	Basilar artery arteriosclerotic	1932						
67	61-70	m	right	BA	y	no information available	1932						
68	61-70	m	undefined	CBAN	y	Arteriosclerosis	1932						
			bilateral	MCA	y	no information available	1932						
			bilateral	MCA	y	no information available	1932						
			midline	AcomA	y	no information available	1932						
			midline	AcomA	y	no information available	1932						
20	16-20	f	left	ICA	y	Congenital aneurysm	1933						
24	21-30	m	left	ICA	y	no information available	1933						
27	21-30	m	midline	BA	y	No other microscopic changes; Heubner's arteritis	1933						
28	21-30	f	right	PCA	y	infection	1933						
28	21-30	m	left	MCA	y	Localized areas of fat absorption	1933						
29	21-30	m	right	AcomA	y	Congenital aneurysm	1933						
29	21-30	m	right	AcomA	y	Congenital aneurysm	1933						
35	31-40	m	undefined	CBAN	n	no information available	1933						
36	31-40	f	left	AcomA	y	no information available	1933						
39	31-40	f	undefined	CBAN	y	no information available	1933						
40	31-40	m	midline	AcomA	n	Arteriosclerosis	1933						
40	31-40	m	right	AcomA	y	no information available	1933						
42	41-50	m	left	MCA	y	Arteriosclerosis	1933						
45	41-50	f	left	ICA	y	no information available	1933						
45	41-50	f	left	PcomA	y	no information available	1933						
47	41-50	m	right	ICA	y	Arteriosclerosis	1933						
47	41-50	m	midline	AcomA	y	Arteriosclerosis	1933						
51	51-60	f	left	ICA	y	Vessels degenerated	1933						
53	51-60	m	left	ICA	n	Arteriosclerosis	1933						
56	51-60	f	right	MCA	y	Extensive atheroma	1933						
57	51-60	m	left	ICA	n	Arteriosclerosis	1933						
58	51-60	m	right	AcomA	n	Arteriosclerosis	1933						
67	61-70	m	left	ICA	n	Arteriosclerosis	1933						
67	61-70	m	right	ICA	y	Cerebral vessels thin and smooth	1933						
69	61-70	f	right	MCA	n	Arteriosclerosis	1933						
75	71-80	m	left	ICA	n	Arteriosclerosis	1933						
78	71-80	m	right	AcomA	n	Arteriosclerosis	1933						
83	81-100	m	right	AcomA	n	no information available	1933						
		m	right	MCA	y	Congenital aneurysm	1933						
24	21-30	f	right	ICA	y	Healthy vessels	1934						
26	21-30	m	left	MCA	y	Healthy vessels	1934						
31	31-40	f	right	ICA	y	other vessels normal	1934						
37	31-40	f	right	PcomA	y	no information available	1934						
38	31-40	f	left	MCA	y	conjenital aneurysm	1934						
40	31-40	f	right	MCA	y	Atheromatous	1934						
42	41-50	m	midline	AcomA	y	Congenital aneurysm	1934						
42	41-50	m	midline	AcomA	y	Healthy vessels	1934						
42	41-50	m	midline	AcomA	y	no information available	1934						
43	41-50	f	left	MCA	y	Arteriosclerosis	1934						
43	41-50	m	right	AcomA	y	conjenital aneurysm	1934						
47	41-50	f	right	MCA	y	no information available	1934						
49	41-50	m	left	AcomA	y	conjenital aneurysm	1934						
50	41-50	m	right	ICA	y	No arteriosclerosis	1934						
51	51-60	m	right	ICA	y	No arteriosclerosis	1934						
53	51-60	m	right	ICA	n	Healthy vessels	1934						
53	51-60	f	right	PCA	y	Healthy vessels	1934						
53	51-60	m	left	MCA	y	Arteriosclerosis	1934						
54	51-60	m	right	ICA	y	Arteriosclerosis	1934						
55	51-60	f	right	ICA	n	Normal vessels	1934						
55	51-60	f	right	PcomA	y	Arteriosclerosis	1934						
57	51-60	f	right	ICA	y	No arteriosclerosis	1934						
59	51-60	f	right	MCA	y	no information available	1934						
60	51-60	m	left	MCA	y	Healthy vessels	1934						
62	61-70	f	right	ICA	y	Arteriosclerosis	1934						
64	61-70	f	right	ICA	y	Normal vessels	1934						
89	81-100	f	right	ICA	y	Healthy vessels	1934						
31	31-40	f	midline	BA	y	congenital aneurysm	1935						
38	31-40	m	right	MCA	y	Healthy vessels	1935						
43	41-50	f	right	ICA	n	no information available	1935						
44	41-50	m	left	ICA	y	no information available	1935						
64	61-70	f	right	PcomA	y	no information available	1935						

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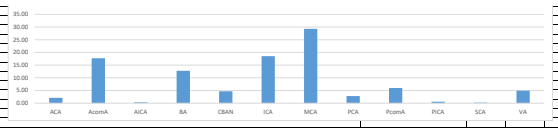
	AcomA	151.00	17.70	17.70	19.81
	AICA	3.00	0.35	0.35	20.16
	BA	109.00	12.78	12.78	32.94
	CBAN	40.00	4.69	4.69	37.63
	ICA	158.00	18.52	18.52	56.15
	MCA	250.00	29.31	29.31	85.46
	PCA	24.00	2.81	2.81	88.28
	PcomA	51.00	5.98	5.98	94.26
	PICA	5.00	0.59	0.59	94.84
	SCA	2.00	0.23	0.23	95.08
	VA	42.00	4.92	4.92	100.00
	Total	853.00	100.00	100.00	



ruptures- cases of cerebral aneurysms in age groups 218 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	170.00	19.93	19.93	19.93
	y	683.00	80.07	80.07	100.00
	Total	853.00	100.00	100.00	

cases of cerebral aneurysms in age groups less than 20 years, recorded from 1761 to 1938, (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial aneurysm year
N	Valid	122.00	122.00	122.00	122.00	122.00	122	122.00
	Missing	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		13.46						1905.83
Median		15.00						1921.00
Mode		20.00						1928.00
Std. Deviation		5.88						30.63
Minimum		1.92						1814.00
Maximum		20.00						1978.00
Percentiles	25	8.00						1882.75
	50	15.00						1921.00
	75	18.00						1928.00

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	21.00	17.21	17.21	17.21
	11-15	29.00	23.77	23.77	40.98
	16-20	58.00	47.54	47.54	88.52
	6-10	14.00	11.48	11.48	100.00
	Total	122.00	100.00	100.00	

sex

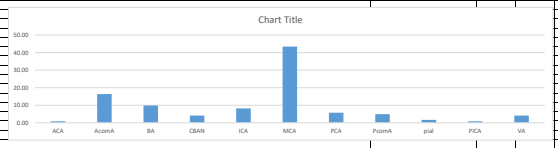
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	59.00	48.36	48.36	48.36
	m	63.00	51.64	51.64	100.00
	Total	122.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	7.00	5.74	5.74	5.74
	left	53.00	43.44	43.44	49.18
	midline	17.00	13.93	13.93	63.11
	right	38.00	31.15	31.15	94.26
	undefined	7.00	5.74	5.74	100.00
	Total	122.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	1.00	0.82	0.82	0.82
	AcomA	20.00	16.39	16.39	17.21
	BA	12.00	9.84	9.84	27.05
	CBAN	5.00	4.10	4.10	31.15
	ICA	10.00	8.20	8.20	39.34
	MCA	53.00	43.44	43.44	82.79
	PCA	7.00	5.74	5.74	88.52
	PcomA	6.00	4.92	4.92	93.44
	pial	2.00	1.64	1.64	95.08
	PICA	1.00	0.82	0.82	95.90
	VA	5.00	4.10	4.10	100.00
	Total	122.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	16.00	13.11	13.11	13.11
	y	106.00	86.89	86.89	100.00
	Total	122.00	100.00	100.00	

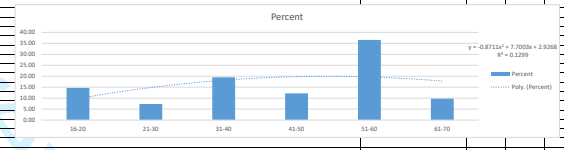
Frequency- cases of cerebral aneurysms in age >= 18 & year < 1850 up to 1761 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	41.00	41.00	41.00	41.00	41.00	41	41.00
	Missing	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		44.32						
Median		47.00						
Mode		20.00						
Std. Deviation		15.61						
Minimum		19.00						
Maximum		68.00						
Percentiles	25	33.50						
	50	47.00						
	75	59.00						

age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	age range in years				
	16-20	6.00	14.63	14.63	14.63
	21-30	3.00	7.32	7.32	21.95
	31-40	8.00	19.51	19.51	41.46
	41-50	5.00	12.20	12.20	53.66
	51-60	15.00	36.59	36.59	90.24
	61-70	4.00	9.76	9.76	100.00
	Total	41.00	100.00	100.00	



sex

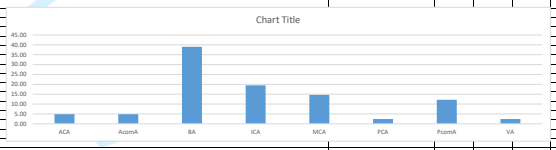
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	16.00	39.02	39.02	39.02
	m	25.00	60.98	60.98	100.00
	Total	41.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	4.88	4.88	4.88
	left	10.00	24.39	24.39	29.27
	midline	18.00	43.90	43.90	73.17
	right	7.00	17.07	17.07	90.24
	undefined	4.00	9.76	9.76	100.00
	Total	41.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	2.00	4.88	4.88	4.88
	AcomA	2.00	4.88	4.88	9.76
	BA	16.00	39.02	39.02	48.78
	ICA	8.00	19.51	19.51	68.29
	MCA	6.00	14.63	14.63	82.93
	PCA	1.00	2.44	2.44	85.37
	PcomA	5.00	12.20	12.20	97.56
	VA	1.00	2.44	2.44	100.00
	Total	41.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	8.00	19.51	19.51	19.51
	y	33.00	80.49	80.49	100.00
	Total	41.00	100.00	100.00	

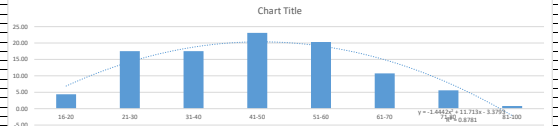
Frequency- cases of cerebral aneurysms in age >= 18 & year >= 1850 & year < 1900 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	251.00	251.00	251.00	251.00	251.00	251	251.00
	Missing	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		45.63						
Median		45.00						
Mode		40.00						
Std. Deviation		15.59						
Minimum		18.00						
Maximum		86.00						
Percentiles	25	34.00						
	50	45.00						
	75	56.00						

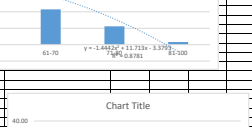
age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-20	11.00	4.38	4.38	4.38
	21-30	44.00	17.53	17.53	21.91
	31-40	44.00	17.53	17.53	39.44
	41-50	58.00	23.11	23.11	62.55
	51-60	51.00	20.32	20.32	82.87
	61-70	27.00	10.76	10.76	93.63
	71-80	14.00	5.58	5.58	99.20
	81-100	2.00	0.80	0.80	100.00
	Total	251.00	100.00	100.00	



sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	?	1.00	0.40	0.40	0.40
	f	136.00	54.18	54.18	54.58
	m	114.00	45.42	45.42	100.00
	Total	251.00	100.00	100.00	

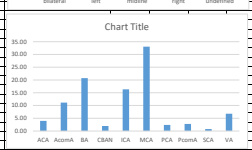


side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	0.80	0.80	0.80
	left	90.00	35.86	35.86	36.65
	midline	82.00	32.67	32.67	69.32
	right	67.00	26.69	26.69	96.02
	undefined	10.00	3.98	3.98	100.00
	Total	251.00	100.00	100.00	

arteries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	10.00	3.98	3.98	3.98
	AcomA	28.00	11.16	11.16	15.14
	BA	52.00	20.72	20.72	35.86
	CBAN	5.00	1.99	1.99	37.85
	ICA	41.00	16.33	16.33	54.18
	MCA	83.00	33.07	33.07	87.25
	PCA	6.00	2.39	2.39	89.64
	PcomA	7.00	2.79	2.79	92.43
	SCA	2.00	0.80	0.80	93.23
	VA	17.00	6.77	6.77	100.00
	Total	251.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	63.00	25.10	25.10	25.10
	y	188.00	74.90	74.90	100.00
	Total	251.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in age >= 18 & year 1900 to 1938 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	561.00	561.00	561.00	561.00	561.00	561	561.00
	Missing	0.00	0.00	0.00	0.00	0.00	0	0.00
Mean		44.27						

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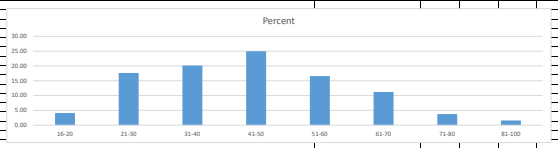
Median		42.00				
Mode		41.00				
Std. Deviation		15.39				
Minimum		18.00				
Maximum		89.00				
Percentiles	25	32.00				
	50	42.00				
	75	55.00				



age range

	age range	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-20	23.00	4.10	4.10	4.10
	21-30	99.00	17.65	17.65	21.75
	31-40	113.00	20.14	20.14	41.89
	41-50	140.00	24.96	24.96	66.94
	51-60	93.00	16.58	16.58	83.42
	61-70	63.00	11.23	11.23	94.65
	71-80	21.00	3.74	3.74	98.40
	81-100	9.00	1.60	1.60	100.00
	Total	561.00	100.00	100.00	

sex

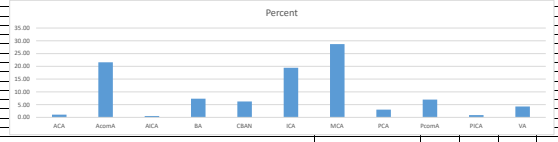
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5.00	5.00	0.89	0.89	0.89
	f	286.00	50.98	50.98	51.87
	m	270.00	48.13	48.13	100.00
	Total	561.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	20.00	3.57	3.57	3.57
	left	195.00	34.76	34.76	38.32
	midline	81.00	14.44	14.44	52.76
	right	231.00	41.18	41.18	93.94
	undefined	34.00	6.06	6.06	100.00
	Total	561.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	6.00	1.07	1.07	1.07
	AcomA	121.00	21.57	21.57	22.64
	AICA	3.00	0.53	0.53	23.17
	BA	41.00	7.31	7.31	30.48
	CBAN	35.00	6.24	6.24	36.72
	ICA	109.00	19.43	19.43	56.15
	MCA	161.00	28.70	28.70	84.85
	PCA	17.00	3.03	3.03	87.88
	PcomA	39.00	6.95	6.95	94.83
	PICA	5.00	0.89	0.89	95.72
	VA	24.00	4.28	4.28	100.00
	Total	561.00	100.00	100.00	



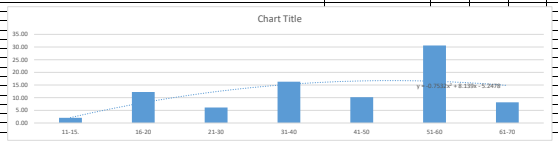
rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	99.00	17.65	17.65	17.65
	y	462.00	82.35	82.35	100.00
	Total	561.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year <1850 to 1761 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	42.00	49.00	49.00	49.00	49.00	49	49.00
	Missing	7.00	0.00	0.00	0.00	0.00	0	0.00
Mean		43.60						
Median		46.00						
Mode		20.00						
Std. Deviation		16.11						
Minimum		14.00						
Maximum		68.00						
Percentiles	25	31.75						
	50	46.00						
	75	59.00						

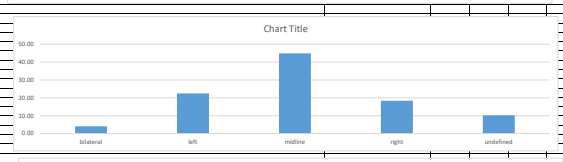


age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7.00	7.00	14.29	14.29	14.29
	11-15.	1.00	2.04	2.04	16.33
	16-20	6.00	12.24	12.24	28.57
	21-30	3.00	6.12	6.12	34.69
	31-40	8.00	16.33	16.33	51.02
	41-50	5.00	10.20	10.20	61.22
	51-60	15.00	30.61	30.61	91.84
	61-70	4.00	8.16	8.16	100.00
	Total	49.00	100.00	100.00	

sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	3.00	6.12	6.12	6.12
	f	16.00	32.65	32.65	38.78
	m	30.00	61.22	61.22	100.00
	Total	49.00	100.00	100.00	

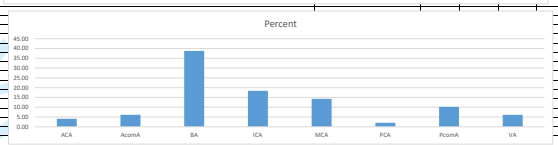


side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	2.00	4.08	4.08	4.08
	left	11.00	22.45	22.45	26.53
	midline	22.00	44.90	44.90	71.43
	right	9.00	18.37	18.37	89.80
	undefined	5.00	10.20	10.20	100.00
	Total	49.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	2.00	4.08	4.08	4.08
	AcomA	3.00	6.12	6.12	10.20
	BA	19.00	38.78	38.78	48.98
	ICA	9.00	18.37	18.37	67.35
	MCA	7.00	14.29	14.29	81.63
	PCA	1.00	2.04	2.04	83.67
	PcomA	5.00	10.20	10.20	93.88
	VA	3.00	6.12	6.12	100.00
	Total	49.00	100.00	100.00	



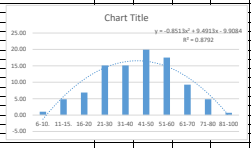
rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	2.00	4.08	4.08	4.08
	n	13.00	26.53	26.53	30.61
	y	34.00	69.39	69.39	100.00
	Total	49.00	100.00	100.00	

Frequency- cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year<1900 & year >= 1850 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	277.00	291.00	291.00	291.00	291.00	291	291.00
	Missing	14.00	0.00	0.00	0.00	0.00	0	0.00
Mean		42.67						
Median		43.00						
Mode		40.00						
Std. Deviation		17.50						
Minimum		6.00						
Maximum		86.00						
Percentiles	25	28.50						
	50	43.00						
	75	56.00						



age range

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	14.00	14.00	4.81	4.81	4.81
	6-10.	3.00	1.03	1.03	85.22
	11-15.	14.00	4.81	4.81	9.62
	16-20	20.00	6.87	6.87	16.49
	21-30	44.00	15.12	15.12	31.62
	31-40	44.00	15.12	15.12	46.74
	41-50	58.00	19.93	19.93	66.67
	51-60	51.00	17.53	17.53	84.19
	61-70	27.00	9.28	9.28	94.50
	71-80	14.00	4.81	4.81	99.31
	81-100	2.00	0.69	0.69	100.00
	Total	291.00	100.00	100.00	

sex

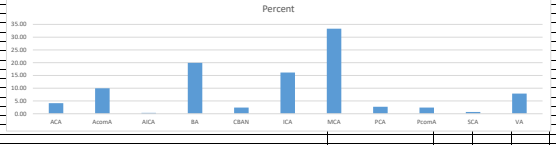
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5.00	5.00	1.72	1.72	1.72
	f	147.00	50.52	50.52	52.23
	m	139.00	47.77	47.77	100.00
	Total	291.00	100.00	100.00	

side

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	3.00	1.03	1.03	1.03
	left	104.00	35.74	35.74	36.77
	midline	90.00	30.93	30.93	67.70
	right	78.00	26.80	26.80	94.50
	undefined	16.00	5.50	5.50	100.00
	Total	291.00	100.00	100.00	

arteries

	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	12.00	4.12	4.12	4.12
	AcomA	29.00	9.97	9.97	14.09
	AICA	1.00	0.34	0.34	14.43
	BA	58.00	19.93	19.93	34.36
	CBAN	7.00	2.41	2.41	36.77
	ICA	47.00	16.15	16.15	52.92
	MCA	97.00	33.33	33.33	86.25
	PCA	8.00	2.75	2.75	89.00
	PcomA	7.00	2.41	2.41	91.41
	SCA	2.00	0.69	0.69	92.10
	VA	23.00	7.90	7.90	100.00
	Total	291.00	100.00	100.00	



rupture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	3.00	1.03	1.03	1.03
	n	73.00	25.09	25.09	26.12
	y	215.00	73.88	73.88	100.00
	Total	291.00	100.00	100.00	

Cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year year>= 1900 (McDonald & Korb 1939)

Statistics

		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	616.00	787.00	787.00	787.00	787.00	787	787.00
	Missing	171.00	0.00	0.00	0.00	0.00	0	0.00
Mean		41.12						
Median		41.00						
Mode		41.00						
Std. Deviation		17.88						
Minimum		1.50						
Maximum		89.00						
Percentiles	25	29.00						
	50	41.00						
	75	53.00						

Frequency Table

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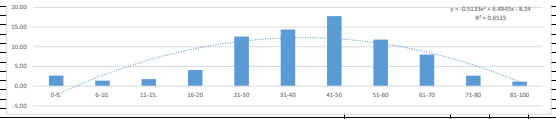
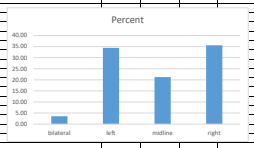
age range					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		171.00	21.73	21.73	21.73
	0-5.	21.00	2.67	2.67	24.40
	6-10.	11.00	1.40	1.40	88.18
	11-15.	14.00	1.78	1.78	26.18
	16-20	32.00	4.07	4.07	30.24
	21-30	99.00	12.58	12.58	42.82
	31-40	113.00	14.36	14.36	57.18
	41-50	140.00	17.79	17.79	74.97
	51-60	93.00	11.82	11.82	86.79
	61-70	63.00	8.01	8.01	96.19
	71-80	21.00	2.67	2.67	98.86
	81-100	9.00	1.14	1.14	100.00
	Total	787.00	100.00	100.00	

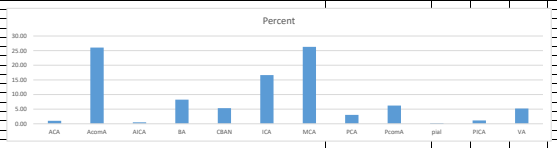


sex					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		20.00	2.54	2.54	2.54
	f	410.00	52.10	52.10	54.64
	m	357.00	45.36	45.36	100.00
	Total	787.00	100.00	100.00	



side					
	sides	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	28.00	3.56	3.56	3.56
	left	271.00	34.43	34.43	37.99
	midline	167.00	21.22	21.22	59.21
	right	280.00	35.58	35.58	94.79
	undefined	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	

arteries					
	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	8.00	1.02	1.02	1.02
	AcomA	205.00	26.05	26.05	27.06
	AICA	4.00	0.51	0.51	27.57
	BA	65.00	8.26	8.26	35.83
	CBAN	42.00	5.34	5.34	41.17
	ICA	131.00	16.65	16.65	57.81
	MCA	207.00	26.30	26.30	84.12
	PCA	24.00	3.05	3.05	87.17
	PcomA	49.00	6.23	6.23	93.39
	pial	2.00	0.25	0.25	93.65
	PICA	9.00	1.14	1.14	94.79
	VA	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	

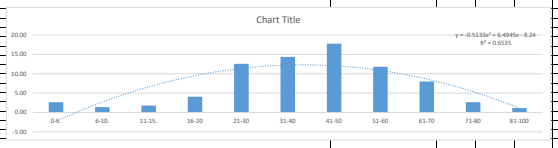


rupture				
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	49.00	6.23	6.23	6.23
n	112.00	14.23	14.23	20.46
y	626.00	79.54	79.54	100.00
Total	787.00	100.00	100.00	

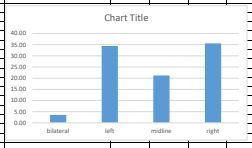
Cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year yearyear>= 1900 to 1938 (McDonald & Korb 1939)

Statistics								
		age	age range	sex	side	arteries	rupture	arterial condition
N	Valid	616.00	787.00	787.00	787.00	787.00	787	787.00
	Missing	171.00	0.00	0.00	0.00	0.00	0	0.00
Mean		41.12						
Median		41.00						
Mode		41.00						
Std. Deviation		17.88						
Minimum		1.50						
Maximum		89.00						
Percentiles	25	29.00						
	50	41.00						
	75	53.00						

age range					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		171.00	21.73	21.73	21.73
	0-5.	21.00	2.67	2.67	24.40
	6-10.	11.00	1.40	1.40	88.18
	11-15.	14.00	1.78	1.78	26.18
	16-20	32.00	4.07	4.07	30.24
	21-30	99.00	12.58	12.58	42.82
	31-40	113.00	14.36	14.36	57.18
	41-50	140.00	17.79	17.79	74.97
	51-60	93.00	11.82	11.82	86.79
	61-70	63.00	8.01	8.01	96.19
	71-80	21.00	2.67	2.67	98.86
	81-100	9.00	1.14	1.14	100.00
	Total	787.00	100.00	100.00	

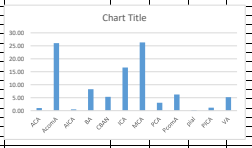


sex					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		20.00	2.54	2.54	2.54
	f	410.00	52.10	52.10	54.64
	m	357.00	45.36	45.36	100.00
	Total	787.00	100.00	100.00	



side					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	28.00	3.56	3.56	3.56
	left	271.00	34.43	34.43	37.99
	midline	167.00	21.22	21.22	59.21
	right	280.00	35.58	35.58	94.79
	undefined	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	

arteries					
	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	8.00	1.02	1.02	1.02
	AcomA	205.00	26.05	26.05	27.06
	AICA	4.00	0.51	0.51	27.57
	BA	65.00	8.26	8.26	35.83
	CBAN	42.00	5.34	5.34	41.17
	ICA	131.00	16.65	16.65	57.81
	MCA	207.00	26.30	26.30	84.12
	PCA	24.00	3.05	3.05	87.17
	PcomA	49.00	6.23	6.23	93.39
	pial	2.00	0.25	0.25	93.65
	PICA	9.00	1.14	1.14	94.79
	VA	41.00	5.21	5.21	100.00
	Total	787.00	100.00	100.00	



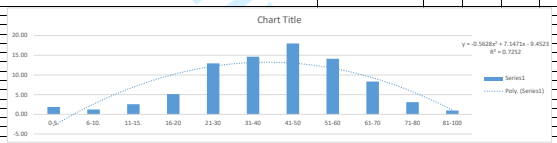
rupture				
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	49.00	6.23	6.23	6.23
n	112.00	14.23	14.23	20.46
y	626.00	79.54	79.54	100.00
Total	787.00	100.00	100.00	

All 1127 cases of cerebral aneurysms in all age (i.e., >15 months to 89 years) & year year>= 1761 to 1938 (McDonald & Korb 1939)

Statistics								
		age	age range	sex	side	arteries	rupture	
N	Valid	935.00	1127.00	1127.00	1127.00	1127.00	1127	
	Missing	192.00	0.00	0.00	0.00	0.00	0	
Mean		41.69						
Median		41.00						
Mode		41.00						
Std. Deviation		17.69						
Minimum		1.50						
Maximum		89.00						
Percentiles	25	29.00						
	50	41.00						
	75	54.00						

Frequency Table

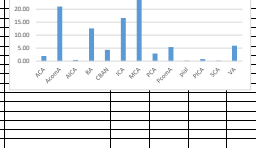
age range					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		192.00	17.04	17.04	17.04
	0-5.	21.00	1.86	1.86	18.90
	6-10.	14.00	1.24	1.24	87.58
	11-15.	29.00	2.57	2.57	21.47
	16-20	58.00	5.15	5.15	26.62
	21-30	146.00	12.95	12.95	39.57
	31-40	165.00	14.64	14.64	54.21
	41-50	203.00	18.01	18.01	72.23
	51-60	159.00	14.11	14.11	86.34
	61-70	94.00	8.34	8.34	95.92
	71-80	35.00	3.11	3.11	99.02
	81-100	11.00	0.98	0.98	100.00
	Total	1127.00	100.00	100.00	



sex					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		28.00	2.48	2.48	2.48
	f	573.00	50.84	50.84	53.33
	m	526.00	46.67	46.67	100.00
	Total	1127.00	100.00	100.00	

side					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bilateral	33.00	2.93	2.93	2.93
	left	386.00	34.25	34.25	37.18
	midline	279.00	24.76	24.76	61.93
	right	367.00	32.56	32.56	94.50
	undefined	62.00	5.50	5.50	100.00
	Total	1127.00	100.00	100.00	

arteries					
	arteries involved	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACA	22.00	1.95	1.95	1.95
	AcomA	237.00	21.03	21.03	22.98
	AICA	5.00	0.44	0.44	23.43
	BA	142.00	12.60	12.60	36.02
	CBAN	49.00	4.35	4.35	40.37
	ICA	187.00	16.59	16.59	56.97
	MCA	311.00	27.60	27.60	84.56
	PCA	33.00	2.93	2.93	87.49
	PcomA	61.00	5.41	5.41	92.90
	pial	2.00	0.18	0.18	93.08
	PICA	9.00	0.80	0.80	93.88
	SCA	2.00	0.18	0.18	94.06
	VA	67.00	5.94	5.94	100.00
	Total	1127.00	100.00	100.00	



rupture				
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	54.00	4.79	4.79	4.79
n	198.00	17.57	17.57	22.36
y	875.00	77.64	77.64	100.00
Total	1127.00	100.00	100.00	

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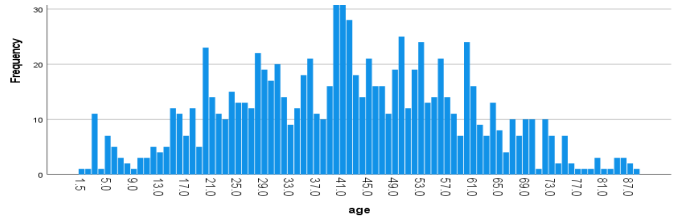

	2.00	1.00	0.10	0.10	0.20
	3.00	11.00	1.00	1.20	1.40
	4.00	1.00	0.10	0.10	1.50
	5.00	7.00	0.60	0.70	2.20
	6.00	5.00	0.40	0.50	2.80
	7.00	3.00	0.30	0.30	3.10
	8.00	2.00	0.20	0.20	3.30
	9.00	1.00	0.10	0.10	3.40
	10.00	3.00	0.30	0.30	3.70
	11.00	3.00	0.30	0.30	4.10
	12.00	5.00	0.40	0.50	4.60
	13.00	4.00	0.40	0.40	5.00
	14.00	5.00	0.40	0.50	5.60
	15.00	12.00	1.10	1.30	6.90
	16.00	11.00	1.00	1.20	8.00
	17.00	7.00	0.60	0.70	8.80
	18.00	12.00	1.10	1.30	10.10
	19.00	5.00	0.40	0.50	10.60
	20.00	23.00	2.00	2.50	13.00
	21.00	14.00	1.20	1.50	14.50
	22.00	11.00	1.00	1.20	15.70
	23.00	10.00	0.90	1.10	16.80
	24.00	15.00	1.30	1.60	18.40
	25.00	13.00	1.20	1.40	19.80
	26.00	13.00	1.20	1.40	21.20
	27.00	12.00	1.10	1.30	22.50
	28.00	22.00	2.00	2.40	24.80
	29.00	19.00	1.70	2.00	26.80
	30.00	17.00	1.50	1.80	28.70
	31.00	20.00	1.80	2.10	30.80
	32.00	14.00	1.20	1.50	32.30
	33.00	9.00	0.80	1.00	33.30
	34.00	12.00	1.10	1.30	34.50
	35.00	18.00	1.60	1.90	36.50
	36.00	21.00	1.90	2.20	38.70
	37.00	11.00	1.00	1.20	39.90
	38.00	10.00	0.90	1.10	41.00
	39.00	16.00	1.40	1.70	42.70
	40.00	34.00	3.00	3.60	46.30
	41.00	35.00	3.10	3.70	50.10
	42.00	28.00	2.50	3.00	53.00
	43.00	18.00	1.60	1.90	55.00
	44.00	14.00	1.20	1.50	56.50
	45.00	21.00	1.90	2.20	58.70
	46.00	16.00	1.40	1.70	60.40
	47.00	16.00	1.40	1.70	62.10
	48.00	11.00	1.00	1.20	63.30
	49.00	19.00	1.70	2.00	65.30
	50.00	25.00	2.20	2.70	68.00
	51.00	12.00	1.10	1.30	69.30
	52.00	19.00	1.70	2.00	71.30
	53.00	24.00	2.10	2.60	73.90
	54.00	13.00	1.20	1.40	75.30
	55.00	14.00	1.20	1.50	76.80
	56.00	21.00	1.90	2.20	79.00
	57.00	14.00	1.20	1.50	80.50
	58.00	11.00	1.00	1.20	81.70
	59.00	7.00	0.60	0.70	82.50
	60.00	24.00	2.10	2.60	85.00
	61.00	16.00	1.40	1.70	86.70
	62.00	9.00	0.80	1.00	87.70
	63.00	7.00	0.60	0.70	88.40
	64.00	13.00	1.20	1.40	89.80
	65.00	8.00	0.70	0.90	90.70
	66.00	4.00	0.40	0.40	91.10
	67.00	10.00	0.90	1.10	92.20
	68.00	7.00	0.60	0.70	92.90
	69.00	10.00	0.90	1.10	94.00
	70.00	10.00	0.90	1.10	95.10
	71.00	1.00	0.10	0.10	95.20
	72.00	10.00	0.90	1.10	96.30
	73.00	7.00	0.60	0.70	97.00
	74.00	2.00	0.20	0.20	97.20
	75.00	7.00	0.60	0.70	98.00
	76.00	2.00	0.20	0.20	98.20
	77.00	1.00	0.10	0.10	98.30
	78.00	1.00	0.10	0.10	98.40
	79.00	1.00	0.10	0.10	98.50
	80.00	3.00	0.30	0.30	98.80
	81.00	1.00	0.10	0.10	98.90
	83.00	1.00	0.10	0.10	99.00
	84.00	3.00	0.30	0.30	99.40
	86.00	3.00	0.30	0.30	99.70
	87.00	2.00	0.20	0.20	99.90
	89.00	1.00	0.10	0.10	100.00
	Total	935.00	83.00	100.00	
Missing	System	192.00	17.00		
Total		1127.00	100.00		

Age in years	Frequency
1.50	1.00
2.00	1.00
3.00	11.00
4.00	1.00
5.00	7.00
6.00	5.00
7.00	3.00
8.00	2.00
9.00	1.00
10.00	3.00
11.00	3.00
12.00	5.00
13.00	4.00
14.00	5.00
15.00	12.00
16.00	11.00
17.00	7.00
18.00	12.00
19.00	5.00
20.00	23.00
21.00	14.00
22.00	11.00
23.00	10.00
24.00	15.00
25.00	13.00
26.00	13.00
27.00	12.00
28.00	22.00
29.00	19.00
30.00	17.00
31.00	20.00
32.00	14.00
33.00	9.00
34.00	12.00
35.00	18.00
36.00	21.00
37.00	11.00
38.00	10.00
39.00	16.00
40.00	34.00
41.00	35.00
42.00	28.00
43.00	18.00
44.00	14.00
45.00	21.00
46.00	16.00
47.00	16.00
48.00	11.00
49.00	19.00
50.00	25.00
51.00	12.00
52.00	19.00
53.00	24.00
54.00	13.00
55.00	14.00
56.00	21.00
57.00	14.00
58.00	11.00
59.00	7.00
60.00	24.00
61.00	16.00
62.00	9.00
63.00	7.00
64.00	13.00
65.00	8.00
66.00	4.00
67.00	10.00
68.00	7.00
69.00	10.00
70.00	10.00
71.00	1.00
72.00	10.00
73.00	7.00
74.00	2.00
75.00	7.00
76.00	2.00
77.00	1.00
78.00	1.00
79.00	1.00
80.00	3.00
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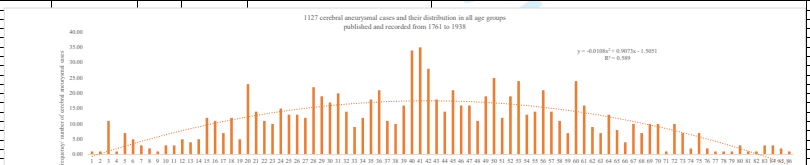
84.00	3.00
86.00	3.00
87.00	2.00
89.00	1.00



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Supplementary File 2: Statistical parameters of distributions of aneurysmal cases reported from 1761-1938,[14] and recorded in RAH from 2011 to 2019.

		102 patients with cerebral aneurysmal aneurysms recorded in RAH from 2011 to 2019	1127 patients with cerebral aneurysms recorded in 407 publications - published from 1761 to 1938							
Statistics - all cases with cerebral aneurysms		age>18, 2011 to 2019	age>18 years, 1761 to 1938	age >= 18 & year < 1850	age >= 18 & year >= 1850 & year < 1900	age >= 18 & year >= 1900	all age, year <1850	all age, year < 1900 & year >= 1850	all ages, year >= 1900	all age group, all years, >400 publications
Age in years										
N	Valid	102	851	41	252	560	42	278	613	935
	Missing	0	0	0	0	0	7	14	171	192
Mean age		57.6	44.7	44.3	45.6	44.3	43.6	42.6	41.2	41.7
Median age		60.0	43.0	47.0	45.0	42.0	46.0	43.0	41.0	41.0
Mode age		48.0	41.0	20.0	40.0	41.0	20.0	40.0	41.0	41.0
Std. Deviation		13.1	15.5	15.6	15.6	15.4	16.1	17.5	17.9	17.7
Minimum age		18.0	18.0	19.0	18.0	18.0	14.0	6.0	1.5	1.5
Maximum age		83.0	89.0	68.0	86.0	89.0	68.0	86.0	89.0	89.0
Percentiles	25	48.0	32.0	33.5	33.3	32.0	31.8	28.8	29.0	29.0
	50	60.0	43.0	47.0	45.0	42.0	46.0	43.0	41.0	41.0
	75	68.3	56.0	59.0	56.0	55.0	59.0	56.0	53.0	54.0

Legend: 14 = McDonald, CA & Korb, M 1939, Intracranial aneurysms, Archives of neurology and psychiatry (Chicago), vol. 42, no. 2, pp. 298-328.

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Supplementary file 3: contains type 2 data: The Human Ethics permit (approval number: H2014-176, Research Ethics Committee, Office of Research Ethics, Compliance and Integrity, Faculty of Health Sciences, University of Adelaide) granted permission to access and use the deidentified data set from the Carestream data registry system (Vue-RIS-version-11·0·14·35) for research

Manuscript title: The trend of cerebral aneurysms over the past two centuries: Need for early screening - An observational study.

Type 2 data were Cerebral computed tomography angiography images obtained from 173 randomly selected patients, who visited the Royal Adelaide Hospital (RAH) between January 2011 and December 2019 for a variety of cranial pathologies

Abbreviations: cases with cerebral aneurysms=y, cases without cerebral aneurysms=n; cases without cerebral aneurysms = y, cases with cerebral aneurysms = n; aneurysmal only cases = y, cases withour aneurysms = n; AcomAC An = aneurysms at anterior communicating artery; n= no, y=yes

complex (AcomAC) region, y=yes and n=no; aneurysms elsewhere otherthan in the AcomAC region, y = yes and n=no; aneurysms elsewhere otherthan in the AcomAC region = y = yes and n=no; rt ICA an = aneurysms in right internal carotid artery (rt ICA) region; rt MCA an = aneurysms in right middle cerebral artery region;

rt ICA + MCA an = aneurysms in right internal carotid and middle cerebral arterial region; lft ICA an = aneurysms in left internal carotid artery (lft ICA) region; lft MCA an =aneurysms in left middle cerebral artery region; lft ICA + MCA an =aneurysms in left internal carotid and middle cerebral arterial region;

right P2 an =aneurysm in the 2nd part of right posterior cerebral artery; left P2 an =aneurysm in the 2nd part of the left posterior cerebral artery; VB an = aneurysm in vertebro basilarregion; rt PICA an = aneurysms in the right posterior inferior cerebellar (rt PICA) region;

lft PICA an =aneurysms in the left posterior inferior cerebellar (lft PICA) region; rt VA an =aneurysms in the right vertebral artery (rt VA); BA an =aneurysms in the basilar artery region; rt SCA = aneurysms in the right superior cerebellar region; lft SCA an =aneurysms in the left superior cerebellar region

age range	Sex	cases with cerebral aneurysms=y,	cases without cereb	aneurysmal only cases =	AcomAC An	aneurysms elsewhere otherthan in the AcomAC region = y =	rt ICA an	rt MCA an	rt ICA + MCA an	lft ICA an	lft MCA an	lft ICA + MCA an =	right P2 an	left P2 an	VB an	rt PICA an	lft PICA an	rt VA an =	lft VA an =	BA an =an	rt SCA an	lft SCA =aneurysms in the left superior cerebellar region
15-20	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
15-20	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
21-30	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
31-40	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
31-40	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
41-50	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
51-60	m	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
61-70	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
61-70	f	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
61-70	m

| | | |

Valid	n	102.00	100.00	100.00	100.00
lft SCA an					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	n	101.00	99.02	99.02	99.02
	y	1.00	0.98	0.98	100.00
	Total	102.00	100.00	100.00	
age range- patients with (n=102) and without aneurysms (n=71) included in the study					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-20	3.00	1.70	1.70	1.70
	21-30	7.00	4.00	4.00	5.80
	31-40	8	4.6	4.6	10.4
	41-50	27	15.6	15.6	26
	51-60	36	20.8	20.8	46.8
	61-70	51	29.5	29.5	76.3
	71-80	27	15.6	15.6	91.9
	81-100	14	8.1	8.1	100
	Total	173	100	100	
Sex					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	90	52	52	52
	m	83	48	48	100
	Total	173	100	100	

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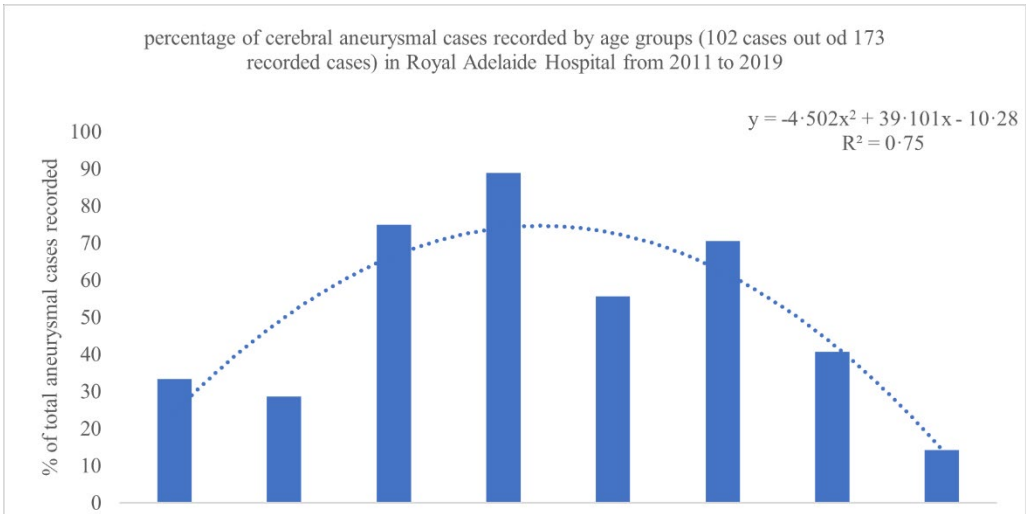

Supplementary File 4: The prevalence (%) of cerebral aneurysms observed over a broad age range (18-100 years, n=173, cases with aneurysms=102, cases without aneurysm=71), with a median of 62 years, a mean of 60 years, and a standard deviation of 15.75, is shown in the chart. The peak prevalence occurs between 31-60 years ($p<0.001$).

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract (indicated- line number 2 in the main document)
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found (done, lines from 35 to 62)
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported (done, lines 81 to 95)
Objectives	3	State specific objectives, including any prespecified hypotheses (done, lines 94 to 98)
Methods		
Study design	4	Present key elements of study design early in the paper (line 101)
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection (not applicable)
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants (not applicable)
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable (lines 125 to 140)
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group (lines 102 to 117)
Bias	9	Describe any efforts to address potential sources of bias (the first author studied type 2 data himself and as such biases were eliminated, The Human Ethics permit (approval number: H2014-176, lines 112 to 116)
Study size	10	Explain how the study size was arrived at (we used two sources of data, lines 102, 103, 106 and 109, we had no influence upon changing sample sizes)
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why (lines 142 to 144, lines 135 to 140)
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding (lines 142 to 144)
		(*b*) Describe any methods used to examine subgroups and interactions (not applicable)
		(*c*) Explain how missing data were addressed (not applicable)
		(*d*) If applicable, describe analytical methods taking account of sampling strategy (not applicable)
		(*e*) Describe any sensitivity analyses (not applicable)
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (type 1 data already published, type two data participants, lines 106 to 117)
		(b) Give reasons for non-participation at each stage (not applicable)
		(c) Consider use of a flow diagram (not applicable)
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (see table 1, line 213 to 218, and supplementary file 1 and supplementary File 2, and supplementary File 3)

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		(b) Indicate number of participants with missing data for each variable of interest (not applicable)
Outcome data	15*	Report numbers of outcome events or summary measures (lines 151 to 201)
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (not applicable)
		(*b*) Report category boundaries when continuous variables were categorized (see the supplementary File 1, supplementary File 2 and supplementary File 3)
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period (not applicable)
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses (not applicable)
Discussion		
Key results	18	Summarise key results with reference to study objectives (lines 239 to 241)
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias (lines 322 to 324)
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence (rest of the discussion, lines 246 to 298)
Generalisability	21	Discuss the generalisability (external validity) of the study results (line numbers 310 to 317)
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based (not applicable)

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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