Title
Authors
Journal
Year publication
Country
Funding
Population source
Demographics
Period follow up
Years of study
Study size
Intervention'
NAFLD definition
CKD definition
Quality (Newcastle-Ottawa Score)
Inclusion criteria
Exclusion criteria
Study design
Subgroup analysis
Adjustments for confounding factors
Longitudinal f/u
Outcome examined & definition
Statistical analysis
NAFLD prevalence
Cases
Primary outcome results
Secondary outcome results
OUTCOME

Rajaura Cuirradural, James Ritchie, Durren Green and Philip X. Kaira         Neprice Dia Transgient         2019         Name of Green and Philip X. Kaira         Namotal Kaira       Chaira of Green And	Non-alcoholic fatty liver disease and clinical outcomes in chronic kidney disease
hepbol Dial Transplant         DD9         DD9         Non any 66 Synchy (SKS) - extension of the Chronic Renal Insufficiency Standards Implementations Study (CRISS)         Mean any 66 Synchy, mane BM 28, DM 34K, HIN 78K, hyporlipidaemia 49K, median eGK 33.5 mL/min/1.73 m <sup>2</sup> Median D5 months         New Toy B(D/D//DO0.31/12/2014), end of analysis period 31/12/2015         118 dO1 D primes (DK 18/D), 72 mmail New, 13H Inst other Hepsic Anormalities on LSS)         25 CCO patherts (15) NAD12, 66 mmail New 71H Properties Store methods         26 CCO patherts (15) NAD12, 66 mmail New 71H In consplete Ioliborup data sets         27 CCO patherts (15) NAD12, 60 mmail New 71H In consplete Ioliborup data sets         27 CCO patherts (15) NAD12, 60 mmail New 71H In consplete Ioliborup data sets         27 CCO patherts (15) NAD12, 60 mmail New 71H In consplete Ioliborup data sets         27 CCO patherts (15) NAD12, 60 mmail New 71H In consplete Ioliborup data sets         27 CCO patherts (15) NAD12, 60 mmail New 71H In consplete Ioliborup data sets         27 CCO patherts (15) NAD12, 60 mmail New 71H In consplete Ioliborup data sets         27 CCO patherts (15) NAD12, 60 mmail New 71H In consplete Ioliborup data sets         27 CCO patherts (15) NAD12, 60 mmail New 71 In units new 714 units wome, Nistary of chronic Repatis R RT         NACK-D Contens subgroup analysis according to severity of NATD J Severity (CCE Debtase)         Pather naber of New 1555, Sinhing and misson, cardioxascular event,	Rajkumar Chinnadurai, James Ritchie, Darren Green and Philip A. Kalra
D039         UK         2         Salford Kidney Study (SKS) - extension of the Chronic Renal Insufficiency Standards Implementations Study (CRISS)         Mean age 65 years, mate 60.7%, mean BMI 28, DMI 28%, IMTN 78%, hyperliptidemina 49%, median eGR 8.3.5 ml/min/1/33 m <sup>-1</sup> Mean Stude 55 months         User USS (00/07/2000 - 31/12/2014), end of analysis period 31/12/2015         Link COL Datents (DS NAHLO, 75, Jonnal Inter). 31H and other hapitic abnormalities on USS)         S2C COD patients (S13 MORD, Link contain thery with 2.1 propensity iccore matching         MARLD via NAHLD via NAHLD         User USS (http://col.2016/10000000000000000000000000000000000	Nephrol Dial Transplant
uk disk disk disk disk disk disk disk dis	2019
2           Shiford Kidny Study (SKS) - extension of the Chronic Renal Insufficiency Standards Implementations Study (CREIS)           Mean age 6 years, males 60, 7%, mean BM 28, 0M 34%, FIN 78%, hyperlipidemia 40%, median eGPR 33.5 mi/mi/L/3 m <sup>-2</sup> Median 66 social           User USS (02)/2200 - 32/22/2011, end of analysis paned 31/22/2013           Life CG Dataties, 163 NARD, 0.5 do normal liver, 31 hand ther hepric tabornalities on USS)           SS COD patients, 163 NARD, 0.6 normal liver, 31 hand ther hepric tabornalities on USS)           SS COD patients, 103 NARD, 0.6 normal liver, 31 hand ther hepric tabornalities on USS)           SS COD patients, 103 NARD, 0.1 formula           Liver USS (Myperchogenicity or echologite liver consistent with fatty infitration)           CSF 440 m/m <sup>2</sup> /1, 71 m vice; COC Formula           Liver USS (Myperchogenicity or echologite liver consistent with fatty infitration)           CSF 450 m/m <sup>2</sup> /1, 71 m vice; COC Formula           Liver USS (Myperchogenicity or echologite liver consistent with a tabut women, history of chronic hepatitis is & C or other chronic liver diseases           Retrospecifie abservational longitudinal cohert study           VCVC outcomes study on panylois according to severity of NALD / severity COC ab baseline           No subgroup analysis according to severity of NALD / severity COC ab baseline           No subgroup analysis according to severity of NALD / severity COC abseline           No subgroup analysis according to severity of NALD / severity COC ab	ик
saford Kdney Study (SK5) - otension of the Chronic Renal insufficiency Standards Implementations Study (CB55) Mean age 66 years, makes 50.7%, mean BMI 20, DMI 34%, HTN 78%, hyperlipidaenta 49%, median eGFR 33.5 mt/min/2.73 m <sup>-2</sup> Median as montis Univer USS 100/102000 - 31/12/2014), end of analysis period 31/12/2015 11/36 COB patients (ISB NAFD, 66 nonmalifier) after scudialized baormalities on USS) SSC DD patients (ISB NAFD, 61 nonmalifier) after scudialized patients with integrate baormalities on USS) 257 COD patients (ISB NAFD, 63 nonmalifier) after scudialized patients with integrate baormalities on USS) 257 COD patients (ISB NAFD, 66 nonmalifier) after scudialized patients with integrate baormalities on USS) 257 COD patients (ISB NAFD, 65 nonmalifier) after scudialized patients with integrate baormalities on USS) 257 COD patients (ISB NAFD, 65 nonmalifier) after scudialized and the ISB NAFD, 65 nonmalifier) and the ISB NAFD of Standard COD Patients 13 propensity score matching 257 COD patients (ISB NAFD, 65 nonmalifier) after scudialized and the ISB NAFD of Standard COD Patients 218 years old referred to Salford real service (tertary centre): 66/R4 c60 mt/min/1.173 m <sup>-1</sup> , not needing immediate RHT Maintenance RHT at time of liver USS, drinking above 21 units men / 14 units women, history of chronic hepatits B & C or other chronic liver diseases Retrospective observational longitudial actoric tatuy NCVE outcomes subgroup analysis according to serverity on NAFD / severity COD is baseline Propensity matching for : age, gender, BMI, SP, DBP, baseline hypertension, diabetes, hypertenblasterohaemia, HD, ML, CCF, CVA, PVD, malguancy, use of statu and encounces usingroup analysis according to severity of NAFD / severity COD at baseline Propensity matching for : age, gender, BMI, SP, DBP, baseline hypertension, diabetes, hypertenblasterohaemia, HD, ML, CCF, CVA, PVD, malguancy, use of statu and electra constraities, hospital admissions, cardiouscular event, erotobary resourcular tatus displastes anature and corder f	?
Noten age 65 years, males 60, 76, mean 60M 28, DM 348, HTN 285, hyperfip/dsemia 496, median eGFR 33.5 mL/mp/1.73 m <sup>2</sup> Number USS (01/01/2000 - 31/12/2014), end of analysis period 31/12/2015           L148 CKD Spatients (125 NAFLD, 57 normal liver, 131 had ofther hepatic dhormalities on USS)           S20 Opatients (128 NAFLD, 138 normal liver) attri : 10 properinty iscer matching           NAFLD van OARLD           Liver USS (Nyperechegenichy or echobright liver consistent with 111 properinty iscer matching           NAFLD van OARLD           Liver USS (Nyperechegenichy or echobright liver consistent with fatty infitration)           eGFR +60 mL/min(/ 1.73 m <sup>2</sup> ) (21 on of table (CK EOS +8, 43) CCD progression NOS = 9           Patients 18 van OARLD (KE COS +8, 43) CCD progression NOS = 9           Retrospective observational longibudinal cohort study           NFCVE outcomes subgroup analysis cordia cevent, cerebrowscular event, PVD CCE           Deata analysed conding to seventry of NAFLD / seventry CKD at baseline           Properioding to cardiac, cevent, cerebrowscular events, medications, blood results           Nature veice: conorbidities, hoppertable (SK eyes profile)           Consultar events, cerebro subgroup analysis acroding to seventry of NAFLD / seventry CKD at baseline           Properiodity matching for age, ender, EMSL (SF, PGB, Habeline hyperter Habeline)           Notary on AMARD (SK eyes of PG < 100 m/m/mL/m/mL/mAB)	Salford Kidney Study (SKS) - extension of the Chronic Renal Insufficiency Standards Implementations Study (CRISIS)
Nedlane Simonths         Uncertus SIG (007):000 - 31/2/2013(), end of analysis period 31/2/2015         1348 CCD patients (1289 NAPLD, 725 normal liver; 191 had other hepatic abnormalities on USS)         532 CCD patients (1289 NAPLD, 752 normal liver; 191 had other hepatic abnormalities on USS)         532 CCD patients (1289 NAPLD, 525 normal liver; 191 had other hepatic abnormalities on USS)         632 CCD patients (1289 NAPLD, 526 normal liver; 191 had other hepatic abnormalities on USS)         MAEID vs no NAPLD         Liver USS (hyperechogenicity or echoloright liver consistent with faity infiltration]         687 cd0 m/m/m / 173 ml using CCD-FM formula         (1) Mortality NOS = 8, (2) non-fatal CVE NOS = 8, (3) CCD progression NOS = 9         Patients 2.18 years old referred to Safford renal service (tertiary centre); 6GFR 400 m/min/ 1.73 m <sup>2</sup> , not needing immediate RMT         Maintenance RMT attime of liver USS, dinking above 21 unts men / 14 units women, history of chronic hepatitis 8.8 C or other chronic liver diseases         Retrospective observational longitudinal cohort Study         Nor UCD outcomes Study or aphysics cardiac cevent, corretrowascular event, PVD CCF         Deaths analyeed according to seventry of NAFLD / severity CKD at baseline         Nor UCD outcomes Study or aphysics cardiac fills with non-fatal cardiac arrest, coronary revascularizations, new diagnosts cardiac failure / admissions with exacerbations of cardia	Mean age 66 years, males 60.7%, mean BMI 28, DM 34%, HTN 78%, hyperlipidaemia 49%, median eGFR 33.5 mL/min/1.73 m <sup>2</sup>
Univer USS (0)/01/2000 - 31/22/2014), end of analysis period 31/22/2005         138 CK DD attering (DS NAITD, 72 on orall liver) shift at the result and monitores on USS]         857 CKD patterins (ISB NAITD, 25 on orall liver) shift 1:1 propensity score matching         MAIL Ov sno NAID         Liver USS (hyperechagenicity or echobright liver consistent with facts infiliration)         ecfR + 60 mU/min/ 1.73 m <sup>-1</sup> using CKD-EPI termula         Liver USS (hyperechagenicity or echobright liver consistent with facts infiliration)         ecfR + 60 mU/min/ 1.73 m <sup>-1</sup> using CKD-EPI termula         Liver USS (hyperechagenicity or echobright liver consistent with facts infiliration)         ecfR + 60 mU/min/ 1.73 m <sup>-1</sup> using CKD-EPI termula         Liver USS (hyperechagenicity or echobright liver consistent with facts infiliration)         ecfR + 60 mU/min/ 1.73 m <sup>-1</sup> using CKD-EPI termula         Liver USS (hyperechagenicity or echobright liver consistent with facts infiliration)         ecfR + 60 mU/min/ 1.73 m <sup>-1</sup> using CKD-EPI termula         Maintenance RR + at time of liver USS, dinking above 21 units men / 14 units women, history of chronic hepatitis B & C or other chronic liver diseases         Retrospective observational longitudinal cohort study         NICVE concomes tubproup analysis: cardiac event, correlrowascular events, PVD CCF         Deaths analysed carding to severity of NAFLD / severity CKD at baseline         Propensity matching for: age, geneder, BMJ, SBP, DBP, baseline hypertension, diabetes, hypercholest	Median 65 months
1148 CUS patients (202 NAPL) 630 montal liver, 191 had other hepatic abnormalities on USS)         S2C CUS patient (138 NAPL) 630 montal liver) after x durin (nonpatien follow-up data sets         272 CUS patients (138 NAPL) 630 montal liver) after x durin (nonpatien follow-up data sets         272 CUS patients (138 NAPL) 630 montal liver) diver consistent with fatty infiltration)         edf8# 450 mJ/mid/ 1.2 m of linet (CUS PT formula         (1) Montality NOS = 8, (2) non-fatal CVE NOS = 8, (3) COS progression NOS = 9         Patients 2 18 years oil referred to Saltord renal service (tertiary centre): eGF8 <60 mL/mid/ 1.73 m <sup>-1</sup> , not needing immediate RRT         Maintenance RRT at time of liver USS, dimining above 21 units men / 14 units women, history of chronic hepatitis 8 & C or other chronic liver diseases         Retrospective observational longitudinal cohort study         Work USC outcomes subgroup analysis: cardiac event, cerebrowascular event, PVD CCF         Deaths analysed according to circline, non-cardiac         No subgroup analysis: cardiac event, cerebrowascular event, medications, blood results         (1) SSRD: commencement of RRT or eGFR of <10 mL/min/1.73 Å	Liver USS (01/01/2000 - 31/12/2014), end of analysis period 31/12/2015
Base LLD patients (Las) NAELD, Sam of the intermediate with incomplete volum-up data sets         CEX CDD patient (Las) NAELD         User USS (hyperechogenicity or echobright liver consistent with faty infiltration)         GRA Gob M_(min) 12 and using CDX-PH formuta         (1) Mortality NOS = 8, (2) non-fatal CVE NOS = 8, (3) CXD progression NOS = 9         Patients > 18 years old referred to Salford renal service (tertiary centre); eGFR <00 m/(min/1.73 m <sup>-1</sup> , not needing immediate RRT         Maintenance RRT at time of liver USS, drinking above 21 units mon / 14 units women, history of chronic hepatitis B & C or other chronic liver diseases         Retrospective observational longitudinal cohort study         NTCVC outcomes subgroup analysis: acridice event, evebrovascular event, PVD CCF         Deatis analysed accriding to: cardiac, non-cardiac         No subgroup analysis according to: cardiac, non-cardiac         Na subgroup analysis according to: cardiac, non-cardiac         Viropensity matching for: age, gender, RMS, SBP, DBP, Daseline hyperthension, diabetes, hypercholesterolaemia, HD, MI, CCF, CVA, PVD, malignancy, use of statin and renin-anglotensin blocking agents, eGFR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04)         Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results         (1) ESBC: commencement of RRT or RGFR of 10 m/(min/1.73 m)         (2) REVC: scata baseling experiments in Results a SySC (1 (outcomes 1.3.4))         Univariate & multinaritace corpopatrional hazards models to determi	1148 CKD patients (205 NAFLD, 752 normal liver, 191 had other hepatic abnormalities on USS)
NAFLO VS NO NAFLD Liker USS (hyperechagenicity or echabright liver consistent with fatty infiltration) eGRR 460 mJ/min/ 1.73 mf uing CKD-EPI formula (1) Mortality NOS = 8, (2) non-fatal CVE NOS = 8, (3) CKD progression NOS = 9 Patients 2 18 years of referred to Salford renal service (tertiary centre); eGR 460 mJ/min/ 1.73 m <sup>-1</sup> , not needing immediate RRT Maintenance RRT at time of liver USS, drinking above 21 units men / 14 units women, history of chronic hepatitis 8 & C or other chronic liver diseases Retrospective observational longitudinal cohort study NCVC outcomes subgroup analysis cardiac event, cerebrovascular event, PVD CCF Deaths analysed according to cardiac, non-cardiac No subgroup analysis, cardiac event, cerebrovascular event, pVD CCF Deaths mankyed according to cardiac, non-cardiac No subgroup analysis, edR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs pr0.04) Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results (1) ISRD: commencement of RRT or eGR of <10 m/min/1.73 m <sup>-</sup> ) (2) RVC is composite of AGS, non-fatal (XFLD 66 yrs, normal liver 68 yrs pr0.04) Annual review: comorbidities, non-fatal exit are st. coronary revascularizations, new diagnosis cardiac falure / admissions with exacerbations of cardiac, indicate arest, coronary revascularizations, new diagnosis cardiac falure / admissions with exacerbations of cardiac, indicate arest, coronary revascularizations, new diagnosis cardiac falure / admissions with exacerbations of cardiac, indicate arest, oconary revascularizations, new diagnosis cardiac falure / admissions with exacerbations of cardiac, indicate arest, coronary revascularizations, new diagnosis cardiac falure / admissions with exacerbations of cardiac, indicate arest, coronary revascularizations, new diagnosis cardiac falure / admissions with exacerbations of cardiac, indicate arest, coronary revascularizations, new diagnosis cardiac falure / admissions with exacerbations of cardiac, indicate arest, coronary revascularizations, n	276 CKD patients (183 NAFLD, 669 normal liver) after excluding patients with incomplete follow-up data sets
Like USS (hyperechagenicity or echobright liver consistent with fatty infiltration) eGFR 4:60 mJ/min/ 1.73 m diag CKD-EPI formula (1) Mortality NOS = 8, (2) non-fatal CVE NOS = 8, (3) CKD progression NOS = 9 Patients 2: 18 years old referred to Salford renal service (tertiary centre); eGFR 4:60 mL/min/ 1.73 m <sup>-1</sup> , not needing immediate RRT Maintenance RRT at time of liver USS, drinking above 21 units men / 14 units women, history of chronic hepatitis 8 & C or other chronic liver diseases Retrospective observational longitudinal cohort study NCVC outcomes subgroup analysis: cardiac event, event, event, PVD CCF Deaths analysed according to: cardiac, non-cardiac No subgroup analysis, cardiac (SR, ND, SBP, DBP baseline hypertension, diabets, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and rein-anglotenian blocking agents, GFR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04) Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results (1) ISRD: commencement of RRT or GFR of <10 m.//min/1.73 m <sup>-</sup> (2) Rev of change of GFR (GFR 100 B age) from buseline to study and point (3) RVCV: composite of AGS, non-fatal King, non-fatal cardiac arrest, coronary revascularizations, new diagnosis cardiac failure / admissions with exacerbations of cardiac (4) Alicause motiality Univariate & multivariations of PVD, CVA (4) Alicause motiality, NAED 26 (21 arrys), normal 134 (19.15%), p=0.07 (2) CKD progression (rate of decline of GFR Rolep; NaBL-254 [7.51 - 0.31] ml/min/1.73 ml ormal-2.09 [6.14 - 1.06] ml/min/1.73 ml (3) NFCV: KAELD 46 (25.51), more 309, morthed HR 0.64 (0.35-1.16), p=0.14; (1) ESRD: NAFLD 26 (12.54), normal 134 (12.35%), p=0.07 (2) CKD progression (rate of decline of GFR Rolep; NAELD -254 [7.51 - 0.31] ml/min/1.73 ml (3) NFCV: KAELD 46 (25.53), more 309, matched HR 0.64 (0.35-1.16), p=0.14; (4) Alicause motiality total sample HR 0.79 (0.58-1.08), p=0.14; matched HR 0.88 (0.57-1.34), p=0.54 N/A	NAFLD vs no NAFLD
dGFR 4G0 m/m/n 1/3 m <sup>2</sup> using CKD/EPI formula         (1) Mortality NOS = 8, (2) non-fatal CVE NOS = 8, (3) CKD progression NOS = 9         Patients 2: 18 years old referred to Safford renal service (tertiary centre); eGFR 4G0 m//min/173 m <sup>-2</sup> , not needing immediate RRT         Maintenance RRT at time of liver USS, drinking above 21 units men / 14 units women, history of chronic hepatitis 8 & C or other chronic liver diseases         Retrospective observational longitudinal cohort study         NFCVE outcomes subgroup analysis: cardiac event, cerebrovascular event, PVD CCF         Deatiss analysed according to cardiac, one-ardiac         No subgroup analysis according to serverity of NAFLD / severity CKD at baseline         Propensity matching for; age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and renin-angiotensin blocking agents, eGFR (Ma age difference, NAFLD 66 yrs, normal liver 68 yrs pri0.04)         Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results         (1) ESRD: commencement of RRT or eGFR ol <10 ml/min/1.73 m <sup>2</sup> (2) RRE of change of 66 GFR (eGFR slope) from baseline to study end-point         (3) NFCVC: composite of ACS, non-fatal admissions, cardiovascular events, coronary revascularizations, new diagnosis cardiac failure / admissions with exacerbations of cardiac fal	Liver USS (hyperechogenicity or echobright liver consistent with fatty infiltration)
(1) Mortality NoS = 8, (2) non-fait CVE NOS = 8, (3) CKD progression NOS = 9         Patients 2: 18 years old referred to Salford renal service (tertiary centre); eGFR <go 173="" m<sup="" min="" ml="">-2, not needing immediate RRT         Maintenance RRT at time of liver USS, drinking above 21 units men / 14 units women, history of chronic hepatitis 8 &amp; C or other chronic liver diseases         Retrospective observational longitudinal cohort Study         NFCVE outcomes subgroup analysis : cardiac event, cerebrovascular event, PVD CCF         Deaths analysed according to cardiac, non-cardiac         No subgroup analysis according to seventy of NAFLD / severity CKD at baseline         Propensity matching for; age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MJ, CCF, CVA, PVD, malignancy, use of statin and renin-angiotensin blocking agents, eGFR (MB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04)         Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results         (1) ISSRD: commencement of RRT or GFR of &lt;10 mL/min/1.73 m<sup>1</sup>         (2) NEVCY: composite of AKC, non-fatal MS, non-fatal cardiac arrest, coronary revascularizations, new diagnosis cardiac failure / admissions with exacerbations of cardiac failure, new diagnost of PVD, CVAs         (4) All-cause mortality       Univariate &amp; multivariate Cox proportional hazards models to determine HRR &amp; 95% CI (outcomes 1.3.4)         Linear regression slope generated using serial serum creatinine measurements (outcome 2)       1.7.9 (205 / 1.4.9)         (1) MEVCY: KALD 65 (215.30, normal 124 (19.1%), p=0.0</go>	eGFR <60 mL/min/ 1.73 m <sup>2</sup> using CKD-EPI formula
Patients 2 18 years old referred to Salford renal service (tertiary centre); eGFR <60 mL/min/1.73 m <sup>-2</sup> , not needing immediate RRT Maintenance RRT at time of liver USS, drinking above 21 units men / 14 units women, history of chronic hepatitis 8 & C or other chronic liver diseases Retrospective observational longitudinal cohort study NCVC outcomes subgroup analysis: cardiac vent, cerebrovascular event, PVD CCF Deaths analysed according to severity of NAFLD / severity CKD at baseline Propensity matching for: age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and renin-angiotensin blocking agents, eGFR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04) Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results (1) ESRD: commencement of RRT or eGFR of 10 mL/min/1.73 m̂ (2) Ret of change of eGFR (eGFR slope) from baseline to study end-point (3) INFCVE: composite of ACS, non-fatal Mis, non-fatal cardiae arrest, coronary revascularizations, new diagnosis cardiac failure / admissions with exacerbations of cardiac failure, new diagnosis of PVD, CVAs (4) All-cause montality Univariate & multivariate Cox proportional hazards models to determine HRs & 95% CI (outcomes 1,3,4) Linear regession slope generated using serial serum creatinine measurements (outcome 2) 1.79 % (205 / 104 (215 M), normal 124 (19.1%), p=0.07 (2) CCD progression (rate of decline of eGFR slope): NAFLD -2.54 (7.61 - 0.31] mL/min/1.73 m̂ normal -2.09 [-6.14 - 1.06] mL/min/1.73 m̂ (3) NFCVE: total sample HR 0.99 [0.65 - 1.52], p=0.90, matched HR 0.64 [0.35 - 1.06], p=0.145 (3) NFCVE: total sample HR 0.99 [0.58 - 1.08], p=0.014; matched HR 0.88 [0.57 - 1.34], p=0.54 N/A (4) All-cause mortality: total sample HR 0.79 [0.58 + 1.08], p=0.14; matched HR 0.88 [0.57 - 1.34], p=0.54 N/A	(1) Mortality NOS = 8, (2) non-fatal CVE NOS = 8, (3) CKD progression NOS = 9
Maintenance RRT at time of liver USS, drinking above 21 units men / 14 units women, history of chronic hepatitis 8 & C or other chronic liver diseases         Retrospective observational longitudinal cohort study         MFCVE outcomes subgroup analysis: cardiac, non-cardiac         No subgroup analysis according to severity of NAFLD / severity CKD at baseline         Propensity matching for: age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and renin-angiotensin blocking agents, eGFR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04)         Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results         (1) ESRD: commencement of RRT or eGFR of <10 mL/min/1.73 m/h	Patients ≥ 18 years old referred to Salford renal service (tertiary centre); eGFR <60 mL/min/ 1.73 m <sup>2</sup> , not needing immediate RRT
Retrospective observational longitudinal cohort study         NEVE outcomes subgroup analysis: cardiac event, cerebrovascular event, PVD CCF         Deaths analysed according to: cardiac, non-cardiac         No subgroup analysis according to sevenity of NAED / sevenity CKD at baseline         Propensity matching for: age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignaney, use of statin and renin-angiotensin blocking agents, eGFR (NB age difference, NAED 66 yrs, normal liver 68 yrs p=0.04)         Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results         (1) ESR0: commencement of RRT or eGFR of <10 m//min/1.73 m/	Maintenance RRT at time of liver USS , drinking above 21 units men / 14 units women, history of chronic hepatitis B & C or other chronic liver diseases
NPCVE outcomes subgroup analysis: cardiac, non-cardiac         No subgroup analysis according to severity of NAFLD / severity CKD at baseline         Propensity matching for: age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and renin-angiotensin blocking agents, eGFR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04)         Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results         (1) ESRD: commencement of RRT or eGFR of <10 mL/min/1.73 m²	Retrospective observational longitudinal cohort study
No subgroup analysis according to severity of NAFLD / severity CKD at baseline Propensity matching for: age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and renin-anglotensin blocking agents, eGFR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04) Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results (1) ESRD: commencement of RRT or eGFR of <10 ml/min/1.73 m (2) Rate of change of eGFR (EGFR (Shope) from baseline to study end-point (3) NFCVE: composite of ACS, normal fath MIs, non-fatal cardiac arrest, coronary revascularizations, new diagnosis cardiac failure / admissions with exacerbations of cardiac failure, new diagnosis of PVD, CVAs (4) All-cause mortality Univariate & multivariate Cox proportional hazards models to determine HRs & 95% CI (outcomes 1,3,4) Linear regression slope generated using serial serum creatinine measurements (outcome 2) 17.9% (205 / 1148) (1) ESRD: VAFLD 26 (12.42%), normal 134 (19.1%), p=0.07 (2) CKD progression (rate of decIne of eGFR Shope): NAFLD -2.54 [-7.61 - 0.31] mL/min/1.73 m (4) All-cause mortality: NAFLD 50 (27.3%), normal 22 (33.0%), p=0.14 (1) ESRD: total sample HR 0.99 (0.65-1.52), p=0.90; matched HR 0.64 [0.53-1.16], p=0.145 (2) CKD progression (rate of decline of eGFR Shope): total sample CO: 0.33.01, p<0.001; matched HR 2.00 [1.10-3.36], p=0.02 (4) All-cause mortality: total sample HR 0.79 [0.58-1.08], p=0.14; matched HR 0.88 [0.57-1.34], p=0.54 N/A N/A	NFCVE outcomes subgroup analysis: cardiac event, cerebrovascular event, PVD CCF Deaths analysed according to: cardiac, non-cardiac
Propensity matching for: age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and creinin-angliotensin blocking agents, eGFR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04)         Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results         (1) ESRD: commencement of RRT or eGFR of <10 ml/min/1.73 m/h	No subgroup analysis according to severity of NAFLD / severity CKD at baseline
Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results (1) ESRD: commencement of RRT or eGFR of <10 mL/min/1.73 m (2) Rate of change of eGFR (eGFR slope) from baseline to study end-point (3) NFCVE: composite of ACS, non-fatal NLS, non-fatal cardiac arrest, coronary revascularizations, new diagnosis cardiac failure / admissions with exacerbations of cardiac failure, new diagnosis of PVD, CVAs (4) All-cause mortality Univariate & multivariate Cox proportional hazards models to determine HRs & 95% CI (outcomes 1,3,4) Linear regression slope generated using serial serum creatinine measurements (outcome 2) 17.9% (205 / 1148) (1) ESRD: NAFLD 26 (14.2%), normal 134 (19.1%), p=0.07 (2) CKD progression (rate of decline of eGFR slope): NAFLD -2.54 [-7.61 - 0.31] mL/min/1.73 m (3) NFCVE: NAFLD 46 (25.1%), normal 22 (12.3%), p=0.014 (1) ESRD: total sample HR 0.99 [0.65-1.52], p=0.90; matched HR 0.64 [0.35-1.16], p=0.145 (2) CKD progression (rate of decline of eGFR slope): total sample p<0.09; matched p=0.58 (3) NFCVE: total sample HR 0.79 [0.58-1.08], p=0.14; matched HR 0.88 [0.57-1.34], p=0.54 N/A N/A N/A N/A	Propensity matching for: age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and renin–angiotensin blocking agents, eGFR (NB age difference, NAFLD 66 yrs, normal liver 68 yrs p=0.04)
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Univariate & multivariate Cox proportional hazards models to determine HRs & 95% CI (outcomes 1,3,4) Linear regression slope generated using serial serum creatinine measurements (outcome 2) 17.9% (205 / 1148) (1) ESRD: NAFLD 26 (14.2%), normal 134 (19.1%), p=0.07 (2) CKD progression (rate of decline of eGFR slope): NAFLD -2.54 [-7.61 - 0.31] mL/min/1.73 Å normal -2.09 [-6.14 - 1.06] mL/min/1.73 Å (3) NFCVE: NAFLD 46 (25.1%), normal 82 (12.3%), p<0.001 (4) All cause mortality: NAFLD 50 (27.3%), normal 22 (33.0%), p=0.14 (1) ESRD: total sample HR 0.99 [0.65–1.52], p=0.90; matched HR 0.64 [0.35-1.16], p=0.145 (2) CKD progression (rate of decline of eGFR slope): total sample p<0.09; matched p=0.58 (3) NFCVE: total sample HR 2.07 [1.39-3.09], p<0.001; matched HR 1.85 [1.04-3.30], p<0.04 (multivariate: total sample HR 2.03 [1.33-3.13], p<0.001; matched HR 2.00 [1.10- 3.66], p=0.02) (4) All-cause mortality: total sample HR 0.79 [0.58-1.08], p=0.14; matched HR 0.88 [0.57–1.34], p=0.54 N/A	<ol> <li>(1) ESRD: commencement of RRT or eGFR of &lt;10 mL/min/1.73 m/</li> <li>(2) Rate of change of eGFR (eGFR slope) from baseline to study end-point</li> <li>(3) NFCVE: composite of ACS, non-fatal MIs, non-fatal cardiac arrest, coronary revascularizations, new diagnosis cardiac failure / admissions with exacerbations of cardiac failure, new diagnosis of PVD, CVAs</li> <li>(4) All-cause mortality</li> </ol>
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N/A INCLUDE	<ul> <li>(1) ESRD: total sample HR 0.99 [0.65–1.52], p=0.90; matched HR 0.64 [0.35-1.16], p=0.145</li> <li>(2) CKD progression (rate of decline of eGFR slope): total sample p&lt;0.09; matched p=0.58</li> <li>(3) NFCVE: total sample HR 2.07 [1.39-3.09], p&lt;0.001; matched HR 1.85 [1.04-3.30], p&lt;0.04 (multivariate: total sample HR 2.03 [1.33-3.13], p&lt;0.001; matched HR 2.00 [1.10-3.66], p=0.02)</li> <li>(4) All-cause mortality: total sample HR 0.79 [0.58-1.08], p=0.14; matched HR 0.88 [0.57–1.34], p=0.54</li> </ul>
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Nonalcoholic fatty liver disease accelerates kidney function decline in patients with chronic kidney disease: a cohort study
Hye Ryoun Jang, Danbee Kang, Dong Hyun Sinn, Seonhye Gu, Soo Jin Cho, Jung Eun Lee, Wooseong Huh, Seung Woon Paik, Seungho Ryu, Yoosoo Chang, Tariq Shafi, Mariana
Lazo, Eliseo Guallar, Juhee Cho, Geum-Youn Gwak
Scientific reports
2018
Courth Korea
Individuals who underwent a comprehensive health screening examination at the Samsung Medical Centre Health Promotion Centre, Seoul, South Korea
Mean age 60.8 years, males 70%, mean BMI 24.8, DM 24%, HTN 60%, hyperlipidaemia 41%, median eGFR 59.1 mL/min/1.73 m <sup>2</sup>
Average 6.5 years
January 2003 through December 2013
1,525 CKD patients
NAFLD vs no NAFLD
USS based on standard criteria, including parenchymal brightness, liver-to-kidney contrast, deep beam attenuation and bright vessel walls
eGFR < 60 ml/min/1.73 m <sup>2</sup> using CKD-EPI formula. or proteinuria ≥2+ on urinalysis
NOS = 7
Patients ≥ 18 years old who underwent a comprehensive health screening examination at the Samsung Medical Centre Health Promotion Centre and were found to have CKD with at least 1 additional follow up serum creatinine
History of cancer, liver cirrhosis, positive hepatitis B surface antigen, or hepatitis C virus antibodies, alcohol intake ≥ 30 g/day in men or ≥20 g/day in women, previous kidney transplant or started dialysis within 1 year after baseline examination, missing information on alcohol intake, NFS, or less than 6 months follow up
Retrospective observational longitudinal cohort study (1) Severity NAFLD assessed via NFS: -1.675 + 0.037 × age (years) + 0.094 × BMI + 1.13 × impaired fasting glucose/diabetes (yes = 1, no = 0) + 0.99 × AST/ALT ratio – 0.013 ×
platelet count (×10 <sup>9</sup> /l) – 0.66 × albumin (g/dl). Based on NFS, patients were classified as high-intermediate (NFS $\geq$ -1.455) and low probability (NFS < -1.455) of advanced
TIDROSIS. (2) Sourceity of CVD at baselines with off value of CPD ME at lattic (4.72 $rs^2$ value of C + 1/rsin (4.72 $rs^2$ (4) visiting C2+ and C2+)
Descently of CR3 and reacting current value ester 245 million $7.5$ m $>$ Case million $7.3$ m (invining costa and costa). Stratified analyses to evaluate if association of NAFLD with CKD progression differed in pre-specified subgroups: age (<60 vs. $\ge$ 60 years), sex, smoking (never or former vs.
current), alcohol drinking (none vs. moderate), BMI ≥ 25 kg/m2, hypertension (SBP ≥ 140 mmHg, DBP ≥ 90 mmHg, or use of antihypertensives), diabetes (fasting serum
glucose ≥ 126 mg/dl, HbA1c ≥ 6.5%, or use of antidiabetic medication), hyperlipidaemia (HDL < 40 mg/dl in men or < 50 mg/dl in women, TG ≥ 150 mg/dl, or use of lipid-
lowering medication), or baseline eGFR (<45 vs. ≥ 45 ml/min/1.73 m²).
At each visit demographic characteristics, smoking status, alcohol consumption, medical history and medication use were collected through standardized, self-administered questionnaires along with blood results
CKD progression: average annual percent change in eGFR from baseline eGFR
Compared serial changes in eGFR among CKD patients with or without NAFLD at baseline using linear mixed models for longitudinal data with random intercepts and
random slopes. Used loge-transformed eGFR as outcome and estimated the average difference in annual % change in eGFR (with 95% CI).
40.9% (902/1525)
Average annual percent change in eGFR from baseline: NAFLD -0.79% [-1.310.27], no NAFLD 0.30% [-0.14 - 0.76]
Average difference in % decline of eGFR per year NAFLD vs no NAFLD:
(i) Adjusted for age, sex, year of visit: -1.09% [-1.770.41]
(ii) Adjusted for all confounders: -1.06% [-1.730.38]
Austrate difference is 0/ dealing of oCEP per user NAELDUC to NAELDU
(i) Adjusted for age, sex, year of visit: n=0.002
(i) Adjusted for all confounders: n=0.002
(1) Multivariable adjusted average difference in annual % changes in eGFR for low NFS (≤ 1.455) or intermediate to high NFS (≥ -1.455) & those without NAFLD: 0.01% [-0.74
- 0.99) & -2.12% (-2.931.31) respectively
(2) Multivariable adjusted average difference in annual % changes in eGFR among patients with eGFR < 45 ml/min/1.73 m <sup>2</sup> at baseline -6.27% [-12.08 0.08] (n=168) vs -0.76
[-1.320.19] (n=1357) for baseline eGFR ≥ 45
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Chronic Makey disease in independently subcated with increased mortality in patients with nonalcobolic fatty liver disease. James Paik, Pegah Golaki, Zahra Youonozai, Alita Michra, Gregory Timble, Zabar M. Younosi User International 2039 USA None Member 2039 USA None Member 2039 Method mortality files Member 2039 Method Method Method Method No. 55, HTN 40.75, (total cohort) Average 18.23 years, males 48.45, DM 6.35, HTN 40.75, (total cohort) Average 18.23 years, males 48.45, DM 6.35, HTN 40.75, (total cohort) Average 18.23 years, Males 40.05, HTN 40.75, (total cohort) Average 19.20, 74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements Patients with other clauses of chronic liver disease were excluded Retrospective analysis of data collected from cross-sectional study Presence of at within hepatic parenchma graded as normal, midi, moderato, or severe hepatic steatosis AVALD-associated advanced fibrosis was defined with ultrasound digrader MM10 and at least are of the fullowing throsis maness. 246:11, FM 4 data > 2.67, or MP30-L67.5 Cardiovacular motality was defined in duath due to heart diseases (ICD-10: 100-103, 111, 13, 40-151) and carelinovascular diseases (ICD-10: 160-163). Cardiovacular motality was defined in duath due to heart diseases (ICD-10: 100-103, 111, 13, 40-151) and carelinovascular diseases (ICD-10: 160-163). Cardiovacular motality, MALD 54.75, (55.36), no MALD 65.55, (55.2.4), p-0.55 (ge 2.4), p-0.55 (	
ane Pak, Pagah Golabi, Zahra Younoszal, Alfa Midra, Gregory Trimble, Zobar M. Younossi Liver international 2019 USA None WARSS-III & Inited mortality files Mean age 43.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.3 years, males 48.4%, DM. 6.5%, ITM 40.7% (total cohort) Avarage 13.2%, VARTLe-CO2* 16.1%, WARTLe-CO2* 6.8%, WARTLe-CO2* 2.5% CO2 on co CO1 MARD Cohort (some results reported in paper) NATU in CO2 cohort (form RADC cohort (some results reported in paper) MATU in CO2 cohort (form RADC cohort (some results) Patients with other causes of chronic liver disease were excluded Retrospective analysis of data collected from cross sectional study Presence of fit within hepstic parenchyma graded as normal, midd, moderate, or severe hepstic testosis. NARLO associated advanced fibrosis was defined with ultrasound diagnosed NATD and a latesta cer of the following floridam annurs. 29% or MS-20.67 Cardiovascular mortality was defined as seath due to heart diseases (CD-10: 100-109, 111, 113, 110-151) and cerebrovascular diseases (CD-10: 160-169). (1) All cause mortality: NARLD 16.0% (SZ 2.5), no NARLD 2.6% (SZ 2.4), p-0.05 (gae adjusted: NARLD 2.8% (SZ 2.4), p-0.16 (JD. 100-109, 111, 113, 110-151) & kerebrovascular diseases (CD-10: 160-169). (1) All cause mortality: NARLD 16.0% (SZ 2.5), no NARLD 2.6%	Chronic kidney disease is independently associated with increased mortality in patients with nonalcoholic fatty liver disease.
Liver International 2019 2019 2019 2019 2014 2014 2014 2014 2014 2014 2014 2014	James Paik, Pegah Golabi, Zahra Younoszai, Alita Mishra, Gregory Trimble, Zobair M. Younossi
2019       UsA         None       None         NILARES III & linked mertality files       None (111)         Average 192 years       None (111)         Nutrates III 1288 - 1386; linked mortality files up to 2011 or date of death       None (111)         NARDES III 288 - 1386; linked mortality files up to 2011 or date of death       None (111)         NARDES III 288 - 1386; linked mortality files up to 2011 or date of death       Nore (111)         NARDES III 288 - 1386; linked mortality files up to 2011 or date of death       Nore (111)         NARDES III 288 - 1386; linked mortality files up to 2011 or date of death       Nore (111)         NARDES III 288 (Intel mortality files up to 2011 or date of death       Nore (211)         NARDES III 288 (Intel mortality files up to 2011 or date of death       Nore (211)         NARDE III COC cohort (1000 data)       Paperson 3ged 20-74 at time of examination with complete data on ultrascurd video images for hepatic steatosis assessment and serum creatinine measurements         Patients with other causes of chronic liver disease were excluded       Retrospective analysis of data collected from cross-sectional study         Presence of ret within hepatic parenchyma graded as sormal, mild, moderate, race were hepatic treatosis. NARDE-passcieted advanced fibrosis was defined with ultrasound dagroese NARD III and taxes 267, NR SEA 567.66         Cardiovascular mortality was defined as doath due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & creatoroascular disea	Liver International
USA None Name NAMAES-III & linked mortality files Mean age 41.3 years, males 44.4%, DM 6.5%, ITTN 40.7% (total cohort) Average 31.3 years, males 44.4%, DM 6.5%, ITTN 40.7% (total cohort) Average 31.3 years, males 44.4%, DM 6.5%, ITTN 40.7% (total cohort) Average 31.3 years, males 44.4%, DM 6.5%, ITTN 40.7% (total cohort) Average 31.3 years, males 44.4%, DM 6.5%, ITTN 40.7% (total cohort) Average 32.9 years Cohort 20.5%, TANED Cohort 1.5%, TANED COLO * 6.8%, "NATED * COLO * 2.5% COLO * 76.6%, "NATED COLO * 16.1%, "NATED COLO * 6.8%, "NATED * COLO * 2.5% COLO * 76.0% DM ADED cohort (finan exists reported in paper) NATE ID COC cohort 50me data) Color * 00 CD in NATED cohort (finan exists reported in paper) NATE ID COC cohort 50me data) Color * 00 CD in NATED cohort (finan exists reported in paper) NATE ID COC cohort 50me data) Color * 00 CD in NATED cohort (finan exists reported in paper) NATE ID COC cohort 50me data) Color * 00 CD in NATED cohort (finan exists reported in paper) NATE ID COC cohort 50me data) Color * 00 CD in NATED cohort (finan exists reported in paper) NATE ID COC cohort 50me data) Partons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements Patients with other causes of chronic liver diseases ever excluded Concloraccutar montality was defined with complete data on ultrasound video images for hepatic steatosis. NAFLD-2450 classes (CD-10: 160-160). Age, gender, race, smoker, metabolic syndrome Concloraccutar montality was defined with ultrasound diagnose functionality was defined as death use to heart diseases (ICD-10: 100-100, 111, 113, 101/21-51) and terebrovascular diseases (ICD-10: 160-160). Coll collowascular-related montality. death due to heart diseases (ICD-10: 100-100, 111, 113, 101/21-51) and terebrovascular diseases (ICD-10: 160-160). Coll collowascular-related montality. WALD 54.5% (SE 2.4), p-0.05 (age adjusted. NATLD 31.0% (25.0-37.0), no NATLD 32.0% (22.0-23.7), p-m3) Coll collowascula	2019
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NHARTS-III & linked mortality files Viewn age 43.3 years, males 48.4%, DM 6.5%, HTN 40.7% (total cohort) Average 13.2 years III AMARTS-III 398-1994. III AMARTS-III 308-1994. III AMARTS-IIII 308-1994. III AMARTS-IIIII	None
Neen age 3.3 years, males 48.4%, DM 6.5%, HTN 40.7% (total cohort) Average 19.2 years MARDES III 398 - 1994; Inked mortality files up to 2011 or date of death 11.695 adult participants MARDE Cohort (Som CADE 16.1%, 'NAFLD- CKD+'6.8%, 'NAFLD+ CKD+'2.5% CKD vs oc XCh In NAFLD cohort (main results reported in paper) NAFLD in CKD cohort (some deals) Liver USS (moderatific severe heaptic steatosis in absence of any other possible cause CLD) edFR < 60 m/min/1.73 m2 using CKD-EPI formula +/- albuminuria NOS = 9 Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements Persons of alw with other causes of chronic liver diseases were excluded Retrospective analysis of data collected from cross-sectional midl, moderate, or severe hepatic steatosis. NAFLD-associated advanced fibrosis was defined with ultrasound diagnosed NAFLD and at least one of the following fibrosis markers. ARED 1, FIIA - Index > 2.67, or MFS-0.676. Cardiovascular mortality was defined as death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169). Age, gender, race, smoker, metabolic syndrome Data linked with mortality files (1) Ali-cause mortality: INAFLD 54.7% (SE 3.6), no NAFLD 65.5% (SE 2.4), pc0.05 (age adjusted: NAFLD 31.0% (ZS 0.57.0), no NAFLD 25.9% (Z2.0.20.7), pms) (2) Cardiovascular-related mortality: ARFLD 16.0% (SE 2.5), no NAFLD 16.2% (SE 1.7), press (age adjusted: NAFLD 7.8% (JS.7.1.1.9), no NAFLD 2.3% (JS.6.1.9), p	NHANES-III & linked mortality files
Average 19.2 years         HHARES-III 1988 - 1994; linked mortality files up to 2011 or date of death         LSSS adult participants         NAELD - CKO <sup>-</sup> 74.6%, "NAELD - CKD <sup>-1</sup> 6.1%, "NAELD - CKD <sup>+1</sup> 6.8%, "NAELD - CKD <sup>+1</sup> 2.5%.         CKD on oc KD in NAELD cottor (some data)         Uver USS (moderate/severe hepatic steators) in absence of any other possible cause CLD         c678.4 60 m/min/1.23 m2 using CKD-EPI formula +/ albuminuria         NOS 5         Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steators) is assessment and serum creatinine measurements         Patients with other causes of chronic liver diseases were excluded         Retrospective analysis of data collected from cross-sectional study         Presence of far within hepatic garenchyma graded as normal, mild, moderate, or severe hepatic steators) and cerebrovascular diseases (ICD-10: I60-I69).         Age, gender, race, smoker, metabolic syndrome         Data linked with mortality: death due to heart diseases (ICD-10: I00-I09, 111, 113, I20-I51) and cerebrovascular diseases (ICD-10: I60-I69).         11) Ali-cause mortality         12) Cardiovascular-related mortality: death due to heart diseases (ICD-10: I00-I09, 111, 113, I20-I51) & cerebrovascular diseases (ICD-10: I60-I69).         13) Ali-cause mortality         14) Ali-cause mortality: NAELD 54.7% (5E 3.6), no NAELD 45.5% (5E 2.4), p-0.05 (age adjusted: NAELD 73.6% [3.7.0], no NAELD 2.9% [22.02.97], p-ms)         12) Cardiovascular-rela	Mean age 43.3 years, males 48.4%, DM 6.5%, HTN 40.7% (total cohort)
NHARESHI 1988-1994; Inited mortality files up to 2011 or date of death 11.653 dolt participants NARLD CCD 7-4655, TMAFLD - CCD * 6.55, "NARLD - CCD * 6.55, "S. CCD *	Average 19.2 years
11.653 adult participants         NARED: CXD: 74.6%, NARED + CXD: 16.1%, NARED - CXD: 4.6.8%, NARED + CXD: 2.5%         CXD van CXD: In NARED chort (main results reported in paper)         NAFLD: In CXD: Cohor (Some data)         Uver USS (moderate/severe hepatic steatosis in absence of any other possible cause CLD)         eER < 60 m/m/L 73 m2 using CXD-EPI formula +/- albuminuria	NHANES-III 1988 - 1994; linked mortality files up to 2011 or date of death
CKD bit NAFLD cocktor choot (main result reported in paper)         NAFLD in CKD conf (sme dist)         Liver USS (moderate/severe hepatic steatosis in absence of any other possible cause CLD)         cCFR > 60 m/min/L73 m2 using CKD-EPI formula +/- albuminuria         NOS = 9         Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements         Patients with other causes of chronic liver disease were excluded         Betrospective analysis of data collected from cross-sectional study         Presence offs turb in hepatic parenchyma graded as normal, mild, moderate, or severe hepatic steatosis. NAFLD-associated advanced fibrosis was defined with ultrasound diagnosed NAFLD and at least one of the following fibrosis markers: APRD 1, FIB-4 index > 2.67, or KFS>0.676.         Cardiovascular mortality was defined as death due to heart diseases (ICD-10: 100-109, 111, 113, and 120-151) and cerebrovascular diseases (ICD-10: 160-169).         Age, gender, race, smoker, metabolic syndrome         (1) All-cause mortality files         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         29% (410/1,413)         (1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), pc0.05 (age adjusted: NAFLD 31.0% I25.0-37.0], no NAFLD 2.5% (SE 2.5), pc1.0% (SE 2.5),	11,695 adult participants 'NAFLD- CKD-' 74.6%, 'NAFLD+ CKD-' 16.1%, 'NAFLD- CKD+' 6.8%, 'NAFLD+ CKD+' 2.5%
Liver USS (moderate/severe hepatic steatosis in absence of any other possible cause CLD)         C6FR < C6 ml/min/L7.3 m2 using CKD-EPI formula +/- albuminuria	CKD vs no CKD in NAFLD cohort (main results reported in paper) NAFLD in CKD cohort (some data)
EGFR < 60 ml/min/1.73 m2 using CR0-EPI formula +/- albuminuria	Liver USS (moderate/severe hepatic steatosis in absence of any other possible cause CLD)
NOS = 9         Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements         Patients with other causes of chronic liver disease were excluded         Retrospective analysis of data collected from cross-sectional study         Presence of fat within hepatic parenchyma graded as normal, mild, moderate, or severe hepatic steatosis. NAFLD-associated advanced fibrosis was defined with ultrasound diagnosed NAFLD and at least one of the following fibrosis markers: APRI> 1, FiB-4 index >2.67, or NES-0.676.         Cardiovascular mortality was defined as death due to heart diseases (ICD-10: 100-105, 111, 113, and 120-151) and cerebrovascular diseases (ICD-10: 160-169).         Age, gender, race, smoker, metabolic syndrome         Data linked with mortality files         (1) Alf-cause mortality         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         Logistic regression & cox proportional hazards model         29% (410/1,413)         (1) Alf-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p=0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 2.5% (22.0-29.7], p=ns)         (2) cardiovascular-related mortality: NAFLD 5.34 (1.91-2.87), no NAFLD 1.6.2% (SE 1.7), p=ns (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 2.5% (32.0-9.7), p=ns)         (1) Alf-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p=0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 2.5% (52.0-9.7), p=ns)	eGFR < 60 ml/min/1.73 m2 using CKD-EPI formula +/- albuminuria
Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements         Patients with other causes of chronic liver disease were excluded         Retrospective analysis of data collected from cross-sectional study         Presence of FALD and at least one of the following fibrosis markers: APRD-1, FIB-4 Index >2.67, or NFS>0.676.         Cardiovascular mortality was defined as death due to heart diseases (ICD-10: 100-109, 111, 113, and 120-151) and cerebrovascular diseases (ICD-10: 160-169).         Age; gender, race, smoker, metabolic syndrome         Data linked with mortality files         (1) All-cause mortality:         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         (2) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), pc0.05 (age adjusted: NAFLD 31.0% (25.0-37.0), no NAFLD 25.9% (22.0-29.7), p=ns)         (2) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 2.08 [1.80-2.40], p=ns         (2) Cardiovascular-related mortality: NAFLD 16.0% (SE 2	NOS = 9
Patients with other causes of chronic liver diseases were excluded         Retrospective analysis of data collected from cross-sectional study         Presence of fat within hepatic parenchyma graded as normal, mild, moderate, or severe hepatic steatosis. NAFLD-associated advanced fibrosis was defined with ultrasound diagnosed NAFLD and at least one of the following fibrosis markers: APRI> 1, FIB-4 index >2.67, or NE>0.676.         Cardiovascular mortality was defined as death due to heart diseases (ICD-10: 100-109, 111, 113, and 120-151) and cerebrovascular diseases (ICD-10: 160-169).         Age, gender, race, smoker, metabolic syndrome         Data linked with mortality files         (1) AII-cause mortality         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         Logistic regression & cox proportional hazards model         29% (410/1,413)         (1) AII-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p-0.05 (age adjusted: NAFLD 31.0% (25.0-37.0), no NAFLD 25.9% [22.0-29.7], p=ns)         (2) Cardiovascular-related mortality: NAFLD 16.0% (SE 2.5), no NAFLD 10.2% [54.17), p=ns (age adjusted: NAFLD 7.8% [3.7-11.9], no NAFLD 2.5% [5.6-10.9], p=ns)         (1) AII-cause mortality: adjusted HR NAFLD 2.34 (1.91-2.87], no NAFLD 2.08 [1.80-2.40], p=ns         (2) Cardiovascular-related mortality: adjusted HR NAFLD 2.12 [1.44-3.13], no NAFLD 2.43 [1.8-3.2], p=ns         (1) CKD + NAFLD + advanced fibrosis (n=60)         AII-cause mortality: 73.1% [50.7-95.5], pens vs no advanced fibr	Persons aged 20-74 at time of examination with complete data on ultrasound video images for hepatic steatosis assessment and serum creatinine measurements
netrospective analysis of data collected from cross-sectional study         Presence of fat within hepatic parenchyma graded as normal, mild, moderate, or severe hepatic steatosis, NAFLD-associated advanced fibrosis was defined with ultrasound diagnozed NAFLD and at least no of the following fibrosis markers: ARPID 1, F184 index >2.67, or NFS>0.676.         Cardiovascular mortality was defined as death due to heart diseases (ICD-10: 100-109, 111, 113, and 120-151) and cerebrovascular diseases (ICD-10: 160-169).         Age, gender, race, smoker, metabolic syndrome         Data linked with mortality files         (1) All-cause mortality         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         (2) Cardiovascular-related mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p<0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns)	Patients with other causes of chronic liver disease were excluded
Presence of fat within hepatic parenchyma graded as normal, mild, moderate, or severe hepatic steatosis. NAFLD-associated advanced fibrosis was defined with ultrasound diagnosed NAFLD and at least one of the following fibrosis markers: APRIs 1, FIB-4 index >2.67, or NFS-0.676. Cardiovascular mortality was defined as death due to heart diseases (ICD-10: 100-109, 111, 113, and 120-151) and cerebrovascular diseases (ICD-10: 160-169). Age, gender, race, smoker, metabolic syndrome Data linked with mortality files (1) All-cause mortality (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169) Logistic regression & cox proportional hazards model 29% (4101,413) (1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p<0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns) (2) Cardiovascular-related mortality: NAFLD 16.0% (SE 2.5), no NAFLD 16.2% (SE 1.7), p=ns (age adjusted: NAFLD 7.8% [3.7-11.9], no NAFLD 8.2% [5.6-10.9], p=ns) (2) Cardiovascular-related mortality: adjusted HR NAFLD 2.34 [1.91-2.87], no NAFLD 2.08 [1.80-2.40], p=ns (2) Cardiovascular-related mortality: adjusted HR NAFLD 2.12 [1.44-3.13], no NAFLD 2.43 [1.8-3.2], p=ns (2) Cardiovascular-related mortality: adjusted HR NAFLD 2.12 [1.44-3.13], no NAFLD 2.43 [1.8-3.2], p=ns (1) CKD + NAFLD + advanced fibrosis (n=60) All-cause mortality: 73.1% [50.7-55.], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis Cardiovascular-related mortality: 1.4.5% [1.6-27.7], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis Cardiovascular-related mortality: 1.4.5% [1.6-27.7], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis Cardiovascular-related mortality: 1.4.5% [1.6-27.7], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis	Retrospective analysis of data collected from cross-sectional study
Age, gender, race, smoker, metabolic syndrome         Data linked with mortality files         (1) All-cause mortality         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         Logistic regression & cox proportional hazards model         29% (410/1,413)         (1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p<0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns)	Presence of fat within hepatic parenchyma graded as normal, mild, moderate, or severe hepatic steatosis. NAFLD-associated advanced fibrosis was defined with ultrasound diagnosed NAFLD and at least one of the following fibrosis markers: APRI> 1, FIB-4 index >2.67, or NFS>0.676. Cardiovascular mortality was defined as death due to heart diseases (ICD-10: 100-109, 111, 113, and 120-151) and cerebrovascular diseases (ICD-10: 160-169).
Data linked with mortality files         (1) All-cause mortality         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         Logistic regression & cox proportional hazards model         29% (410/1,413)         (1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p<0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns)	Age, gender, race, smoker, metabolic syndrome
(1) All-cause mortality         (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: 100-109, 111, 113, 120-151) & cerebrovascular diseases (ICD-10: 160-169)         Logistic regression & cox proportional hazards model         29% (410/1,413)         (1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p<0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns)	Data linked with mortality files
Logistic regression & cox proportional hazards model         29% (410/1,413)         (1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p<0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns)	(1) All-cause mortality (2) Cardiovascular-related mortality: death due to heart diseases (ICD-10: I00-I09, I11, I13, I20-I51) & cerebrovascular diseases (ICD-10: I60-I69)
29% (410/1,413) (1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p<0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns) (2) Cardiovascular-related mortality: NAFLD 16.0% (SE 2.5), no NAFLD 16.2% (SE 1.7), p=ns (age adjusted: NAFLD 7.8% [3.7-11.9], no NAFLD 8.2% [5.6-10.9], p=ns) (1) All-cause mortality: adjusted HR NAFLD 2.34 [1.91-2.87], no NAFLD 2.08 [1.80-2.40], p=ns (2) Cardiovascular-related mortality: adjusted HR NAFLD 2.12 [1.44-3.13], no NAFLD 2.43 [1.8-3.2], p=ns (1) CKD + NAFLD + advanced fibrosis (n=60) All-cause mortality: 73.1% [50.7-95.5], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis Cardiovascular-related mortality: 14.6% [1.6-27.7], p=ns vs no advanced fibrosis; adjusted HR 2.83 [0.69-11.51], p=ns vs no advanced fibrosis	Logistic regression & cox proportional hazards model
<ul> <li>(1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p&lt;0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns)</li> <li>(2) Cardiovascular-related mortality: NAFLD 16.0% (SE 2.5), no NAFLD 16.2% (SE 1.7), p=ns (age adjusted: NAFLD 7.8% [3.7-11.9], no NAFLD 8.2% [5.6-10.9], p=ns)</li> <li>(1) All-cause mortality: adjusted HR NAFLD 2.34 [1.91-2.87], no NAFLD 2.08 [1.80-2.40], p=ns</li> <li>(2) Cardiovascular-related mortality: adjusted HR NAFLD 2.12 [1.44-3.13], no NAFLD 2.43 [1.8-3.2], p=ns</li> <li>(1) CKD + NAFLD + advanced fibrosis (n=60)</li> <li>All-cause mortality: 73.1% [50.7-95.5], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis</li> <li>Cardiovascular-related mortality: 14.6% [1.6-27.7], p=ns vs no advanced fibrosis; adjusted HR 2.83 [0.69-11.51], p=ns vs no advanced fibrosis</li> </ul>	29% (410/1,413)
<ol> <li>(1) All-cause mortality: adjusted HR NAFLD 2.34 [1.91-2.87], no NAFLD 2.08 [1.80-2.40], p=ns</li> <li>(2) Cardiovascular-related mortality: adjusted HR NAFLD 2.12 [1.44-3.13], no NAFLD 2.43 [1.8-3.2], p=ns</li> <li>(1) CKD + NAFLD + advanced fibrosis (n=60)</li> <li>All-cause mortality: 73.1% [50.7-95.5], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis</li> <li>Cardiovascular-related mortality: 14.6% [1.6-27.7], p=ns vs no advanced fibrosis; adjusted HR 2.83 [0.69-11.51], p=ns vs no advanced fibrosis</li> </ol>	(1) All-cause mortality: NAFLD 54.7% (SE 3.6), no NAFLD 46.5% (SE 2.4), p<0.05 (age adjusted: NAFLD 31.0% [25.0-37.0], no NAFLD 25.9% [22.0-29.7], p=ns) (2) Cardiovascular-related mortality: NAFLD 16.0% (SE 2.5), no NAFLD 16.2% (SE 1.7), p=ns (age adjusted: NAFLD 7.8% [3.7-11.9], no NAFLD 8.2% [5.6-10.9], p=ns)
<ul> <li>(1) CKD + NAFLD + advanced fibrosis (n=60)</li> <li>All-cause mortality: 73.1% [50.7-95.5], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis</li> <li>Cardiovascular-related mortality: 14.6% [1.6-27.7], p=ns vs no advanced fibrosis; adjusted HR 2.83 [0.69-11.51], p=ns vs no advanced fibrosis</li> </ul>	(1) All-cause mortality: adjusted HR NAFLD 2.34 [1.91-2.87], no NAFLD 2.08 [1.80-2.40], p=ns (2) Cardiovascular-related mortality: adjusted HR NAFLD 2.12 [1.44-3.13], no NAFLD 2.43 [1.8-3.2], p=ns
(2) CKD + NAFLD + no advanced fibrosis (n=97) All-cause mortality: 52.1% [44.8-59.3]; adjusted HR 2.51 [1.98-3.18] Cardiovascular-related mortality: 16.5% [11.1-21.9]; adjusted HR 2.45 [1.61-3.73] INCLUDE	<ul> <li>(1) CKD + NAFLD + advanced fibrosis (n=60)</li> <li>All-cause mortality: 73.1% [50.7-95.5], p=ns vs no advanced fibrosis; adjusted HR 3.49 [2.25-5.43], p=ns vs no advanced fibrosis</li> <li>Cardiovascular-related mortality: 14.6% [1.6-27.7], p=ns vs no advanced fibrosis; adjusted HR 2.83 [0.69-11.51], p=ns vs no advanced fibrosis</li> <li>(2) CKD + NAFLD + no advanced fibrosis (n=97)</li> <li>All-cause mortality: 52.1% [44.8-59.3]; adjusted HR 2.51 [1.98-3.18]</li> <li>Cardiovascular-related mortality: 16.5% [11.1-21.9]; adjusted HR 2.45 [1.61-3.73]</li> </ul>

Increased Risk for Cardiovascular Events in Patients with Diabetic Kidney Disease and Non-Alcoholic Fatty Liver Disease.
Rajkumar Chinnadurai, Constantina Chrysochou, Philip A. Kalra
Nephron
2018
UK
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Salford Kidney Study (SKS) - extension of the Chronic Renal Insufficiency Standards Implementations Study (CRISIS)
Mean age 65 years, males 66%, mean BMI 30, DM 100%, HTN 87%, median eGFR 31.6 mL/min/1.73 m <sup>2</sup> , hyperlipidaemia 79%
Median 69 months
Liver USS (01/01/2000 - 31/12/2014), end of analysis period 31/12/2015
192 patients with DKD (55 NAFLD, 113 normal liver, 24 had other hepatic abnormalities on USS) 149 patients with DKD (183 NAFLD, 669 normal liver) after excluding patients with incomplete follow-up data sets
NAFLD vs no NAFLD
Liver USS (hyperechogenicity or echobright liver consistent with fatty infiltration)
eGFR <60 mL/min/ 1.73 m <sup>2</sup> using CKD-EPI formula
Patients ≥ 18 years old referred to Salford renal service (tertiary centre); eGFR <60 mL/min/ 1.73 m <sup>2</sup> , not needing immediate RRT
Maintenance RRT at time of liver USS , drinking above 21 units men / 14 units women, history of chronic hepatitis B & C or other chronic liver diseases
Retrospective observational longitudinal cohort study
NFCVE outcomes subgroup analysis: cardiac event, cerebrovascular event, PVD CCF Deaths analysed according to: cardiac, non-cardiac No subgroup analysis according to severity of NAFLD / severity CKD at baseline
Propensity matching for: age, gender, BMI, SBP, DBP, baseline hypertension, diabetes, hypercholesterolaemia, IHD, MI, CCF, CVA, PVD, malignancy, use of statin and renin-angiotensin blocking agents, eGFR (NB age difference, p=0.04)
Annual review: comorbidities, hospital admissions, cardiovascular events, medications, blood results
<ol> <li>(1) ESRD: commencement of RRT or eGFR of &lt;10 mL/min/1.73 m/</li> <li>(2) Rate of change of eGFR (eGFR slope) from baseline to study end-point</li> <li>(3) NFCVE: composite of ACS, non-fatal MIs, non-fatal cardiac arrest, coronary revascularizations, new diagnosis cardiac failure / admissions with exacerbations of cardiac failure, new diagnosis of PVD, CVAs</li> <li>(4) All-cause mortality</li> </ol>
Univariate & multivariate Cox proportional hazards models to determine HRs & 95% CI (outcomes 1,3,4)
Linear regression slope generated using serial serum creatinine measurements (outcome 2)
(251 /20) 20.0%
(1) ESRD: NAFLD 7 (14.6%), normal 17 (16.8%), p=0.73 (2) CKD progression (rate of decline of eGFR slope): NAFLD -3.97 [-7.2 - 0.12] mL/min/1.73 ㎡, -2.95 [-9.07 - 0.407] normal mL/min/1.73 ㎡ (3) NFCVE: NAFLD 20 (41.7%), normal 14 (13.9%), p<0.001 (4) All cause mortality: NAFLD 16 (33.3%), normal 36 (35.6%), p=0.78
<ul> <li>(1) ESRD: not reported</li> <li>(2) CKD progression (rate of decline of eGFR slope): p=0.65</li> <li>(3) NFCVE: HR 3.48 [1.59-7.6], p=0.002 (multivariate: HR 2.95 [1.31-6.60], p=0.01)</li> <li>(4) All-cause mortality: HR 0.72 [0.40-1.31], p=0.28</li> </ul>
N/A Sub group of previous paper by Chinnadurai

Nonalcoholic Fatty Liver Disease and Renal Function Impairment: A Cross-Sectional Population-Based Study on Its Relationship From 1999 to 2016

Michael H. Le, Yee Hui Yeo, Linda Henry, and Mindie H. Nguyen

Hepatology Communications

2019

USA

National Health and Nutrition Examination Survey (NHANES): cross-sectional survey conducted in US by the National Centre for Health Statistics of the Centres for Disease Control and Prevention (CDC)

Mean age 53 years, males 56%, mean BMI 34, DM 24%, HTN 52.3%, median eGFR 90.5 mL/min/1.73 m<sup>2</sup>, dyslipidaemia 61%

1999 - 31 Dec 2015

14,255 adults (not all had renal insufficiency); 4680 NAFLD patients (population of interest for this study)

Renal insufficiency vs no renal insufficiency

U.S. Fatty Liver Index (USFLI) ≥30 to rule in fatty liver

eGFR determined CKD-EPI & ACR. Unable to determine if renal insufficiency was acute or chronic. Renal insufficiency divided into 4 stages: no RI, mild, moderate & severe

People aged 18 years and older, who participated in a medical examination at a mobile centre, and underwent fasting blood work during their examination.

Participants <18 years old, missing laboratory data needed to calculate the non-invasive indices (age, race/ethnicity, waist circumference, GGT, fasting insulin, fasting glucose, serum creatinine, urine creatinine, and urine albumin), those who had a diagnosis of viral hepatitis, and those with heavy alcohol use.

Cross-sectional study

Severity of liver fibrosis assessed using NAFLD Fibrosis Score (NFS). NFS >0.676 rule in stage 3-4 fibrosis, NFS <-1.455 rule out stage 3-4 fibrosis.

2 yearly cross-sectional interviews, examinations and laboratory data

(1) Trends in NAFLD +/- renal insufficiency prevalence over time in US

(2) Predictors of RI in NAFLD patients

(3) Health literacy levels for kidney & liver disease

(4) Mortality (national death index): all-cause mortality, cause-specific mortality from diseases of heart and malignant neoplasms: compared NAFLD + renal insufficiency vs NAFLD without renal insufficiency

(5) Risk factors predicting mortality in NAFLD cohort with & without renal insufficiency

Univariate & multivariate logistic regression; Kaplein Meier curves; cox regression

31.2% (not all patients had renal insufficiency)

(1) Prevalence 1999-2000: NAFLD without RI 23.5% [20.2-27.1], NAFLD-RI 5.7% [4.3-7.6]; prevalence 2015- 2016, NAFLD without RI 27.3% [23.7-31.1], NAFLD-RI 7.7% [6.2-9.5]. Trend analysis 1999-2016: prevalence of overall NAFLD, NAFLD without RI & NAFLD-RI all significantly increased over time (p=0.007, p=0.048, p=0.006 respectively). Among those with NAFLD, RI prevalence did not increase significantly 1999-2016 (p=0.221). No significant increases were observed in mild, moderate, or severe RI in those with NAFLD (p=0.448, p=0.222, p=0.478 respectively)

(2) Significant independent predictors of RI in NAFLD: age > 65, HTN, DM, dyslipidaemia, CVD, high probability of fibrosis stage 3 and 4 (multivariate analysis)
 (3) Among those with NAFLD-RI, awareness of kidney disease was 8.56% [6.69-10.89], awareness of liver disease among all NAFLD was 4.49% [3.17-6.33]
 (4) 5 yr cumulative mortality incidence: NAFLD alone 4.5%; mild RI 14.2%, moderate 21.2%, and severe 36.0% RI (p<0.001). 15 yr cumulative mortality incidence: NAFLD</li>

alone 19.9%, mild RI 42.4%, moderate RI 80.6%, and severe RI 85.5% (p<0.001). 5 yr cumulative incidence CV-related mortality highest in NAFLD + severe RI at 10.5% (36.7% at 15 years). Independent risk factors for all-cause mortality in NAFLD: age, mild/mod/sever RI, high probability of fibrosis; former/current smoker; history of CVD. Independent risk factors for CV mortality in NAFLD: older age, moderate & severe RI, history of CVD.

Intervention is CKD in NAFLD cohort rather than NAFLD in CKD cohort.

Predicting timing of clinical outcomes in patients with chronic kidney disease and severely decreased glomerular filtration rate.
Grams MEL, Sang Y2, Bailew SH2, Carrero JJ3, Djurojev O4, Heerspink HJL5, Ho K6, Ito S7, Marks A8, Naimark D9, Nash DM10, Navaneethan SD11, Sarnak M12, Stengel B13, Visseren FLJ14, Wang AY15, Köttgen A16, Levey AS12, Woodward M17, Eckardt KU18, Hemmelgarn B19, Coresh J20
Kidney Int.
2018
30 countries
Participants in International Chronic Kidney Disease Prognosis Consortium
Median eGFR 24 mL/min/1.73 m2
Age, sex, race, eGFR, ACR, SBP, smoking status, DM, history of CVD.
eGFR < 30 ml/min/1.73m2
Aim to develop 2 & 4 year models of the probability & timing of kidney failure requiring RRT, a non-fatal CVD event & death
Competing-risk regression, random-effect meta-analysis, and Markov processes with Monte Carlo simulations
NAFLD was not examined in this study