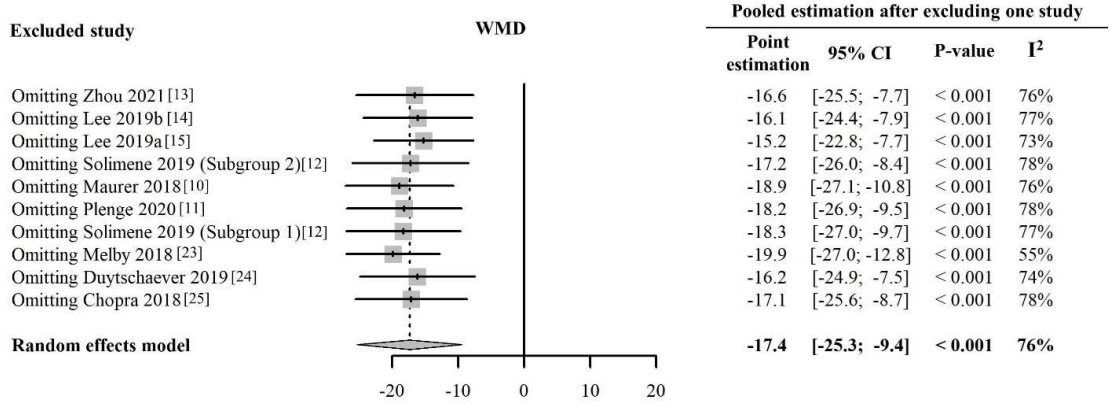
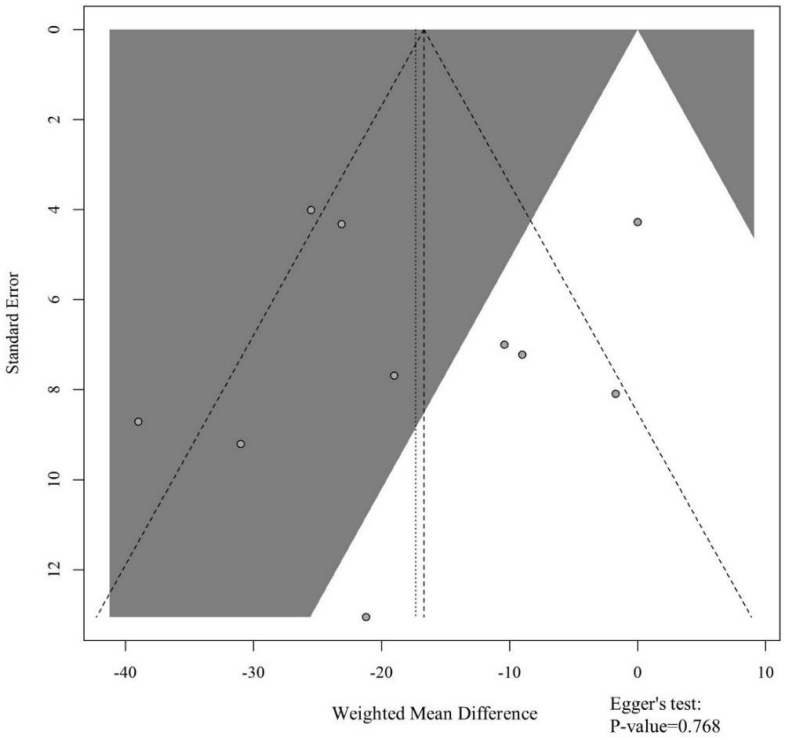
Supplementary Figures

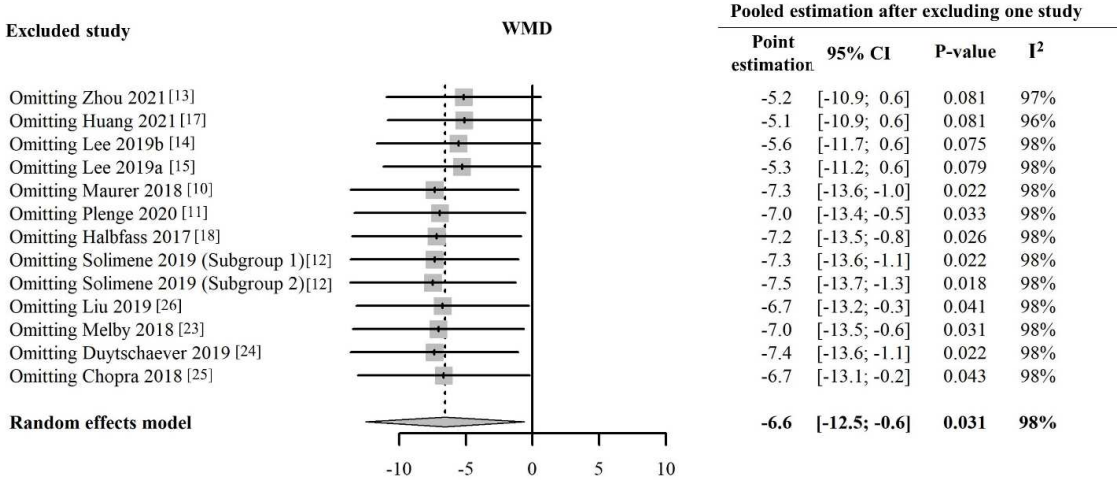
Supplementary Figure 1. Forest plot of the leave-one-out sensitivity analysis for pooled difference in RFCA procedure time (minutes) between STSF catheter and ST catheter (WMD: Weighted mean difference; CI: Confidence interval).



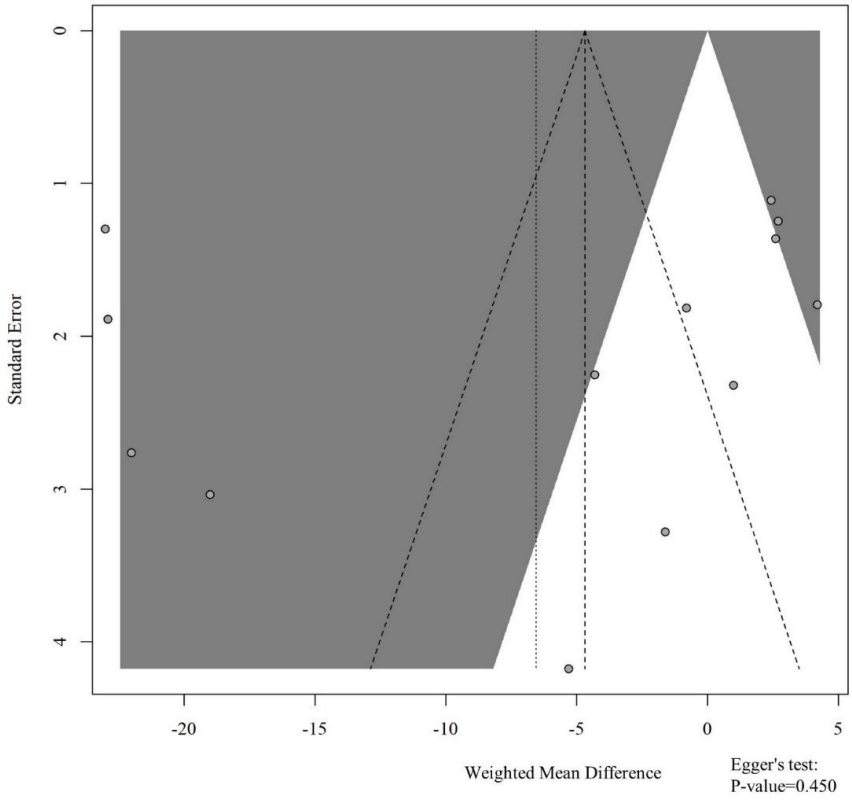
Supplementary Figure 2. Illustrated publication bias analysis for the included studies comparing STSF catheter with ST catheter for RFCA procedure time (minutes).



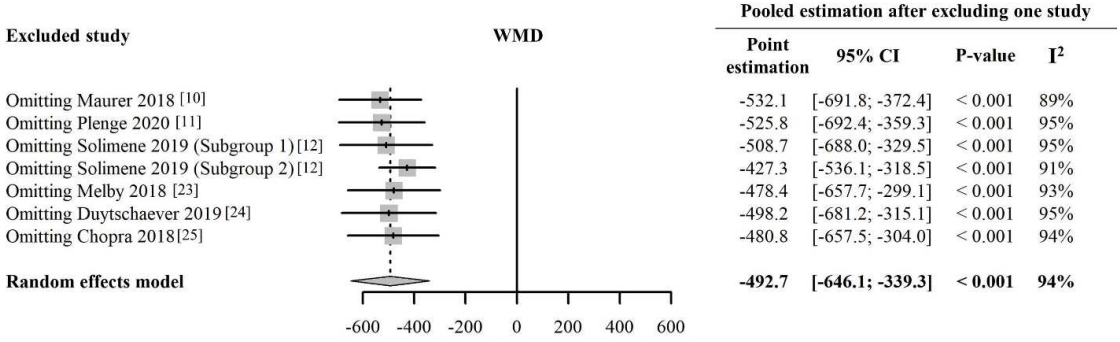
Supplementary Figure 3. Forest plot of the leave-one-out sensitivity analysis for pooled difference in ablation time (minutes) between STSF catheter and ST catheter (WMD: Weighted mean difference; CI: Confidence interval).



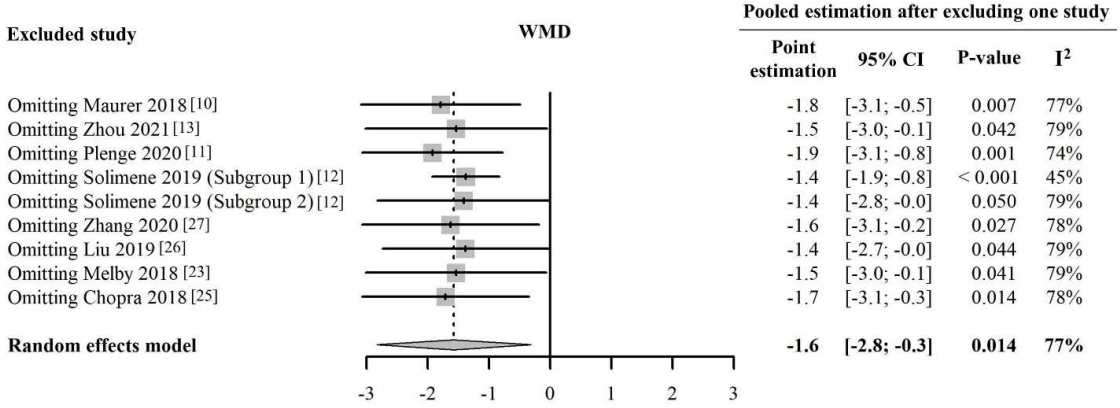
Supplementary Figure 4. Illustrated publication bias analysis for the included studies comparing STSF catheter with ST catheter for ablation time (minutes).



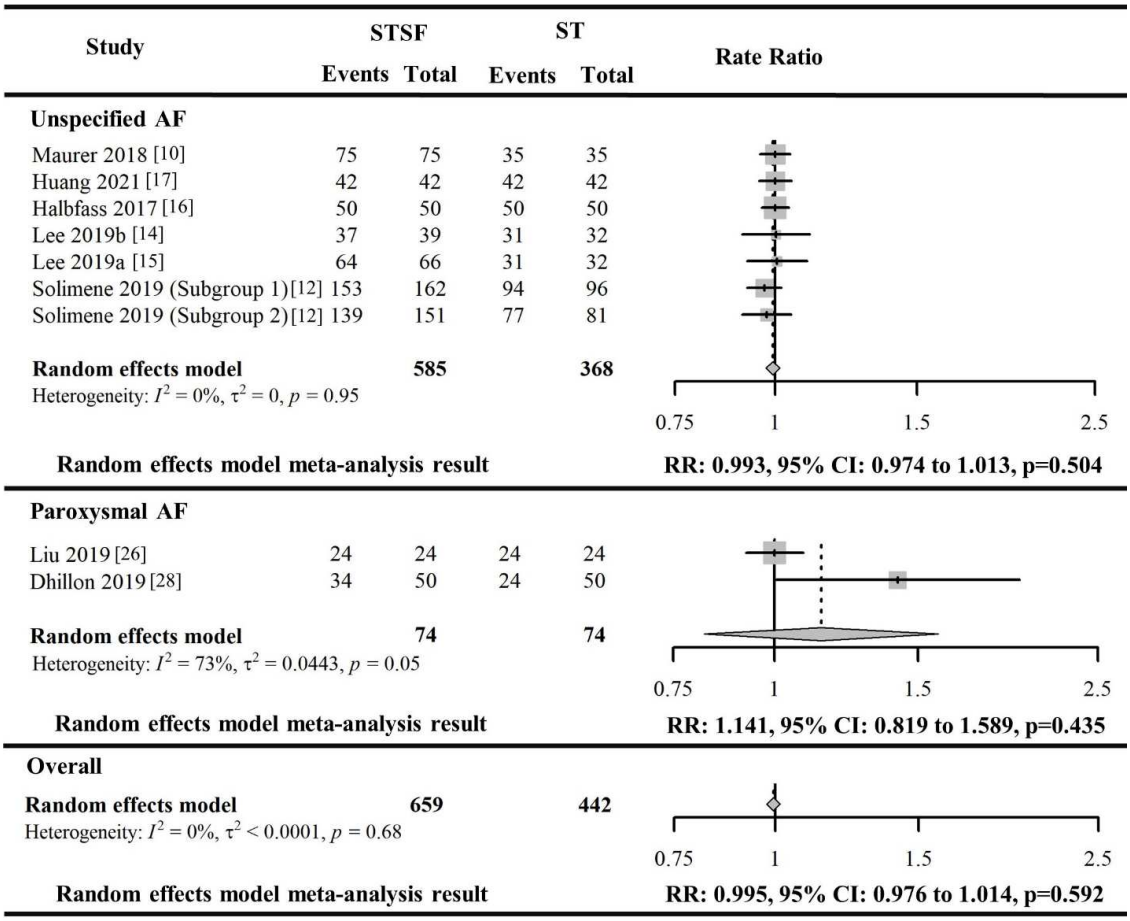
Supplementary Figure 5. Forest plot of the leave-one-out sensitivity analysis for pooled difference in irrigation fluid volume (mL) during RFCA between STSF catheter and ST catheter (WMD: Weighted mean difference; CI: Confidence interval).



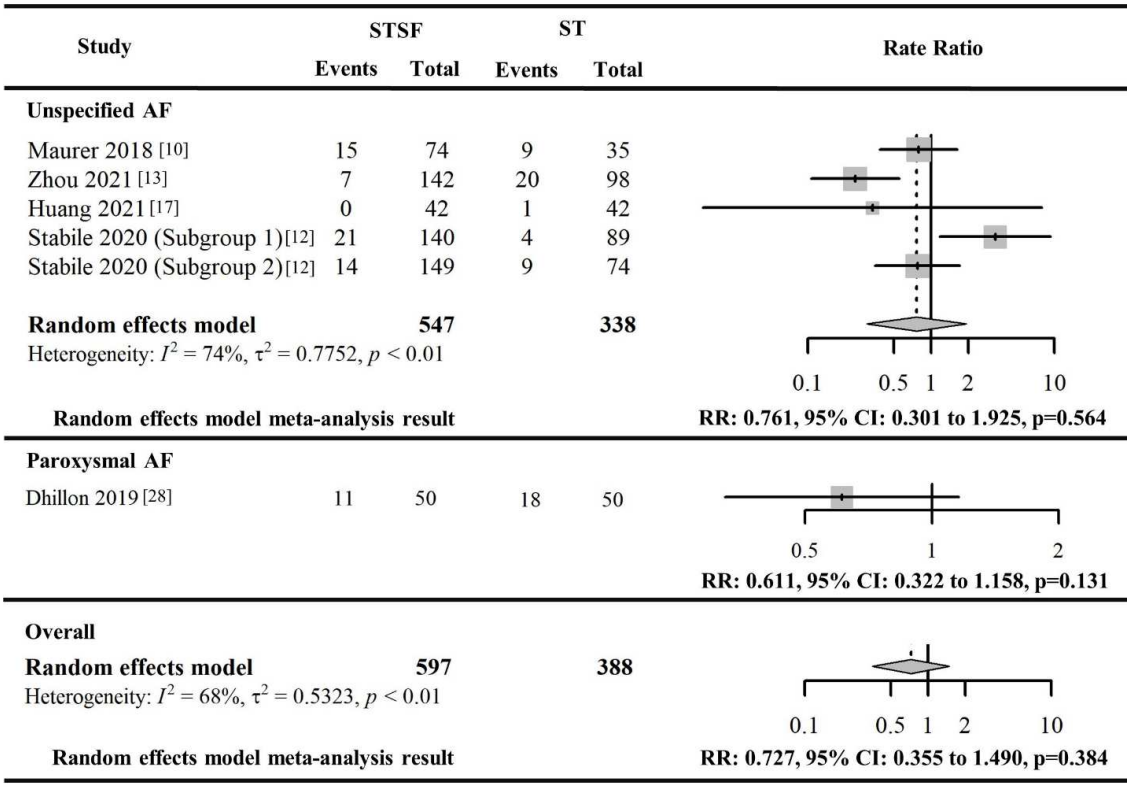
Supplementary Figure 6. Forest plot of the sensitivity analysis for pooled difference in fluoroscopy time (minutes) during RFCA between STSF and ST (WMD: Weighted mean difference; CI: Confidence interval).



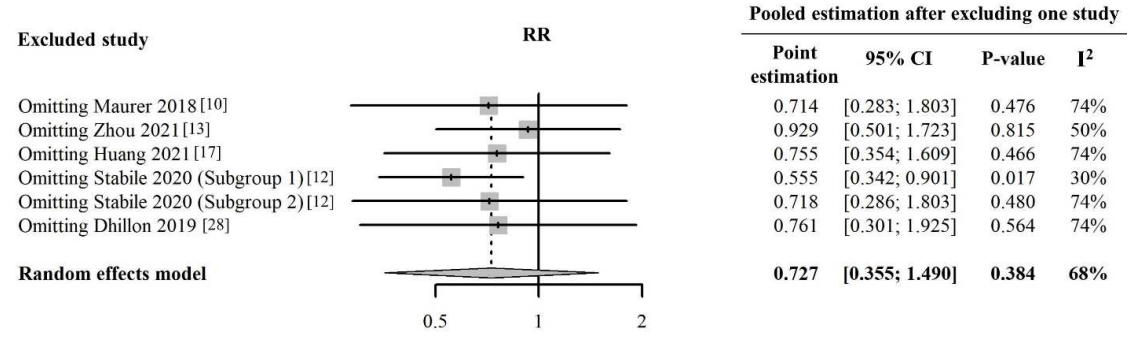
Supplementary Figure 7. Forest plot for the paired meta-analysis of the included studies comparing STSF vs. ST for acute procedural success of PVI (STSF: SMARTTOUCH® SURROUNDFLOW; ST: THERMOCOOL SMARTTOUCH®; AF: Atrial fibrillation; RR: Rate ratio; CI: Confidence interval).



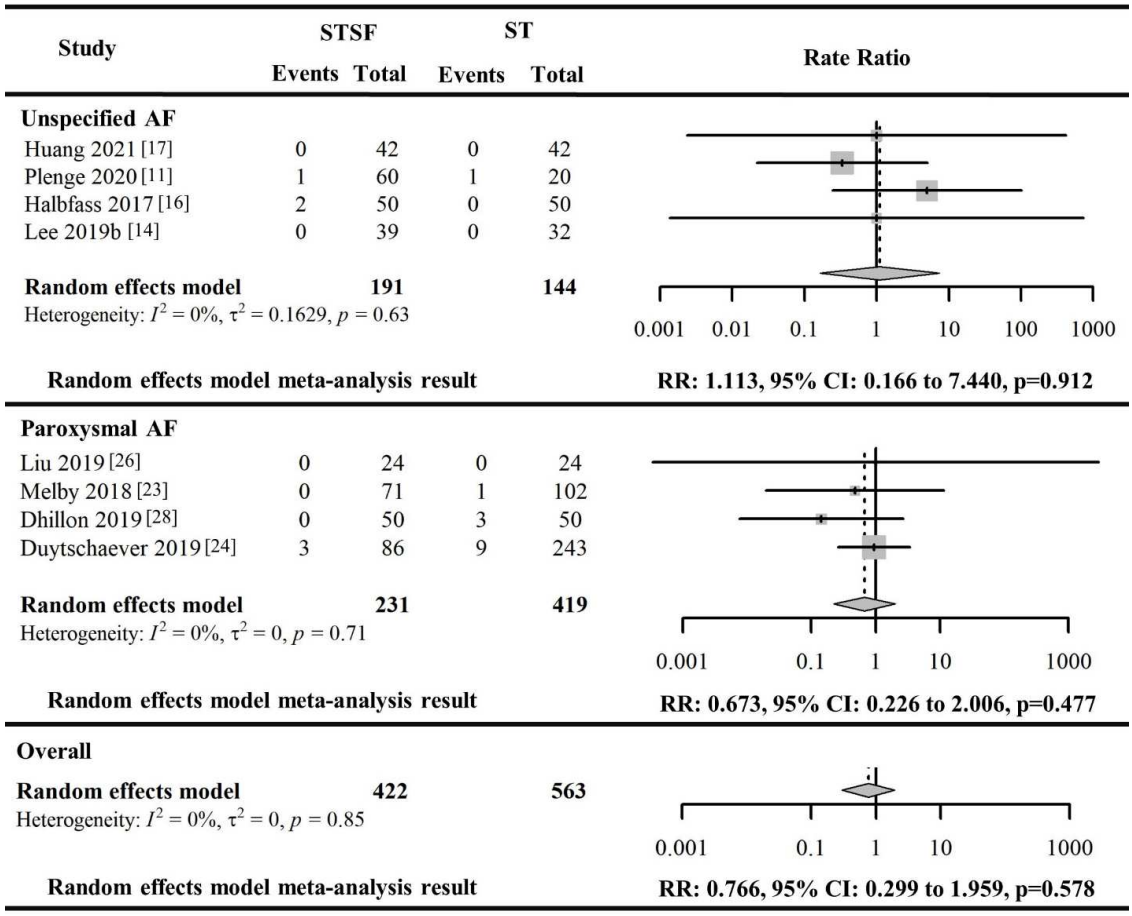
Supplementary Figure 8. Forest plot for the paired meta-analysis of the included studies comparing STSF catheter with ST catheter for one-year post-ablation cardiac arrhythmia recurrence (STSF: SMARTTOUCH® SURROUNDFLOW; ST: THERMOCOOL SMARTTOUCH®; AF: Atrial fibrillation; RR: Rate ratio; CI: Confidence interval).



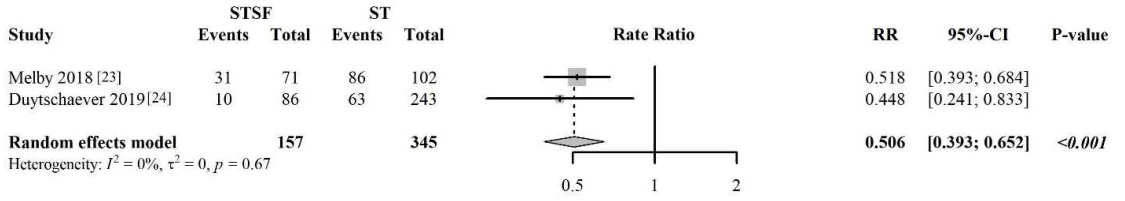
Supplementary Figure 9. Forest plot of the leave-one-out sensitivity analysis for pooled RR for one-year post-ablation cardiac arrhythmia recurrence between STSF catheter and ST catheter (RR: Rate ratio; CI: Confidence interval).



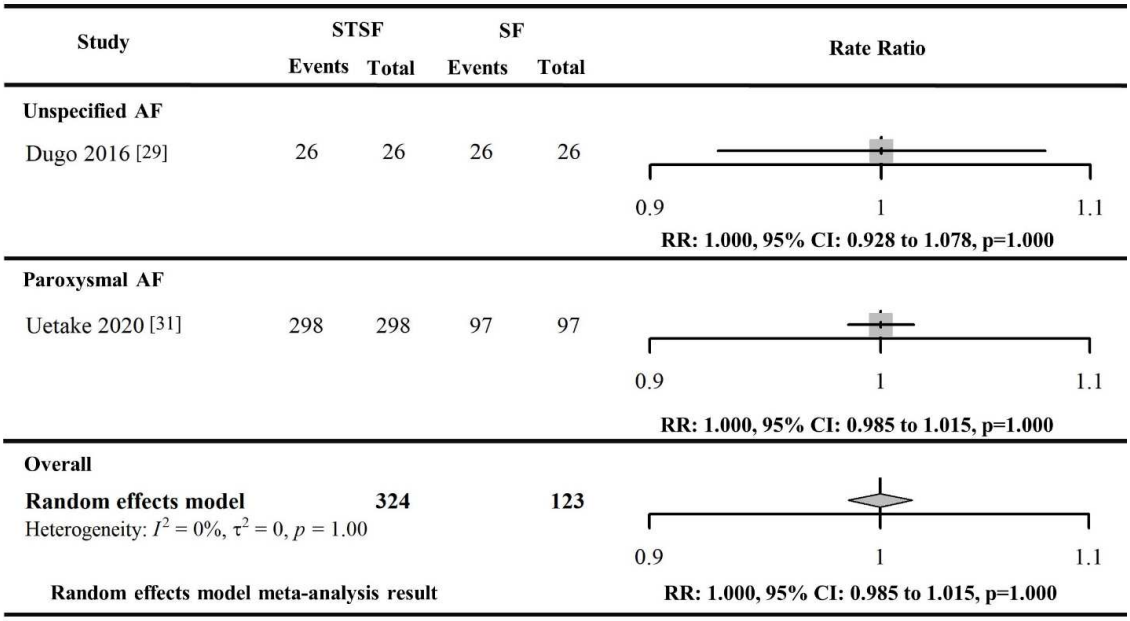
Supplementary Figure 10. Forest plot for the paired meta-analysis of the included studies comparing STSF catheter with ST catheter for the risk of overall complications related to RFCA (STSF: SMARTTOUCH® SURROUNDFLOW; ST: THERMOCOOL SMARTTOUCH®; AF: Atrial fibrillation; RR: Rate ratio; CI: Confidence interval).



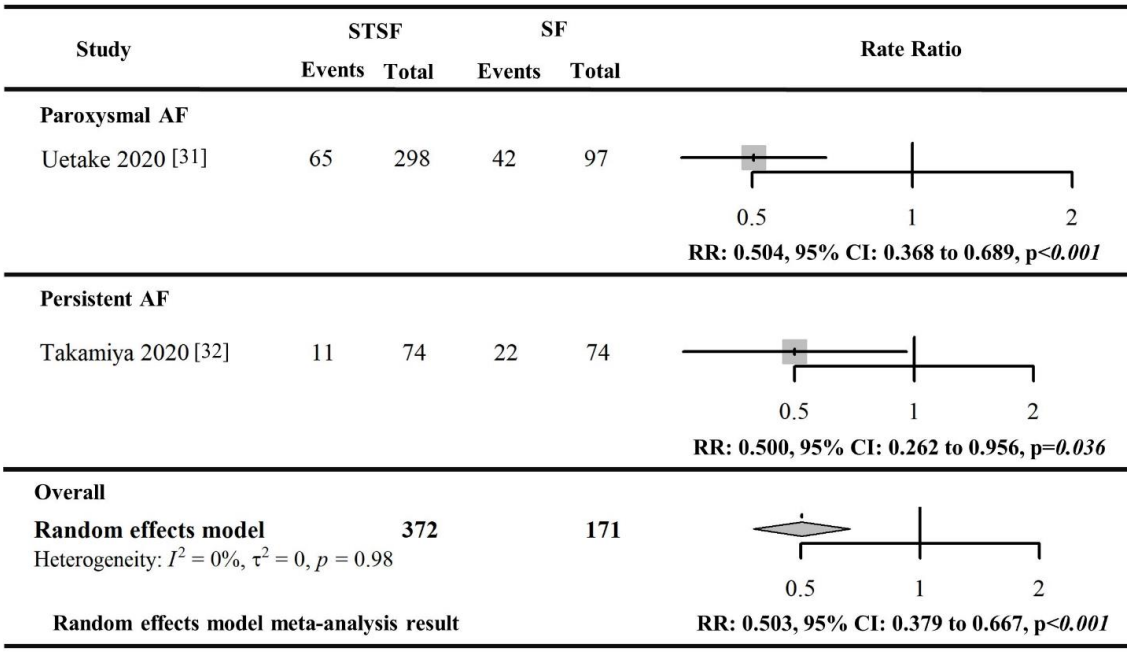
Supplementary Figure 11. Forest plot for the paired meta-analysis of the included studies comparing STSF catheter with ST catheter for foley catheter use (STSF: SMARTTOUCH® SURROUNDFLOW; ST: THERMOCOOL SMARTTOUCH®; RR: Rate ratio; CI: Confidence interval).



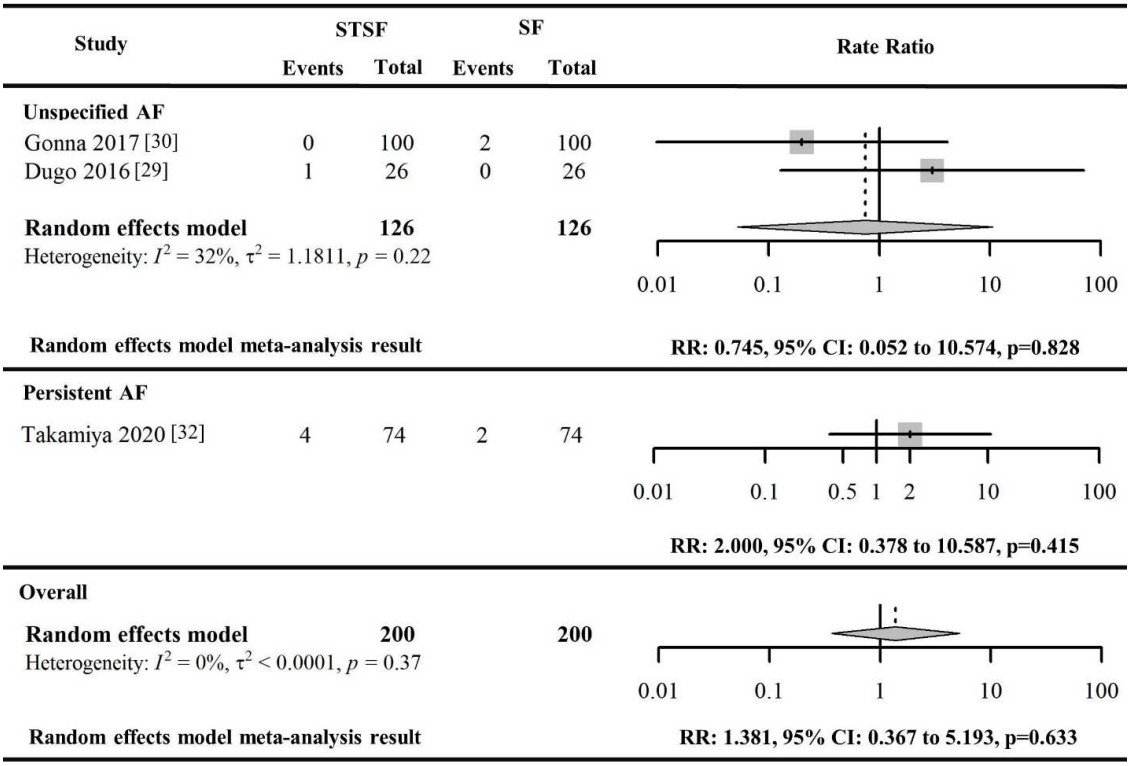
Supplementary Figure 12. Forest plot for the paired meta-analysis of the included studies comparing STSF catheter with SF catheter for acute procedure success of PVI (STSF: SMARTTOUCH® SURROUNDFLOW; SF: SURROUNDFLOW; AF: Atrial fibrillation; RR: Rate ratio; CI: Confidence interval).



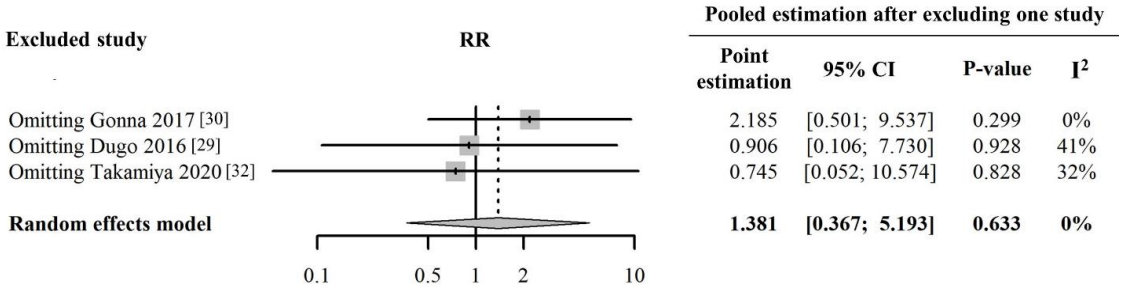
Supplementary Figure 13. Forest plot for the paired meta-analysis of the included studies comparing STSF catheter with SF catheter for one-year post-ablation arrhythmia recurrence (STSF: SMARTTOUCH® SURROUNDFLOW; SF: SURROUNDFLOW; AF: Atrial fibrillation; RR: Rate ratio; CI: Confidence interval).



Supplementary Figure 14. Forest plot for the paired meta-analysis of the included studies comparing STSF catheter with SF catheter for the risk of overall complications related to RFCA (STSF: SMARTTOUCH® SURROUNDFLOW; SF: SURROUNDFLOW; AF: Atrial fibrillation; RR: Rate ratio; CI: Confidence interval).



Supplementary Figure 15. Forest plot of the leave-one-out sensitivity analysis for pooled RR for the risk of overall complications related to RFCA between STSF catheter and SF catheter (RR: Rate ratio; CI: Confidence interval).



Supplementary Table

Supplementary Table 1. Search strategies for all databases of systematic literature retrieval.

Embase retrieval via Ovid, run on July 31, 2022		
#	**Searches**	**Results**
1	exp atrial fibrillation/	100,822
2	atrial fibrillation.ti,ab,kw.	149,900
3	1 or 2	175,990
4	(Smart Touch or Smarttouch or ST).af.	2,039,661
5	(Surround Flow or Surroundflow or SF).af.	147,154
6	4 and 5	9,825
7	STSF.af.	81
8	6 or 7	9,875
9	3 and 8	336
10	limit 9 to yr="2016 -current"	263
11	limit 10 to english language	260
Medline retrieval via Ovid, run on July 31, 2022		
#	**Searches**	**Results**
1	exp atrial fibrillation/	65,749
2	atrial fibrillation.ti,ab,kw.	83,864
3	1 or 2	96,391
4	(Smart Touch or Smarttouch or ST).af.	1,566,840
5	(Surround Flow or Surroundflow or SF).af.	58,697
6	4 and 5	4,937
7	STSF.af.	29
8	6 or 7	4,953
9	3 and 8	75
10	limit 9 to yr="2016 -current"	53
11	limit 10 to english language	53

The Cochrane library retrieval via Ovid, run on July 31, 2022		
#	**Searches**	**Results**
1	exp atrial fibrillation/	5,190
2	atrial fibrillation.ti,ab,kw.	14,561
3	1 or 2	14,959
4	(Smart Touch or Smarttouch or ST).af.	66,732
5	(Surround Flow or Surroundflow or SF).af.	26,824
6	4 and 5	2,022
7	STSF.af.	9
8	6 or 7	2,027
9	3 and 8	38
10	limit 9 to yr="2016 -current"	21
11	limit 10 to english language	20
Web of Science Core Collection, run on July 31, 2022		
#	**Searches**	**Results**
1	TS=atrial fibrillation	109,124
2	TS=(Smart Touch or Smarttouch or ST)	179,345
3	TS=(Surround Flow or Surroundflow or SF)	102,686
4	#2 AND #3	973
5	TS=STSF	56
6	#4 OR #5	1,018
7	#1 AND #6	34
8	PY="2016-2022"	21,184,249
9	#7 AND #8	31
WANFANG, run on July 31, 2022		
#	**Searches**	**Results**
1	主题:("房颤" or "心房颤动" or "心房纤维颤动" or "心房纤颤")	15,732
2	全部:("Smart Touch" or "Smarttouch" or "ST")	32,844

3	全部:("Surround Flow" or "Surroundflow" or "SF")	28,101
4	2 AND 3	125
5	全部:("STSF")	3
6	4 OR 5	127
7	1 AND 6	3
CNKI, run on July 31, 2022		
#	**Searches**	**Results**
1	TKA=('房颤' + '心房颤动' + '心房纤维颤动' + '心房纤颤')	13,497
2	FT=('Smart Touch' + 'Smarttouch' + 'ST')	426,266
3	FT=('Surround Flow' + 'Surroundflow' + 'SF')	155,221
4	2 AND 3	18,007
5	FT=('STSF')	71
6	4 OR 5	18,070
7	1 AND 6	87
VIP, run on July 31, 2022		
#	**Searches**	**Results**
1	M=("房颤" or "心房颤动" or "心房纤维颤动" or "心房纤颤") OR R=("房颤" or "心房颤动" or "心房纤维颤动" or "心房纤颤")	13,437
2	U=("Smart Touch" or "Smarttouch" or "ST") OR R=("Smart Touch" or "Smarttouch" or "ST")	43,133
3	U=("Surround Flow" or "Surroundflow" or "SF") OR R=("Surround Flow" or "Surroundflow" or "SF")	52,374
4	2 AND 3	288
5	U=("STSF") OR R=("STSF")	4
6	4 OR 5	291
7	1 AND 6	3
US Clinical Trials Registry, run on July 31, 2022		

1	(atrial fibrillation) AND (STSF or Smart Touch Surround Flow)	7
EU Clinical Trials Registry, run on July 31, 2022		
1	STSF or Smart Touch Surround Flow	0
International Clinical Trials Registry Platform, run on July 31, 2022		
1	STSF or Smart Touch Surround Flow	7

Supplementary Table 2. Study characteristics and main extracted information from the included studies.

Reference ID	Region	Publication type	Publication language	Study design	Patient inclusion and exclusion criteria	Catheter comparison and sample size	Patient characteristics	Main outcomes
Halbfass 2017 [16]	Germany	Full text	English	Prospective cohort study	Inclusion criteria: Patients with symptomatic, drug-refractory paroxysmal or persistent atrial fibrillation (AF) who underwent left atrial radiofrequency (RF) catheter ablation and post-procedural esophagogastroduodenoscopy (EGD) Exclusion criteria: Unspecified.	STSF (n=50) vs. ST (n=50)	Demographics • Mean age: STSF vs. ST (64.0±10.7 vs. 63.3±13.5 years, *p*=0.39); • Male: STSF vs. ST (58% vs. 58%, *p*=1.00); • BMI: STSF vs. ST (29.0±4.9 vs. 29.7±6.1 kg/m^2, *p*=0.52); Clinical characteristics • Paroxysmal AF: STSF vs. ST (44% vs. 38%, *p*=0.68); • Left ventricular ejection fraction: STSF vs. ST (55.6±11.0 vs. 56.5±9.8%, *p*=0.69); • CHA_2DS_2 VASc Score: STSF vs. ST (2.3±1.5 vs. 2.7±1.4, *p*=0.20); Comorbidities • Hypertension: STSF vs. ST (90% vs. 98%, *p*=0.20); • Coronary artery disease: STSF vs. ST (26% vs. 30%, *p*=0.82); • Diabetes: STSF vs. ST (14% vs. 20%, *p*=0.60); • Stroke/transient ischemic attack: STSF vs. ST (10% vs. 8%, *p*=1.00).	Procedural characteristics • Ablation time: STSF vs. ST (41.1±11.1 vs. 40.1±12.1 minutes, *p*=0.66); Clinical outcomes • Acute procedure success rate: STSF vs. ST (100% vs. 100%); • Any complications: STSF vs. ST (4% vs. 0%, *p*=0.49); • Cardiac tamponade: STSF vs. ST (2% vs. 0%); • Bleeding: STSF vs. ST (2% vs. 0%).
Horiuchi 2017 [18]	Japan	Abstract	English	Randomized controlled study	Inclusion criteria: Atrial fibrillation patients undergoing circumferential pulmonary vein isolation. Exclusion criteria: Unspecified.	STSF (n=20) vs. ST (n=20)	Pooled information of two groups Demographics • Mean age: 60±11 years; Clinical characteristics • Paroxysmal AF: 47.5%.	Procedural characteristics • Median radiofrequency time from superior to anterior sites: STSF vs. ST (9 vs. 22 seconds, *p*<0.01); • Median radiofrequency time at inferior and posterior sites: STSF vs. ST (9 vs. 8 seconds, *p*=NS); • There was no difference between the two groups in the

								mean contact force at each of 6 sites (anterior, anterosuperior, anteroinferior, inferior, posteroinferior, and posterosuperior site); • Total number of residual conduction gaps: STSF vs. ST (1.0±1.1 vs. 0.9±1.1, *p*=NS).
Ullah 2017 [19]	United Kingdom	Full text	English	Prospective cohort study	Inclusion criteria: Patients undergoing their first catheter ablation procedure for atrial fibrillation (AF) Exclusion criteria: Unspecified.	STSF (n=10) vs. ST (n=30)	Demographics • Mean age: STSF vs. ST (65.8±5.3 vs. 61±8 years, *p*=0.65); • Male: STSF vs. ST (70% vs. 70%, *p*=1); Clinical characteristics • Paroxysmal AF: STSF vs. ST (50 % vs. 50%, *p*=1); • Duration of persistent AF: STSF vs. ST (11±3 vs. 20±12 months, *p*=0.13); • Left atrial diameter: STSF vs. ST (4.1±0.8 vs. 4.4±0.6 cm, *p*=0.17); • CHA_2DS_2 VASc score: STSF vs. ST (1.5±0.8 vs. 1.4±1.0, *p*=0.61).	Procedural characteristics • Median catheter tip temperature at the start of energy delivery: STSF vs. ST (28 vs. 36 °C, *p*<0.005); • Median impedance at start of energy delivery: STSF vs. ST (154 vs. 181 Ω, *p*<0.005); • Median minimum catheter tip temperature during RF delivery: STSF vs. ST (25 vs. 35 °C, *p*<0.005); • Median time to reach minimum catheter tip temperature: STSF vs. ST (8.4 vs. 1.2 seconds, *p*<0.005); • Median maximum catheter tip temperature during RF delivery: STSF vs. ST (29 vs. 41 °C, *p*<0.005); • Median time to reach maximum catheter tip temperature: STSF vs. ST (0 vs. 14.9 seconds, *p*<0.005); • Median time to reach maximum ablation power: STSF vs. ST (0.6 vs. 8.1 seconds, *p*<0.005).
Chopra 2018 [25]	United States	Full text	English	Retrospective study	Inclusion criteria: Patients aged between 18 and 81 years who had undergone a radiofrequency ablation procedure for the indication of paroxysmal AF at OhioHealth Riverside	STSF (n=24) vs. ST (n=23)	Pooled information of two groups Clinical characteristics • Left atrial diameter: 44.2±7.5 mm; • Left ventricular ejection fraction: 57.8%±7%; • CHADS VASc Score: 2.4±1.4.	Procedural characteristics • Procedure time: STSF vs. ST (192.7±46.6 vs. 213.9±43.5 minutes, *p*=0.11); • Ablation time: STSF vs. ST (43.8±13.8 vs. 49.1±14.8 minutes, *p*=0.18);

					Methodist Hospital, Columbus, Ohio, USA, from May 1, 2017, to June 1, 2018. Exclusion criteria: Unspecified.			• Fluoroscopy time: STSF vs. ST (511.8±231.8 vs. 523.6±277.4 seconds, *p*=0.39); • Total fluid: STSF vs. ST (2,288.8±725.8 vs. 3,105±803 mL, *p*<0.001); • Fluid via ablation catheter: STSF vs. ST (697.3±299.3 vs. 1277±315.8 mL, *p*<0.001); • Fluid from sources other than ablation catheter: STSF vs. ST (1591±583.6 vs. 1828±689 mL, *p*=0.21); • Post-RFA Furosemide use (0% vs. 39%; *p*=0.0006).
Maurer 2018 [10]	Germany	Full text	English	Prospective cohort study	Inclusion criteria: Patients with symptomatic, drug-refractory paroxysmal, or short-term persistent AF (< 3 months in duration). Exclusion criteria: 1. Prior pulmonary vein isolation or left atrial surgery; 2. A left atrial (LA) diameter > 60 mm; 3. Severe valvular heart disease or contraindications to post-interventional oral anticoagulation.	STSF (n=75) vs. ST (n=35)	Demographics • Mean age: STSF vs. ST (65.4±11.5 vs. 66.6±9 years); • Male: STSF vs. ST (46.7% vs. 68.6%); • BMI: STSF vs. ST (28.5±6 vs. 26.3±4.3 kg/m^2); Clinical characteristics • Paroxysmal AF: STSF vs. ST (52% vs. 43%); • Left atrial diameter: STSF vs. ST (45.2±6.6 vs. 44.23±6 mm); • Median CHA_2DS_2 VASc Score: STSF vs. ST (2 vs. 2); • Median CHADS Score: STSF vs. ST (1 vs. 1); Comorbidities • Coronary artery disease: STSF vs. ST (29.3% vs. 22.9%); • Congestive heart failure: STSF vs. ST (17.3% vs. 3%); • Arterial hypertension: STSF vs. ST (61.3% vs. 71.4%); • Diabetes mellitus: STSF vs. ST (9.3% vs. 11.4%); • Stroke/transient ischemic attack: STSF vs. ST (4% vs. 14.3%).	Procedural characteristics • Procedure time: STSF vs. ST (131.3±33.7 vs. 133.0±42 minutes, *p*=0.995); • Ablation time: STSF vs. ST (1751±394.0 vs. 1604.6±287.8 seconds, *p*=0.201); • Fluoroscopy time: STSF vs. ST (14±6 vs. 13.5±6.6 minutes, *p*=0.559); • Total fluid: STSF vs. ST (265.5±64.4 vs. 539.6±118.2 mL, *p*<0.001); Clinical outcomes • Acute procedure success rate: STSF vs. ST (100% vs. 100%); • 12-month arrhythmia recurrence rate: STSF vs. ST (20.3% vs. 25.7%); • Audible steam pop: STSF vs. ST (0% vs. 0%).

Melby 2018 [23]	Unspecified	Abstract	English	Retrospective study	Inclusion criteria: Paroxysmal AF patients undergoing first-time ablation, guided by CARTO VISITAG™ Module. Exclusion criteria: Unspecified.	STSF (n=71) vs. ST (n=102)	Demographics • Mean age: STSF vs. ST (60±10 vs. 61±9 years, *p*=0.74); Clinical characteristics • Left ventricular ejection fraction: STSF vs. ST (60.2±7.6 vs. 59.5±7.9%, *p*=0.54); • CHADS VASc Score: STSF vs. ST (1.62±1.4 vs. 1.7±1.4, *p*=0.56); Comorbidities • Congestive heart failure: STSF vs. ST (0% vs. 4%).	Procedural characteristics • Procedure time: STSF vs. ST (1.9±0.5 vs. 1.9±0.4 hours, *p*=0.77); • Ablation time: STSF vs. ST (37.4±11.2 vs. 38.2±12.5 minutes, *p*=0.74); • Fluoroscopy time: STSF vs. ST (3.1±4.4 vs. 4.7±2.7 minutes, *p*<0.001); • Fluoroscopy dose: STSF vs. ST (12.4±16.7 vs. 27.3±18.6 mGy, *p*<0.001); • Total fluid: STSF vs. ST (1505±440 vs. 2353±605 mL, *p*<0.001); • Fluid via ablation catheter: STSF vs. ST (563±168 vs. 1145±375 mL, *p*<0.001); • Foley catheter usage (%): STSF vs. ST (43.7% vs. 84.3%, *p*<0.001); Clinical outcomes • Any complications: STSF vs. ST (0% vs. 1%); • Cerebrovascular accident: STSF vs. ST (0% vs. 1%).
Dhillon 2019 [28]	United Kingdom	Full text	English	Prospective cohort study	Inclusion criteria: Consecutive patients with paroxysmal atrial fibrillation underwent pulmonary vein isolation guided by ablation index (AI) between January 2017 and October 2017. Exclusion criteria: Unspecified.	STSF (n=50) vs. ST (n=50)	Demographics • Mean age: STSF vs. ST (60.1±11.8 vs. 59.9±10.8 years, *p*=0.915); • Male: STSF vs. ST (70% vs. 48%, *p*=0.042); Clinical characteristics • Median duration of AF: STSF vs. ST (24 vs. 42 months, *p*=0.057); • Left atrial diameter: STSF vs. ST (37.6±5 vs. 38.7±4 mm, *p*=0.145); • CHA_2DS_2 VASc Score: STSF vs. ST (1.3±1.2 vs. 1.68±1.6, *p*=0.184);	Procedural characteristics • Mean procedure time: STSF vs. ST (156 vs. 199 minutes, *p*<0.001); • Mean ablation time: STSF vs. ST (27.2 vs. 43.2 minutes, *p*<0.001); • Mean left wide antral circumferential ablation Time: STSF vs. ST (29.5 vs. 38.5 minutes, *p*<0.001); • Mean right wide antral circumferential ablation Time: STSF vs. ST (32 vs. 38.5 minutes, *p*=0.001);

							Comorbidities • Hypertension: STSF vs. ST (38% vs. 34%, *p*=0.835); • Diabetes Mellitus: STSF vs. ST (12% vs. 6%, *p*=0.485); • Ischemic Heart Disease: STSF vs. ST (4% vs. 2%, *p*=0.291).	• Mean fluoroscopy time: STSF vs. ST (7.7 vs. 8.5 minutes, *p*=0.079); Clinical outcomes • Acute procedure success rate: STSF vs. ST (68% vs. 48%, *p*=0.068); • 12-month AF/AT recurrence rate: STSF vs. ST (6% vs. 34%); • Any complications: STSF vs. ST (0% vs. 6%); • Pericarditis: STSF vs. ST (0% vs. 4%); • Femoral venous hematoma: STSF vs. ST (0% vs. 2%).
Duytschaever 2019 [24]	Europe	Abstract	English	Prospective cohort study	Inclusion criteria: Patients underwent point-by-point paroxysmal atrial fibrillation ablations across 17 European centers in the VISTAX study. Exclusion criteria: Unspecified.	STSF (n=86) vs. ST (n=243)	Not reported	Procedural characteristics • Procedure time: STSF vs. ST (137.4±30.1 vs. 162.9±36.9 minutes); • Ablation time: STSF vs. ST (37.1±9.23 vs. 34.4±11.73 minutes); • Fluid via ablation catheter: STSF vs. ST (785.3±356.0 vs. 1,255.6±469.3 mL); • Foley catheter usage (%): STSF vs. ST (11.6% vs 25.9%); Clinical outcomes • Any complications: STSF vs. ST (3.5% vs. 3.7%).
Goldstein 2019a [20]	United States	Abstract	English	Retrospective study	Inclusion criteria: Patients with a primary diagnosis of AF (≥18 years) who underwent radiofrequency ablation between 09/01/2016–03/31/2018, identified from the Premier Healthcare database.	STSF (n=1,445) vs. ST (n=1,766)	Demographics • Age group ≥70: STSF vs. ST (35.09% vs. 30.18%, *p*=0.0031); Clinical characteristics • Paroxysmal AF: STSF vs. ST (63.32% vs. 67.21%, *p*=0.0210); • $CHADS_2VASc$ score≥3: STSF vs. ST (43.39% vs. 35.28%, *p*<0.001);	Not reported

					Exclusion criteria: Unspecified.		Comorbidities • Obesity: STSF vs. ST (23.88% vs. 19.42%, *p*=0.0022); • Diabetes: STSF vs. ST (20.90% vs. 17.27%, *p*=0.0090); • Atrial flutter: STSF vs. ST (41.38% vs. 32.67%, *p*<0.0001); • Valvular disease: STSF vs. ST (21.87% vs. 12.34%, *p*<0.0001); • Cardiomyopathy: STSF vs. ST (12.87% vs. 9.68%, *p*=0.0042); • Hypertension: STSF vs. ST (69.48% vs. 63.08%, *p*=0.0001); • Heart failure: STSF vs. ST (20.69% vs. 17.84%, *p*=0.0407).	
Goldstein 2019b [21]	United States	Abstract	English	Retrospective study	Inclusion criteria: Patients with a primary diagnosis of AF (≥18 years) who underwent index (first occurrence) radiofrequency ablation in an outpatient setting (09/01/2016–03/31/2018), identified from the Premier Healthcare database. Exclusion criteria: Unspecified.	STSF (n=571) vs. ST (n=571)	Not reported	Hospital readmission outcomes • 4-6 months all-cause readmission rate: STSF vs. ST (2.78% vs. 2.78%, *p*=1.000); • 4-6 months cardiovascular-related inpatient readmission rate: STSF vs. ST (1.23% vs. 1.23%, *p*=1.000); • 4-6 months AF-related inpatient readmission rate: STSF vs. ST (0.93% vs. 0.62%, *p*=0.6535).
Lee 2019a [15]	South Korea	Abstract	English	Prospective cohort study	Inclusion criteria: Drug refractory symptomatic AF patients. Exclusion criteria: Unspecified.	STSF (n=66) vs. ST (n=32)	Pooled information of two groups Demographics • Mean age: 61±9 years; Clinical characteristics • Paroxysmal AF: 67%.	Procedural characteristics • Procedure time: STSF vs. ST (160±37 vs. 199±42 minutes, *p*<0.001); • Ablation time: STSF vs. ST (44±10 vs. 66±14 minutes, *p*<0.001); Clinical outcomes • Acute procedure success rate: STSF vs. ST (96.3% vs. 95.8%, *p*=0.613).
Lee 2019b [14]	South Korea	Abstract	English	Retrospective study	Inclusion criteria: Drug refractory symptomatic AF patients.	STSF (n=39) vs. ST (n=32)	Pooled information of two groups Demographics Mean age: 61±10 years;	Procedural characteristics

					Exclusion criteria: Unspecified.		Male: 79%; Clinical characteristics Paroxysmal AF: 69%.	• Procedure time: STSF vs. ST (168±34 vs. 199±42 minutes, *p*=0.001); • Ablation time: STSF vs. ST (47±11 vs. 66±14 minutes, *p*<0.001); Clinical outcomes • Acute procedure success rate: STSF vs. ST (96.0% vs. 95.8%, *p*=0.867); • Any complications: STSF vs. ST (0% vs. 0%).
Liu 2019 [26]	China	Full text	Chinese	Retrospective study	Inclusion criteria: Drug-refractory paroxysmal AF patients underwent pulmonary vein isolation. Exclusion criteria: Unspecified.	STSF (n=24) vs. ST (n=24)	Demographics • Mean age: STSF vs. ST (65.0±9.6 vs. 65.2±9.6 years, p=0.95); • Male: STSF vs. ST (37.5% vs. 37.5%, *p*=1.00); • BMI: STSF vs. ST (22.1±1.7 vs. 21.8±1.4 kg/m^2, *p*=0.53); Clinical characteristics • Duration of AF: STSF vs. ST (10.4±10.1 vs. 6.4±4.3 months, *p*=0.08); • Left atrial diameter: STSF vs. ST (34.1±13.9 vs. 39.4±5.4 mm, *p*=0.09); • Left ventricular ejection fraction: STSF vs. ST (55±6 vs. 53±8%, *p*=0.23); Comorbidities • Coronary heart disease: STSF vs. ST (8.3% vs. 29.2%, *p*=0.14); • Heart failure: STSF vs. ST (25.0% vs. 41.7%, *p*=0.22); • Hypertension: STSF vs. ST (41.7% vs. 50%, *p*=0.56); • Diabetes: STSF vs. ST (12.5% vs. 29.2%, *p*=0.16); • Stroke: STSF vs. ST (4.2% vs. 8.3%, *p*=1.00).	Procedural characteristics • Procedure time: STSF vs. ST (67 vs. 70 minutes, *p*=0.45); • Ablation time: STSF vs. ST (35.3±6.4 vs. 39.6±9.0 minutes, *p*=0.07); • Fluoroscopy time: STSF vs. ST (7.8±3.1 vs. 11.2±6.3 minutes, *p*=0.02); • Total infusion fluid: STSF vs. ST (356 vs. 700 mL, *p*<0.01); Clinical outcomes • Acute procedure success rate: STSF vs. ST (100% vs. 100%, *p*=1); • Any complications: STSF vs. ST (0% vs. 0%).

Solimene 2019 [12]	Italy	Full text	English	Prospective cohort study	Inclusion criteria: Patients with paroxysmal or persistent AF who underwent their first AF ablation. Exclusion criteria: 1. Age <18; 2. Longstanding persistent AF (AF was the sole rhythm for the last 12 months); 3. AF secondary to a transient or correctable abnormality, including electrolyte imbalance, trauma, recent surgery, infection, toxic ingestion, and endocrinopathy; 4. Intra-atrial thrombus, tumor, or other abnormality precluding catheter insertion; 5. Left ventricular ejection fraction <35%; 6. Women of childbearing potential who are or might be pregnant; 7. Hematological contraindications to ionizing radiation exposure; 8. Presence of complex congenital heart disease; 9. Cardiac surgery within 1 month from enrollment.	STSF (Subgroup with AI 330-450, n=162; Subgroup with AI 380-500, n=151) vs. ST (Subgroup with AI 330-450, n=96; Subgroup with AI 380-500, n=81)	The subgroup with AI 330-450 Demographics • Mean age: STSF vs. ST (60±12 vs. 58±10 years); • Male: STSF vs. ST (68% vs. 71%); • BMI: STSF vs. ST (27.5±4.3 vs. 27.2±3.8 kg/m^2); Clinical characteristics • Paroxysmal AF: STSF vs. ST (79.6% vs. 81.3%); • Left ventricular ejection fraction: STSF vs. ST (58±8 vs. 52±10%); Comorbidities • Hypertension: STSF vs. ST (30.4% vs. 31.3%); • Ischemic heart disease: STSF vs. ST (5.3% vs. 3.7%); • Valvulopathy: STSF vs. ST (1.2% vs. 1%); • Dilated cardiomyopathy: STSF vs. ST (4.9% vs. 4.2%); • Previous transient ischemic attack/Stroke: STSF vs. ST (4.3% vs. 1%); • Diabetes mellitus: STSF vs. ST (11.1% vs. 2.1%); • Chronic renal failure: STSF vs. ST (1.9% vs. 0%); The subgroup with AI 380-500 Demographics • Mean age: STSF vs. ST (59±10 vs. 59±13 years); • Male: STSF vs. ST (72% vs. 77%); • BMI: STSF vs. ST (26.2±4 vs. 28.1±4.8 kg/m^2); Clinical characteristics • Paroxysmal AF: STSF vs. ST (83.4% vs. 75.3%);	The subgroup with AI 330-450 Procedural characteristics • Procedure time: STSF vs. ST (120±72 vs. 129±44 minutes); • Ablation time: STSF vs. ST (33.3±11.5 vs. 30.7±10 minutes); • Fluoroscopy time: STSF vs. ST (257±356 vs. 542±285 seconds); • Total fluid: STSF vs. ST (701±287 vs. 1105±573 mL); Clinical outcomes • Acute procedure success rate: STSF vs. ST (94.5% vs. 97.5%); The subgroup with AI 380-500 Procedural characteristics • Procedure time: STSF vs. ST (125±73 vs. 144±44 minutes); • Ablation time: STSF vs. ST (33±11.7 vs. 28.8±13.7 minutes); • Fluoroscopy time: STSF vs. ST (379±454 vs. 540±416 seconds); • Total fluid: STSF vs. ST (836±503 vs. 1,732±664 mL); Clinical outcomes • Acute procedure success rate: STSF vs. ST (92.2% vs. 94.5%).

							• Left ventricular ejection fraction: STSF vs. ST (60±7 vs. 57±7%); Comorbidities • Hypertension: STSF vs. ST (45.7% vs. 39.5%); • Ischemic heart disease: STSF vs. ST (5.5% vs. 6.2%); • Valvulopathy: STSF vs. ST (2.6% vs. 6.2%); • Dilated cardiomyopathy: STSF vs. ST (0.7% vs. 1.2%); • Previous transient ischemic attack/Stroke: STSF vs. ST (2.6% vs. 1.2%); • Diabetes mellitus: STSF vs. ST (4% vs. 6.2%); • Chronic renal failure: STSF vs. ST (0.7% vs. 3.7%).	
Plenge 2020 [11]	Germany	Full text	English	Prospective cohort study	Inclusion criteria: Consecutive patients with symptomatic paroxysmal or persistent AF scheduled for pulmonary vein isolation. Exclusion criteria: Age younger than 18 years, reversible causes of AF, prior pulmonary vein isolation, and intracardiac thrombus.	STSF (n=60) vs. ST (n=20)	Demographics • Mean age: STSF vs. ST (63.0±9.1 vs. 65.3±10.7 years, *p*=0.33); • Male: STSF vs. ST (63.3% vs. 65.0%, *p*=0.56); • BMI: STSF vs. ST (27.4±5.1 vs. 25.7±4.3 kg/m^2, *p*=0.24); Clinical characteristics • Duration of AF: STSF vs. ST (79.6±97.2 vs. 85.8±100.7 months, *p*=0.82); • Left atrial diameter: STSF vs. ST (41.2±7.0 vs. 42.7±6.3 mm, *p*=0.64); • Left ventricular ejection fraction: STSF vs. ST (61.3±8.4 vs. 62.2±5.3 %, *p*=0.68); Comorbidities • Hypertension: STSF vs. ST (65% vs. 73.3%, *p*=0.39); • Hyperlipoproteinemia: STSF vs. ST (33.3% vs. 40%, *p*=0.42);	Procedural characteristics • Procedure time: STSF vs. ST (106.3±28.4 vs. 116.7±26.7 minutes, *p*=0.2); • Ablation time: STSF vs. ST (25.9±7.3 vs. 32.1±16 minutes, *p*=0.045); • RF time for PVI left veins: STSF vs. ST (836.5±296.3 vs. 1,086.6±523.0 seconds, *p*=0.08); • RF time for PVI right veins: STSF vs. ST (913.5±1,435.8 vs. 1,002.8±544.6 seconds, *p*=0.8); • Fluoroscopy time: STSF vs. ST (16.0±6.7 vs. 13.8±5.7 minutes, *p*=0.25) • Fluoroscopy dose: STSF vs. ST (1,854.7±1,247.9 vs. 1,756.7±822.6 µGym2, *p*=0.77); • Fluid via ablation catheter: STSF vs. ST (241.4±79.6 vs. 540.3±229.5 mL, *p*<0.01);

							• Cardiovascular disease: STSF vs. ST (20% vs. 40%, *p*=0.10); • Cardiomyopathy: STSF vs. ST (15% vs. 13.3%, *p*=0.62); • Diabetes mellitus: STSF vs. ST (15% vs. 13.3%, *p*=0.62); • Renal failure: STSF vs. ST (11.7% vs. 0%, *p*=0.20); • Sleep-disordered breathing: STSF vs. ST (8.8% vs. 6.7%, *p*=0.63).	Clinical outcomes • Any complications: STSF vs. ST (1.7% vs. 5%); • Audible steam pop: STSF vs. ST (1.7% vs. 0%); • Bleeding: STSF vs. ST (0% vs. 5%).
Stabile 2020 [22]	Italy	Full text	English	Prospective cohort study	Inclusion criteria: Patients with paroxysmal or persistent AF who underwent their first AF ablation. Exclusion criteria: 1. Age <18; 2. Longstanding persistent AF (AF was the sole rhythm for the last 12 months); 3. AF secondary to a transient or correctable abnormality, including electrolyte imbalance, trauma, recent surgery, infection, toxic ingestion, and endocrinopathy; 4. Intra-atrial thrombus, tumor, or other abnormality precluding catheter insertion; 5. Left ventricular ejection fraction <35%; 6. Women of childbearing potential who are or might be pregnant; 7. Hematological contraindications to	STSF (Subgroup with AI 330-450, n=140; Subgroup with AI 380-500, n=149) vs. ST (Subgroup with AI 330-450, n=89; Subgroup with AI 380-500, n=74)	Duplicate with Solimene 2019.	The subgroup with AI 330-450 Clinical outcomes • 12-month arrhythmia recurrence rate: STSF vs. ST (14.9% vs. 4.5%); The subgroup with AI 380-500 Clinical outcomes • 12-month arrhythmia recurrence rate: STSF vs. ST (9.4% vs. 12.2%).

					ionizing radiation exposure; 8. Presence of complex congenital heart disease; 9. Cardiac surgery within 1 month from enrollment.			
Zhang 2020 [27]	China	Full text	Chinese	Retrospective study	Inclusion criteria: 1. Recurrent paroxysmal atrial fibrillation (defined as paroxysmal atrial fibrillation that can be terminated by itself or intervention within 7 days after the attack), which does not respond to antiarrhythmic drugs. 2. Preoperative echocardiography showed left atrial diameter <55mm and left ventricular ejection fraction (LVEF) > 35%. Exclusion criteria: Stroke, heart valve disease, heart failure (cardiac function IV level), atrial thrombus, cardiomyopathy (including hypertrophic cardiomyopathy and dilated cardiomyopathy), acute coronary syndrome, hyperthyroidism, hypothyroidism, coronary heart disease, chronic renal insufficiency (chronic kidney disease stage 4-5)	STSF (n=34) vs. ST (n=34)	Demographics • Mean age: STSF vs. ST (66.63±7.59 vs. 63.49±7.53 years, p>0.05); • Male: STSF vs. ST (55.9% vs. 58.8%, p>0.05); Clinical characteristics • Duration of AF: STSF vs. ST (9.6±3.6 vs. 8.7±3.6 months, p>0.05); • Left atrial diameter: STSF vs. ST (36.8±3.7 vs. 34.9±5.3 mm, p>0.05); • Left ventricular ejection fraction: STSF vs. ST (60.1±3.7 vs. 59.3±3.4%, p>0.05).	Procedural characteristics • Right PVI time: STSF vs. ST (23.30±5.53 vs. 28.65±4,95 minutes, p<0.05); • Left PVI time: STSF vs. ST (28.25±9.67 vs. 33.25±5.60 minutes, p<0.05); • Fluoroscopy time: STSF vs. ST (11.30±2.91 vs. 12.30±3.31 minutes, p>0.05); • Total fluid: STSF vs. ST (930.00±319.70 vs. 1,770.00±482.43 mL); Clinical outcomes • Unilateral PVI success rate: STSF vs. ST (88.23% vs. 58.82%, p<0.05); • Cardiac tamponade: STSF vs. ST (2.9% vs. 2.9%); • Eschar: STSF vs. ST (0.0% vs. 8.8%, p<0.05).

Huang 2021 [17]	China	Full text	Chinese	Retrospective study	Inclusion criteria: 1. Aged between 18 and 75 years; 2. ECG examination confirmed AF attack. Exclusion criteria: 1. Patients with cardiac thrombosis; 2. Patients complicated with active hemorrhagic disease, severe organic disease, or advanced chronic wasting disease; 3. Left atrial diameter > 55mm; 4. Patients with valvular heart disease or vascular disease requiring surgical treatment.	STSF (n=42) vs. ST (n=42)	Demographics • Mean age: STSF vs. ST (62.3±8.8 vs. 61.0±10.0 years, *p*=0.510); • Male: STSF vs. ST (69.0% vs. 64.3%, *p*=0.643); Clinical characteristics • Paroxysmal AF: STSF vs. ST (45.2% vs. 54.8%, *p*=0.383); • Left atrial diameter: STSF vs. ST (4.38±0.48 vs. 4.40±0.62 cm, *p*=0.854); • Left ventricular ejection fraction: STSF vs. ST (59.45±4.72 vs. 57.69±10.91%, *p*=0.340); Comorbidities • Hypertension: STSF vs. ST (54.8% vs. 52.4%, *p*=0.827); • Coronary heart disease: STSF vs. ST (21.4% vs. 21.4%, *p*=1.000); • Cardiac insufficiency: STSF vs. ST (9.5% vs. 9.5%, *p*=1.000); • Diabetes: STSF vs. ST (4.8% vs. 11.9%, *p*=0.236); • Cerebral infarction: STSF vs. ST (7.1% vs. 19.0%, *p*=0.106).	Procedural characteristics • Ablation time: STSF vs. ST (28.3±5.1 vs. 51.3±6.7 minutes, *p*<0.001); Clinical outcomes • Circumferential pulmonary vein isolation success rate: STSF vs. ST (100.0% vs. 100.0%, *p*=1.000); • Complement ablation rate in CPVI: STSF vs. ST (45.2% vs. 85.7%, *p*=0.087); • 12-month arrhythmia recurrence rate: STSF vs. ST (0% vs. 2.4%, *p*=0.314); • Any complications: STSF vs. ST (0% vs. 0%).
Zhou 2021 [13]	China	Full text	Chinese	Retrospective study	Inclusion criteria: Patients undergoing first-time percutaneous radiofrequency catheter ablation. Exclusion criteria: Unspecified.	STSF (n=142) vs. ST (n=98)	Demographics • Mean age: STSF vs. ST (63.2±9.2 vs. 63.1±10.5 years, *p*=0.950); • Male: STSF vs. ST (59.2% vs. 65.3%, *p*=0.491); Clinical characteristics • Paroxysmal AF: STSF vs. ST (59.9% vs. 66.3%, *p*=0.335); • Left atrial diameter: STSF vs. ST (43.4±4.4 vs. 44.4±5 mm, *p*=0.193);	Procedural characteristics • Procedure time: STSF vs. ST (96.4 ±31.6 vs. 119.5±33.8 minutes, *p*=0.021); • Ablation time: STSF vs. ST (38.6±15.2 vs. 61.5±13.8 minutes, *p*=0.013); • Fluoroscopy time: STSF vs. ST (15.3±3.3 vs. 16.9±3.6 minutes, *p*=0.144); Clinical outcomes • 12-month arrhythmia recurrence rate: STSF vs. ST (4.9% vs. 20.4%, *p*=0.025).

							• Left ventricular ejection fraction: STSF vs. ST (61.4±5.7 vs. 61.2±5.1%, *p*=0.845); • CHA_2DS_2 VASc Score: STSF vs. ST (2.3±1.7 vs. 1.9±1.7, *p*=0.243).	
Dugo 2016 [29]	Germany	Abstract	English	Retrospective study	Inclusion criteria: Patients with AF underwent ablation between July 2014 and May 2015, with a minimum follow-up of 6 months. Exclusion criteria: Unspecified.	STSF (n=26) vs. SF (n=26)	Demographics • Mean age: STSF vs. SF (66±9 vs. 67±10 years); • Male: STSF vs. SF (54% vs. 50%); Clinical characteristics • Paroxysmal AF: STSF vs. SF (96% vs. 81%); • Left atrial diameter: STSF vs. SF (40±7 vs. 42±4 mm).	Procedural characteristics • Procedure time: STSF vs. SF (98±32 vs. 78±31 minutes, *p*< 0.05); • Fluoroscopy time: STSF vs. SF (11±7 vs. 7±3 minutes, *p*< 0.05); Clinical outcomes • Acute procedure success rate: STSF vs. SF (100% vs. 100%); • Any complications: STSF vs. SF (0% vs. 0%); • Cardiac tamponade: STSF vs. SF (0% vs. 0%); • Stroke: STSF vs. SF (0% vs.0%); • Atrial-esophageal fistula: STSF vs. SF (0% vs. 0%); • Vascular access: STSF vs. SF (3.8% vs. 0%);
Gonna 2017 [30]	United Kingdom	Full text	English	Prospective cohort study	Inclusion criteria: Atrial fibrillation patients undergoing ablation, Between May and December 2015. Exclusion criteria: Unspecified.	STSF (n=100) vs. SF (n=100)	Demographics • Mean age: STSF vs. SF (60.5±14.0 vs. 62.4±13.3 years, *p*=0.38); • Male: STSF vs. SF (73% vs. 71%, *p*=0.75).	Procedural characteristics • Mean procedure time: STSF vs. SF (225.5 vs. 221.4 minutes, *p*=0.55); • Mean fluoroscopy time: STSF vs. SF (25.8 vs. 30.0 minutes, *p*=0.03); Clinical outcomes • Any complications: STSF vs. SF (0% vs. 2%, *p*=0.16); • Pericardial effusion: STSF vs. SF (0% vs. 1%, *p*=0.32); • Atrioventricular block: STSF vs. SF (0% vs. 1%, *p*=0.32).
Takamiya 2020 [32]	Japan	Full text	English	Retrospective study	Inclusion criteria: Patients who underwent	STSF (n=74) vs. SF (n=74)	Demographics	Procedural characteristics

					first catheter ablation for drug-refractory persistent AF. Exclusion criteria: Unspecified.		• Mean age: STSF vs. SF (63±10 vs. 63±12 years, *p*=0.92); • Male: STSF vs. SF (76% vs. 80%, *p*=0.69); • BMI: STSF vs. SF (25±4 vs. 25±4 kg/m^2, *p*=0.98); Clinical characteristics • Median duration of persistent AF: STSF vs. SF (10.5 vs. 6 months, *p*=0.30); • Left atrial diameter: STSF vs. SF (43±6 vs. 43±7 mm, *p*=0.96); • Left ventricular ejection fraction: STSF vs. SF (59±11 vs. 58±14%, *p*=0.57); Comorbidities • Heart failure: STSF vs. SF (18% vs. 20%, *p*=0.83); • Hypertension: STSF vs. SF (61% vs. 54%, *p*=0.51); •Diabetes mellitus: STSF vs. SF (20% vs. 19%, *p*=1.00).	• Procedure time: STSF vs. SF (180 vs. 200 minutes, *p*=0.150); • Fluoroscopy time: STSF vs. SF (67 vs. 76 minutes, *p*=0.026); Clinical outcomes • 12-month arrhythmia recurrence rate: STSF vs. SF (15% vs. 30%); • Any complications: STSF vs. SF (5% vs. 3%, p=1.0); • Pericardial effusion: STSF vs. SF (1.4% vs. 1.4%); • Esophageal gastroparesis: STSF vs. SF (1.4% vs. 0%); • Phrenic nerve injury: STSF vs. SF (1.4% vs. 0%); • Aspiration pneumonia: STSF vs. SF (1.4% vs. 0%); • Sinus node injury as a result of superior vena cava isolation: STSF vs. SF (0% vs. 1.4%).
Uetake 2020 [31]	Japan	Full text	English	Prospective cohort study	Inclusion criteria: Paroxysmal AF patients who underwent their first radiofrequency catheter ablation procedure. Exclusion criteria: 1. Severe valvular disease; 2. Left ventricular ejection fraction < 35%; 3. Left atrial dimension > 55 mm; 4. Active thyroid disease; 5. Hypertrophic cardiomyopathy; 6. Hemodialysis;	STSF (n=298) vs. SF (n=97)	Demographics • Mean age: STSF vs. SF (65.3±9.9 vs. 63.7±9.7 years, *p*=0.085); • Male: STSF vs. SF (68.8% vs. 79.4%, *p*=0.028); • BMI: STSF vs. SF (24.1±3.5 vs. 24.0±3.1 kg/m^2, *p*=0.485); Clinical characteristics • Duration of AF: STSF vs. SF (32.1±33.5 vs. 24.9±42.2 months, *p*=0.023); • Left atrial diameter: STSF vs. SF (41.0±6.0 vs. 40.6±5.9 mm, *p*=0.709); • Left ventricular ejection fraction: STSF vs. SF (65.8±7.7 vs. 65.5±8.4%, *p*=0.863);	Procedural characteristics • Ablation time: STSF vs. SF (2,056.8±534.5 vs. 2,401.1±733.4 seconds, *p*<0.001); Clinical outcomes • Acute procedure success rate: STSF vs. SF (100% vs. 100%); • 12-month arrhythmia recurrence rate: STSF vs. SF (21.8% vs. 43.3%, *p*<0.001).

					7. Use of antiarrhythmic drugs during the blanking period.		• CHA_2DS_2 VASc Score: STSF vs. SF (1.94±1.26 vs. 1.51±1.13, *p*=0.010); Comorbidities • Hypertension: STSF vs. SF (53.4% vs. 52.6%, *p*=0.493); • Congestive heart failure: STSF vs. SF (4.7% vs. 2.1%, *p*=0.203); • Diabetes mellitus: STSF vs. SF (10.1% vs. 13.4%, *p*=0.230); • Previous stroke or transient ischemic attack: STSF vs. SF (3.4% vs. 1.0%, *p*=0.202); • Vascular disease: STSF vs. SF (5.7% vs. 1.0%, *p*=0.055).	
Ikeda 2021 [33]	Japan	Full text	English	Retrospective study	Inclusion criteria: 1. Age of > 20 years and provision of informed consent to undergo a second AF ablation at our institute, the performance of the second AF ablation using high-density mapping or the conventional method (CARTO® mapping system; Biosense Webster, Irvine, CA, USA) during that period; 2. ≥ 3 months of follow-up at the outpatient clinic in our institute. Exclusion criteria: 1. Refusal to participate in the study; 2. An inability to undergo follow-up for any reason; 3. The lack of use of a 3D mapping system.	STSF (n=51) vs. CELSIUS® (n=49)	Demographics • Mean age: STSF vs. CELSIUS® (63.5±8.54 vs. 64.2±9.97 years, *p*=0.98); • Male: STSF vs. CELSIUS® (63% vs. 73%, *p*=0.25); Clinical characteristics • Paroxysmal AF: STSF vs. CELSIUS® (59% vs. 65%, *p*=0.5); • Median $CHADS_2$ VASc Score: STSF vs. CELSIUS® (0.8 vs. 0.8, *p*=0.91); Comorbidities • Sick sinus syndrome: STSF vs. CELSIUS® (14% vs. 16%, *p*=0.72); • Cerebrovascular disease: STSF vs. CELSIUS® (12% vs. 4%, *p*=0.16); • Congestive heart failure: STSF vs. CELSIUS® (16% vs. 22%, *p*=0.39); • Hypertension: STSF vs. CELSIUS® (35% vs. 33%, *p*=0.78);	Procedural characteristics • Procedure time: STSF vs. CELSIUS® (260.5±82.7 vs. 255.8±45.3 minutes, *p*=0.82); • Fluoroscopy dose: STSF vs. CELSIUS® (313.2±187.9 vs. 363.4±257.3 mGy, *p*=0.28); Clinical outcomes • 12-month arrhythmia recurrence rate: STSF vs. CELSIUS® (33% vs. 16%, *p*=0.017); • Cardiac tamponade: STSF vs. CELSIUS® (0% vs. 0%); • Cerebral infarction: STSF vs. CELSIUS® (0% vs. 0%); • Bleeding: STSF vs. CELSIUS® (13.7% vs. 10.2%); • Congestive heart failure: STSF vs. CELSIUS® (2% vs. 0%, *p*=0.32); • Pericarditis: STSF vs. CELSIUS® (2% vs. 0%, *p*=0.32).

							• Diabetes mellitus: STSF vs. CELSIUS® (2% vs. 8%, *p*=0.15); • Chronic kidney disease: STSF vs. CELSIUS® (8% vs. 16%, *p*=0.19).	
Reinsch 2021 [36]	Germany	Full text	English	Retrospective study	Inclusion criteria: Atrial fibrillation patients undergoing ablation at the Alfried Krupp Krankenhaus, Essen, Germany from October 2014 to June 2019. Exclusion criteria: Unspecified.	STSF (n=690) vs. Thermocool NAVISTAR® (n=99)	Demographics • Mean age: STSF vs. Thermocool NAVISTAR® (67.5±10.6 vs. 62.6±9.9 years); • Male: STSF vs. Thermocool NAVISTAR® (53.8% vs. 59.6%); Clinical characteristics • Paroxysmal AF: STSF vs. Thermocool NAVISTAR® (43.5% vs. 48.5%); • Duration of AF: STSF vs. Thermocool NAVISTAR® (50.1±57.5 vs. 55.5±53.4 months); • Left ventricular ejection fraction≥55%: STSF vs. Thermocool NAVISTAR® (77.5% vs. 81.8%); • CHA_2DS_2 VASc Score≥3: STSF vs. Thermocool NAVISTAR® (57.0% vs. 46.9%); Comorbidities • Hypertension: STSF vs. Thermocool NAVISTAR® (69.9% vs. 57.6%).	Procedural characteristics • Procedure time: STSF vs. Thermocool NAVISTAR® (160±48 vs. 190±47 minutes); • Ablation time: STSF vs. Thermocool NAVISTAR® (43±19 vs. 58±27 minutes); • Fluoroscopy time: STSF vs. Thermocool NAVISTAR® (5±3 vs. 7±4 minutes); Clinical outcomes • Cardiac tamponade: STSF vs. Thermocool NAVISTAR® (1.7% vs. 2.9%).
Di 2020 [35]	Italy	Abstract	English	Prospective cohort study	Inclusion criteria: Patients with paroxysmal or persistent AF underwent point-by-point pulmonary vein isolation. Exclusion criteria: Unspecified.	CARTO+STSF (n=59) vs. Rhythmia System™ + DirectSense (n=57)	Pooled information of two groups Clinical characteristics • Paroxysmal AF: 63%.	Procedural characteristics • Procedure time: CARTO+STSF vs. Rhythmia System™ + DirectSense (180±56 vs. 180±89 minutes, *p*=0.590); • Fluoroscopy time: CARTO+STSF vs. Rhythmia System™ + DirectSense (13±9 vs. 20±12 minutes, p=0.002); Clinical outcomes

								• Acute procedure success rate: CARTO+STSF vs. Rhythmia System™ + DirectSense (100% vs. 100%); • 9-month arrhythmia recurrence rate: CARTO+STSF vs. Rhythmia System™ + DirectSense(14% vs. 25%, *p*=0.2); • Any complications: CARTO+STSF vs. Rhythmia System™ + DirectSense (0% vs. 0%); • Audible steam pop: CARTO+STSF vs. Rhythmia System™ + DirectSense (0% vs. 0%).
Guckel 2022 [34]	Germany	Abstract	English	Prospective cohort study	Inclusion criteria: Patients undergoing radiofrequency ablation for AF. Exclusion criteria: Unspecified.	STSF (n=69) vs. DiamondTemp ™ (n=33)	Not reported	Procedural characteristics • Procedure time: STSF vs. DiamondTemp™ (78.2±25.6 vs. 98.8±30.1 minutes, *p*=0.002); • Ablation time: STSF vs. DiamondTemp™ (1,035.5±287.2 vs.792.1±311.2 seconds, *p*<0.001); • Fluoroscopy time: STSF vs. DiamondTemp™ (5.5±2.5 vs.4.6±2.1 minutes, p<0.006); • Fluoroscopy dose: STSF vs. DiamondTemp™ (295.8±247.5 vs. 183.8±178.1 yGym2, *p*<0.013); Clinical outcomes • Acute procedure success rate: STSF vs. DiamondTemp™ (100% vs. 100%); • Acute stroke: STSF vs. DiamondTemp™ (0% vs. 3%).

STSF: SMARTTOUCH® SURROUNDFLOW; ST: ST: THERMOCOOL SMARTTOUCH®; SF: SURROUNDFLOW; BMI: Body mass index.