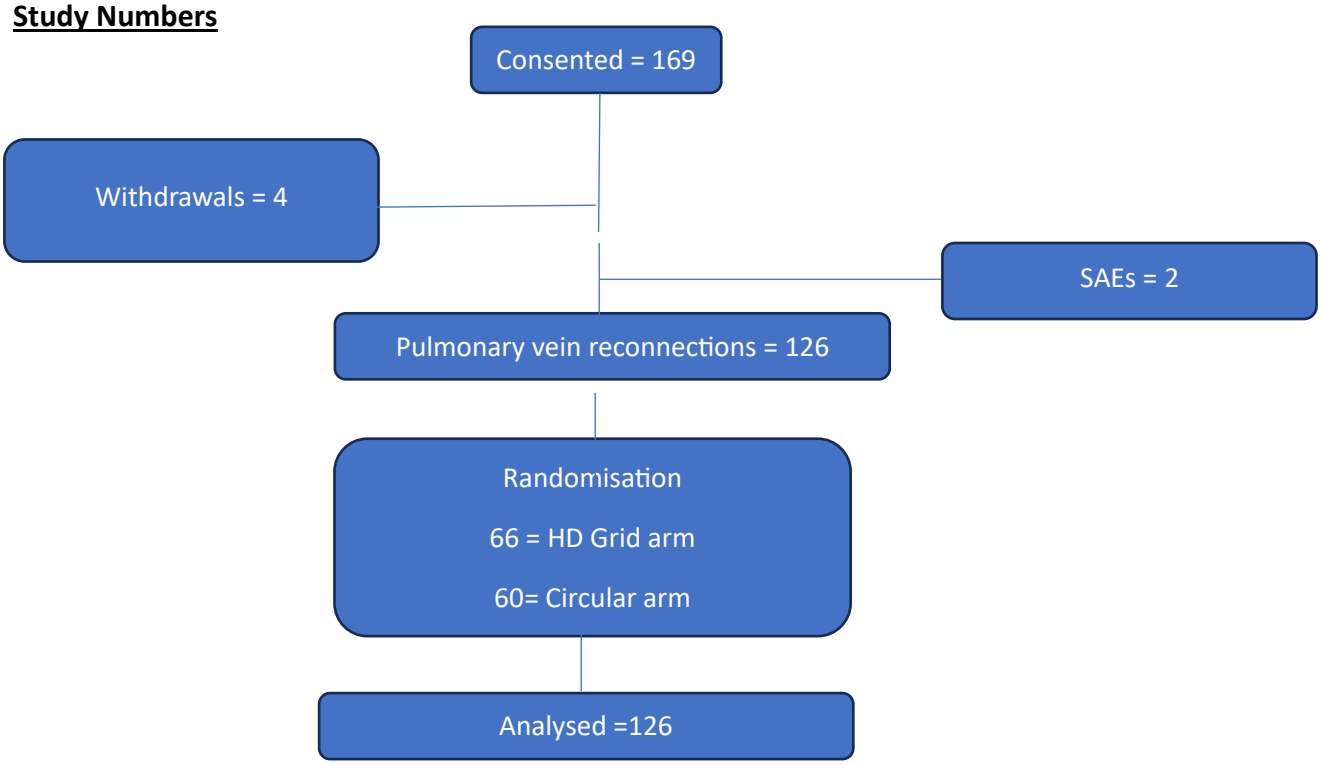
HD grid vs circular mapping catheter for assessment of pulmonary vein reconnection

Results

Trial registration number: ISRCTN30513341

Study Numbers



Demographics

	Number	Percentage
Male	104	62
Female	65	38
70-80 years	67	39.6
60-70 years	54	32.0
50-60 yeas	39	23.1
40-50 years	6	3.6
30-40 years	2	1.2
20-30 years	1	0.6

Baseline Characteristics

	Grid (n=66)	CMC (n=60
Demographics		
Median Age	65 (22-83)	65.5 (31-83)
Male	42 (64%)	41(68%)
Co-morbidities		
Coronary artery disease	8 (12%)	8 (13%)
Acute coronary syndrome	3 (5%)	1 (2%)
Diabetes	9 (14%)	4 (7%)
Cerebrovascular disease	2 (3%)	3 (5%)
Transient Ischaemic Attack	5 (8%)	1 (2%)
Chronic Kidney Disease	4 (6%)	2 (3%)
Peripheral Vascular disease	0	0
Hypertension	30 (45%)	21 (35%)
Current Smoker	0	0
Thyroid disease	6 (9%)	5 (8%)
Previous Cardiac Surgery	4 (6%)	5 (8%)
Classification of AF		
Paroxysmal	38	39
Persistent	22	22
Longstanding persistent AF	6	0

Outcome Measures

	Grid	CMC	P value
Radiofrequency time to achieve PVI (seconds)	mean RF time 200 ± 23	mean RF time 169 ± 298	0.202
LA mapping time (seconds)	mean 1047 ± 454	mean 1080 ± 440	0.407
Mean Total Procedure time (mins)	122.7	130	0.411
PV mapping points (mean)	354±213	234±154	<0.001
Identification of PV sleeve reconnections	120 PV sleeve reconnections with a mean 1.4±0.71 reconnection	98 PV sleeve reconnections with a mean 1.52±0.72 reconnections	0.106

PV sleeve reconnection visible on subject catheter not visualised on opposing catheter	20 PV sleeve reconnections not visible on the CMC	9 were visible on the CMC and not the grid	

Adverse Events

	Number	Expected	Related	Outcome
Adverse Events	2	2	2	Resolved
Serious Adverse Events	2	2	2	Resolved

Background:

Traditionally, circular mapping catheters (CMC) have been considered superior to other designs for mapping pulmonary vein reconnections due to the circular shape of the PV ostium. The grid multipolar catheter produces higher definition maps potentially overcoming the disadvantage of being rectangular. #

Purpose:

We assessed the acute procedural results, comparing Grid versus CMC in the setting of PV re-isolation to understand if one was superior to the other.

Methods:

In this multicentre randomised controlled trial, 169 patients (62% male; median age 66 years [22-83) underwent repeat ablation, between July 2021 and March 2023, for recurrent symptomatic atrial arrhythmias. We undertook two LA maps for patients, utilising the Grid and the CMC. Blinded maps were collected with both catheters, followed by randomisation to one map for analysis and ablation. The primary outcome was the radiofrequency time required to isolate the pulmonary veins. Secondary outcomes include LA mapping time and density for both catheters, ability to identify pulmonary vein sleeves and duration of the ablation procedure. Results 126 patients had PV reconnections. 66 patients (64% male; median age 65 years [22-83]) in the Grid arm and 60 patients (68% male; median age 65.5 years [31-83]) in the CMC arm. There was one pericardial effusion and one TIA. There was no significant difference (p=0.202) found in the

RF time required to achieve PV isolation in both Grid (mean RF time 200 ± 232 secs) vs CMC (mean RF time 169 ± 298 secs) arms. There was no significant difference (p=0.407) found between LA mapping time for the CMC (mean 1047 ± 454 seconds) and the Grid (Median 1080 ± 440 seconds). There was no significant difference (p=0.411) found in the total procedure time for the CMC (mean 122.7 minutes) and the HD grid (130 minutes). There were significantly more (p<0.001) PV mapping points identified with the grid (mean 354±213 points) than the CMC (mean 234±154 points) arm. There was no significant difference in PV sleeve reconnections found (p=0.106) between the grid (120 PV sleeve reconnections with a mean 1.4±0.71 reconnections) and the CMC (98 PV sleeve reconnections with a mean 1.52±0.72 reconnections). Both maps were analysed to assess reconnections on opposing catheter arms. The grid identified 20 PV sleeve reconnections not visible on the CMC, whilst 9 were visible on the CMC and not the grid.

Conclusion:

There was no significant difference found in RF time, mapping time and overall procedure time. The Grid identified more reconnections not seen with the CMC and had an overall improved mapping density suggesting that this configuration could be superior for LA mapping.