Use of asymmetric bidirectional catheters for catheter ablation of cardiac arrhythmias

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Bidirectional catheters

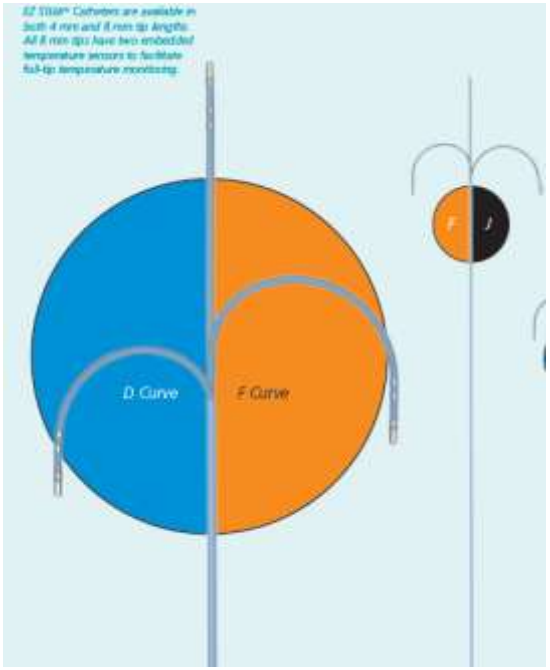
4mm RF Conductr (Multi -Curve) Series Ablation Catheters

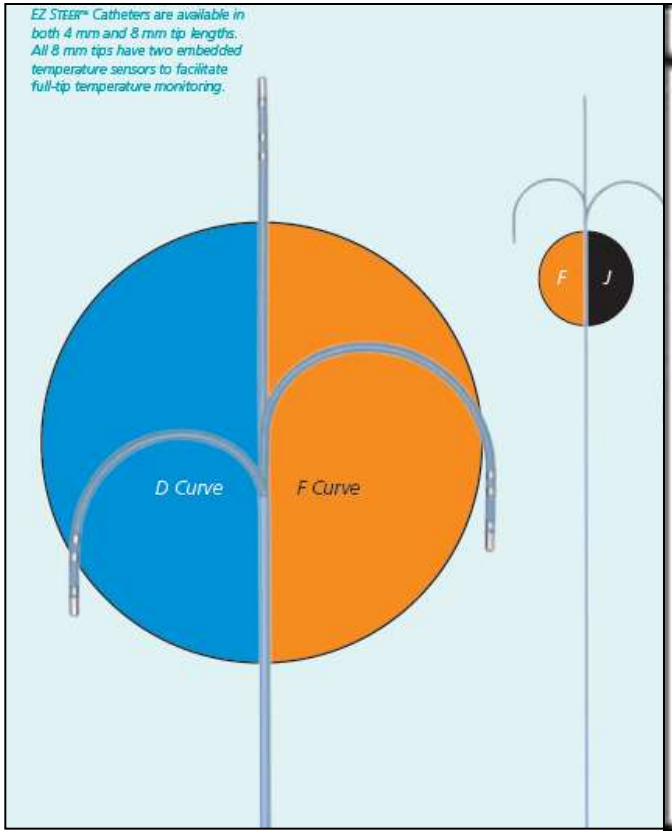
The 4 mm Conductr® series of RF ablation catheters are available for sale in the U.S. Combinations of shaft and tip stiffness offer enhanced steerability for ease of placement.

BENEFITS | SPECIFICATIONS

Specifications

- 7F steerable curve, braided stainless steel shaft
- 4 mm tip electrode catheters with thermocouple
- Bi-directional, multi-curve, lateral deflection curve movement
- Quad (4) electrodes
- 2/5/2 electrode spacing
- 110 cm length




EZ STEER™ Catheters are available in both 4 mm and 8 mm tip lengths. All 8 mm tips have two embedded temperature sensors to facilitate full-tip temperature monitoring.
D Curve
F Curve
F
J


Biosense Webster
Blazer Prime™

Royal Brompton Hospital experience

- March 2010- January 2011
- 50 ablation cases performed using an asymmetric bidirectional catheter
- D/F in 42 cases, F/J in 8 cases, 4 mm-tip
- 4 different operators

Ablation type

ABLATION TYPE		N
ATRIAL N=14	•Focal atrial tachycardia •atrial ectopics • re-entrant atrial tachycardia •Atrial flutter	2 1 2 9
ATRIAL FIBRILLATION N=23	•Persistent AF •Paroxysmal AF	9 14
SVTs N=6	•Overt accessory pathway •Slow pathway in AVNRT	4 2
VENTRICULAR N=7	•Ventricular tachycardia •Ventricular ectopics	4 3

Methods

- Retrospective analysis
- Control group 1:5 matched for ablation type and operator.
- Differences in procedure duration, fluoroscopy time, acute success
- Statistical analysis, median and IQR

Results

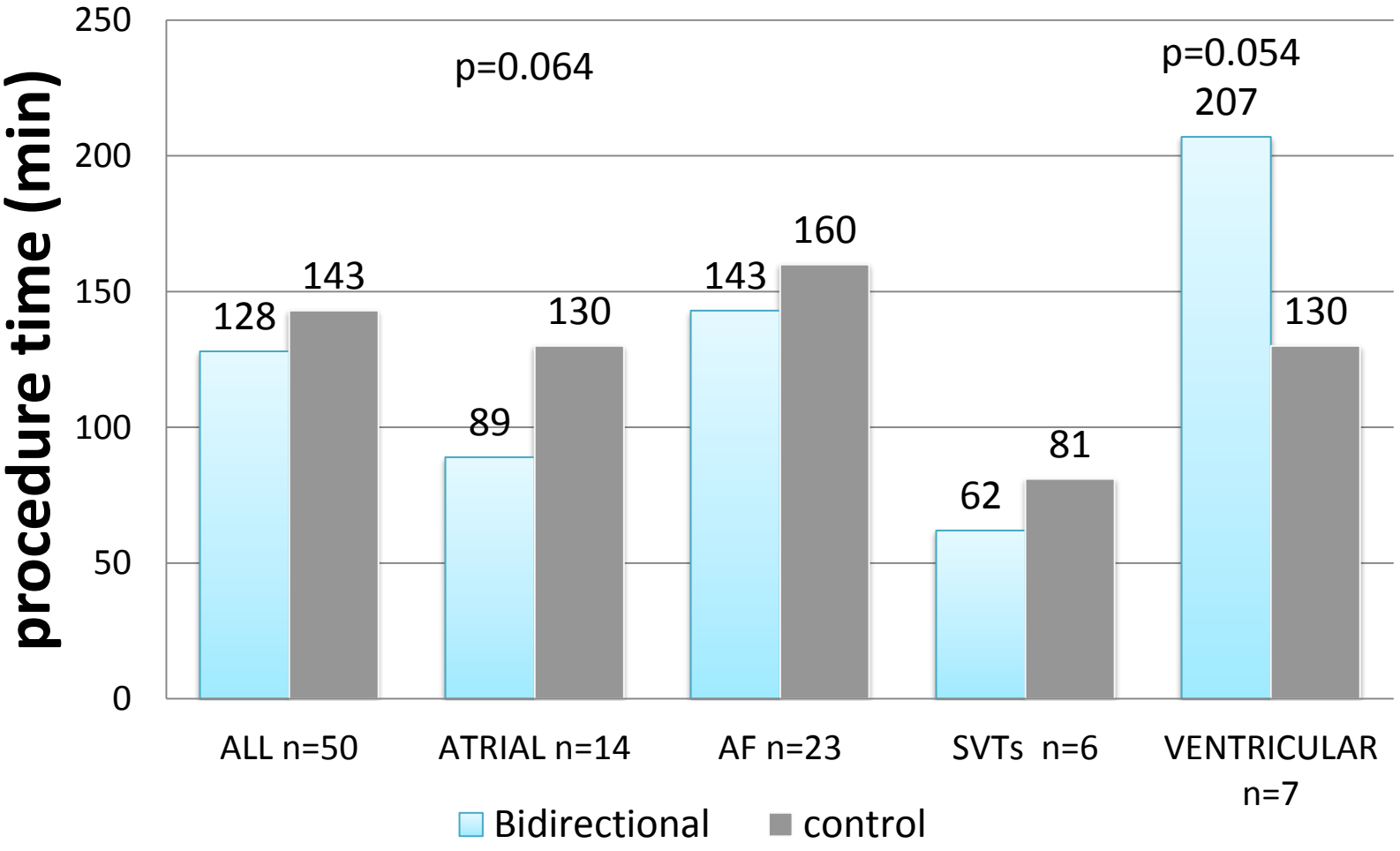
- Patient characteristics

	Bidirectional N=50	**Control N=250**	**P value**
Age, median (IQR)	60 (22)	60 (17)	0.472
Gender female/male n (%)	17 (34)/33(66)	87 (35)/163(65)	0.929
Structural heart disease, n (%)	19 (39)	89 (39)	0.955
Congenital heart disease, n (%)	7 (14)	22 (9)	0.256
History of previous ablations, %	27 (54)	76 (30)	0.001
Ablation procedure, %			1.000
Atrial ectopics/tachycardia/flutter	14 (28)	70 (28)	
AF ablation	23 (46)	115(46)	
SVTs	6 (12)	30 (12)	
Ventricular ectopics/tachycardia	7 (14)	35 (14)	

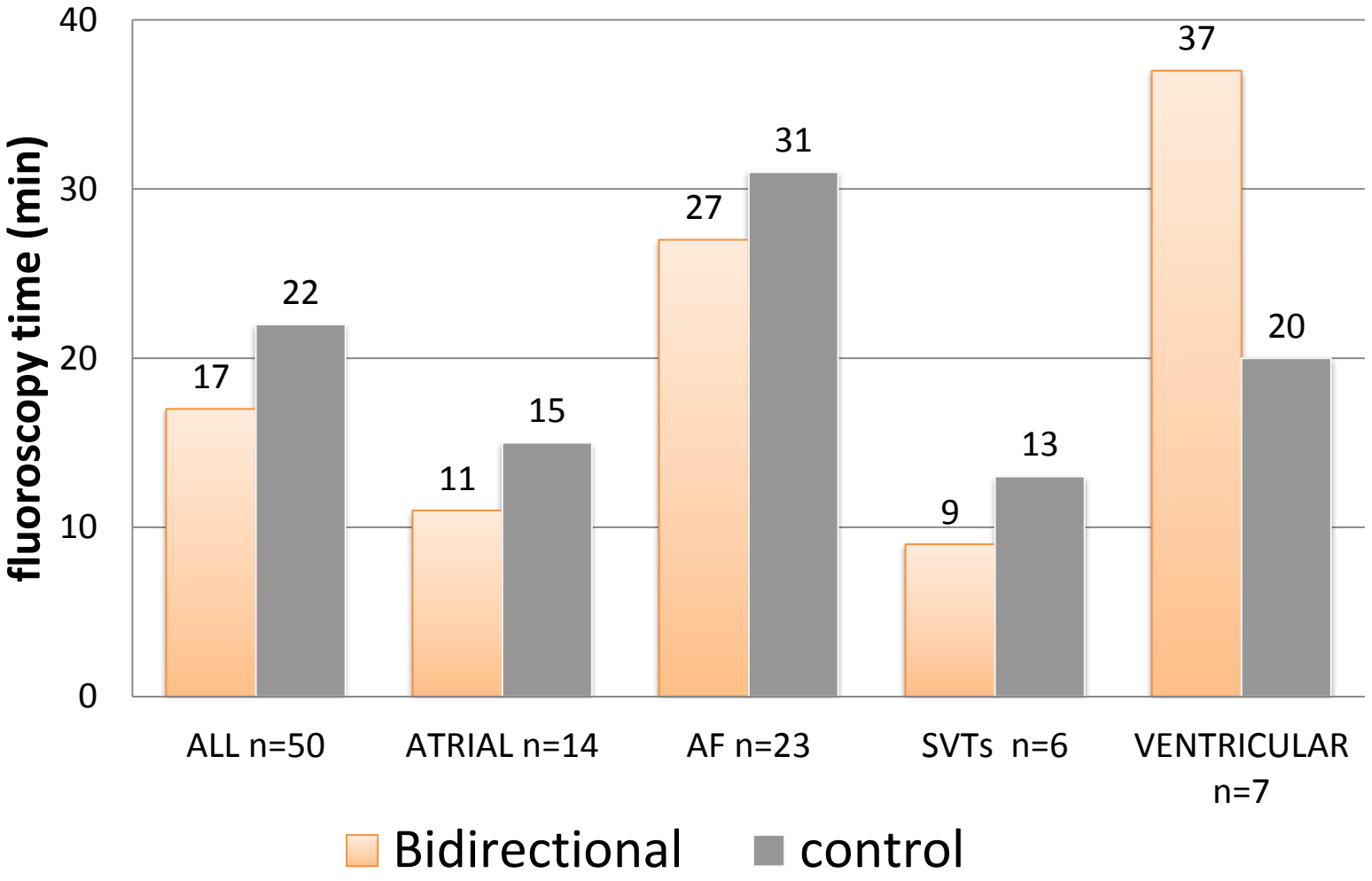
- Procedure characteristics

	Bidirectional N=50	Control N=250	P value
EPS arrhythmia, n (%)			0.992
None	1 (2)	6 (2)	
Atrial ectopics/tachycardia	8 (16)	35 (14)	
Paroxysmal atrial flutter	4 (8)	23 (9)	
Persistent artial flutter	6 (12)	24 (10)	
Paroxysmal AF	10 (20)	60 (24)	
Persistent AF	9 (18)	45 (18)	
AVNRT	3 (6)	9 (4)	
AVRT	3 (6)	13 (5)	
Ventricular ectopics/tachycardia	6 (12)	33 (13)	
Anaesthesia, n (%)			0.190
Genaral	42 (84)	180 (72)	
Sedation	6 (12)	58 (23)	
Local	2 (4)	12 (5)	
Mapping system, n (%)			0.184
Conventional electrodes	9 (18)	72 (29)	
Carto	41 (82)	169 (68)	
NaVx	0	8 (3)	
Non-contact mapping	0	1 (<1)	
Catheter configuration, n (%)			
4 mm tip	50 (100)	236 (94)	0.178
8 mm tip	0	14 (6)	
Additional catheters used, n (%)	4 (8)	30 (12)	0.415

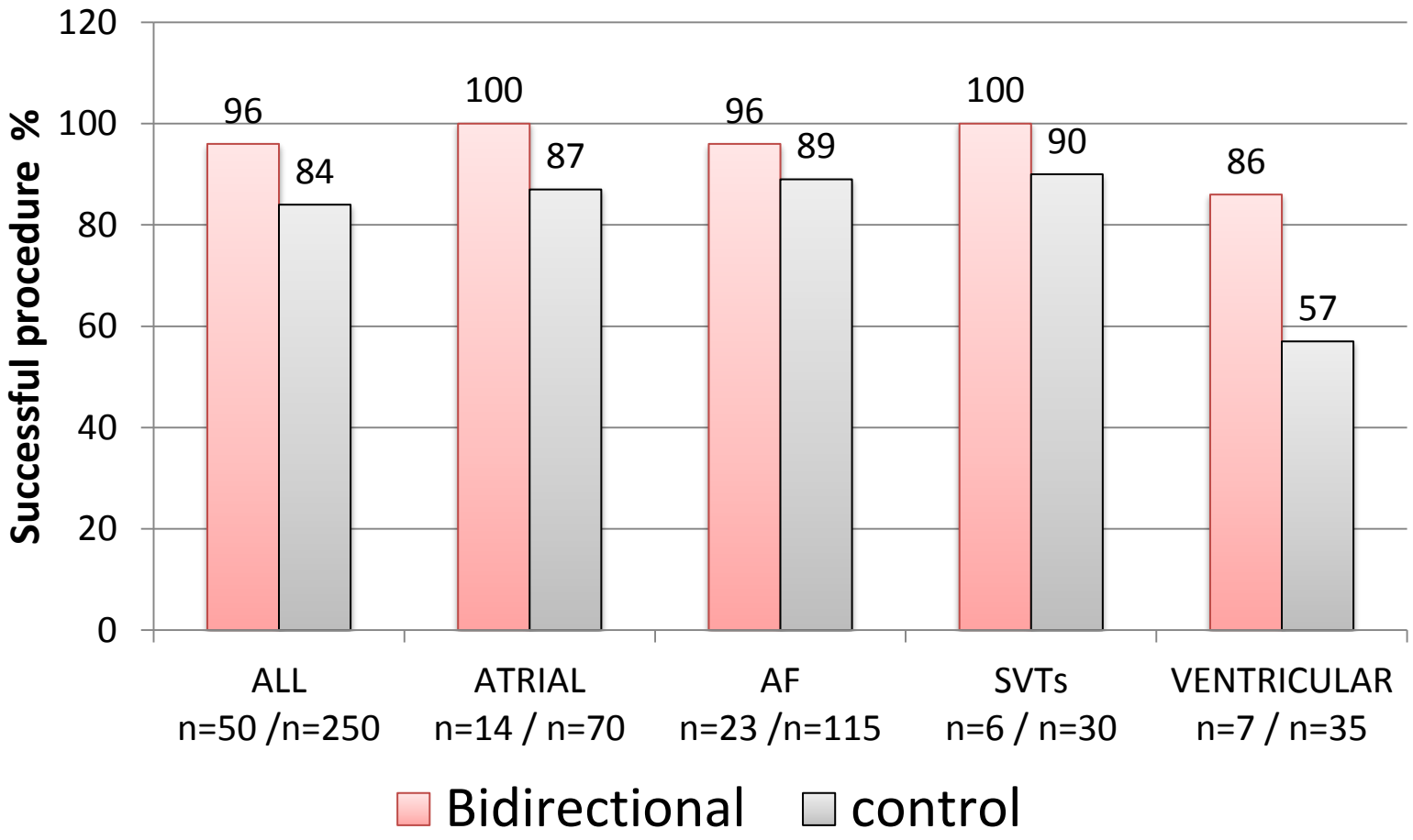
Procedure duration



Fluoroscopy time



Acute success



Summary of main findings

- Reported “ease of use”
- Did not prolong the procedure duration and fluoroscopy duration (trend for decreased procedure duration for atrial tachycardias ablation)
- Did not change significantly the success rates

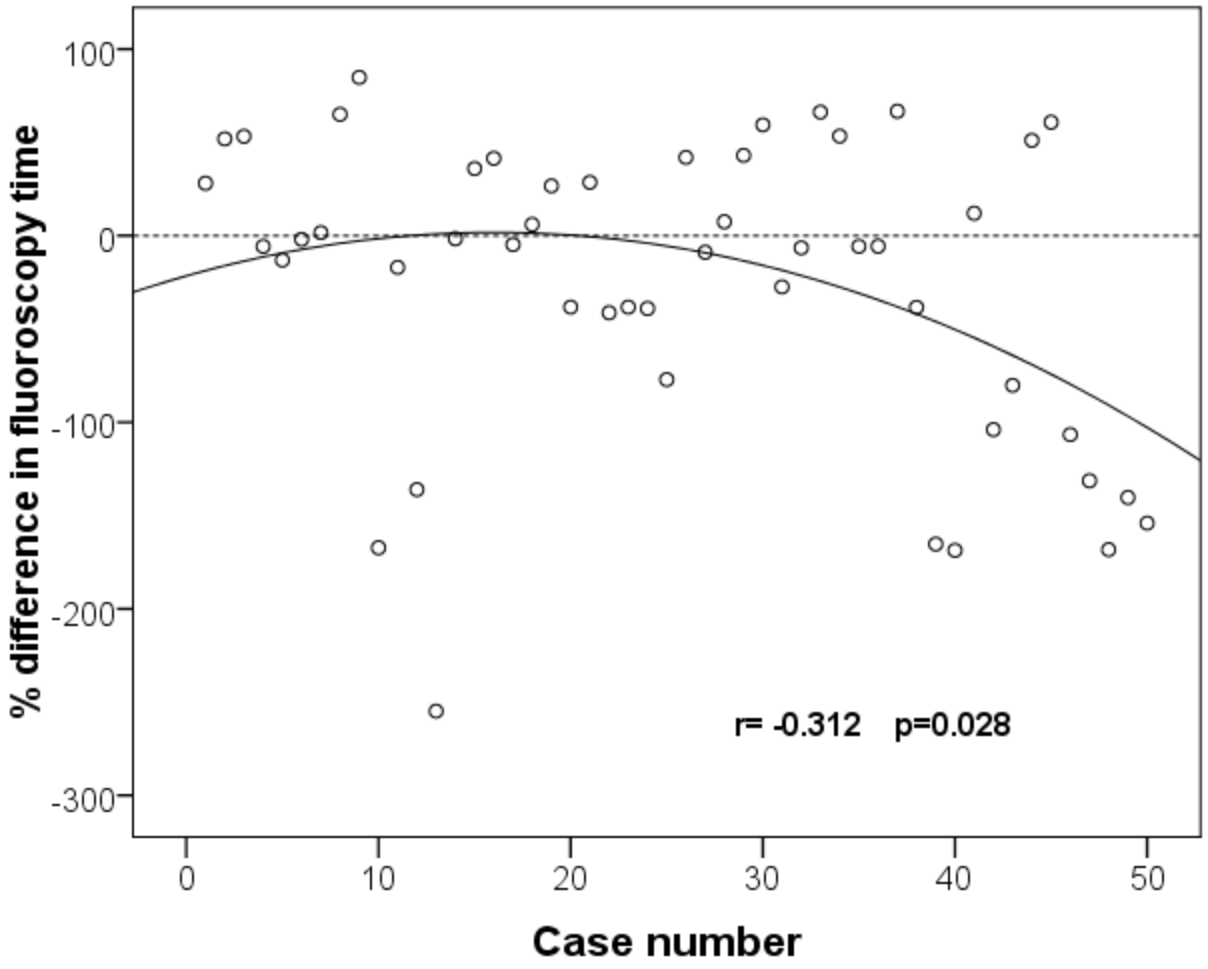
Possible explanations for findings

- Learning curve

% difference in procedure duration and fluoroscopy duration (compared to the median values for each ablation type of the control group)

All study cases numbered sequentially

Learning curve



Possible explanations for findings

- A small number of each ablation type using the bidirectional catheter may not be representative of the true procedural parameters for each operator.

- Complex cases:
  - previous ablations in 54% vs 30% in the control group, p=0.001
  - Congenital heart disease in 14% of the study vs 9% of the control group, p=NS

Possible explanations for findings

- experienced operators
  - the median procedure duration and median fluoroscopy duration in this study are amongst the lowest reported in literature

- Exchange rates (8% in the study arm vs 12% in the control arm, p=NS)
  - 64% of the exchanges in the control arm were to a bidirectional catheter
  - All the exchanges in the study arm by a single operator to 8 mm-tip

conclusions

- The initial experience of the use of the asymmetric bidirectional catheter for the ablation of different types of cardiac arrhythmia showed that the subjective feeling of “ease of use” was not followed by significant improvement in either procedure parameters or procedure success rates.

- Further validation including a larger number of procedures and a long term follow up is needed in order to objectively evaluate the potential advantages of the use of the bidirectional catheter.