



Pulsed-electric field ablation of cavotricuspid isthmus: a randomized comparison of flower and basket configuration of pentaspline catheter

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Introduction

- Cavo-tricuspid isthmus (CTI) ablation is commonly performed as a concomitant procedure in patients undergoing catheter ablation of atrial fibrillation (AF).
- However, the acute efficacy of the CTI ablation using pentaspline Farawave catheter and pulsed-electric field (PEF) energy has not been systematically evaluated.
- **Aims:** We compared acute efficacy and the extent of hemolysis between the two available configurations (basket or flower) of the pentaspline catheter used for CTI ablation.



SECTION trial (NCT06691074) – study design

POPULATION



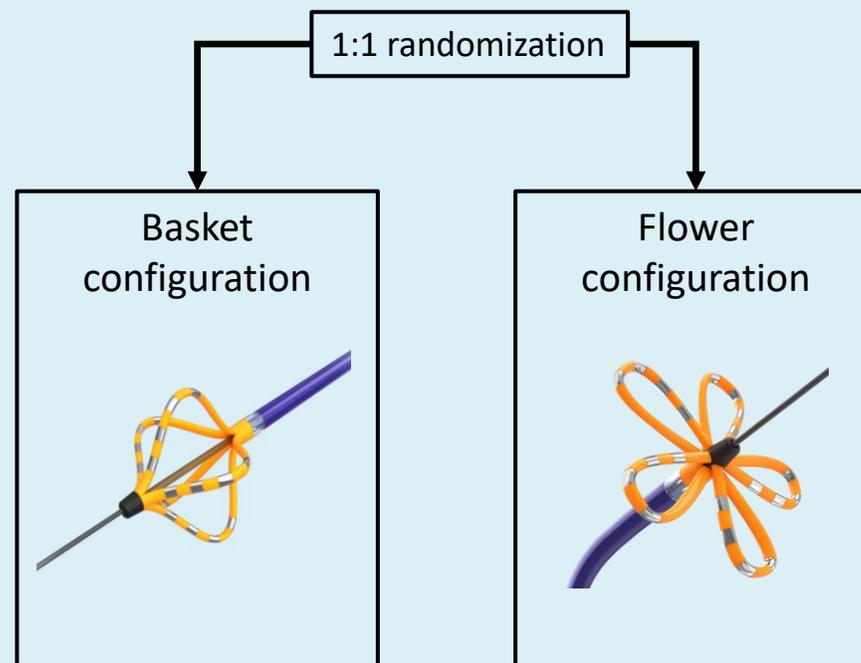
180 patients undergoing ICE-guided PEF ablation of CTI concomitantly to AF ablation



Four high-volume EP centers in Czech republic

INTERVENTION

CTI ablation prior to LA ablation



Bidirectional block confirmed by pacing/sensing from CS and halo catheter

OUTCOME measures

- The acute durability of the CTI block (reconduction rate)
- Time to reconduction
- Total number of PEF applications
- Concentration of plasma free haemoglobin
- The presence of the coronary vasospasm
- The role of adenosine testing

Interim analysis – 35 patients from IKEM

Table 1. Patient Characteristics

	Overall N = 35 ¹	Basket N = 20 ²	Flower N = 15 ²	p-value ³
Female	14 / 35 (40%)	7 / 20 (35%)	7 / 15 (47%)	0.5
Age	64 (10)	62 (9)	67 (10)	0.13
BMI	31 (5)	30 (6)	31 (4)	0.6
AF history (months)	36 (31)	36 (33)	37 (30)	>0.9
History of CTI flutter	9 / 35 (26%)	4 / 20 (20%)	5 / 15 (33%)	0.5
Previous AF ablation	4 / 35 (11%)	3 / 20 (15%)	1 / 15 (7%)	0.6
Arterial hypertension	22 / 35 (63%)	14 / 20 (70%)	8 / 15 (53%)	0.3
Diabetes Mellitus	5 / 35 (14%)	1 / 20 (5%)	4 / 15 (27%)	0.14
Coronary artery disease	1 / 35 (2.9%)	1 / 20 (5%)	0 / 15 (0%)	>0.9
Chronic kidney disease	4 / 35 (11%)	3 / 20 (15%)	1 / 15 (7%)	0.6
CHA₂DS₂-VASC	2.7 (1.8)	2.3 (1.5)	3.1 (2.1)	0.2

	Overall N = 35 ¹	Basket N = 20 ²	Flower N = 15 ²	p-value ³
Echocardiography				
LVEF (%)	53 (11)	52 (11)	55 (9)	0.4
LAVi (ml/m²)	49 (20)	52 (22)	44 (17)	0.2
LAD (mm)	45 (7)	46 (7)	45 (6)	>0.9
TAPSE (mm)	22 (5)	22 (5)	23 (6)	0.6
S' (cm/s)	12 (4)	13 (4)	12 (4)	0.5
RA area (cm²)	22 (6)	24 (7)	19 (4)	0.05
RVD1 (mm)	41 (6)	42 (7)	40 (5)	0.8

¹ n / N (%); Mean (SD)

² Means (SD) or Frequency (%)

³ Pearson's Chi-squared test; Wilcoxon rank sum exact test; Wilcoxon rank sum test; Fisher's exact test

Results 1 – procedural characteristics

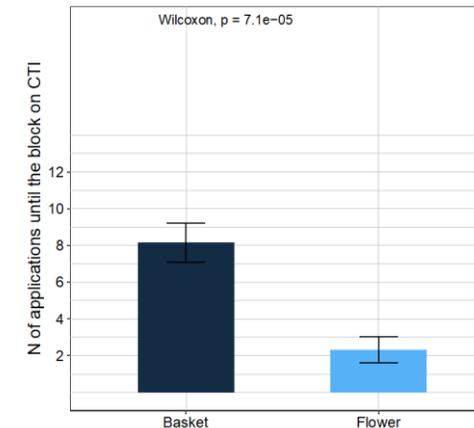
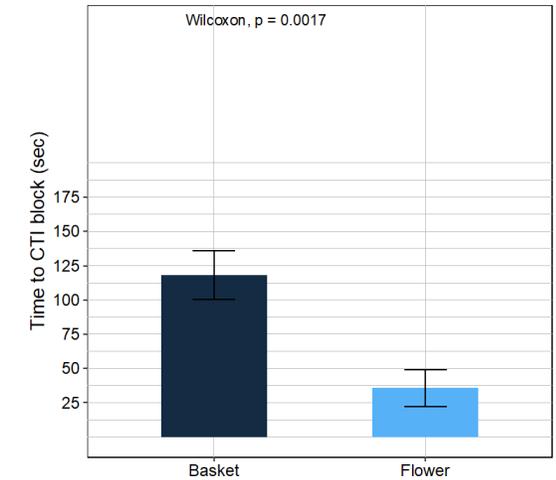
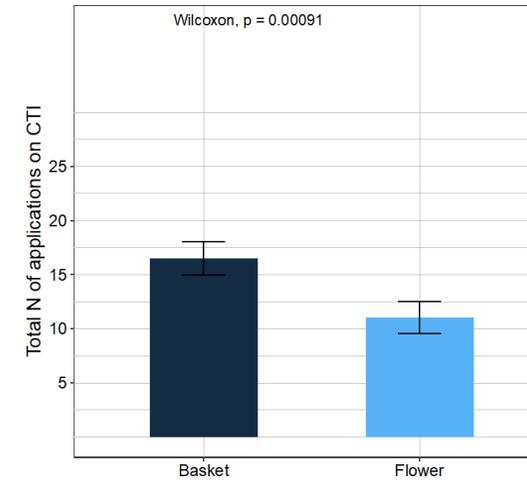
Table 2. Procedural Characteristics

	Basket N = 20 ²	Flower N = 15 ²	p-value ³
Hospitalization duration (days)	3 (3)	3 (4)	0.6
Skin-to-skin time (min)	99 (29)	101 (34)	>0.9
Fluoroscopic time (min)	12 (5)	15 (4)	0.13
N of applications until the block on CTI	8 (5)	2 (3)	<0.001
Total N of applications on CTI	17 (7)	11 (6)	0.002
Time to CTI block (sec)	164 (217)	37 (55)	0.002
Time to reconduction (min)	11 (10)	23 (31)	>0.9
CTI length (mm)	38 (10)	41 (6)	0.3
Pouch on CTI	2 / 20 (10%)	0 / 15 (0%)	0.5
Reconduction on TCI	7 / 20 (35%)	2 / 15 (13%)	0.2
Overall N of PFA pulses	89 (16)	77 (15)	0.036
N of applications on PVI	48 (5)	47 (5)	0.6
N of applications on posterior wall	14 (7)	14 (9)	>0.9
N of applications on anterior wall	10 (11)	6 (8)	0.2
Posterior wall ablation	19 / 20 (95%)	13 / 15 (87%)	0.6
Anterior wall ablation	11 / 20 (55%)	6 / 15 (40%)	0.4
ST elevations after CTI ablation	0/20 (0%)	0/15 (0%)	

¹ Mean (SD); n / N (%)

² Means (SD) or Frequency (%)

³ Wilcoxon rank sum test; Wilcoxon rank sum exact test; Fisher's exact test; Pearson's Chi-squared test



Results 2 – Hemolytic markers

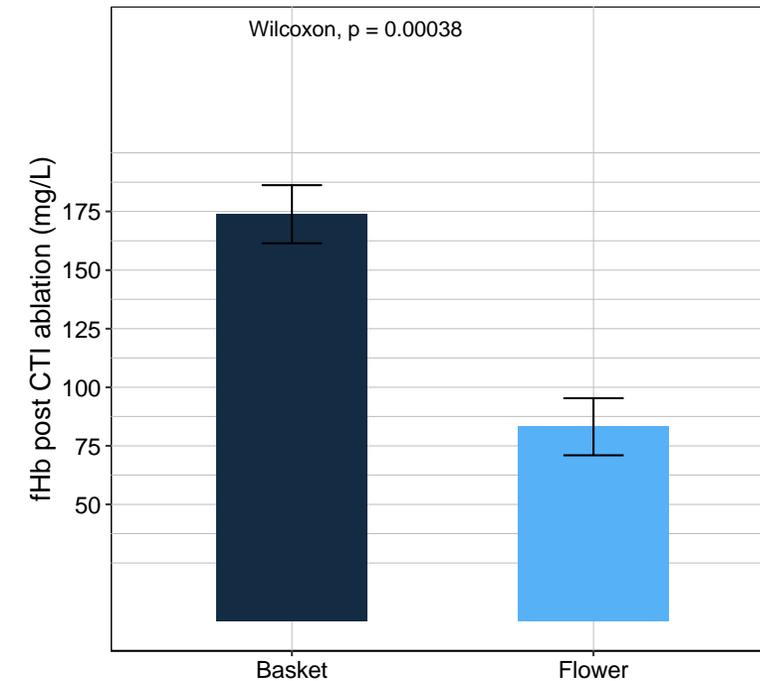
Table 3. Hemolytic markers

	Basket N = 20 ²	Flower N = 15 ²	p-value ³
Creatinine baseline (μmol/L)	95 (24)	86 (20)	0.3
Free Hb baseline (mg/L)	44 (33)	53 (33)	0.4
Increment of fHb per single application (mg/L)	7.7±5.9	3.3±5.3	0.04
LDH baseline (μkat/L)	3.4 (0.6)	3.7 (1.2)	0.9
LDH post CTI ablation (μkat/L)	3.51 (0.6)	3.9 (1.1)	0.4
Bilirubin total baseline (μmol/L)	17 (6)	15 (8)	0.2
Bilirubin total post CTI ablation (μmol/L)	18 (7)	16 (8)	0.2

¹ Mean (SD)

² Means (SD) or Frequency (%)

³ Wilcoxon rank sum exact test; Wilcoxon rank sum test



Conclusion

- PEF ablation of CTI using flower vs. basket configuration of pentaspline catheter appeared more effective in achieving the acute CTI block and safer in terms of hemolysis.
- This can be explained by the larger footprint and better tissue contact of all electrodes, which minimizes the PEF energy leakage into the blood pool.

Flower should be preferred catheter configuration for CTI ablation!



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Thank you!



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