

## V58 - Safety of Transvenous Pulmonary Vein Isolation for the Treatment of Atrial Fibrillation: A Prospective Randomized Study Comparing Radiofrequency Energy with Cryoenergy

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**Background:** New transvenous devices using cryoenergy have been recently introduced to perform pulmonary vein isolation (PVI) for the treatment of atrial fibrillation (AF). Experimental data suggested that cryoenergy (CRYO) produced less endothelial disruption and platelet activation than radiofrequency energy (RF), offering therefore safety benefits. We aimed to compare both systems in this regard by measuring for the first time sensitive laboratory markers of cell damage, platelet activation and inflammation in patients after a PVI using either one of those energies.

**Methods:** Sixty patients with symptomatic drug-resistant AF referred for PVI ( $56 \pm 9$  years of age, 48 males, 38 with paroxysmal and 22 with persistent AF) were randomly assigned to undergo the ablation procedure using either an open irrigated tip RF catheter (Thermocool<sup>®</sup>, Biosense Webster) or a cryoballoon catheter (Arctic front<sup>®</sup>, Medtronic). The endpoint of ablation was complete bidirectional conduction block. Systemic markers of cell damage (procoagulant microparticles [MP - total MP captured on annexin-V and MP of various cellular origin], troponin T, CK and CK-MB), platelet activation (ADP-induced light transmittance aggregation [LTA], expression of the platelet surface proteins P-selectin [pSEL] and activated GPIIb/IIIa [PAC-1]) and inflammatory response (high sensitive C-reactive protein - hs-CRP) were determined before and 4, 24 and 48 hours after the procedure.

**Results:** Procedure time was significantly shorter in patients treated with the cryoballoon ( $177 \pm 30$  min versus  $200 \pm 46$  min,  $p=0.028$ ), but there were no differences in fluoroscopic time, complication rate and success rate. The laboratory safety parameters are summarized for both ablation systems in the enclosed table. Post-procedural increases were observed in Troponin T and hs-CRP, but there were no consistent differences in parameters used for comparative laboratory safety assessment between cryoenergy and radiofrequency energy.

**Conclusions:** Neither systematic sensitive markers of cell damage, of platelet activation nor of inflammatory response could detect any difference in the safety profile between cryoenergy and RF energy used for transseptal PVI in patients with AF.

	Catheter	Before	4 h after	24 h after	48 h after
MP annexin-V RF (M)	Thermocool	5.4 [4.4 - 6.8]	4.4 [2.8 - 6.2]	7.6 [6.0 - 9.5]	6.7 [5.9 - 8.4]
MP annexin-V Cryo (nM)	Cryocath	5.6 [4.9 - 6.6]	6.8 [5.1 - 8.2] *	8.3 [6.7 - 9.6]	6.9 [5.6 - 8.4]
Troponin RF (ng/ml)	Thermocool	<0.01	0.89 [0.51 - 1.46]	1.36 [0.88 - 1.59]	0.57 [0.46 - 0.63]
Troponin Cryo (ng/ml)	Cryocath	<0.01	0.91 [0.73 - 1.23]	0.93 [0.77 - 1.35] *	0.64 [0.48 - 0.74]
LTA ADP 5µM RF (%)	Thermocool	59.5 [49.0 - 77.8]	68.0 [54.3 - 78.5]	75.0 [62.5 - 86.0]	78.5 [70.0 - 89.0]
LTA ADP 5µM Cryo (%)	Cryocath	67.5 [50.5 - 79.0]	66.5 [52.8 - 73.5]	78.0 [56.0 - 84.0]	76.0 [67.5 - 89.5]
pSEL ADP RF (AU)	Thermocool	27.5 [21.8 - 31.2]	26.6 [21.9 - 30.6]	34.6 [30.7 - 47.2]	36.5 [31.5 - 44.0]

pSEL ADP Cryo (AU)	Cryocath	25.2 [19.4 - 30.9]	23.4 [20.5 - 29.9]	31.7 [28.0 - 37.1]	33.4 [27.4 - 40.1]
hs-CRP RF (mg/dL)	Thermocool	0.16 [0.16 - 0.23]	0.20 [0.16 - 0.30]	1.60 [1.20 - 2.28]	3.8 [1.80 - 5.70]
hs-CRP Cryo (mg/dL)	Cryocath	0.16 [0.16 - 0.20]	0.20 [0.16 - 0.35]	2.05 [1.33 - 3.00]	1.80 [1.28 - 3.05] *

Median with interquartile range; \*p<0.05 Cryo vs. RF by Mann-Whitney test

Clin Res Cardiol 99, Suppl 1, April 2010

Zitierung mit Vortrags- oder Posternummer s.o.

DOI 10.1007/s00392-010-1100-3