Incidence of Low Voltage Area and Fractionated Potentials after Cryo-Balloon Ablation as Index Procedure

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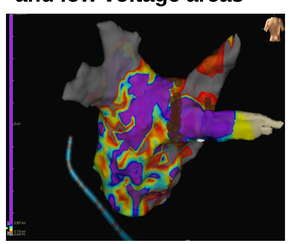
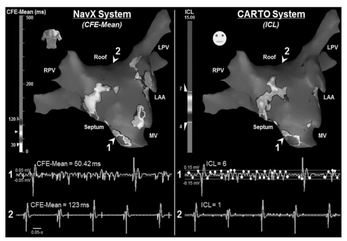
Background: Although pulmonary vein isolation (PVI) with cryo-balloon (CBA) the 2nd and 3rd generation has been shown to be highly effective, approximately 20% of the patients have recurrence of AF. Low voltage area (LVA), or complex fractionated atrial electrograms **(**CFAEs**)** by AF, were supposed to be responsible for recurrence of AF. *A*im of this study was to investigate the possible reasons of recurrence and incidence of possible non-PV AF triggers.

Methods: Since May 2012 a total of 832 pts were ablated in our institution using CBA, a total of 152 (18 %) of them experienced recurrence of AF. In 73 pts with recurrence repeat ablation was performed using a double trans-septal approach with a SL1 and Agilis sheath™. The Carto 3™ or NavX™ System was used for electro-anatomical mapping. Mapping of the PV signals was performed with a Lasso catheter. Once localized, RF applications were applied on the conduction gaps until PV re-isolation was achieved. LVA, CFAEs or other non-PV potential triggers were mapped and ablated.

Re-connection of RSPV and low voltage areas



Identification of CFAES in LA



TP. Almeida et al. Med Biol Eng Comput. 2016; 54(11): 1695–1706

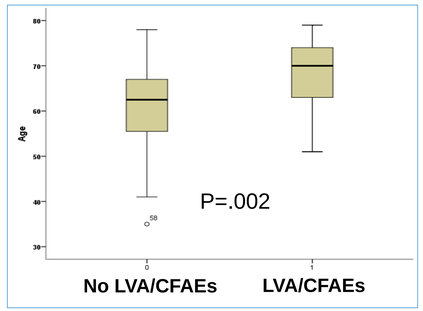
Table 1 Baseline data

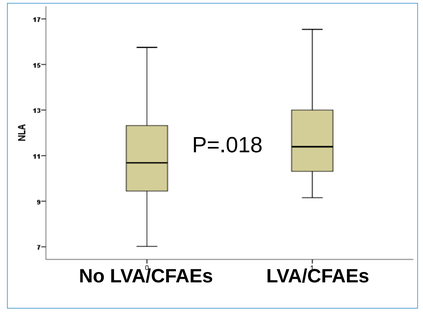
Total	73
Male	38 (52.05%)
Age (y)	64 (59-70)
Persistent AF	25 (34.25%)
History of AF (mo)	53 (16-98)
LA area cm²	22.41(19.98-24.36)
NLA cm²/m²	10.98 (9.65-12.54)
CAD	10 (13.70%)
Hypertension	61 (83.56%)
DM	6 (8.22%)
CHA_2DS_2-VASc-Score	2.03(1.73-2.33)
Abnormal anatomy	11 (15.07%)
Time to Re-Do	282(159-505)

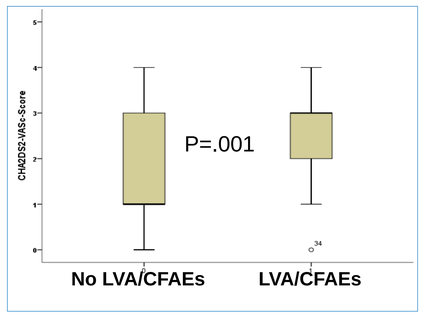
Table 2 Finding by Re Do procedure

Reconnected PV	No	Yes
Total	21	52
NonPV sites		
RA	3	1
Perimitral Flutter	2	0
CFAEs	**8**	**6**
Low Voltage Area	**11**	**10**
Low Voltage area only	8	6
CFAEs only	5	2
Low Voltage area and CFAEs	3	4

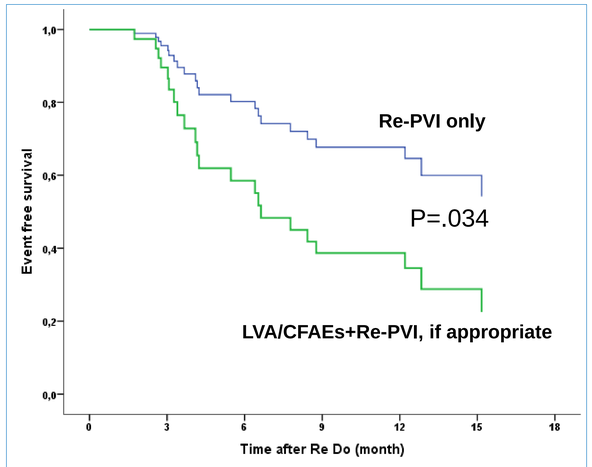
Correlations with LVA/CFAEs







Outcome after Re-Do



LVA_CFAES	Total N	N of Events	Censored	
			N	Percent
No	41	12	29	70.7%
Yes	21	10	11	52.4%
Overall	62	22	40	64.5%

Conclusion

- Approximately in 30.% of patients considered for re-do recurrence were observed by isolated PVs.
- In our study presence of low voltage area or/and CFAEs was found in 38% of the pts.
- The probability to detect LVA/CFAEs gets increased with the age, indexed left atrial size and CHA_2DS_2-VASc-Score.
- Re-do procedure after AF-recurrence following PVI with CBA should be performed with electro-anatomical mapping systems