

Biatrial flutters: unique circuits requiring a customized ablation approach

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Funding Acknowledgements: None.

Introduction: Atrial flutters are macroreentrant tachycardias that typically involve several walls of a certain atrium, being the other atrium passively activated. Biatrial flutters (BAF) are peculiar macro-reentries associated with anterior/septal scars, involving both atria and using the interatrial connections.

Purpose: To characterize the mechanism of BAF a cohort of patients (pts) submitted to mapping and ablation.

Methods: Retrospective single-center study of pts with atypical atrial flutter submitted to ablation from 2015 to 2022. High resolution electroanatomical voltage and activation mapping were collected using Carto, Ensite or Rhythmia. Whenever the arrhythmia circuit was not fully displayed in a certain atrium, of the other atrium was mapped to fully characterize the reentrant circuit and establish the critical isthmus. Biatrial circuits were classified into 4 types: type 1, involving the mitral annulus and the tricuspid annulus, escaping the septal wall in both atria; type 2 using most of the mitral annulus and the right atrium (RA) septum; type 3, using both the left atrium (LA) and RA septum; and type 4, using most of the tricuspid annulus and the LA septum. Acute and long-term success was evaluated.

Results: From a total of 107 pts submitted to atypical flutter ablation, 5 pts presented BAF (3 male, median age: 55-yo), 4 of them previously submitted to cardiac surgery (CABG in 1, mitral valvuloplasty in 1, mitral+tricuspid valvuloplasty in 1 and surgical correction of aortic coarctation and ostium primum atrium septal defect in 1) and 1 had been previously submitted to pulmonary vein isolation (PVI), empirical roof line and cavotricuspid isthmus (CTI) ablation. A proximal-to-distal coronary sinus activation and extensive low-voltage areas at the septum were recognized in all these pts. The BAF mechanism was single loop in all of them, with a type 2 circuit in 2 pts, and types 1, 3 and 4 in one patient each. BAF types 1 and 4 were terminated with CTI ablation. BAF types 2 and 3 were terminated with linear ablations from the mitral annulus to the right superior PV, complemented with focal applications at Bachmann bundle insertion sites in the pts with type 2 BAF. Acute success was achieved in all pts. During a mean time of follow-up of 344±91 days, 1 pt had AFI recurrence.

Conclusion: BAF is a rare and complex arrhythmia, which is possible to ablate successfully by applying high-density mapping tools, a comprehensive analysis of the substrate/activation maps and a mechanism-tailored ablation strategy.

