Acute Sinus Node Dysfunction After Atrial Ablation: 
Incidence, Risk Factors and Management

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Introduction

- Many patients with atrial fibrillation (AF) or flutter (AFL) have concomitant sinus node dysfunction (SND).
- Ablation may injure sinus node or surrounding tissue.
- We sought to characterize a series of patients who develop SND during or immediately after catheter ablation for AF or AFL.

Methods

- Retrospective analysis between 01/01/2010 & 02/28/2015
  Patient undergoing AF/AFL ablation at Mayo Clinic, MN.
- Sinus node dysfunction (SND) defined as:
  Sinus arrest, severe sinus bradycardia (heart rate <40bpm) or junctional escape rhythm with hemodynamic instability >5 minutes.
Results

- 8 of 2151 patients (<0.5%) developed acute SND
  
  AF ablation was performed in 4, atypical AFL in 1 and AF/AFL in 3 patients
  
  All male, average age 66±9.9 years
  
  All treated with AV node blockers prior to ablation; 5 received antiarrhythmic drugs (stopped 5 half-lives pre ablation).

- None had evidence of SND immediately pre ablation.

- Mean time duration of diagnosis to ablation: 6.5 years (range 0.1-18 years).

- Average ejection fraction 60±5%; average left atrial volume index 46±11mls/m2.
Results (continued)

• Ablation lesion set consisted of:
  
  Pulmonary vein (PV) isolation (n=6), roof line ablation (n=6), mitral annulus-left inferior PV line ablation (n=5), left atrial (LA) appendage to mitral annulus ablation (n=1), cavotricuspid isthmus ablation (n=5), vein of Marshall (n=1) and isolation of the superior vena cava (SVC, n=4).
  
• Patients with vs. without peri-SVC ablation were more likely to develop SND 1.1% vs. 0.2% (P=0.03).
  
• All 8 received temporary pacemaker implantation initially
  
  6 received permanent pacemaker pre-discharge (average 3.5 days post-ablation)
  
  At 3-month device interrogation, all patients were atrially paced >50%.
Possible mechanisms of sinus node dysfunction during atrial ablation.

A, right anterior oblique view: damage to sino-atrial (SA) node or SA nodal artery during ablation near the SVC, atriotomy scar from previous cardiac surgery leading to fibrosis and conduction slowing, ablation of autonomic ganglia.

B, left anterior oblique view: left atrial pulmonary vein isolation, roof line and/or mitral isthmus line may cause damage to the SA nodal artery originating from the left circumflex coronary artery.
Conclusions

• SND is a rare complication of AF/AFL ablation.
• It may be more common when ablation is performed at the SVC ostium.
• It may necessitate permanent pacemaker implantation.

Thank you

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