Reduced Esophageal Cooling with Left Atrial Roof and Posterior Wall Cryoablation

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BACKGROUND

• Thermal esophageal injury is a rare but devastating complication of atrial ablation.

• Pulmonary vein (PV) isolation using radiofrequency (RF) energy or cryoablation (CRYO) and also with RF ablation of posterior wall can cause esophageal thermal injury.

• Risk of esophageal injury with posterior wall and roof CRYO is unknown.

• Since posterior wall and roof CRYO has recently been advocated, we studied minimum esophageal temperature (MET) to assess safety of roof and posterior wall CRYO.

LEARNING OBJECTIVES

• To assess safety of posterior wall and roof CRYO during atrial fibrillation ablation.

METHODS

• CRYO was performed in 16 patients with atrial fibrillation (8 paroxysmal; 8 persistent):
  • 12 males; age 64 ± 9 yrs; LA volume 59 ± 24 mL/m2

• Following PV isolation, CRYO balloon was dragged across the roof and posterior wall with lesions delivered at ½ balloon width intervals.

• CRYO balloon and esophagus were precisely localized to 1mm accuracy with the novel NAVIK 3D mapping system.

• Lesions were maintained for 3 minutes unless MET < 28°C was encountered.

• Incidence of lesions with MET< 28°C was compared between PVs, posterior wall, and roof sites using Fisher’s exact test.

RESULTS

Minimum Esophageal Temperature < 28°C

- Lesions were distributed as follows:
  • roof (n=81), posterior wall (n=34), and PVs [right superior (RSPV, n=19), right inferior (RIPV, n=21), left superior (LSPV, n=19), and left inferior (LIPV, n=17)].

- Occurrence of MET < 28°C was:
  • 1/81 roof, 2/34 PW, 2/21 RIPV, 2/17 LIPV, and no RSPV/LSPV lesions.

- MET < 28°C was more common in RIPV (9.5%) and LIPV (11.8%) when compared to roof (1.2%) and PW (5.9%); these differences were statistically significant (P ≤ 0.001 for all comparisons).

DISCUSSION

• Significant esophageal cooling with CRYO is less common at the roof and posterior wall than in PVs.

• The overall incidence of esophageal cooling is low.

• CRYO of posterior wall and roof may be safer than CRYO of the PVs.