Highlights from:
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Achieving Contrast-Free Ultra-Low Radiation Exposure Without Compromising Safety and Acute Efficacy Through Evolving AF Cryoballoon Ablation Procedure Techniques

INTRODUCTION

- Due to the detrimental effects of radiation during catheter-based procedures, it should be assumed that a safe level of radiation exposure does not exist.
- This study demonstrates the safety and acute effectiveness of ultra-low fluoroscopy use during cryoballoon ablation for atrial fibrillation.

METHODS

- A retrospective observational analysis was performed on 307 cryoballoon ablation procedures for pulmonary vein isolation (PVI) using ultra-low fluoroscopy.

Imaging

- Pre-procedural planning included cardiac computed tomography or magnetic resonance imaging.
- Transesophageal echocardiography to rule out thrombus.
- Intracardiac echocardiography (ICE; Zonare Ultrasound System, St. Jude Medical) was used for transseptal puncture and catheter guidance.
- 3D electroanatomic mapping (EAM) was used to recreate cardiac geometries and for catheter guidance (Achieve™ Mapping Catheter, Medtronic, Inc.; EnSite™ NavX™ Mapping System, St. Jude Medical).
- "Single-shot" fluoroscopy (3.75 frames/s) was used if resistance was felt during device exchange.

Transseptal access

- Transseptal puncture was performed using the **NRG™** Transseptal Needle (Boston Scientific).
- Catheter exchange in the left atrium was initially done using a STORQ® Steerable Guidewire (Cordis) during the first 18 months of the study before switching to the **ProTrack™** Pigtail Wire (Boston Scientific) for the remaining 28 months.

Cryoballoon ablation

- Ablations were performed using the Arctic Front Advance™ Cryoballoon (Medtronic, Inc.).
- Direct pressure monitoring and Doppler flow were used to confirm pulmonary vein occlusion in place of radiopaque contrast.

RESULTS

- Radiation dose decreased from 6.7 mGy to 2.0 mGy over the study period ($p<0.01$).
- Fluoroscopy time decreased from 0.75 min to 0.2 min over the study period ($p<0.0001$).
- Use of a 28-mm cryoballoon required significantly lower fluoroscopy use than both the 23-mm cryoballoon and combination of 23-mm and 28-mm cryoballoons.
- Acute procedural success was achieved in 99% of patients with a 2.0% complication rate, consistent with other cryoballoon studies.
- One incidence of left atrial appendage perforation leading to cardiac tamponade was attributed to the STORQ® Steerable Guidewire, and prompted the switch to the **ProTrack™** Pigtail Wire.

DISCUSSION AND CONCLUSIONS

- This study describes a method for ultra-low fluoroscopy cryoballoon ablation compared to other large sponsored studies, and demonstrates safety and effectiveness.
- The best practices for fluoroscopy reduction include:
  - ICE to visualize the **NRG™** Transseptal Needle for transseptal puncture and **ProTrack™** Pigtail Wire for wiring across the left atrium
  - 3D EAM, ICE, pressure waveform, and Doppler imaging for catheter navigation
  - Cryoballoon dosing algorithm to minimize freezing beyond acute PVI
  - Slow fluoroscopy frame rate when needed
- These tools and techniques are common within electrophysiology labs and require minimal additional operator training.

Indications, safety, and warnings for NRG™ Transseptal Needle

Indications, safety, and warnings for ProTrack™ Pigtail Wire

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