

# The use of a radiofrequency needle improves the safety and efficacy of transeptal puncture for atrial fibrillation ablation

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## INTRODUCTION

- ▶ This large case series compares the safety and efficacy of transeptal puncture using the purpose-built radiofrequency (RF) NRG® Transeptal Needle (Baylis Medical) to a sharp mechanical needle (BRK-1™ or BRK-1™ ES, Abbott) for atrial septal puncture.

## METHODS

- ▶ 1550 consecutive atrial fibrillation ablations were retrospectively analyzed.
- ▶ Fluoroscopy, intracardiac ultrasound, pressure measurement and/or contrast injection were used to guide the transeptal puncture.

### Transeptal puncture

- ▶ Mechanical needle (975 ablations).
  - Forward force was applied for TSP and to advance the transeptal apparatus across the septum.
- ▶ NRG® RF needle (575 ablations).
  - RF energy was applied using a dedicated generator (RFP-100, Baylis Medical) to perforate the septum with no significant forward motion of the needle.
  - The transeptal apparatus was then advanced into the left atrium (LA) over the needle.
- ▶ After a successful transeptal puncture, all patients underwent standard AF ablation.

### Data analysis

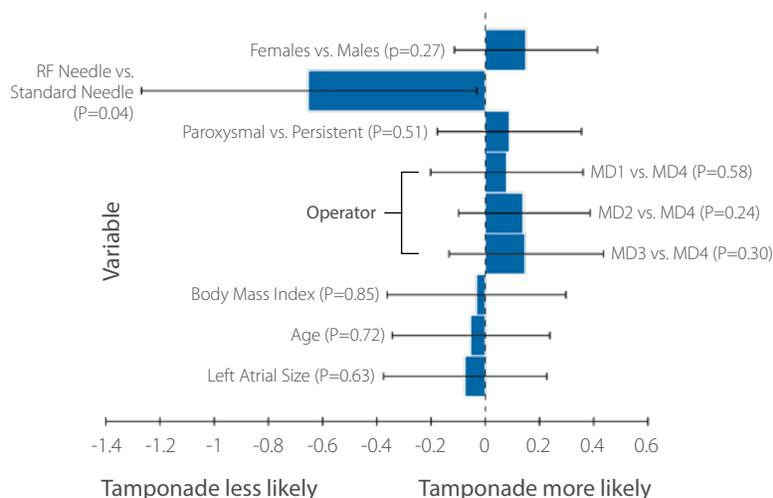
- ▶ Instrumentation time was recorded from lidocaine injection to heparin injection upon LA access.
- ▶ Complications during TSP were assessed, including failure of LA access, pericardial tamponade, inadvertent aortic puncture, death, stroke or transient ischemia.
- ▶ Operator experience over time was assessed by quartile using Cochran-Armitage trend analysis.

## RESULTS

- ▶ Failure of TSP was lower with RF needle than mechanical needle (0.17% vs. 1.2323%;  $p=0.039$ ).
- ▶ No cardiac tamponade occurred with RF needle compared to mechanical needle (0 vs. 0.92%;  $p<0.04$ ).
- ▶ With mechanical needle, septal crossing rates ( $P=0.79$ ) and rate of tamponade ( $P=0.46$ ) did not improve with operator experience.
- ▶ Instrumentation time was shorter with the RF needle than mechanical needle ( $27.1 \pm 10.9$  min vs.  $36.4 \pm 17.7$  min;  $p<0.0001$ ).

## DISCUSSION & CONCLUSIONS

- ▶ RF needles reduce the rate of atrial perforation by requiring minimum forward movement to cross the septum compared to sharp mechanical needles.
- ▶ RF needles improve the rate of crossing, even in septa that are thick or scarred from prior punctures.
  - Atraumatic tip of RF needle allows verification of needle tip position without tissue penetration.
  - Sharp mechanical needles can create micro-punctures upon tissue contact that may lead to procedure termination to prevent risks from procedural anticoagulation.
- ▶ Clean tissue perforation requires a dedicated RF needle and purpose-built generator.
  - Connecting an ablation generator to a mechanical or RF needle may lead to tissue heating, necrosis and septal damage.
- ▶ This study showed that purpose-built RF needles reduce instrumentation times, increase TSP efficacy and reduce the incidence of pericardial tamponade during AF ablation.



**Figure 1** Multivariate analysis of pericardial tamponade indicated that the RF needle is the only variable associated with lower tamponade (95% conf. interval).