



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

INTRODUCTION

- ▶ This large case series compares the safety and efficacy of transeptal puncture (TSP) 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 (AF) 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-100-115, 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. 1.23%; $p=0.039$).
- ▶ No cardiac tamponade occurred with RF needle compared to mechanical needle (0.00% 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 ± 10.9 min vs. 36.4 ± 17.7 min; $p<0.0001$).

DISCUSSION AND 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.

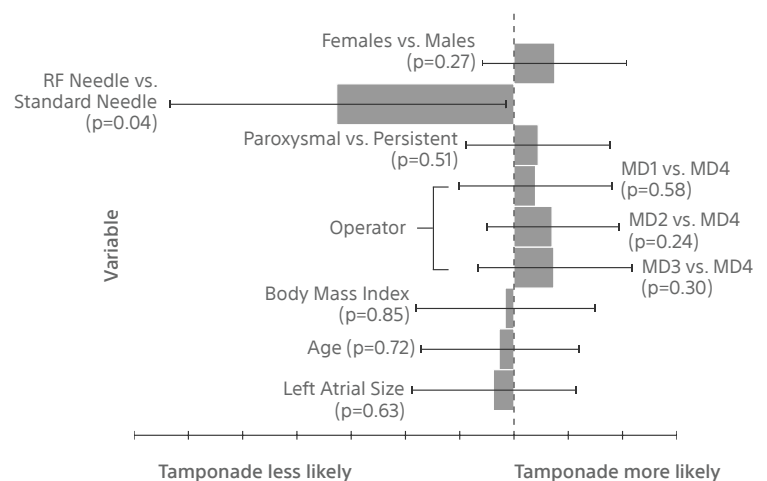


Figure 1. Multivariate analysis of pericardial tamponade indicated that the RF needle is the only variable associated with lower tamponade (95% confidence interval).

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