

A Cost-Effectiveness Analysis Comparing a Conventional Mechanical Needle to a Radiofrequency Device for Transseptal Punctures

INTRODUCTION

- ▶ Previous studies have demonstrated that use of a dedicated radiofrequency (RF) transseptal puncture (TSP) device (NRG™ Transseptal Needle, Baylis Medical) is associated with reductions in transseptal complications, failures to cross the septum, and transseptal access time, as compared to use of a mechanical transseptal needle (BRK™, Abbott).
- ▶ While the upfront cost of the RF TSP device is more than the mechanical needle, the cost-effectiveness of the two options has not previously been evaluated.

METHODS

- ▶ A decision tree was prepared to evaluate the cost-effectiveness of the RF TSP device and the mechanical needle, as used during pulmonary vein isolation (PVI) procedures, in three different clinical scenarios: single TSP with one device (base case), double TSP with one device, and double TSP with two devices.
- ▶ Probability and clinical cost inputs were located in peer-reviewed literature and healthcare databases, while costs of TSP materials were obtained from the University of California, San Francisco electrophysiology lab.
- ▶ The total cost at 30 days was the sum of PVI procedure costs and costs of TSP-related complications.
- ▶ Effectiveness was defined as probability of survival at day 30 following TSP success.
- ▶ Incremental cost-effectiveness ratios (ICER) were calculated for these four scenarios.
- ▶ One-way and Monte-Carlo probabilistic sensitivity analyses were then performed, with the latter used to prepare a cost-effectiveness acceptability curve (CEAC).

RESULTS

- ▶ The cost-effectiveness rankings of the four scenarios are shown in Table 1.
- ▶ In all scenarios the RF TSP device was found to be dominant, as compared to the mechanical needle.
- ▶ The probabilistic sensitivity analysis and CEAC found that the RF TSP device was more cost-effective at any willingness-to-pay threshold.

DISCUSSION AND CONCLUSIONS

- ▶ When all costs are accounted for, the RF TSP device is less costly and more effective than the mechanical needle, despite a greater upfront equipment cost.
- ▶ The modified base case analysis suggested that the shorter time-to-transseptal with the RF TSP device may further increase cost savings, which may enable faster lab turn-over and more efficient use of personnel and space.
- ▶ It is noted that variations in procedural and equipment costs between centers could influence the level of dominance or cost-effectiveness reported.

Table 1. Cost-Effectiveness of RF TSP device compared to mechanical needle

Scenario	Incremental Total Cost at 30 Days for RF TSP device (\$)†	Incremental Effectiveness at 30 Days for RF TSP Device (%)†	ICER‡
Single TSP with 1 device (base case)	-41	+0.9	Dominant
Double TSP with 1 device	-338	+1.1	Dominant
Double TSP with 2 devices	-158	+1.1	Dominant
Single TSP with 1 device (modified base case, with PVI costs adjusted for transseptal time savings)	-774	+0.9	Dominant

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† As compared to mechanical transseptal needle

‡ The term "Dominant" indicates a device was associated with higher effectiveness and lower cost TSP denotes transseptal puncture; RF, radiofrequency; ICER, incremental cost-effectiveness ratio; PVI, pulmonary vein isolation

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