

# Economic analysis of active esophageal cooling in zero-fluoroscopy settings without intracardiac echocardiography

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## Introduction/Objective

Multiple esophageal protection methods currently available for use during PVI. Recent data show improvements in safety with the use of active esophageal cooling as the esophageal protective method (2). Active esophageal cooling can be performed without fluoroscopy, as the cooling device is visible on intracardiac echocardiography (ICE) but performing cases without ICE is also possible.

## Purpose

To quantify the cost impact of implementing active esophageal cooling during pulmonary vein isolation (PVI) performed without fluoroscopy or intracardiac echocardiography (ICE).

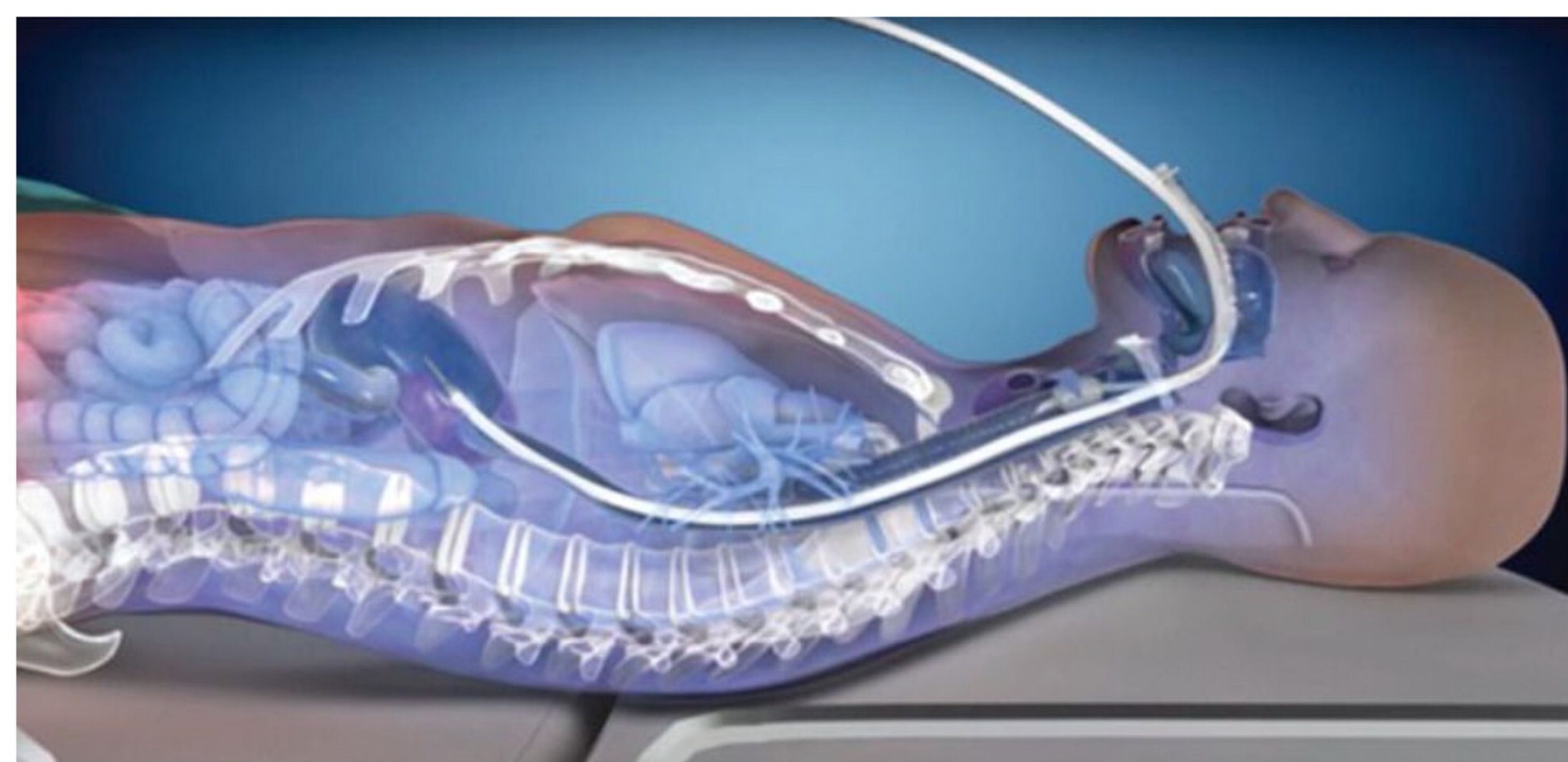


Figure 1: Active esophageal cooling device (Attune Medical, Chicago, IL)

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## Methods

We reviewed data from a large academic hospital system using active esophageal cooling. In addition to using zero-fluoroscopy, transesophageal echocardiography (TEE) was utilized in lieu of ICE for transseptal puncture for all cases. Visualization of the esophageal cooling device was made possible on the 3D mapping system by placing a guidewire (an SL-1, 0.032 inch, 150 cm length) through the central lumen of the cooling device. The guidewire was then pinned via pin block to allow visualization on the 3D mapping system (EnSite, Abbott). Cost impacts of this approach were then analyzed.

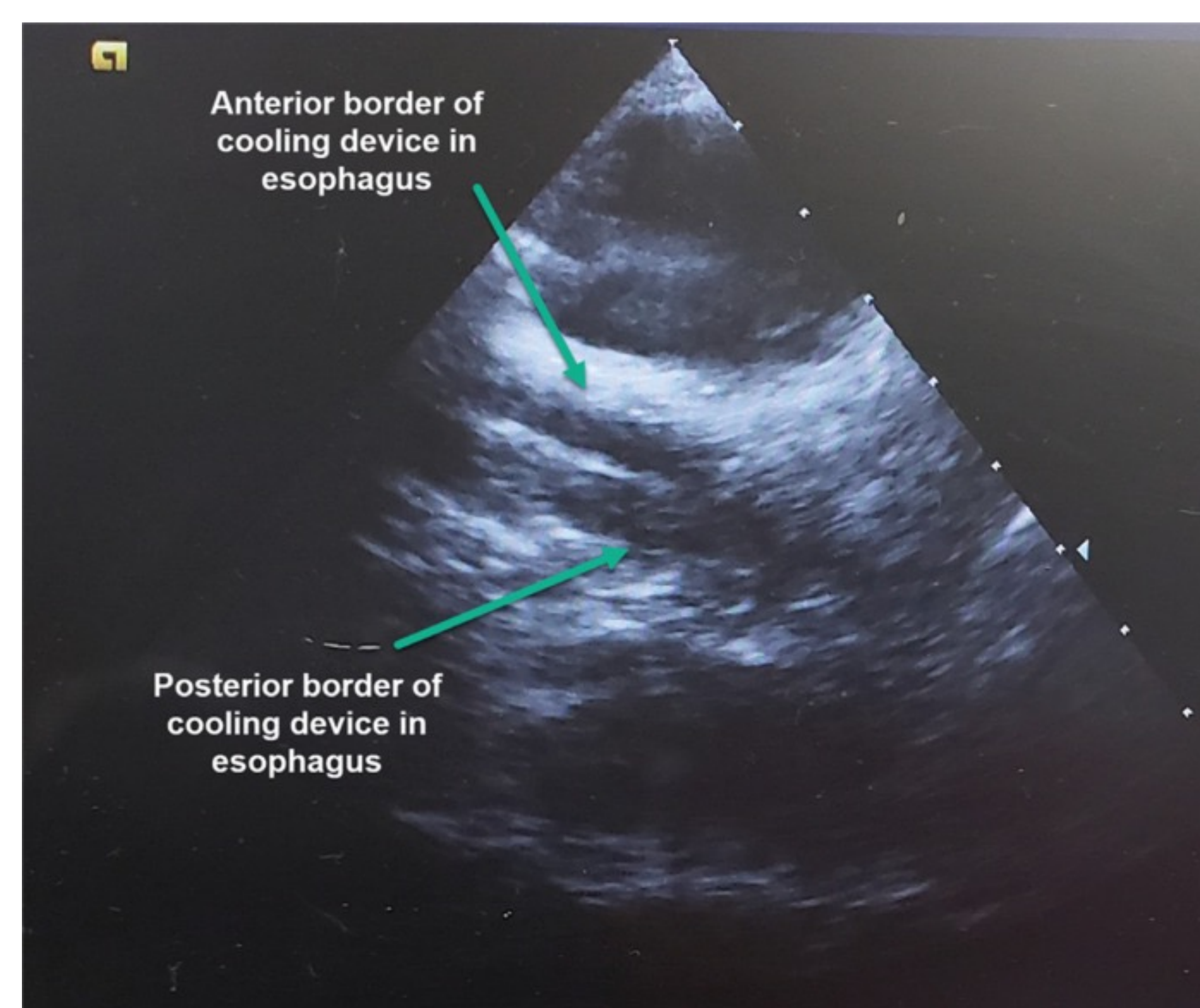


Figure 2: Image of ensoETM cooling device on intra-cardiac echocardiography

## Results

Data from a total of 261 patients were reviewed. All received active esophageal cooling, with a complication rate of 1.9% (3 pericardial effusions, 1 pseudoaneurysm, and 1 air embolism).

A cost savings of \$1800 per case was identified, including the costs of the active esophageal cooling device, by eliminating the need for an ICE catheter.

## Conclusions

The use of active esophageal cooling in cases using no fluoroscopy and no ICE catheter appears safe and provides significant cost savings.

## References

1. Kaplan RS, Anderson SR. Time-driven activity-based costing. *Harv Bus Rev.* 2004;82(11):131–138, 150.
2. Leung LWM, Bajpai A, Zuberi Z, et al. Randomized comparison of oesophageal protection with a temperature control device: results of the IMPACT study. *Europace.* 2021;23(2):205–215.
3. Joseph C, Cooper J, Daniels J, et al. Improved hospital discharge and cost savings with esophageal cooling during left atrial ablation, *Journal of Medical Economics,* 2023;26(1):158-167

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