

The cost-effectiveness of transcatheter aortic valve replacement in low surgical risk patients with severe aortic stenosis

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Objectives

Given evidence that TAVR is less invasive and at least non-inferior to surgery, and that the potential cohort of low surgical risk patients is large, the aim of this study (the first of its kind) was to determine the cost effectiveness of balloon-expandable TAVR and self-expandable TAVR relative to SAVR in low-risk patients.

Study design

Cost-utility analysis

Materials and methods

- A fully probabilistic Markov cohort model was constructed to estimate differences in cost and effectiveness over the patient's lifetime from a third-party payer's perspective
- The PARTNER 3 Trial and the Evolut Low Risk Trial contributed to the network meta-analysis comparing balloon-expandable, self-expandable and SAVR for the efficacy inputs

Key results

- The total life-time costs in the balloon-expandable TAVR, self-expandable-TAVR, and SAVR arms were \$37,330±4724, \$39,660±4862, and \$34,583±6731, respectively
- Total lifetime quality-adjusted life-years (QALYs) gained were 9.15±3.23, 9.13±3.23, and 9.05±3.20, respectively
- The incremental cost-effectiveness ratios (ICERs) for balloon-expandable TAVR and self-expandable TAVR against SAVR were \$27,196/QALY and \$59,641/QALY, respectively
- Balloon-expandable TAVR was less costly and more effective than self-expandable TAVR. There was substantial uncertainty, with 53% and 58% of model iterations showing balloon-expandable TAVR to be the preferred option at willingness-to-pay thresholds of \$50,000/QALY and \$100,000/QALY, respectively

Limitations of study

- There is a substantial degree of uncertainty in the probabilistic analyses, as there are only two trials, and no direct head-to-head comparison of balloon- versus self-expandable TAVR in the low-risk group

- The three-way comparison is based on two assumptions: that both types of TAVR device are available, and that operators have equal proficiency with both types of device: this reinforces the importance of head-to-head comparisons of different types of device
- The study populations, while low-risk, were nonetheless still elderly (mean age 74y): the effects of certain complications in younger low-risk populations is not well known. Results may not be generalisable to younger low-risk patients
- RCT efficacy data that may not be generalisable outside the RCT setting were used in effectiveness input
- In the absence of quality-of-life data for the low-risk population, quality of life data from intermediate risk patients were used in the analysis
- Follow-up in both RCT trials was limited to 1 – 2 years

Conclusions

- TAVR may be cost effective compared with SAVR in a low-risk population based on the efficacy findings of two recently published large RCTs
- TAVR (both balloon-expandable and self-expandable) may be cost-effective when compared with SAVR at common willingness-to-pay thresholds
- TAVR with either balloon-expandable or self-expandable valve systems may be cost effective in the low surgical risk population
- Balloon-expandable TAVR may be preferable to self-expandable TAVR
- Further data for long-term durability are warranted