

Advice Statement

Transcatheter aortic valve implantation (TAVI) for the treatment of patients with severe symptomatic aortic stenosis who are at intermediate surgical risk

Advice for NHSScotland

TAVI is non-inferior to surgical aortic valve replacement (SAVR) for primary outcomes of all cause and cardiac mortality or disabling stroke up to two years. TAVI may be considered as an alternative to SAVR, providing similar symptom and quality of life improvements in patients with severe symptomatic aortic stenosis (AS) who are considered operable but at intermediate surgical risk.

The choice of procedure should be guided by detailed individualised assessment of risk factors including age, anatomical feasibility, frailty, previous cardiac surgery and life expectancy. Shared decision-making with patients around choice of procedure for severe AS should also take into account that, compared with SAVR, the long-term durability of TAVI has not been established.

Based on commonly accepted UK cost-effectiveness thresholds, TAVI at list prices is unlikely to be cost-effective in this patient group. Cost-effectiveness is primarily driven by the valve cost. In trials, relative clinical outcomes tended to be more favourable via the transfemoral (TF) access route and, as such, TF TAVI – combined with a reduction in the device cost – increases the likelihood of TAVI being cost effective compared with SAVR.

NHSScotland is required to consider the Scottish Health Technologies Group (SHTG) advice.

Why is SHTG looking at this topic?

For patients with severe symptomatic aortic stenosis (AS), surgical aortic valve replacement (SAVR) is the reference treatment where surgical risk is low. For those assessed by a heart team as being at increased surgical risk, transcatheter aortic valve implantation (TAVI) is an alternative procedure. The patient group of interest for this

technology review are those with severe symptomatic AS who are assessed by a heart team as being operable but at intermediate surgical risk.

The topic was prioritised for inclusion on the SHTG work programme following a topic referral from the National Planning Team of the NHSScotland National Planning Board.

Evidence Note 91 was produced by Healthcare Improvement Scotland in response to this request. Evidence summaries were adapted from a Rapid Relative Effectiveness Assessment developed by the European Network for Health Technology Assessment (EUnetHTA).

Background

- A Scottish TAVI service was established in September 2012 at the Royal Infirmary of Edinburgh. In April 2018, a second TAVI centre was established at the Golden Jubilee National Hospital (GJNH), with a third opening in April 2019 at Aberdeen Royal Infirmary.
- Increased TAVI annual hospital volume is associated with improved clinical outcomes. Although no studies were able to support any specific cut-off values, there was an indication across studies that low procedure volumes (<40 or <50 per year) should be avoided.
- The number of patients with severe symptomatic AS is likely to rise due to the increasing ageing population in Scotland. A total of 318 TAVI procedures were estimated to be carried out in Scotland in the financial year 2018/19. This gives an annualised TAVI rate of 58.4 per million population.
- Forecasts based on the 2017 UK overall TAVI rate (61 per million population) estimate a total of 334 procedures (95% CI 299 to 371) will be carried out in Scotland for the financial year 2019/20.
 - It is unlikely that this forecast includes potential expansion of TAVI to all patients at intermediate risk (i.e. patients who are also eligible for open surgery) due to high levels of missing data on risk factor scoring amongst the UK wide TAVI patient numbers upon which the forecast is based.
 - In 2016/17, around 47% of TAVI patients at the largest centre in Scotland were classified as being at intermediate surgical risk, yet it is unclear whether these patients presented with other clinical characteristics that made them ineligible for open surgery.
- TAVI technology continues to evolve. Rapid progress is being made in device modification and the published evidence base may not fully capture the emergent evidence for the latest generation of TAVI devices.

Clinical effectiveness

- In a meta-analysis of evidence from two randomised controlled trials (RCTs) (PARTNER 2 and SURTAVI) with follow up of two years, TAVI was non-inferior to SAVR in terms of all-cause or cardiac mortality. There was no evidence of a difference between procedures in the degree of symptom improvement.
- TAVI patients had a 3 to 4 day median reduction in length of hospital stay. The PARTNER 2 trial reported a median ICU stay of two days for TAVI compared with 4 days with SAVR.
- Health related quality of life improvements at 30 days were greater with TAVI than with SAVR. At 1 and 2 years follow up there were no significant differences between the interventions for this outcome.
- The certainty of evidence varied by outcome but was generally greater for measures at 30 days or 1 year. There is less certainty around the 2 year outcomes due to potential attrition bias from loss to follow up and imputation based on interim findings.
- The RCTs were not powered to compare outcomes from transthoracic access routes with SAVR. It was also not possible to compare the effectiveness of balloon versus self-expandable TAVI devices due to differences in trial populations.

Safety

- Adverse event profiles differed between the two procedures.
 - Patients undergoing TAVI had a lower rate of new atrial fibrillation (RR 0.32, 95% CI 0.27 to 0.37, $p < 0.00001$) and reduced rates of acute kidney injury 0.47, (95% CI 0.27 to 0.80 $p = 0.006$) at 30 days.
 - TAVI patients had a higher rate of paravalvular regurgitation (RR 9.18, 95% CI 3.97 to 21.22, $p < 0.00001$) and increased rates of aortic valve re-intervention (RR 7.58, 95% CI 1.38 to 41.55, $p = 0.02$) at 30 days/discharge.
 - Rates of stroke (RR 0.72 95% CI 0.44 to 1.20, $p = 0.21$) and disabling stroke (RR 0.70, 95% CI 0.48 to 1.02, $p = 0.07$) at 30 days were not statistically significantly different between TAVI patients and those receiving SAVR.
- Across the two RCTs there were inconsistencies in findings for:
 - Life threatening or disabling bleeding.
 - Rates of new permanent pacemaker implantation.

Cost effectiveness

Published evidence

- The conclusions of five economic evaluations which used data from either the PARTNER 2 or SURTAVI trials were equivocal.

- Two evaluations found TAVI to be both cost saving and more effective than SAVR. Three evaluations reported moderate uncertainty with regards to the cost-effectiveness of TAVI.
- The key areas of uncertainty regarding the cost-effectiveness of TAVI lay in the methodology used to calculate procedural costs, the cost of the device itself, lengths of ICU stay and the durability of TAVI valves. Across the published studies, relative to other TAVI access routes, transfemoral TAVI appeared to be the most cost-effective compared with SAVR.

De novo economic evaluation

- The results of a de-novo cost-utility analysis conducted by Healthcare Improvement Scotland found that TAVI at list prices is unlikely to be a cost-effective option in Scotland for patients with severe aortic stenosis who are considered operable and assessed as being at intermediate surgical risk. This patient population reflects the PARTNER 2 and SURTAVI trial populations.

The base case analysis focussed on the use of the Edwards balloon-expandable valve in the PARTNER 2 intention to treat (ITT) population. Combining these clinical data with NHSScotland costs, resulted in an incremental cost effectiveness ratio (ICER) of £98,000.

- Key considerations are as follows:
 - Access route: results of the analysis were more favourable in the transfemoral sub-population.
 - Device cost: TAVI valve cost is an important driver of results, with the base case ICER falling to more acceptable levels subject to a moderate reduction in TAVI valve price.
 - Durability of the valves: the long-term durability of the TAVI procedure and valves remains uncertain and was not taken into account in the analysis. This issue is particularly important in a patient population who are expected to survive for longer following their procedure.

Patient and social aspects

Patient experience

- There is evidence from three qualitative studies about patient experiences of undergoing TAVI (across all surgical risk groups) to suggest that:
 - Patients' experiences prior to undergoing TAVI vary. In this regard, pre-TAVI consultation in relation to managing expectations about undergoing the procedure and the recovery process is seen as important by patients.
 - Patients experience different levels of improvement after TAVI. Some patients experience reductions in symptom burden (such as less pain, fatigue and shortness of breath) which lead to improvement in quality of life (for example,

ability to stay independent or take part in social activities). Some patients, however, may continue to experience health issues following TAVI, related to comorbidities or frailty.

- Support for family caregivers needs attention when developing care processes for TAVI patients, particularly relating to adequate information about the post-procedure recovery process.

Patient decision making

- There is evidence from three qualitative studies about patients' decision-making about undergoing TAVI to suggest that:
 - Among the most common factors influencing the decision-making process of patients to undergo TAVI are patients' expectations that TAVI will improve their quality of life and wellbeing, reduce symptoms and extend their lives.
 - Trust in healthcare professionals and the information provided before the operation are other important factors considered by patients to influence their decision-making process.
 - Some patients are unsure about the benefits or effects of undergoing TAVI and require more information and support in the decision-making process.

Further research

Ongoing trials

- Two ongoing trials focus on patients at intermediate surgical risk:
 - SURTAVI trial (NCT01586910) International, multicentre, completion date Nov 2026
 - DEDICATE trial (NCT03112980) German, multicentre, completion date Dec 2024
- The UK TAVI trial (ISRCTN57819173) is focused on patients at intermediate or high surgical risk and is due to complete in 2022. Initial results are expected to be published in autumn 2019.

Advice context:

No part of this advice may be used without the whole of the advice being quoted in full. This advice represents the view of the SHTG at the date noted.

It is provided to inform NHS boards in Scotland when determining the place of health technologies for local use. The content of this Advice Statement was based upon the evidence and factors available at the time of publication. An international evidence base is reviewed and thus its generalisability to NHSScotland should be considered by those using this advice to plan services. It is acknowledged that the evidence constitutes only one of the

sources needed for decision making and planning in NHSScotland. Readers are asked to consider that new trials and technologies may have emerged since first publication and the evidence presented may no longer be current. This advice does not override the individual responsibility of health professionals to make decisions in the exercise of their clinical judgment in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

SHTG Advice Statements will be considered for review if new evidence becomes available which is likely to materially change the advice. Stakeholders may submit a request, highlighting new evidence to shtg.hcis@nhs.net

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Chair

Scottish Health Technologies Group



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