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Infective endocarditis after transcatheter aortic valve implantation: findings from a UK nationwide linkage study

Authors:
T.J. Cahill¹, J. Raby¹, P.D. Jewell², P.F. Brennan³, A.P. Banning¹, J. Byrne⁴, R.K. Kharbanda¹, P.A. MacCarthy⁴, M.H. Thornhill⁵, J.A.T. Sandoe⁶, M.S. Spence³, D. Hildick-Smith⁷, S. Redwood⁸, B.D. Prendergast⁸, ¹John Radcliffe Hospital, Department of Cardiology - Oxford - United Kingdom, ²Imperial College Healthcare NHS Trust - London - United Kingdom, ³Belfast Health and Social Care Trust, Department of Cardiology - Belfast - United Kingdom, ⁴Kings College Hospital, Department of Cardiology - London - United Kingdom, ⁵University of Sheffield, Unit of Oral & Maxillofacial Medicine Surgery, ⁶Pathology, School of Clinical Dentistry, - Sheffield - United Kingdom, ⁷Leeds Teaching Hospitals NHS Trust, Department of Microbiology - Leeds - United Kingdom, ⁸Sussex Cardiac Centre - Brighton - United Kingdom, ⁹St Thomas' Hospital, Department of Cardiology - London - United Kingdom,

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Introduction: Infective endocarditis (IE) is a potentially fatal complication of prosthetic valve replacement and increasing use of transcatheter aortic valve implantation (TAVI) has resulted in a new elderly and frail population at increased risk of IE. The incidence of IE after TAVI and factors that influence the risk and subsequent outcome are relatively unknown.

Purpose: To describe the incidence, predictors, echocardiographic findings, microbiology and clinical outcomes of IE following TAVI in the United Kingdom (UK).

Methods: Patients who underwent TAVI between Jan 1 2007 and Dec 31 2016 were identified from the UK TAVI database held by the National Institute for Cardiovascular Outcomes Research. For this cohort, all hospital admissions with a primary diagnosis of IE were identified by linkage with the NHS Hospital Episode Statistics Admitted Patient Care database, or by contact with regional TAVI centres. Additional information concerning clinical presentation, imaging findings, microbiology, management and patient outcome were obtained where possible from the treating physician.

Results: A total of 16,014 patients underwent TAVI, of whom 157 developed IE over a median follow-up of 23.8 (IQR 7.8–52.4) months - an overall incidence of 0.98% (0.53% at one year post-TAVI). The mean age of patients with IE was 79.2±7.8 years, and 69% were male. The median time to IE following TAVI was 10.0 (IQR 4.0–22.3) months.

On multivariate analysis, IE was significantly more common in men (HR 2.05, 95% CI 1.35–3.11, p=0.001) and in patients receiving mechanically-expandable (HR 2.15, 95% CI 1.16–4.01, p=0.015) or balloon-expandable valves (HR 1.60, 95% CI 1.01–2.52, p=0.045) compared to self-expanding valves. IE was also more common in those with an aortic valve peak gradient following TAVI deployment greater than median (HR 1.81, 95% CI 1.23–2.67, p=0.003).

The most common presenting symptom was fever (present in 67.1%). The most frequent causal organisms were enterococci (25.9%), followed by oral streptococci (16.4%) and Staphylococcus aureus (11.8%). Transoesophageal echocardiography demonstrated vegetations in 72.5% of patients, most commonly on the TAVI valve leaflets (58.8%). Only 8.24% of patients underwent surgical valve intervention.
Survival rates at hospital discharge and one year follow up were 61.4% and 54.4%, respectively. Specific factors associated with one-year mortality were cardiogenic shock (HR 4.6, 95% CI 2.1–10.3, p=0.0002), septic shock (HR 3.4, 95% CI 1.4–8.3, p=0.006) and stroke (HR 4.9, 95% CI 1.46–16.7, p=0.01).

**Conclusions:** The incidence of IE one year after TAVI was 0.53% and greater risk was associated with male sex, mechanically-expandable and balloon-expandable valves, and elevated post-deployment valve gradient. Enterococci were the most common causative organism. Overall survival at one year was 54.4%, with adverse outcome predicted by cardiogenic shock, septic shock or stroke.