Imaging

37 TRANSOESOPHAGEAL ECHOCARDIOGRAPHY UNDERESTIMATES TRANSVALVULAR GRADIENTS FOLLOWING TRANS-CATHETER AORTIC VALVE IMPLANTATION (TAVI) – IMPLICATIONS FOR CLINICAL PRACTICE

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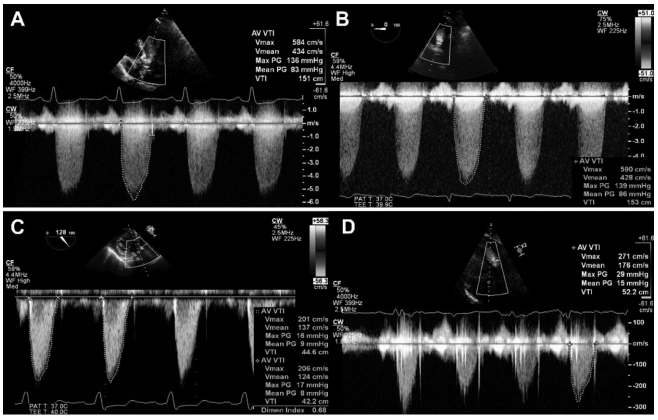
Background Trans-catheter aortic valve implantation (TAVI) is an effective treatment for high risk patients with severe aortic stenosis. As with all prosthetic valves, it is important to document accurate post-procedural gradients for future comparison. This study aimed to determine whether there was a difference between gradients measured immediately post-procedure by trans-oesophageal echocardiography (TOE) compared with the pre-discharge trans-thoracic echocardiogram (TTE). We also compared pre-TAVI gradients obtained by TTE vs. TOE.
Methods We used local and national databases to gather demographics on TAVI patients from our centre and to identify peak and mean aortic gradients measured by TTE and TOE prior to TAVI and also immediately following TAVI deployment (TOE) and prior to discharge (TTE). Data were compared using the paired t-test.
Results We identified 106 TAVI patients with complete echocardiographic data-sets. The mean age was 81+/-8 yrs and 62 (54%) were male. All patients received an Edwards Sapien valve. Pre-TAVI, there were no significant differences between TOE and TTE for both peak (72.2+/-24.8 mmHg vs 71.9+/-24.0 mmHg, p = 0.83) and mean (41.4+/-15.0 mmHg vs 42.4+/-14.9 mmHg,p = 0.22) gradients. However, following TAVI, the peak trans-valvular gradients by TOE vs. TTE were 12+/-6 mmHg vs 22+/-9 mmHg (p < 0.001) and mean trans-valvular gradients were 6+/-3 mmHg vs 11+/-5 mmHg (p < 0.001). There were 36 patients with LV dysfunction: the results were unchanged after excluding these patients (peak gradient 12+/-6 mmHg vs. 23+/-9 mmHg, p < 0.001).
Conclusions Although TTE and TOE perform similarly prior to TAVI, the immediate post-procedural assessment of trans-aortic gradients by TOE leads to significant under-estimation compared to TTE. Intra-procedural TOE should not be used to define baseline peak and mean aortic gradients after TAVI.



Abstract 37 Figure 1 Pre-TAVI TTE (A) vs TOE (B) and post-TAVI TOE (C) vs TTE (D)

Valve Disease/Pericardial Disease/ Cardiomyopathy

38 MYOCARDIAL INFARCTION FOLLOWING SURGICAL AND TRANS-CATHETER AORTIC VALVE REPLACEMENT – IS PERI-PROCEDURAL REVASCULARISATION FOR TAVI NECESSARY?

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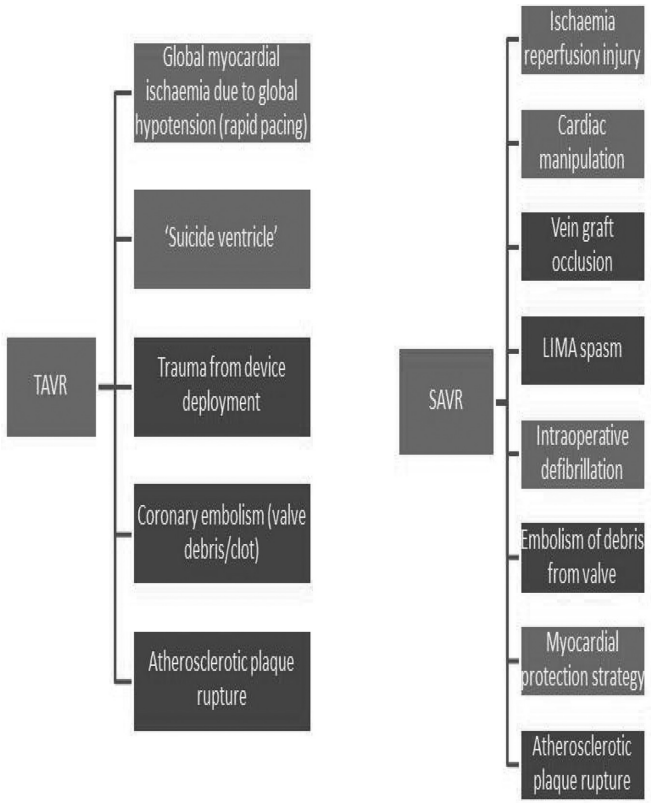
Introduction Cardiac biomarker release is ubiquitous following surgical and trans-catheter aortic valve replacement (SAVR and TAVI), preventing accurate discrimination between release due to focal myocardial infarction (MI) and global myocardial injury (Figure 1). Furthermore, the need for peri-procedural revascularisation in TAVI is debated. Cardiovascular magnetic resonance (CMR) late gadolinium enhancement imaging (LGE) is the most sensitive imaging method to detect post-procedural new MI. Our study aimed to compare rates of new MI using CMR LGE before and 6m after TAVI and SAVR.
Methods Ninety six patients with severe aortic stenosis undergoing TAVI (n = 57) and SAVR (n = 39) were prospectively recruited and identical scans performed prior to (median 1 day) and 6m following aortic valve replacement. The presence of significant coronary artery disease (CAD) was determined by the occurrence of a >50% stenosis in any major epicardial vessel. Areas of LGE were quantified with computer-assisted planimetry (2SD; cmr^{42}, Circle CVI). Presence of new LGE was determined by direct comparison of pre and post-procedure scans.
Results The SAVR group was younger, less symptomatic, had less 3 vessel CAD and were at lower surgical risk than the TAVI group. Most (87%) SAVR implants were bioprosthetic and most TAVI implants were Medtronic CoreValve (79%) (86% Transfemoral). Thirty-four (60%) patients had non-revascularised CAD at the time of TAVI. MI pattern LGE was present at baseline in 24 TAVI (42%) and 9 SAVR (24%) patients. The rate of new MI was greater in the SAVR group than the TAVI group (SAVR, n = 10 (26%) vs. TAVI, n = 3 (5%), p = 0.004). Absolute mean mass of new MI was similar between groups (SAVR 1.1g ± 0.6g vs. TAVI 2.0g ± 1.4g, p = 0.395) as was infarct mass as a percentage of left ventricular mass (SAVR 1.0 ± 0.4% vs. TAVI 2.2 ± 1.3%, p = 0.268) (Figure 2). None of the SAVR and only one of the TAVI infarcts were detected clinically (Figure 1 – blue dot). 34 patients (60%) in the TAVI group had non-revascularised CAD at the time of TAVI, of whom only 3 (9%) had new MI. In the SAVR group, 16 patients (41%) underwent concurrent coronary artery bypass grafting (CABG). Patients undergoing CABG were less likely to have a new MI than those not requiring concurrent revascularisation (CABG 6.3% vs. no CABG 39.1%, p = 0.021). There was no difference in mean cardiopulmonary bypass time (New MI 88.5 ± 31.1 vs. No new MI 114.5 ± 47.4min, p = 0.112) and aortic cross clamp



Abstract 38 Figure 1 Mechanisms of MI

time according to LGE status (New MI 66 ± 25 vs. No New MI 84 ± 42min, p = 0.164).

Conclusions MI is an infrequent complication of TAVI but is more common following SAVR. Infarct size is small following both procedures. The low new infarct rate in TAVI, especially in the context of high rates of non-revascularised CAD, is reassuring and strengthens the notion that coronary revascularization prior to TAVI may be unnecessary.

39 **THE IMPACT OF NEW LEFT BUNDLE BRANCH BLOCK FOLLOWING TRANS-CATHETER AORTIC VALVE IMPANTATION. IS THERE A TAVI LBBB-INDUCED CARDIOMYOPATHY? INSIGHTS FROM CARDIOVASCULAR MAGNETIC RESONANCE IMAGING**

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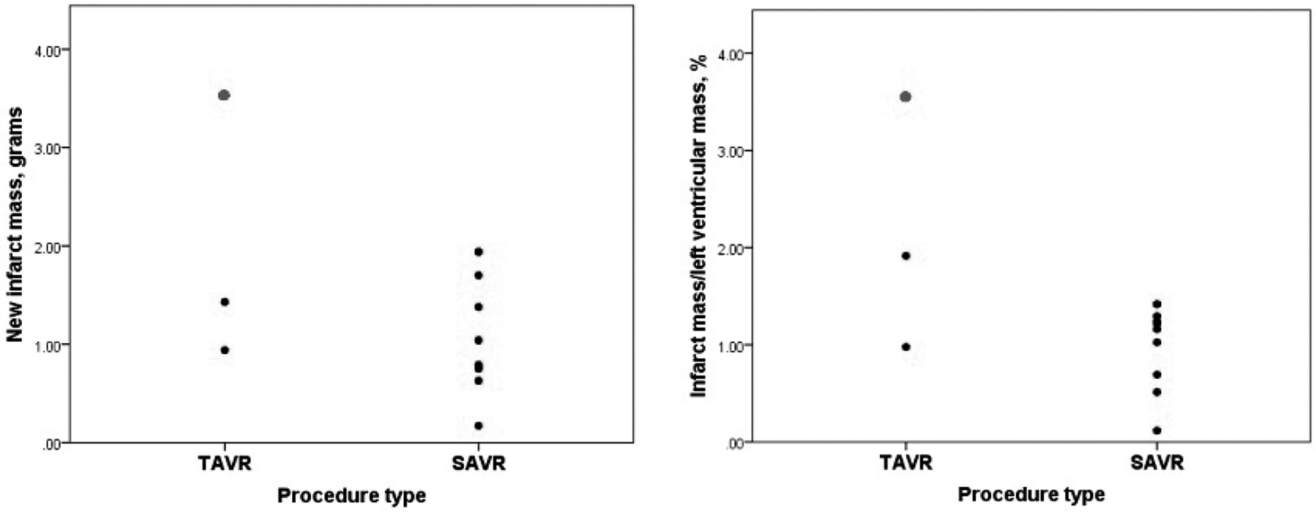
Introduction Left bundle branch block (LBBB) is common following trans-catheter aortic valve implantation (TAVI) and has been linked to increased mortality, although whether this is due to the development of a TAVI-induced LBBB cardiomyopathy is unclear.

Methods 48 patients undergoing TAVI for severe aortic stenosis were evaluated. 24 patients with TAVI-induced LBBB (LBBB-T) were matched with 24 patients with a narrow post-procedure QRS (nQRS). Patients underwent comprehensive Cardiovascular Magnetic Resonance (CMR) imaging prior to and 6m post-TAVI. Measured cardiac reverse remodelling parameters included left ventricular ejection fraction (LVEF), global longitudinal strain (GLS) and left sided chamber size. Inter and intraventricular dyssynchrony was determined using time to peak radial strain derived from CMR Feature Tracking.

Results In the nQRS group there was no change in QRSd (93 ± 17 to 96 ± 11 ms, p = 0.098). In the LBBB-T group, QRSd increased by a mean of 55 ms from 96 ± 14 to 151 ± 12 (p=<0.001). There was a significant difference in change in LVEF and GLS according to post-procedure QRS duration (LVEF: nQRS 4.6 ± 7.8 vs LBBB-T -2.1 ± 6.9%, p = 0.002; GLS: nQRS 2.1 ± 3.6 vs. LBBB-T -0.2 ± 3.2%, p = 0.024) (Figure 1). Those in the nQRS group had a significant improvement in LVEF (54.1 ± 11.5 to 58.7 ± 9.0%, p = 0.010) and GLS (15.6 ± 3.9 to 17.7 ± 2.7, p = 0.010) at 6 m follow up. There was a trend towards a reduction in LVEF in the LBBB-T group (56.6 ± 10.5 to 54.4 ± 9.3%, p = 0.092). The change in LVEF was driven by a reduction in indexed end-systolic volume in the nQRS group not seen in the LBBB-T group (nQRS -7.9 ± 14.0 vs. LBBB-T -0.6 ±



Abstract 38 Figure 2 Graphs of new infarct size