

complications. We would like to add a short comment concerning the complications of AVB.

AVB involves the use of a valved conduit to connect the left ventricular apex to the descending aorta, thereby providing an additional outlet for blood flow and relieving the left ventricular pressure overload.

Despite these advantages, there are likely concerns about malperfusion, aortic stasis and the potential for complications concerning the conduit. The potential complications of AVB include bleeding, thromboembolic events, porcine valve deterioration, endocarditis, myocardial infarction, arrhythmias, pseudoaneurysm formation of left ventricular apex graft anastomosis, conduit dehiscence from left ventricular apex, ventricular septal defect as reported by the authors, and thrombus formation in the aorta.

Aortic thrombus is a rare moribund complication of AVB and needs to be recognized. There have been some case reports of thrombus formation in the ascending aorta possibly caused by stagnation of native antegrade blood flow and fractionation of the cardiac output [2-5].

Parsa *et al.* [2] reported catastrophic complication of thrombus in the aortic root after AVB in a patient with severely left ventricular dysfunction, which required a left ventricular assist device. On the contrary, Takeda *et al.* [3] reported unusual thrombus formation in the aortic arch after AVB for severe aortic stenosis with good left ventricular ejection fraction.

Kotani *et al.* [4], by postoperative cine MRI study, reported that 29% of the cardiac output occurred through the native aortic valve but antegrade flow had decreased to 6% of the cardiac output at one year after surgery. Takahashi *et al.* [5] described that thrombus formation may be due to flow competition after AVB, especially in cases with poor left ventricular function.

Despite these undesired complications, we think that AVB still remains a safe and alternative option for a few high-risk complex patients in whom surgical AVR or TAVI is not feasible.

Conflict of interest: none declared.

References

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eComment. Specific complications of apico-aortic conduit

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doi: 10.1093/icvts/ivt198

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We read with interest the article by Lund *et al.* regarding the Danish experience with the aortic valve bypass and we would like to comment on the complications of this procedure [1].

Potential complications include bleeding, chest infection, wound healing problems, myocardial infarction, benign arrhythmias, pulmonary embolism, endocarditis and sepsis. Specific complications include thrombus formation, possibly caused by stagnation due to flow competition (need for anticoagulation or antiplatelet treatment), as well as formation of pseudoaneurysm, subepicardial aneurysm or dehiscence of apico-aortic conduit (AAC) from the left ventricular (LV) apex, ventricular septal defect (VSD) at the tip of the apical connector, prosthetic valve structure failure or late apico-aortic conduit (AAC) obstruction [1-4].

We have described the complication of pseudoaneurysm formation following an AAC procedure in a 49-year old male with aortic valve stenosis [2]. The patient had undergone coronary artery bypass grafting (CABG) six years previously, via a median sternotomy and subsequent surgical repair of a juxta-ductal coarctation of the aorta through a left postero-lateral thoracotomy three months after his CABG. Six weeks after the AAC procedure, the patient was re-admitted due to chest pain, severe dyspnoea and uncontrolled hypertension, having stopped his anti-hypertensive treatment two weeks prior to admission. Computed tomography scan revealed a patent AAC with extensive dehiscence from the LV plus an associated pseudoaneurysm requiring urgent surgical intervention [2]. A modification of establishment of cardiopulmonary bypass (via femoral cannulation) due to inadequate arterial inflow as a bailout procedure was used with direct cannulation distal to the valve of AAC with a new arterial cannula. It was subsequently followed by removal of the LV connector and application of a new apical connector with its distal end re-anastomosed to the existing valved conduit [2].

The patient made a slow recovery and remains well over a 5-year period.

Gammie *et al.*, in their study of 14 patients with AAC, have reported on two patients with LV apical pseudoaneurysms. The first one presented with this complication on the 15th postoperative day with symptoms of haemodynamic instability and tamponade and the second one on the 8th postoperative day during his follow-up CT-scan [3]. The surgical treatment was consisted with direct pledgeted sutures and the one case 4 months later had recurrent apical pseudoaneurysm which was successfully treated with coils and thrombin (by percutaneous approach) [3].

Doi *et al.* have reported on a case of postoperative subepicardial aneurysm near the site of the proximal anastomosis of AAC in a 78-year old woman, which was repaired with pledgeted sutures [4].

In recent years, transcatheter aortic valve implantation (TAVI) has become favourable in patients who are not suitable candidates for conventional aortic valve replacement. It reduces the rates of death from any cause, repeat hospitalization and cardiac symptoms, despite the higher incidence of strokes and vascular events compare to standard therapy [5].

Even though the need for AAC has been markedly reduced, this method can be considered for patients with exclusion criteria for TAVI (unicuspid/bicuspid AV valve, aortic annulus size <18 mm or >25 mm, pre-existing prosthetic valve, bulky calcified AV leaflets in close proximity to coronary ostia, peripheral vascular disease, recent stroke and others) [5].

Conflict of interest: none declared.

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