In this paper, we suggest that when surgical AVR or TAVI is not feasible, AVB is an option in high-risk patients.

Conflict of interest: none declared.

REFERENCES


APPENDIX. CONFERENCE DISCUSSION

Dr B. Osswald (Bad Oeynhausen, Germany): It may be a renewal of a technique, so it’s not really completely new but perhaps an alternative. However, I do have some problems with the patient selection. You have 10 patients so far since 2011 who were neither candidates for TAVI nor for classical aortic valve replacement. There is a 65 year old patient in your group. So I wondered, why are even the younger patients not candidates for TAVI or aortic valve replacement?

Dr Arendrup: We have a young patient, I think he’s 64 years old, he had severe atherosclerosis in the iliac artery, an abdominal aortic aneurysm, and he has a patent graft from the subclavian and a severely calcified aorta. Perhaps he could be a candidate for the transcatheter type, but at our institution we don’t perform it, we only do the transfemoral auxiliary approach, direct approach.

Dr Osswald: And the next point: two-thirds of the blood flow is going through the bypass; is one-third enough for the brain and the upper part of the body? Do you make any tests for cognition or something like that? Did you do some diagnostics about what happens in the upper part after you’ve established your bypass?

Dr Arendrup: We do flow measurement during the operation, but I don’t think you can do anything about that. We are routinely postoperatively doing MR scans, and the flow distribution is very consistent in all patients. Also, from the literature, one-third goes through the native aortograft, two-thirds through the conduit. I don’t know why, but that’s the way it is. And with the MRI you have perfect visualization and flow measurement, so you can be quite sure it is so.

Dr Osswald: Well, at least on your acute results; I’m worrying a little bit about the long-term results especially because of the impaired coronary blood supply. I don’t know whether you’re thinking about long-term results in these patients, but did you do any diagnostics on the coronaries?

Dr Arendrup: Of course, preoperatively we perform a coronary arteriography and we do not accept patients with coronary stenosis of more than 60%. If needed, we can do a graft to the LAD and to the circumflex during this operation, actually as an OPCAB procedure. I don’t know anything about the flow through the coronaries postoperatively. But the patients have no angina, and we have patients with two years’ follow-up without significant problems with the coronaries.

eComment. Aortic thrombus after aortic valve bypass surgery

Authors: Senol Yavuz, Furuk Toktas, Cuneyt Eris and Yusuf Ata

Department of Cardiovascular Surgery, Bursa Yuksek Ihtisas Education & Research Hospital, Bursa, Turkey

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Conventional aortic valve replacement (AVR) carries significant operative risks, especially in the elderly, high-risk patients with severe aortic valve stenosis including porcelain ascending aorta, complex left ventricular outflow tract obstruction, previous cardiac surgery (patent coronary grafts) or prior sternal infection, and previous radiation to the mediastium.

Transcatheter aortic valve implantation (TAVI) is an alternative therapeutic option in these complicated situations. Nevertheless, TAVI has some limitations in patients with severe aorto-iliac disease, small aortic annulus (<19 mm), and previous prosthesis valve. It is associated with an increased incidence of major stroke, an injury to atrioventricular conduction system, and major vascular complications.

Due to a higher incidence of complications of TAVI, aortic valve bypass (AVB, apicoaortic conduit) surgery may be a therapeutic means of choice in high-risk patient populations with comorbidities. We read the article by Lund et al. [1] with great interest. The authors have shared with us their Danish experiences regarding AVB. They are to be commended for reminding us of another alternative in the armamentarium for the treatment of severe aortic stenosis. The authors clearly stated the benefits of AVB. However, there is mention of a few serious
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 ascending 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


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 posterolateral 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 [4].

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 pledged 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 pledged 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.

References


