Successful transapical aortic valve implantation four weeks before 97th birthday

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Abstract

Aortic valve replacement (AVR) is currently the treatment of choice in patients with symptomatic aortic stenosis, but transcatheter off-pump aortic valve implantation is a novel and emerging technique, which might be performed more frequently in the near future and may be a less invasive alternative to conventional AVR in selected high-risk patients. Up to date, the preoperative patient selection is debated and potential candidates for these new techniques are widely discussed. We report a successful transapical aortic valve implantation performed in a 96-year-old woman demonstrating the potential of the novel technique as an alternative treatment option in old and multimorbid patients at high risk for conventional AVR.

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1. Introduction

Aortic stenosis is the most frequent acquired valve disease in Europe. Surgical aortic valve replacement (AVR) is the treatment of choice and has become the golden standard [1]. In many industrial countries, octogenarians, nonagenarians or even centenarians represent a rapidly growing subgroup of our aging society due to better treatment options and health care and this trend will continue in the future [2]. Therefore, we may expect to see an increase in older patients presenting with symptomatic aortic stenosis being referred to surgery since AVR represents the only effective therapeutic treatment option. Although outcomes of conventional surgical operation are excellent, even in elderly patients, as proven by large national databases and recent numerous studies, mortality rates increase with significant comorbidities. Moreover, there is also recent evidence that >30% of the patients remain untreated and nearly the half of them are deemed ‘too sick’ for AVR. Preoperative risk assessment, reflected by several scoring systems like the EuroSCORE or STS-score, might therefore reveal ‘high-risk’ patient profiles, resulting in an increased risk for conventional surgery. Therefore, transcatheter aortic valve implantation (TAVI) techniques have evolved as an alternative, to offer treatment options for these ‘high-risk’ patients.

2. Case report

In August 2008, a 96-year-old female was referred to our hospital, suffering from dyspnea and recurrent syncope based on severe aortic valve stenosis. The preoperative NYHA functional class was III–IV. Transesophageal echocardiography revealed an aortic valve area of 0.4 cm² and a mean pressure gradient of 61 mmHg. Logistic and additive EuroSCORE was 44.13% and 14%, respectively. Preoperative left-ventricular ejection fraction was not impaired (53%). The STS-score showed an estimated risk of mortality of 16.8%. After extensive discussion together with the patient and her relatives, the patient refused conventional operation and gave informed consent for TAVI. The transfemoral approach was not possible due to severe tortuosity and calcification of the femoral vessels (Fig. 1). Therefore, we chose a transapical approach. The operation was performed on 21st August in the hybrid-OR of the West German Heart Center Essen. A 26-mm Sapien™ bioprosthesis was implanted using rapid right ventricular pacing at 180/min with a good intraoperative result, as shown by the intraoperative mean pressure gradient of 8 mmHg with no signs of paravalvular leakage or aortic valve insufficiency (Fig. 2). Skin-to-skin time was 155 min, 200 ml of contrast media was used and fluoroscopy-time was 8 min. The patient could be extubated immediately on the table after chest closure and was transferred neurologically unremarkable to the intensive care unit. Hemodynamic function was excellent and the patient had a fast and uneventful recovery, showing only mild signs of renal impairment. Two days later, the patient could be transferred to the normal ward.
3. Discussion

The TAVI is a novel and innovative treatment option for multimorbid and aged patients with symptomatic aortic valve stenosis. Transcatheter aortic valve implantation has been introduced into clinical practice in Europe recently [3]. Up to date, early clinical results either via transfemoral or transapical approach are encouraging and proof of concept has been demonstrated [4], although long-term results and prospective randomized trials are not available so far. Nevertheless, careful patient selection is of importance and plays a major role for patient outcomes.

The current available results concerning the new techniques suggest that TAVI is a feasible treatment option in ‘high-risk’ patients [5]. While some authors are confident that TAVI will clearly increase in the near future, others state that the results at present should be regarded critically [6].

According to age as a risk factor per se, postoperative mortality rates for octogenarians undergoing cardiac surgery were reported between 8 and 24% [7]. Studies on morbidity and mortality of subgroups of patients older than 90 years have not been well described yet, due to the fact that cardiac surgery is not commonly performed in patients aged 90 years and older. Edwards and Taylor showed that, on average, five heart valve implantations in non-agenarians were performed annually in the United Kingdom and due to an increased number of elderly patients, this issue aroused lively interest by now [8]. Ullery et al. reported recent operative mortality rates of 8% in non-agenarians undergoing elective cardiac surgery in a highly selective subgroup, but others have also shown higher mortality rates. In the present case report, the patient was in a good preoperative condition, despite the age of 96 years. After discussion of the pro and contra of each concept, the patient refused conventional AVR and preferred the less invasive transcatheter approach. The evaluation of patients older than 90 years should be focussed on the level of physiologic and social functioning, the individual patient’s operative risk and the motivation to undergo a surgical procedure for heart valve implantation has to be well reconsidered [9]. Mainly, these old patients will benefit from these new concepts of minimally invasive aortic valve implantation by avoiding sternotomy, extracorporeal circulatory support and cardiac arrest.

References


