



Case Report

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A Rapid-Deployment Valve Implantation in A Complex Chronic Type A Dissection Reoperation



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Abstract

We present a 59-year-old female patient suffering from recurrent chest pain after acute Stanford type A aortic dissection (TAAD) with previously limited ascending aortic replacement and partial aortic root remodeling. Today, the angiography shows a residual TAAD of the ascending aorta and moderate aortic valve regurgitation. During urgent redo surgery a re-ascending, including arch replacement and frozen elephant trunk was performed, and a rapid-deployment valve system was used for aortic valve treatment. The postoperative course was uneventful and the patient could be discharged on postoperative day 14. At six months follow-up, the patient was completely stable, without recurrent cardiac symptoms.

Introduction

Acute Stanford type A aortic dissection (TAAD) is a devastating and life-threatening disease, with an incidence of 5 to 30 cases per 1 million patients per year [1]. Pre-hospital mortality is between 18-49%, upon hospital arrival 1-2% per hour, with a total mortality of 30-68% within the first 48 hours [2]. Surgical treatment is unavoidable, however the therapeutic strategy of TAAD is still controversy. Some surgeon prefer a limited approach by ascending or hemi-arch replacement and other total treatment of the complete thoracic aorta including using a frozen elephant trunk [3]. If the aortic valve is involved, aortic valve treatment is needed and generally valve repair preferred. We present a case with chronic TAAD, in which the partial root remodeling technique on the non-coronary sinus and limited ascending aorta replacement was performed initially during the acute phase.

Case Report

A 59-year-old female patient suffering from recurrent chest pain after acute Stanford Type A aortic dissection (TAAD) presented at our outpatient clinic. Four months prior to this consultation, the patient underwent emergency surgery with aortic root remodeling and replacement of the ascending aorta in deep-hypothermic arrest at another centre. The postoperative

period was complicated by pulmonary insufficiency with prolonged ventilation. At the present visit in our department, a control contrast-enhanced computed tomography was performed showing a rest dissection starting at the distal ascending aorta was seen (Figure 1). Additionally a moderate aortic valve regurgitation was seen at transesophageal echocardiography (Figure 2). The patient was urgent taken to the operating theatre for complete open repair. Cardiopulmonary bypass was initiated by re-cannulation of the right axillary artery and the right femoral vein. Hypothermic circulatory arrest at 17.7°C was instituted for implantation of a frozen elephant trunk (E-vita OPEN PLUS Hybrid Stentgraft System 24mm with a stentgraft length of 130mm; Jotec GmbH, Hechingen, Germany), arch replacement and replacement of the aortic valve using a rapid-deployment valve system (23mm) after removing the native aortic valve leaflets. Antegrade brain perfusion was performed for 42 minutes and cross-clamp time was 93 minutes. The postoperative course was uneventful and respirator weaning was achieved within 5 hours. On postoperative day 2, the patient was transferred to the general ward. The patient was discharged home on postoperative day 14 showing excellent aortic valve function, without regurgitation and optimal aortic repair (Figure 3,4). On 6 months follow-up these data could be confirmed (Figure 5).

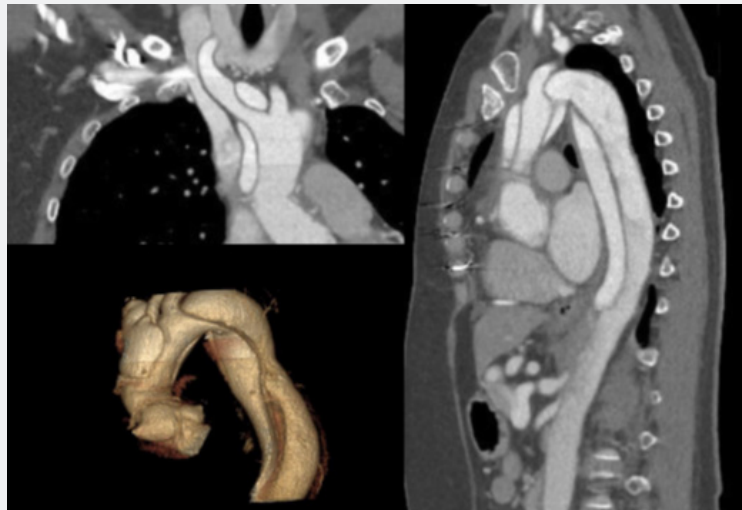


Figure 1: Control contrast-enhanced computed tomography showing a rest dissection starting at the distal ascending aorta.

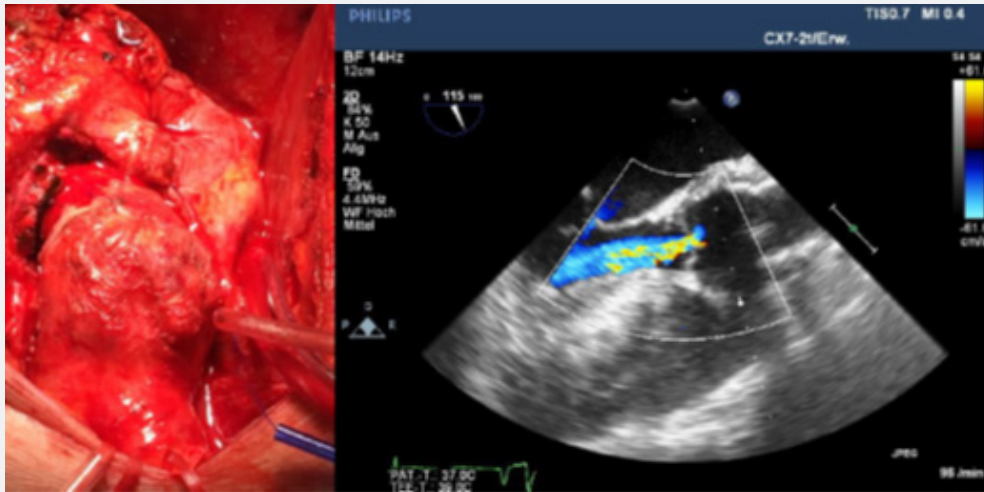


Figure 2: Aortic valve regurgitation depicted in transesophageal echocardiography.



Figure 3: Postoperative control-enhanced computed tomography and 3D-reconstruction.

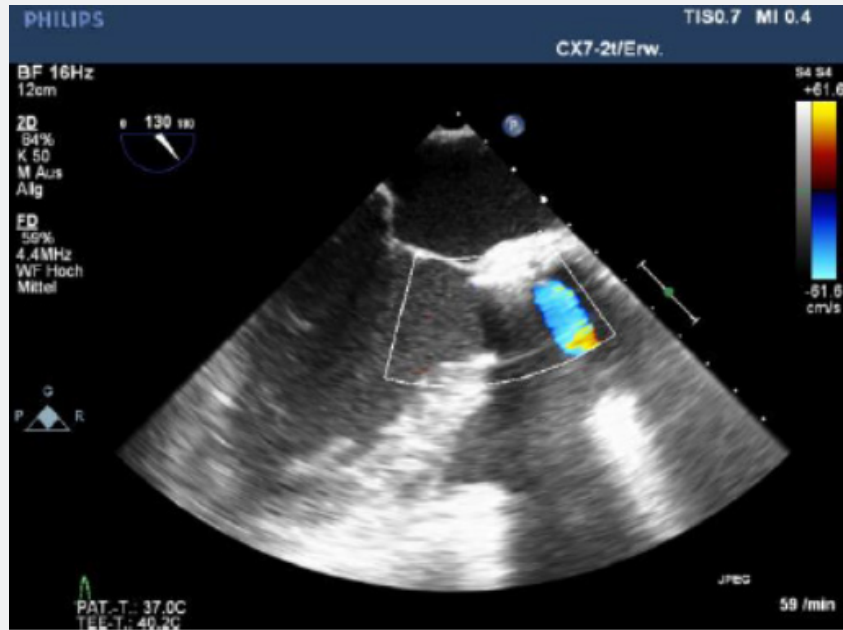


Figure 4: A complete competent aortic valve during postoperative transesophageal echocardiography.

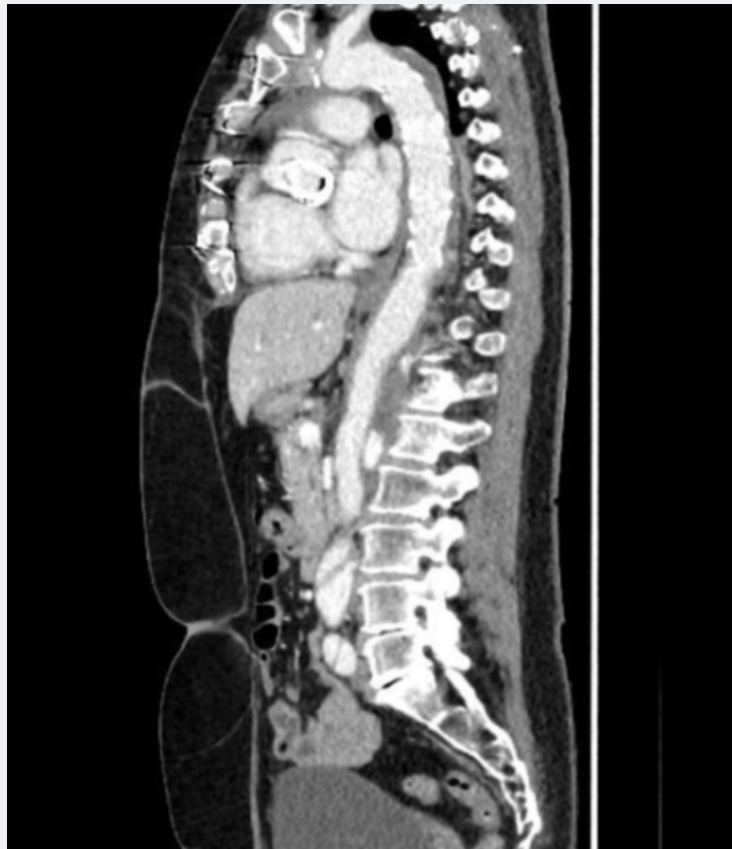


Figure 5: Postoperative control-enhanced computed tomography at six months follow-up.

Comment

Chronic Stanford type A aortic dissection has been defined in the guidelines of 2014 as those TAAO over 90 days [4]. In the setting of a prior surgery for an acute TAAO persistent dissection of the ascending aorta was a rare finding.

Rapid deployment valve system was initially implemented in the therapy of isolated aortic stenosis as an alternative to transcatheter aortic valve implantation with the advantage of surgical inspection and removal of degenerated, calcified aortic valves. Compared to surgical aortic valve replacement, rapid deployment valves offer shortened aortic cross-clamp time and shorter duration of cardiopulmonary bypass. Today indications were extended to concomitant procedures or endocarditis and advantages such as the use of larger prostheses resulting in lower transvalvular gradients and higher indexed effective area have resulted in broad application of these prostheses [5,6]. Although some conflicting data exist in terms of perioperative stroke, need for permanent pacemaker implantation, and mean pressure gradients none of these were observed in our patient but favourable CPB and cross-clamp times were achieved.

Aortic regurgitation as an indication for rapid deployment prostheses is rare and there is only limited data on this indication especially in the setting of redo aortic root surgery such as case studies. Additionally experience with transcatheter aortic valves as an off-label use for pure aortic insufficiency showed no difference in in-hospital mortality compared to surgical aortic valve replacement after 2 years in an analysis of 14.720 patients from National Inpatient Sample database [7].

Reported hospital mortality for operation of the aortic root following previous surgery of the aortic root ranges between 0 and 12% [8] and these procedures undoubtedly are technically demanding. Partial root remodelling is employed in some centres for treating root involvement in aortic dissection with the intimal tear extending into the noncoronary sinus or additionally to the right coronary sinuses only [9]. Haung and colleagues reported a rate of re-operation of the aortic valve after partial aortic root

remodelling of 8.6 % after 36.4 ± 31.6 months in a single-centre study of 40 patients [9].

In conclusion this case report highlights the importance of including all recent technologies into the surgical armamentarium in order to provide best practice and achieve strong results to the individual needs of patients. Rapid deployment prostheses showed excellent function in the reported redo surgery of the root and ascending aorta after initial partial root replacement and aortic ascending replacement.

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