

# Sutureless Aortic Valve Replacement in a Patient with Transfemoral Aortic Valve Replacement and Left Ventricular Hypertrophy

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## Abstract

### Keywords

- ▶ aortic valve
- ▶ heart valve
- ▶ TAVI
- ▶ cardiomyopathy
- ▶ sutureless aortic valve

**Background** Transarterial valve intervention (TAVI) is valuable in high-risk patients, however, in case of left ventricular outflow tract (LVOT) obstruction, conventional surgery, including partial myectomy, is indicated.

**Case Description** An 84-year-old female patient presented with increasing fatigue after TAVI in 2012, demonstrated a narrowed LVOT. Conventional surgery was performed, including removal of the transcatheter valve, partial septal myectomy, and implantation of a sutureless valve. The postoperative course was uncomplicated.

**Conclusion** Aortic valve stenosis combined with severe left-ventricular hypertrophy is not ideal for TAVI. Conventional surgery, performing partial septal myectomy and implantation of sutureless aortic prosthesis, seems more appropriate.

## Background

Transaortic valve intervention (TAVI) is a valuable technique in inoperable and very high-risk patients with severe aortic valve stenosis.<sup>1</sup> These patients often show secondary left ventricular hypertrophy due to chronic pressure overload. In case of left ventricular outflow tract (LVOT) obstruction, partial septal myectomy should be considered the most appropriate treatment for most patients.<sup>2</sup>

## Case Description

An 84-year-old female patient presented with increasing fatigue after transfemoral valve implantation 2 years ago at another hospital. A 23-mm Edwards sapien (Edwards Lifesciences LLC, Irvine, CA) transcatheter heart valve was implanted. Echocardiographic examination demonstrated severe narrowing of the LVOT at 12 mm with a peak pressure gradient of 30.0 mm Hg due to severe septal hypertrophy (▶ Fig. 1) and an elevated pressure gradient

across the valve. Invasive pressure measurement showed a peak pressure gradient of 74.0 mm Hg between the left ventricle and the ascending aorta. After clarifying therapeutic options for the patient (EuroSCORE: 10.1%, EuroSCORE II: 7.54%, STS score: 16.9%), conventional surgery, including sternotomy, aortic cross-clamp, and cardiopulmonary bypass was preferred. The Edwards sapien aortic valve was explanted and the calcified native cusps were removed. The prosthetic valve showed thick pannus formation toward the LVOT (▶ Fig. 2A), which was confirmed histologically by a pentachrome staining (▶ Fig. 2B). Additionally, thrombotic material was found at the cusps toward the aorta. Partial septal myectomy was performed and a sutureless aortic valve (Sorin Perceval Size M [Sorin Group, Milan, Italy]) was implanted. Cross-clamp and cardiopulmonary bypass time was 25 and 43 minutes, respectively. The postoperative course of the patient was uncomplicated with stable sinus rhythm and no atrioventricular block occurred. Echocardiography showed an enlarged LVOT (▶ Fig. 3) with a peak pressure gradient of 13 mm Hg, a

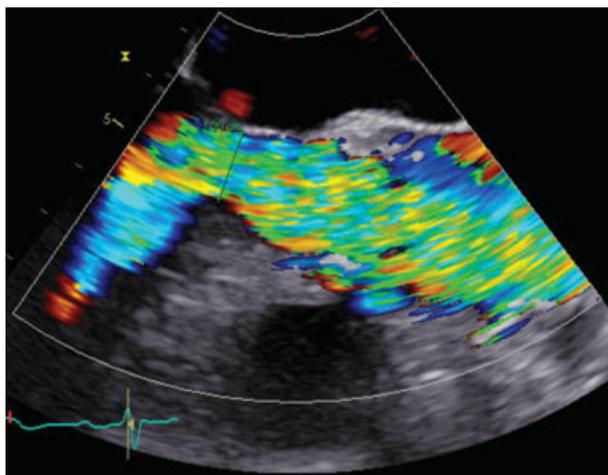
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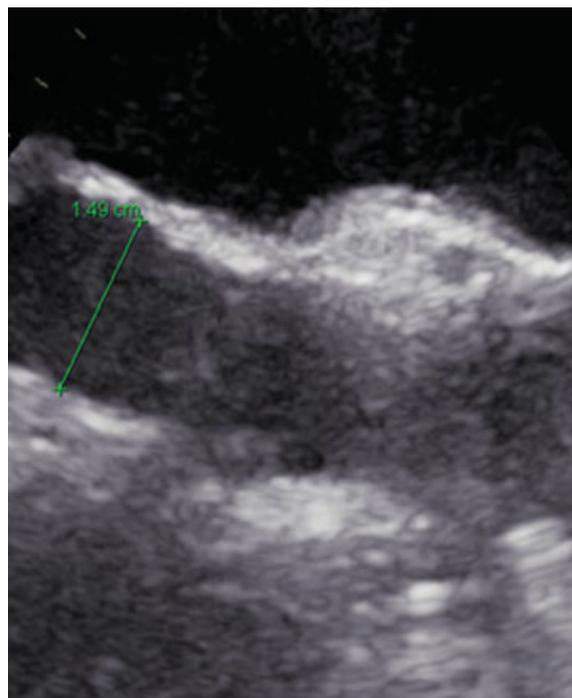


**Fig. 1** Obstruction of the left ventricular outflow tract in color echocardiography before conventional surgery.

normal function of the prosthesis, and no ventricular septal defect.

### Conclusion

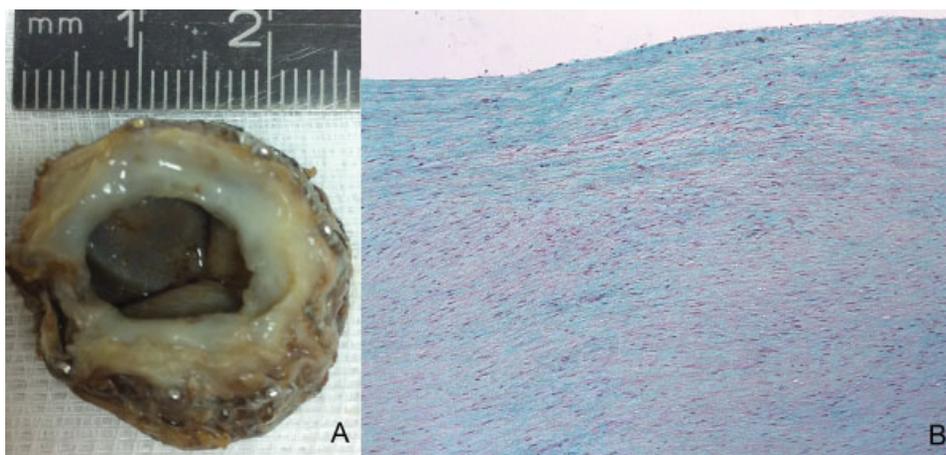
High-risk patients suffering from severe aortic valve stenosis in combination with extensive left ventricular hypertrophy may not be the ideal candidates for TAVI. Even though hemodynamic results after TAVI were reported excellent,<sup>3</sup> no resection of the obstruction in the LVOT is possible. Therefore, pressure overload after the TAVI-procedure persists and regression of left ventricular mass is either slowed down or inhibited. Even minor obstructions in the LVOT can be responsible for this process. This led in the reported case even to an increase of left ventricular obstruction, which had 2 years ago not been considered to be relevant. The LVOT-obstruction caused consecutively hemodynamic turbulences, which are known to trigger the growth of pannus.<sup>4</sup> This led to



**Fig. 3** Enlarged left ventricular outflow tract in echocardiography after conventional surgery including septal myectomy.

an even worse obstruction and the development of an vicious circle of LVOT-narrowing. Finally, the necessity of surgical valve replacement in combination with a septal myectomy arose. This procedure should be considered even in patients with no evident LVOT-obstruction, but extensive left ventricular hypertrophy.

Sutureless valve replacements or fast deployment aortic valves offer advantages in these high-risk patients. With simplified implantation techniques, the operation can be performed with minimized myocardial ischemic time<sup>5,6</sup> and therefore reduced procedural risk.<sup>7</sup> Furthermore,



**Fig. 2** (A) Explanted heart valve with thick pannus formation toward the left ventricular outflow tract. (B) Pentachrome staining of pannus formation.

regression of left ventricular mass benefits from the septal myectomy, to prevent the vicious circle of LVOT obstruction.

Therefore, we conclude that conventional surgery performing partial septal myectomy and surgical valve replacement seems to be the appropriate option for high-risk patients with extensive left ventricular hypertrophy and even slight LVOT obstruction.

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