Available online at www.sciencedirect.com
ScienceDirect
journal homepage: http://www.elsevier.com/locate/crvasa

Case report

Transcatheter aortic valve replacement – Therapeutical option in a patient with complex heart disease

P. Zdráhal [a,b,*], J. Bis [a], P. Polanský [c], J. Dušek [a], J. Šťásek [a,b]

[a] Department of Medicine I, Teaching Hospital Hradec Králové, Czech Republic
[b] Charles University, Faculty of Medicine Hradec Králové, Czech Republic
[c] Department of Cardiac Surgery, Teaching Hospital Hradec Králové, Czech Republic

ARTICLE INFO

Article history:
Received 21 March 2017
Accepted 29 June 2017
Available online xxx

Keywords:
Aortic valve stenosis
TAVR
AVR
Midventricular obstruction
Calcification
Obesity
Dyspnoea

ABSTRACT

Authors are presenting a case report describing diagnostic and therapeutic approach in patient with severe dyspnoea. The dominant cause of the symptoms was combined aortic valve disease and monstrous obesity. The other findings were combined mitral valve disease and provoked midventricular obstruction of the left ventricle. A complex cardiac surgery was not recommended due to the aortic valve annulus size, massive calcification of both mitral and aortic valves and extreme obesity resulting in a high risk of perioperative mortality. As an alternative approach, the transcatheter aortic valve replacement procedure (TAVR) was performed. In a very difficult terrain, the maximum possible result was finally reached – a considerable decrease of dyspnoea and reduction of midventricular obstruction. This case reports additional application for transcatheter stent bioprosthesis in patients with complex cardiac disease.

Introduction

Dyspnoea is a common symptom in patients hospitalized at internal and cardiological departments. The aetiology of dyspnoea is usually multifactorial. The most common causes are cardiac diseases, pulmonary diseases, anaemia, obesity, and their combinations. The case report describes diagnostic and therapeutic approach in patient with severe dyspnoea and recently diagnosed complex heart disease.

Case description

A 64 years old woman with monstrous obesity (body mass index 48, height 158 cm, weight 120 kg, Fig. 1), arterial hypertension, dyslipidemia, glucose tolerance disorder and history of paroxysmal atrial fibrillation, was admitted to our department at the end of 2015 in order to determine the cause of dyspnoea. The symptoms have persisted for 5 years, with a noticeable progression during the last year.

* *Corresponding author at*: Department of Medicine I, Teaching Hospital in Hradec Králové, Czech Republic.
E-mail address: petr.zdrahal@fnhk.cz (P. Zdráhal).
http://dx.doi.org/10.1016/j.crvasa.2017.06.015

Fig. 1 – CT topogram demonstrating severity of patient's obesity.

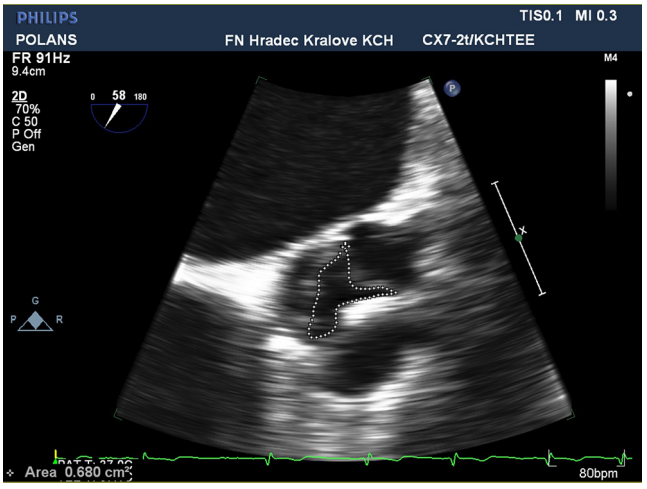

Fig. 2 – Aortic valve orifice planimetry, calcifications of leaflets and annulus – transesophageal echocargdiography.

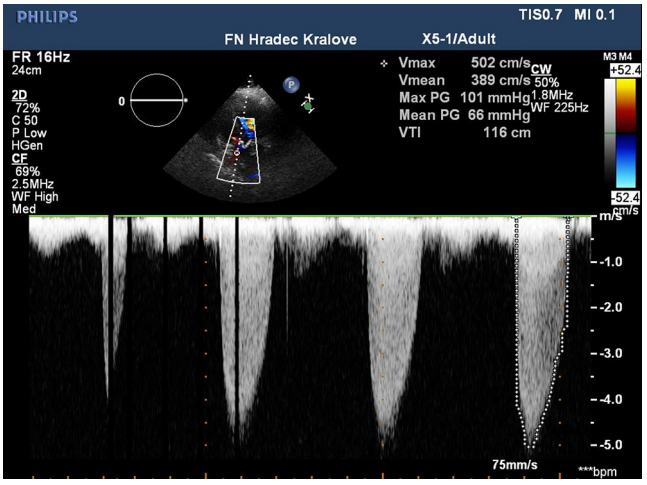

Fig. 3 – Aortic valve pressure gradient measurement – continuous wave Doppler ultrasound (4AC view with aortic valve).

Objectively, the patient was able to walk up to 2.5 floor and the 6-minute walking test distance was 365 m. The patient was limited by dyspnoea. A physical examination proved a systolic murmur above aortic valve (intensity 3/6) and an obvious lower limbs swelling. There were no serious pathological findings in lab tests. The chest X-ray showed enlarged heart and discreet signs of lung congestion. The echocardiography proved a supranormal ejection fraction of hypertrophic left ventricle (70%) and dilated left atrium (55 mm, parasternal long axis view). The aortic valve was tricuspid, heavily calcified, critically stenotic (aortic valve area 0.68 cm^2, aortic valve area related to body surface area 0.31 cm^2, pressure gradient max/mean 101/66 mmHg). There was also a mild to moderate aortic valve regurgitation (Figs. 2–4). The annulus size was 18.5–19 mm (Fig. 5), which substantially contrasted with patients habitus. Occasionally, provoked midventricular pressure gradient was detected (max/mean 48/12 mmHg) (Fig. 6). The mitral valve was rigid (both leaflets were calcified), with mild stenosis (pressure gradient 14/5 mmHg, mitral valve area 2.39 cm^2, mitral valve area index 0.93–1.09 cm^2/m^2) and mild regurgitation (Figs. 7 and 8). There were extreme calcifications of the mitral valve annulus and aortomitral continuity (Figs. 9 and 10). A cardiac catheterization confirmed combined aortic and mitral valve disease. The mitral valve regurgitation was diagnosed as mild to moderate. A series of pressure gradient measurements (left ventricle vs. aorta, left ventricle vs. left ventricle outflow tract, left ventricle outflow tract vs. aorta) revealed a significant, dynamic, midventricular obstruction (Figs. 11–14). The highest pressure gradient between left ventricle and aorta provoked by extrasystole or Valsalva manoeuvre reached 190 mmHg. Pulmonary capillary wedge pressure values indicated mild to moderate, combined, pulmonary arterial hypertension. There were no signs of a coronary artery disease.

The aetiology of dyspnoea was assessed as combined. The data were discussed by the heart team. A complex cardiac surgery (aortic valve replacement, mitral valve replacement, MAZE and septal myectomy) was considered. Finally the surgery was not recommended. The aortic valve disease was evaluated as a dominant cause of the symptoms. All the risk factors were considered and the transcatheter aortic valve replacement (TAVR) was chosen as the most suitable solution. An appropriate prosthesis size was determined by the parameters acquired by three dimensional transesophageal echocardiography (TEE) and CT aortography. According to the TEE, the aortic annulus area was 301–312 mm^2 and the annulus diameter was 19.6–19.9 mm (Fig. 15). The annulus area derived from CT scans was 297 mm^2 and the diameter