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Case Report

Replacement of Bioprosthetic Mitral Valve Ionescu–Shilley with a Mechanical Valve after 24 Years

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Abstract

Background: Reoperations for bioprosthetic valve malfunction can sometimes be technically very demanding. Bio prostheses are of limited durability, regenerate more rapidly than mechanical valves and reoperation usually takes place 7 to 15 years later. They do not require long term anticoagulative treatment and are preferred in patients over about 70 years of age.

A case report of a 55 year old lady, who presented with malfunctioning mitral bio prosthetic valve 24 years after the initial operation, due to rheumatic stenosis that was replaced successfully with a mechanical valve.

Keywords: Bioprosthetic; Mechanical Valves; Open-Closed Commissurotomy; Valvuloplasty; Mitral Valve Replacement

Introduction

Sir Lauder Brunton [1] was among the first surgeons to consider surgical treatment of mitral stenosis. Cutler, Mosley, Bent did experimental work on surgical approaches. In 1923 Cutler and Levine reported an operation *via* median sternotomy in which a special curved knife was inserted through the left ventricular apex to cut a stenotic mitral valve. Souttar (1925) digitally opened a stenotic mitral valve through the left atrial appendage.

The institution of extracorporeal circulation for the management of cardiac diseases, from Gibbon 1953, John Kirkling 1955 and many others, contributed essentially in cardiac surgery development [1]. In 1955 surgeons began to think of opening stenosed mitral valves by open techniques on Cardio Pulmonary Bypass (CPB).

So after this then have been started the surgical management of mitral valve disease see Table 1. Mitral valve replacement can be realise with mechanical or bioprosthetic valves see Table 2.

Case Presantation

A 55-year-old lady who developed insufficiency of the bioprosthetic mitral valve IONESCU-SHILLEY 27mm (replaced 24 years before) that finally was replaced successfully with a metallic valve SULTZER CARBOMEDICS OPTIFORM 25mm.

At the age of 25 she underwent close commissurotomy (mitral stenosis due to rheumatic disease in childhood). Six years later, she underwent mitral bioprosthetic valve replacement (IONESCU-SHILLEY 25mm).

The anamnesis of the patient is accomplished by caesarean 22 years ago, arterial hypertension under treatment 5 years ago, cholecystitis in the 2003 and chronic atrial fibrillation six months ago.

She has never smoke in her life and the alcohol consumption was practically zero.

Her father died 69 years old by myocardial infarct and her mother 75 years old by car accident.

The last six months she expressed of getting tired easily, dyspnoea so she went under the usual medical exams.

The echocardiogram developed insufficiency 2^+ to $3^+/4^+$ with mild stenosis of the bioprosthetic mitral valve. Angiography demonstrated normal coronary perfusion.

Left ventricle ejection fraction was documented as 45%.

The patient underwent redo mitral valve surgery and a metallic valve SULTZER CARBOMEDICS OPTIFORM 25mm was inserted.

The main extracorporeal circulation time was 157 minutes, the cross clamp time 92 minutes and the lowest temperature of the oesophagus was 28.8°C.

The patient was transferred to the cardiothoracic intensive care unit for 30 hours.

She had an uneventful postoperative recovery. Her stay in the hospital was in total 6 days.

At the first postoperative meeting (follow-up) as an outpatient, after 4 weeks, she was asymptomatic.

The new echocardiogram demonstrated well function of the new valve and the ejection fraction was estimated as 50 –55%. She is still well after 48 months.

Discussion

Rheumatic fever is one of the most common causes of mitral stenosis [2]. Approximately 25% of all patients with rheumatic heart disease have pure mitral stenosis. However, the combination of mitral

Table 1: Surgical treatment of mitral valve diseases.

• Close commissurotomy
• Open commissurotomy
• Valvuloplasty
• *Via* PTCA
• Valve replacement

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Table 2: Differences between mechanical and bioprosthetic valves.

	Mechanical Valve	Bioprosthetic Valve
Patient Age	< 70 YEARS	>70 Years, Gravidance In Young Females Patients By The Proposition Of Reoperation
Anticoagulant Therapy	Yes (Life Time). In Case Of Af In Any Age	No
		(In Some Cases Maybe Needed For 3 – 6 Months)
Durability	Life Time	10–15 Years

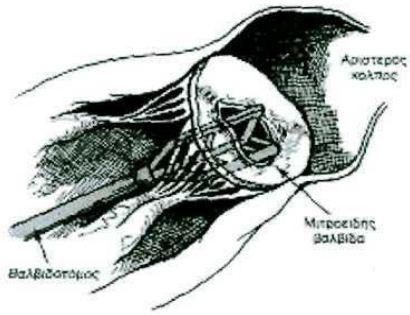

Figure 1: Closed commissurotomy.

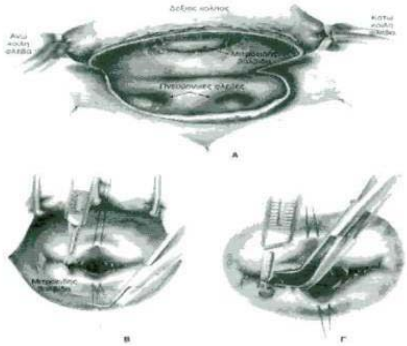

Figure 2: Open commissurotomy.

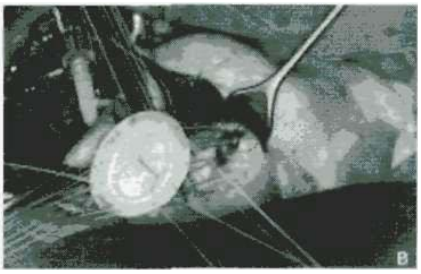

Figure 3: Mitral valve replacement.

stenosis and regurgitation remains the most common form of this condition Rheumatic disease causes a fibroretractive transformation of the valve. Fibrosis is a slow process affecting all segments of the mitral apparatus. Valvular lesions include leaflet thickening, chordal thickening and fusion, and commissural fusion. In mitral stenosis, thickening of the Valvular tissue restricts leaflet motion during diastole. Other aetiologies such as malignant carcinoid and systemic lupus rarely affect the mitral valve, causing varying degrees of mitral stenosis. Endocarditis, calcified cusp, idiopathic hypertrophic miocardiopathy, malfunctioning prosthetic valve, left atrial myxomas [2,3] may also cause mitral stenosis. Idiopathic mitral stenosis is very seldom as the toxic affection from prolonged use of Mettisergide maleate (sansert) [2].

Surgical treatment is suggested when pharmaceutical management no responds see Table 3. Indications for operation take place when one or more than one indication happens (Table 4).

At the initial stage of the disease surgical management is suggest to every symptomatic patient, because mortality is less than 1% and possibility for commissurotomy is more than 90% [3].

Stenosis mitral valve management can be realise surgically by opening repair or replacement [4-6]. The mitral valve opening can be done by close and open commissurotomy [7].

Close commissurotomy *via* lateral left thoracotomy at the 5th intrapleural space without extracorporeal circulation was preferred to young patients (bellow the age of 45 years) with the condition that is not exist calcified cusps or thrombus on the left atrium [4] .

Open commissurotomy *via* middle sternotomy with extracorporeal circulation is most preferable to replacement. Open commissurotomy's results are better in unalloyed stenosis [5-7]. It is a safe operation with good result for at least 5-10 years. When is accompanied to valvuloplasty is best [7].

Last years, cardiologists have been developed a technic (PTCA) for opening the mitral stenotic valve [8].

At the age of 25 years, patient underwent close commissurotomy and six years later under mitral valve replacement.

At the age of 31 she choose bioprosthetic valve because:

- She wanted to be mother
- She was negative receiving anticoagulant therapy (tablets) for all her life.
- At the first step of the cardiac surgery was imens scepticism about valves. There were not existed articles and experience about the resistance and durability of the valves.

Generally in patients under 70 years old, metallic valves are preferred with anticoagulant therapy for all life. Bioprosthetic valves do not demand anticoagulation therapy and preferred in patients over 70 years old. They can also be replaced in young woman who wish to become mothers, with the remaining that they will be operated again [9,10]. Bioprosthetic valves have a durability from 10 to 15 years (Table 2).

Patient received a bioprosthetic mitral valve Ionescu-Shilley 27mm for stenosis who developed due to rheumatic fever in childhood. After the operation she had a normal life and she becomes mother too. The last six months after 24 years approx from the initial

Table 3: Pharmacological treatment of mitral valve stenosis.

Prophylactic treatment with Penicillin for Streptococcus β haemolitic Infection
Prophylaxis from infectious endocarditis
Diuretics to any grade of dyspnoea
Digitalis

Table 4: Indications for surgical treatment of a mitral valve stenosis.

Heart insufficiency stage III–IV (NYHA classification)
Pneumonic hypertension
Dilated left atrium
Atrial Flatter (AF)
Pulmonary complications
Valve's endocarditis

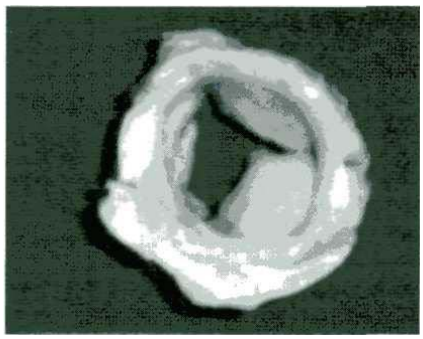

Figure 4: The bioprosthetic valve IONESCU-SHILLEY.

operation she became symptomatic shortness of breath and getting tired easily. The heart ultrasound developed insufficiency 2^+ to $3^+/4^+$ with stenosis of the bioprosthetic mitral valve. The mitral's

reoperation with the known difficulties was finally successfully [11,12]. The reopening of the sternum median sternotomy (it is also described the right thoracotomy in similar reoperation [13,14]).

The access in extracorporeal circulation *via* aorta-atrium (could be realised also *via* femoro-femoral bypass [15]).

The removal of mitral bioprosthesis and the implantation of the new metallic valve and the exit from the extracorporeal circulation was done carefully.

The valve which was removed morphologically did not demonstrate essential lesions.

It was not observed amyloidosis as Walley et al did [16,17] .

Bioprosthetic valve Ionescu-Shelley is previous to Carpentier-Eduards witch has been replaced. Studies referring to durability and resistance demonstrate the superiority of Carpentier-Eduards valve type [18,19]. The same has been documented using the ultrasounds (echocardiografically) [20,21].

Conclusion

From our bibliographic research we did not found another similar case of substitution of an Ionescu-Shilley valve type, after 24 years and the valve so well preserved. [22,23].

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