

Mitral Regurgitation Secondary to Anterior Leaflet Rupture during Percutaneous Balloon Valvuloplasty: Case Report

Ahmet Kirbas,¹ Onur Gurer,¹ Murat Ugurlucan,² Yahya Yildiz,¹ Bekir Cemi Karabay,³ Omer Isik^{1,3}

¹Cardiovascular Surgery Clinic, Camlica Medica Hospital, Istanbul; ²Cardiovascular Surgery Clinic, Duzce Ataturk State Hospital, Duzce; ³Cardiovascular Surgery Clinic, Business Hospital, Istanbul, Turkey

ABSTRACT

Rheumatoid heart disease and the mitral stenosis secondary to it in the long term are still important cardiovascular problems in developing countries. Percutaneous balloon mitral valvuloplasty is a valid treatment option with low complication rates for relieving the signs and symptoms of selected patients with mitral valve stenosis. In this report, we describe subacute mitral regurgitation secondary to anterior leaflet rupture following percutaneous balloon mitral valvuloplasty and the management strategy in a 54-year-old female patient. Such a complication is rare in experienced hands in the current era.

INTRODUCTION

Although rheumatoid heart disease and its long-term complications are rarely seen in developed countries, mitral stenosis is still an important health problem in developing regions of the world [Cubeddu 2010]. Percutaneous mitral balloon valvuloplasty is a commonly used treatment modality in selected cases of isolated mitral stenosis with a suitable valve structure prior to surgical treatment [Inoue 1991; Cubeddu 2010]. With the increase in experience and techniques today, severe leaflet injury during or after percutaneous balloon valvuloplasty leading to acute severe insufficiency is uncommon [Guéris 2005; Cruz-Gonzalez 2009; Piazza 2009].

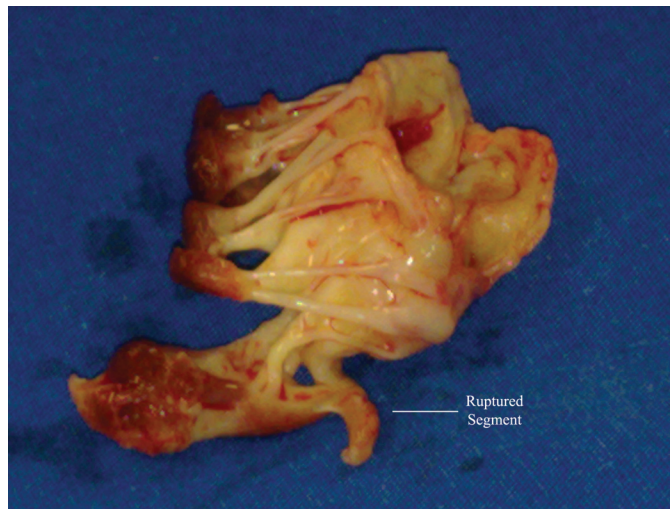
In this report, we describe a patient who developed subacute mitral insufficiency and consequent pulmonary edema after a valvuloplasty procedure that required surgical intervention for treatment.

CASE REPORT

A 54-year-old woman with mitral stenosis secondary to rheumatoid heart disease has been followed up for

approximately 15 years. Her history also indicated ischemic heart disease in addition to the rheumatoid heart disease; both were followed regularly. One year ago, when the patient was admitted with symptoms of exertional chest pain, she underwent coronary angiography. A stent was then implanted in the right coronary artery because of 80% stenosis in the vessel. During her routine control evaluation 2 weeks later, coronary angiography and percutaneous balloon mitral valvuloplasty for severe mitral stenosis were performed. There was 100% stenosis in the stent. Balloon valvuloplasty was performed with the Inoue balloon technique [Inoue 1991] with a 28-mm balloon. The transmitral valve gradient was reduced from 22 mm Hg to 2 mm Hg after the procedure. The patient was discharged in good condition after the procedure with a mitral insufficiency of grade 1 to 2.

Twelve days after the valvuloplasty procedure, however, the patient was admitted to the emergency ward with



Resected mitral valve indicating a rupture (7 × 1 mm) from the mid portion of the anterior leaflet to the posterior commissure, which most probably occurred after the patient's discharge from the hospital following successful balloon valvuloplasty. There were fibrocalcific attachments on three quarters of the anterior leaflet and on all of the posterior leaflet. The anteromedial chorda was ruptured and looked retracted.

Received February 9, 2010; received in revised form April 9, 2010; accepted April 16, 2010.

Correspondence: Dr. Murat Ugurlucan, Bozkurt Caddesi, No: 110-112, Benli Apt., Daire: 6, 80250 Kurtulus, Istanbul, Turkey; +90-535-431-67-86; fax: +90-212-255-35-41 (e-mail: muratugurlucan@yahoo.com).

symptoms of sudden-onset chest pain, dyspnea, and palpitations. The patient was orthopneic, and a physical examination revealed disseminated crepitating rales in both lungs and a mid to late systolic murmur of grade 3/6 to 4/6 at the apex of the heart radiating to the left axillary region. The blood pressure, pulse rate, and temperature were 130/70 mm Hg, 108 beats/minute, and 36.6°C, respectively. An electrocardiography examination revealed sinus tachycardia and P pulmonale. There were bilaterally disseminated opacities and congestion on the plain chest radiograph. An echocardiography evaluation indicated high-grade mitral insufficiency together with tricuspid regurgitation of grade 2 to 3. The pulmonary artery pressure was 75 mm Hg. The patient was hospitalized for surgical treatment.

She underwent operation on elective basis. Following median sternotomy, heparin (300 U/kg) was injected, and cardiopulmonary bypass was established with ascending aortic and bicaval cannulations. Cardioprotection was achieved with moderate hypothermia and with antegrade and retrograde cold blood cardioplegia. After cardioplegic arrest, a left atriotomy was performed parallel to the interatrial groove. Inspection of the mitral valve indicated a rupture (7 × 1 mm) from the mid portion of the anterior leaflet to the posterior commissure (Figure), which most probably occurred after discharge. There were fibrocalcific attachments on three quarters of the anterior leaflet and on the entire posterior leaflet. The anteromedial chorda was ruptured and looked retracted. Owing to this unreparable valve morphology, we replaced the valve with a no. 29 ATS mechanical mitral valve (ATS Medical, Minneapolis, MN, USA). The left atriotomy was closed, and an aorta-right coronary artery bypass was performed with a saphenous vein graft. The heart was deaired, the cross-clamp was removed, and cardiopulmonary bypass was ended under optimal conditions with low-dose inotropic support (5 µg/kg dopamine per minute). A perioperative transesophageal echocardiography examination indicated good mechanical valve functions and a pulmonary artery pressure of 38 mm Hg. The operation was finished in a conventional fashion, and the patient was transferred to the intensive care unit. The patient was extubated after 6 hours and was transferred to the ward the next day. Her postoperative course was uneventful, and she was discharged from the hospital on the sixth day. She visits the clinic regularly and has been asymptomatic for more than 1 year.

DISCUSSION

Percutaneous balloon mitral valvuloplasty was first described by Inoue and performed on a young symptomatic patient with mitral stenosis in 1982 [Inoue 1991]. Since then, with the advances in equipment and techniques, the procedure is commonly used. Today, Inoue balloon valvuloplasty can be performed quickly and easily with low complication rates [Guérios 2005; Cruz-Gonzalez 2009; Piazza 2009].

The most suitable cases for the percutaneous balloon mitral valvuloplasty procedure are patients with isolated

mitral stenosis who do not have newly evolved mural thrombosis or severe mitral insufficiency and in whom the subvalvular structures are not very thick and calcified [Piazza 2009]. According to Cruz-Gonzalez et al [2009], the best patient characteristics for percutaneous balloon mitral valvuloplasty are an age <55 years, male sex, a mitral valve area >1 cm², New York Heart Association class 1 to 2, and a preprocedural mitral insufficiency of less than grade 2.

Today, percutaneous valvuloplasty procedures are usually preferred in patients who are not good candidates for surgical treatment because of various comorbidities. The mortality and morbidity rates of open surgery can consequently be decreased to a certain extent [Inoue 1991]. In patients who do not have suitable valve structures, however, especially in the presence of severe calcification, this procedure should be performed with great care by experienced hands; otherwise, serious injury to valvular and subvalvular structures may occur [Ha 1998; Varma 2005].

On the other hand, iatrogenic valvular insufficiency usually occurs in practice following valvuloplasty, and it is important to decrease the transvalvular gradient that is secondary to the stenotic valve. Sometimes the degree of insufficiency may be higher than expected, however, and it may not be well tolerated. Such a severe and acute complication may be detected during the procedure. Additionally, the insufficiency may ensue in a subacute manner (ie, not during the intervention but afterwards). In these cases, it may be diagnosed with serial transthoracic echocardiography or during the patient's clinic visits, depending on the symptoms [Ha 1998; Varma 2005]. Most probably, this was the issue in our case. Thus, it is important to closely follow up patients after valvuloplasty, especially in the early period. Moreover, it is crucial to evaluate the valvular and subvalvular structures in the presence of the insufficiency as a component leading to the pathology. Subsequent treatment should be planned accordingly.

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