

**CASE REPORT**

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**Mitral balloon valvuloplasty followed by closure of the left atrial appendix in presence of thrombi and recurrent stroke**** Hakan Gocer<sup>1</sup>,  Mohammad Abuskr<sup>2</sup>,  Istemihaan Tengiz<sup>2</sup>,  Ertugrul Ercan<sup>2</sup>**<sup>1</sup> Medical Park Usak Hospital, Department of Cardiology, Usak, Turkey<sup>2</sup> Medical Park Izmir Hospital, Department of Cardiology, Izmir, Turkey

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**Abstract**

Hemodynamic consequences of mitral stenosis as well as inflammatory and structural changes in the left atrium increase the risk of developing atrial fibrillation and predispose to thrombus formation, primarily in the left atrial appendage. Percutaneous mitral balloon valvuloplasty for hemodynamically severe rheumatic mitral stenosis with favorable valve anatomy reduces the risk of thromboembolic events and stroke. Although the presence of left atrial thrombus is determined as a contraindication, percutaneous intervention has been found to be safe when the thrombus is localized to the atrial appendix. Left atrial appendix occlusion is an alternative treatment of choice for stroke prevention in patients with high stroke risk in whom oral anticoagulation is contraindicated or in patients with thromboembolic events in spite of adequate anticoagulation. Here we report a case of a 91-year-old woman with very severe mitral stenosis and chronic atrial fibrillation, with a left atrial appendix thrombus and a history of recurrent stroke despite warfarin. Balloon valvuloplasty was performed firstly without encountering any embolic events. The thrombus was dissolved following restored of the left atrial flow. Subsequently, atrial appendix occlusion device was implanted in order to reduce the risk of recurrent thromboembolic events.

**Keywords:** Left atrial appendage, mitral stenosis, percutaneous mitral balloon valvuloplasty, stroke, thrombus**Introduction**

Percutaneous mitral balloon valvuloplasty (PMBV) initially performed by Inou is widely used in morphologically appropriate severe rheumatic MS.<sup>1-3</sup> One of the important contraindications of PMBV is the left atrium (LA) thrombus.<sup>4</sup> However, some experienced interventional cardiologists have shown that PMBV can be performed confidently when the thrombus is restricted to left atrium appendage (LAA).<sup>2</sup> Here, we present a case of a very severe decompensated MS patient with permanent AF, LAA thrombus and a history of recurrent stroke despite anticoagulation.

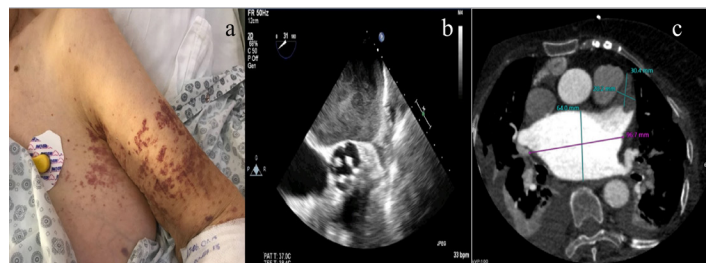
**Case Presentation**

A 91-year-old female patient, in NYHA functional class IV, with very severe MS was admitted to our clinic for intervention. Oxygen saturation was 75% on admission. The patient had permanent AF, recurrent stroke history despite appropriate

oral anticoagulation using warfarin and heparin-induced thrombocytopenia with platelet count of 65,000 (Figure 1a). Transthoracic echocardiography revealed very severe mitral stenosis with a valve area of 0.7 cm<sup>2</sup>, mild mitral regurgitation, and right ventricular systolic pressure of 60 mmHg. Trans mitral valve gradient and Wilkins score were calculated as 26/13 mmHg and 15, respectively. Trans esophageal echocardiography (TEE) demonstrated intense spontaneous echo contrast in LA and a LAA localized thrombus that did not protrude into the cavity. In cardiac CT, LA and LAA thrombus dimensions were 64X96 mm and 20x30 mm, respectively (Figure 1c). Considering the decompensation of the patient and the high risk of surgery, PMBV decision was made. Interatrial septum puncture was made with TEE guidance and mitral dilation was performed using Inoue balloon while keeping the catheter away from the LAA with as few manipulations as possible. The procedure was successfully completed without encountering any embolic event. Post-procedural control echo revealed decreased trans mitral gradient; 12.5 / 6 mmHg and valve area increased to 1.4 cm<sup>2</sup> without an increase in the degree of mitral regurgitation. Patient's clinic recovered dramatically and the follow-up oxygen saturation improved to 96%. Subsequently, two weeks of anticoagulation with warfarin was administered and disappearance of thrombus was confirmed at TEE. The thrombus

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in LAA was dissolved following improving of left atrial flow. We decided to percutaneously close LAA due to recurrent stroke history despite adequate anticoagulation, and for this purpose a 22 mm Amplatzer® Amulet left atrial appendage occluder (St. Jude Medical, MN, USA) was implanted without any complications (Figure 1b). The patient was discharged with warfarin in addition to aspirin (100 mg/d) for three months. No new embolic events or other complications were observed after 6 months of follow-up.



**Figure 1a.** Petechial in the left arm and left pectoral region due to thrombocytopenia. **1b.** Intense spontaneous echo contrast in left atrium and a left atrial appendage localized thrombus (140X95 mm) not protruding into atrial cavity. **1c.** CT image demonstrating dimensions of left atrium (64X96 mm) and appendix thrombus (20X30 mm)

## Discussion

Percutaneous mitral balloon valvuloplasty improves NYHA functional class in anatomically appropriate severe rheumatic MS in addition to reducing risk of thromboembolic events frequently seen in this population due to increased AF prevalence and hemodynamic consequences of the disease itself.<sup>1,2,4</sup> Although LA thrombus is considered as a prohibitory factor for the procedure, localized LAA thrombosis is considered as a controversial issue by some interventional cardiologists.<sup>2,5</sup> In a small study performed by Manjunath, et al.<sup>5</sup> using modified techniques in the presence of LA thrombus, PBMV was considered as safe and effective in the cases of thrombus restricted to appendage, LAA thrombus extending into LA cavity and in a case of LA roof thrombus confined to a plane above the level of fossa ovalis. In our case, thrombus was localized in LAA and lower septal puncture with less manipulation was performed and no systemic thromboembolism was encountered.

Significant MS itself increases incidence of AF and systemic thromboembolism by altering flow and pressures in the LA. Therefore, PMBV is also indicated in asymptomatic severe MS with high thromboembolic risk.<sup>2,5</sup> As known, LAA is the main source of thrombi responsible for cardio embolic strokes in AF patients.<sup>6</sup> Recently, percutaneous LAA occlusion has become an attractive alternative in patients with high stroke risk in whom oral anticoagulation is contraindicated or intolerated.<sup>5</sup> In the case

presented, we aimed not only to improve NYHA functional class, but also to minimize the risk of recurrent stroke and embolism by initially improving left atrium hemodynamics followed by excluding the main source of thrombi in LAA. Although there is insufficient data on the use of percutaneous LAA occlusion in severe rheumatic MS, surgical LAA exclusion /obliteration during mitral valve surgery is recommended, as it reduces the risk of postoperative embolic events.

## Conclusion

Percutaneous mitral valve balloon valvuloplasty followed by percutaneous LAA closure may be considered safe for symptomatic MS with thrombus confined to LAA and high thromboembolic risk despite adequate oral anticoagulation especially when performed in experienced centers.

## Conflict of interests

*The authors declare that they have no conflict of interest.*

## Financial Disclosure

*All authors declare no financial support.*

## Patient informed consent

*Consent of patient was obtained.*

## Ethical approval

*Ethics committee approval was not received for case report.*

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