

CASE REPORT

Infective endocarditis following percutaneous balloon mitral valvuloplasty: A case report of a 25-year-old female from Jimma Medical Center of Ethiopia

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Key Clinical Message

Rheumatic mitral stenosis is a common rheumatic heart diseases in sub-Saharan Africa leading to increased morbidity and mortality. Percutaneous mitral balloon valvuloplasty is the mainstay of less invasive therapy in those with moderate to severe valve stenosis, being symptomatic despite optimal medical therapy. Though generally safe with experienced hand and setup, post procedural complications include development of mitral regurgitation, tear and thrombosis. Mitral leaflet tear and development of infective endocarditis are an uncommon but might lead to increased morbidity, rehospitalization and mortality.

KEYWORDS

cardiac mass, case report, Ethiopia, infective endocarditis, PBMV, rheumatic heart disease

1 | INTRODUCTION

Percutaneous balloon mitral valvuloplasty is a less invasive surgical treatment for moderate to severe mitral stenosis, specially for those symptomatic despite optimal medical therapy, but it is associated with infective endocarditis only in a few cases. Preexisting additional valve abnormalities, extended procedural times, and the use of multiple balloons are potential risk factors for post-PBMV infective endocarditis. Though rare, probably due to underreporting, infective endocarditis should be considered in patients presenting with new-onset fever or positive blood culture following the procedure as it will result in a series complication. Here, we present a case of infective endocarditis after percutaneous balloon mitral valvuloplasty after the patient presented with fever and new onset murmur.

2 | CASE PRESENTATION

A 25-year-old pregnant woman in her third trimester was presented with an exacerbation of shortness of breath with exertion that worsened in the subsequent months. She also reported orthopnea requiring two pillows and paroxysmal nocturnal dyspnea (PND) for the same time period, as well as generalized body swelling that began in the lower extremities. She also had an episodic cough that produces blood-tinged sputum for a year, as well as pleuritic chest pain that has recently intensified. TTE revealed thickening and doming of mitral valves with restricted motion, with a mitral valve size of 1.2 cm², a mean systolic pulmonary gradient of 24 mm Hg, and pulmonary hypertension of 164 mm Hg; while the other valves were normal in structure. Systolic function of the left ventricle was also preserved.

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With the aforementioned findings, she was diagnosed with chronic rheumatic valvular heart disease (CRVHD), with severe mitral valve stenosis and severe pulmonary hypertension. The Abascal echocardiographic score, also known as the Wilkins score, which is a predictor of the effectiveness of percutaneous balloon mitral valvotomy (PBMV) in the setting of rheumatic mitral valve stenosis, was less than 8, indicating a favorable outcome with PBMV. Following supportive medical treatment, she was referred for PBMV management. Reinflation was conducted, after receiving written informed consent, using a Mansfield 9 French balloon catheter with a diameter of 25 mm and a length of 3 cm.

Following the treatment, all of her symptoms resolved and she gave birth to a boy neonate weighing 2.6 kg through spontaneous vaginal delivery, with no complications throughout labor or the postpartum period. After 45 days of the treatment, she was presented with high-grade persistent fever, easy fatigability, weight loss, headache, reddish urine, and epigastric pain progressing over the last month. She had moderate crampy abdominal pain, that occurred after dining for 3 days prior to her current hospitalization. Otherwise, she has no history of body swelling, yellowish discoloration of the eyes or skin, lightheadedness, palpitations, chills, or rigors.

Upon evaluation, she was chronically sick looking with the blood pressure of 110/60 mmHg, pulse rate of 104 beats per minute, strong and regular rhythm recorded from the radial artery, respiratory rate of 26 breaths per minute, body temperature of 38.9°C (recorded from her axilla), and oxygen saturation of 94% in room air. Vesicular breath sounds were heard and comparable in the anterior and posterior lung fields. The jugular venous pulse was not elevated. Cardiac examination showed a grade II holosystolic murmur best heard at the apex that radiates to the left axillary area. There was also mild hepatomegaly, and splenic percussion note was positive. The patient was alert and aware of time, location, and person, with a Glasgow Coma Scale of 15 out of 15.

2.1 | Differential diagnosis

The majority of the adverse complications relevant to post-percutaneous balloon mitral valvuloplasty occur during the procedure, including during interatrial septal puncture, manipulation of the Inoue balloon catheter in the left atrium, and commissurotomy of the mitral valve by Inoue balloon catheter, which include penetration of the needle into the adjacent structure leading to serious complications like hemopericardium, perforation of cardiac or

pulmonary veins, an increase in degree of preexisting mitral regurgitation, among others. These problems typically cause symptoms early after the procedure, which was not the case with our patient.

Another possible complication as a result of excessive tearing of the commissure(s) or the posterior/anterior leaflet at the noncommissural part, incomplete closure of a calcified leaflet, localized rupture of the sub valvular apparatus, and shortened chordate tendineae after splitting of the commissure(s), though rare, is an increase in mitral regurgitation with possibly pulmonary edema and signs and symptoms of heart failure. This was one of the complications reported in our patient, although the patient did not have any symptoms following the procedure, as this is expected immediately following the procedure.

Puncture with the Brockenbrough needle at the interatrial septum causes an iatrogenic left-to-right shunt at the interatrial level that can last for several months, resulting in heart failure and a nidus for infective endocarditis, though these complications were not detected during our patient's transthoracic echocardiographic evaluation. Though the risk of restenosis is substantially lower in the first five to ten years after the procedure, restenosis leading to heart failure is still possible, though this was not noted in our patient.

2.2 | Investigations and management

A complete blood count revealed 10,500 WBC/mm³ with polymorphonuclear cells representing 81% and lymphocytes of 17.2%, hemoglobin of 10.2 g/dL, and 162,000 platelets/mm³ (Table 1). Transthoracic echocardiography performed on her current admission revealed a thickened mitral valve with restricted motion, a mitral valve area of 1.8 cm² (it was 1.2 cm² pre operation), a mean systolic pulmonary gradient of 11 mmHg (it was 24 mmHg pre operation), and pulmonary hypertension of 120 ms (it was 164 ms pre operation); while the other valves are structurally normal. There is a heterogeneous echogenic oscillating mass attached to the anterior mitral valve leaflet (AMVL), as well as a linear longitudinal tear in the AMVL.

Left ventricular systolic function was preserved (Figure 1 and video S1). Electrocardiogram showed a sinus rhythm with a heart rate of 98 beats per minute but with right axis deviation and p-mitrale (Figure 2). Plane chest radiogram was unremarkable (Figure 3). Abdominal post-contrast CT scan revealed a filling defect in the superior mesenteric artery (SMA), indicating a possible septic embolus with possible SMA thrombosis as an alternative (video S2).

TABLE 1 Summary of laboratory investigations of the patient.

Viabiles	Results	Reference ranges
White cell count (per μ L)	10,500	4000–15,000
Neutrophil (%)	81	37–72
Lymphocyte (%)	17.2	20–50
Hemoglobin (mg/dL)	10.2	11–16.5
Platelet (per μ L)	162,000	150,000–450,000
ESR (mm/h)	42	≤ 20
Creatinine (mg/dL)	0.99	0–5–1.2
Blood urea nitrogen (mg/dL)	10.6	7–20
Sodium (mmol/L)	142	135–145
Potassium (mmol/L)	3.8	3.5–5.5
Chloride (mmol/L)	98	98–107
AST (IU/L)	21.3	0–40
ALT (IU/L)	20.3	0–41
ALP (IU/L)	102	40–130
Random blood sugar (mmg/dL)	102	
Prothrombin time (sec)	12.9	10–14
APTT (sec)	29.1	22–38
INR	1.01	0.7–1.2
TSH (per μ IU/L)	0.86	0.27–4.2
Blood cultures for aerobic ^a , anaerobic, and fungal organisms	Negative	Negative
HIV test	Nonreactive	Nonreactive
Serum VDRL test	Nonreactive	Nonreactive
Hepatitis B surface antigen test	Negative	Negative
Hepatitis C antibody test	Negative	Negative
Urinalysis	Microscopic RBCs casts	Negative
ASO titer	Nonreactive	Negative
Serum Albumin (g/dL)	4.1 g/dL (normal range)	

Abbreviations: ALP, alkaline phosphatase; APTT, activated partial thromboplastin time; AST/ALT, aspartate transaminase/alanine transaminase; ESR, erythrocyte sedimentation rate; HIV, human immunodeficiency virus; TSH, thyroid stimulating hormone; VDRL, venereal disease research laboratory.

^aTwo separate blood cultures were taken and both turned negative.

3 | RESULTS AND FOLLOW UP

In the presence of the predisposing factor (RHD), with fever of 38.9°C, possibility of septic emboli, and mild anemia, and supportive evidences of acute infections (ESR was 42mm/H), She was diagnosed with complicated

post percutaneous balloon mitral valvuloplasty with nosocomial Infective Endocarditis, mitral valve tear, and SMA acute thrombosis on the 90th postprocedural day after PMBV and the 60th postpartum day, she was improved and discharged with an appointment for follow-up at Jimma Medical Center in Ethiopia after treated with a combination antibiotics including 2g intravenous ceftazidime and 1g intravenous vancomycin twice daily for 21 days. She was also given 5mg of oral warfarin daily with unfractionated heparin overlap, stopped after 7 days. After 7 days of antibiotics and anticoagulation, all of her clinical symptoms improved, and the patient was discharged after completion of the course of antibiotics for a total of 21 days, with warfarin and appointment for further follow-up. Echocardiography on day of discharge didn't show any significant change, though there was no any complication documented.

4 | DISCUSSION

Percutaneous balloon mitral valvuloplasty (PBMV) is a relatively safe procedure that has long been used to treat mitral stenosis. The real incidence of post-PBMV IE is still being debated. Some studies suggest a very low incidence detecting no cases of IE in a large cohort of more than 1500 individuals.^{1,2} Furthermore, there is worries regarding underreporting, implying that the true incidence could be underestimated.^{2,3} This implies that for the majority of patients, PBMV is a very safe operation with a low risk of IE.

Several studies have looked into potential risk factors for this condition. Preexisting valvular lesions was documented as a major risk factor.³ Patients who had damaged or defective heart valves prior to PBMV may have a higher risk of harboring bacteria, which can be dislodged during the surgery and seed the valve leaflets, resulting in IE. Procedural considerations appear to play an impact as well. The same study reveals that prolonged procedure time and the use of several balloons during PBMV may increase the incidence of IE.³ These factors could contribute to increased endothelial damage and bacteremia, favoring the development of IE.

Diagnosing IE can be difficult, particularly after a recent operation such as PBMV. Clinical symptoms can include new-onset fever, tiredness, night sweats, and new heart murmurs, as in our patient. Blood cultures remain the primary method for diagnosing IE; however, negative cultures do not necessarily rule out the infection. The Duke Infective Endocarditis Committee criteria offer a framework for diagnosing IE.⁴ These criteria use clinical symptoms, blood culture results, and echocardiographic data to classify instances as definite, probable, or rejected IE.⁴ Using these criteria, combined with a high index of

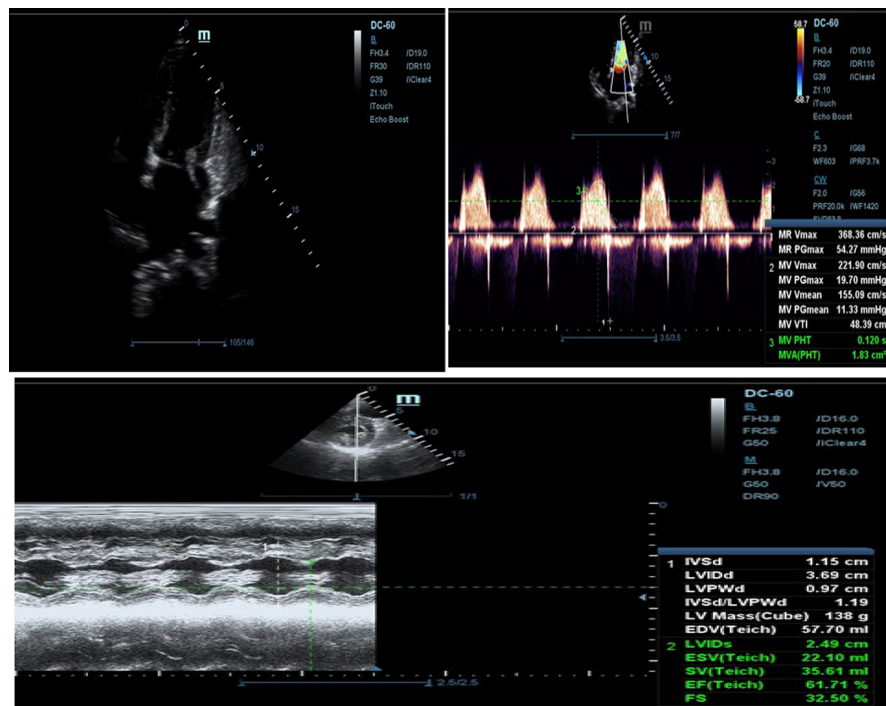


FIGURE 1 Transthoracic echocardiogram taken on current admission revealed heterogeneously echogenic oscillating mass attached to the anterior mitral valve leaflet: (A) M mode and (B) Doppler mode.

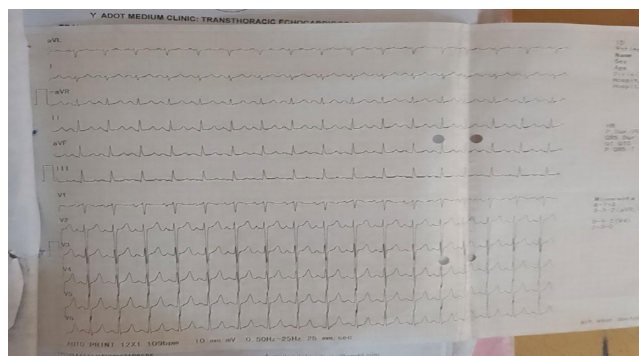


FIGURE 2 Electrocardiogram taken from the patient during her current admission showing regular rhythm with rate of 98 beats per minute, Right axis deviation with p-mitrale.

suspicion, is critical for rapid diagnosis and the beginning of appropriate antibiotic treatment for better patient outcome.

Early and strong antibiotic therapy is the primary treatment for post-PBMV IE to lessen complications.⁵ The specific antibiotic regimen is basically determined by the identified causal organism and probable antibiotic resistance. In some situations, surgical valve replacement may be required, especially if the infection results in severe valve failure or consequences such as abscess formation, which none was documented in our patient. Cardiologists and infectious disease experts should use echocardiographic findings and microbiological data to determine antibiotic selection and length of therapy.

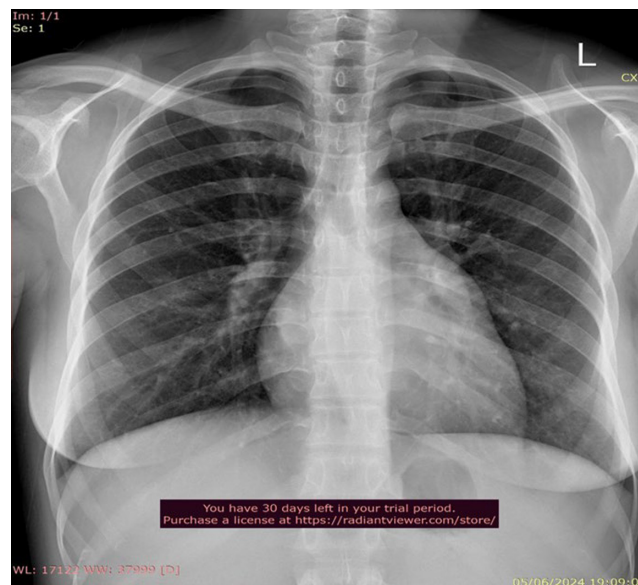


FIGURE 3 The PA chest X ray of the patient, which was unremarkable taken during current admission.

4.1 | Limitation

The problems in this instance were numerous. The lack of confirmatory testing from the sample might lead to a substantial challenge in precisely diagnosing the etiology and subsequent management with bactericidal medication, as empiric treatment might lead to drug resistance. Similarly, the lack of post treatment culture to check whether the

bacteremia is cleared might still suggest persistence of focal infection despite the patient was clinically improved.

5 | CONCLUSION

While this case highlights this rare cardiac infection following percutaneous balloon mitral valvuloplasty, it also emphasizes the importance of having high clinical suspicion and early intervention to reduce series complications when patients present with fever and new onset murmur following the procedure. Clinical decision would also play a pivotal role where investigations are negative despite the patient remains symptomatic.

AUTHOR CONTRIBUTIONS

Kedir Negesso Tukeni: Validation; writing – original draft. **Tamirat Godebo Woyimo:** Software; validation; writing – review and editing. **Leta Alemu Diba:** Investigation; software; writing – original draft. **Elsah Tegene Asefa:** Software; supervision; validation.

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DATA AVAILABILITY STATEMENT

All the data regarding the manuscript is within this document.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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