

A Case Study of Mixed Mitral Valve Disease During Open Mitral Valve Replacement

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Abstract

A 53-year-old female presented to the ER for acute altered mental status and was admitted for acute respiratory failure with hypoxia and acute on chronic CHF. The patient had a significant medical history including HTN, pulmonary HTN, DM type II, COPD, chronic pain, and familial history of MH. An ECHO confirmed severe mitral regurgitation and moderate stenosis associated with rheumatic heart disease. As an ASA 5, the patient was transferred to the ICU for preparation of a high-risk mitral valve replacement under cardiopulmonary bypass.

Learning Objectives

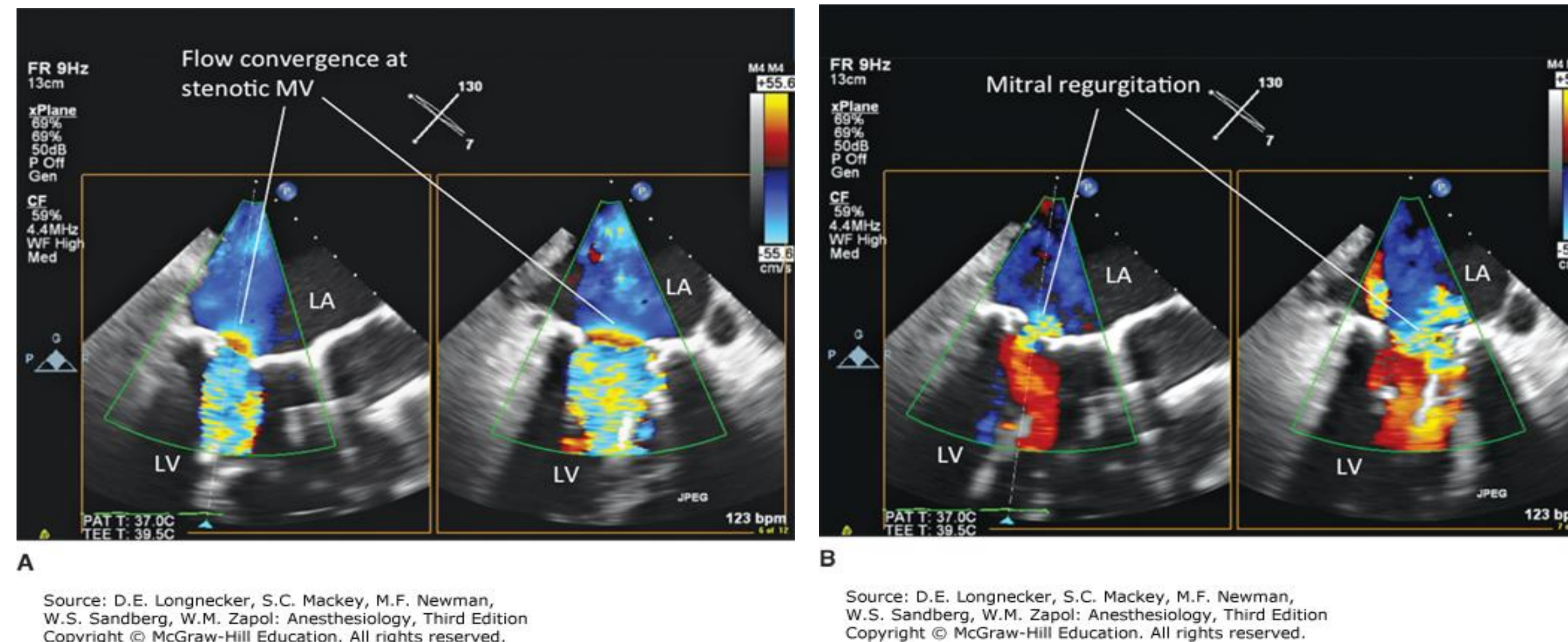
- Discuss the etiology of mixed MV disease.
- Discuss intraoperative management strategies for mixed MV disease.
- Summarize structural features of rheumatic heart disease on the MV.
- Outline common echocardiographic findings for mixed MV disease.

Background

- Mixed MV disease is commonly caused by chronic rheumatic heart disease (Crawford et al., 2018).
- Due to the size of the mitral annulus, mixed MV disease causes both stenosis and regurgitation in the LA, which exacerbates its remodeling over time as MR progresses (Gomes et al., 2022).
- As a result of the left atrial pressure rising appropriately greater than that of LV pressure, pulmonary congestion manifests earlier, pulmonary HTN is more severe, and atrial fibrillation is more common (Crawford et al., 2018).

Case Description and Management

The patient presented to the emergency room for altered mental status and was admitted for acute respiratory failure with hypoxia and acute on chronic CHF 2° to diastolic dysfunction and valvular heart disease. An ECHO confirmed an EF of 60%, MV leaflet thickening with anterior leaflet diastolic doming suggesting rheumatic disease, severe MR, moderate MS, severe biatrial enlargement, and RV enlargement. Left and right heart catheterization also revealed severe pulmonary hypertension. The patient was transported to the cardiac ICU, where a central line was placed, and a Swan-Ganz catheter was floated. A Flolan infusion was started at 1 ng/kg/min, and some improvement was seen in the pulmonary artery pressures. A few days later, the patient was transferred to the OR. The inhalational agents were detached from the anesthesia machine, the machine was flushed for at least 30 minutes, and the MH cart was readily available outside of the OR. ASA standard monitors were placed, and the patient was induced with propofol and intubated. Anesthesia was maintained with a propofol and remifentanyl infusion at 150-250 mcg/kg/hr and 0.2 mcg/kg/hr, respectively. Rocuronium was utilized as the muscle relaxant, and the Flolan infusion was continued at 1 ng/kg/min. Additional monitors were utilized including an arterial line, CVP, PAP, and TEE. Pulmonary artery pressures reached as high as 120/60 mmHg, specifically around the time of incision and sternotomy. Boluses of fentanyl were given, and the propofol infusion was increased to 250 mcg/kg/min. Pressures decreased to ~80/45, and the propofol infusion was titrated down. Aortic and venous cannulation then took place and CPB was initiated. Upon separating from CPB, pressures were not exactly where they needed to be, and a norepinephrine and epinephrine infusion was started at 2 mcg/min and milrinone at 0.375 mcg/kg/min. The surgeon noticed significant hemorrhage from the posterior pericardial space, and CPB was reinstated. Regrettably, the patient suffered an unfixable AV groove dissociation and passed away.



A. Midesophageal biplane view of a stenotic rheumatic mitral valve (MV) with turbulent flow. The flow convergence is displayed in two perpendicular planes illustrating the MV area's asymmetries. **B.** Midesophageal biplane view with color flow Doppler demonstrating mitral regurgitation in the same patient. Frequently, these patients will exhibit significant mitral stenosis and mitral regurgitation upon presentation. (Mackensen & Schuler, 2017)

Discussion

- The more severe lesion gives rise to the most clinical signs and symptoms and therefore, dominates management (Jamilah & Ahmed, 2018). The goal for predominant MR is to avoid bradycardia and increases in afterload as well as maintain contractility. On the other hand, the goal for predominant MS is to avoid tachycardia and decreases in afterload. Likewise, it is important to avoid increases in pulmonary artery pressures.
- Features of mixed MV disease include: (Dass & Kanmanthareddy, 2022)
 - Thickening of the anterior leaflet
 - Chordal thickening
 - Restricted leaflet motion
 - Excessive leaflet motion during systole
- ECHO findings are consistent with: (Crawford et al., 2018)
 - Thickened mitral valve
 - Diastolic doming
 - Confirmation of pulmonary HTN via Doppler
 - MS via Doppler
 - Visualization of MR via color Doppler
 - Typically, normal LV function

References

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