

Anaesthetic management of emergency caesarean section in a patient with undiagnosed severe rheumatic mitral stenosis

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Introduction

- A leading cause of mortality during pregnancy is cardiac disease, of which mitral stenosis is the highest risk valvulopathy, with the greatest number of deaths occurring at 2-9 days post partum
- The increase in cardiac output associated with pregnancy, labour and post-delivery auto-transfusion from uterine contraction; combined with a fixed cardiac output heightens the risk of pulmonary oedema.
- This case details the anaesthetic management of caesarean section in a patient with undiagnosed mitral stenosis. [1]

Case Report

- A young white British woman presented at 41 weeks and 6 days gestation with abdominal pain, vomiting, one contraction per 10 minutes and loss of mucus plug. She had a history of well controlled epilepsy, penicillin allergy and was gravida 1 with no issues during pregnancy.
- After admission overnight to labour ward for induction, an artificial rupture of membranes was completed. A Syntocinon infusion was started and effective epidural analgesia administered at request. Due to multiple unprovoked cardiotocography decelerations, she consented to a category 2 emergency caesarean section under epidural top up.
- A total of 20mls 0.75% ropivacaine and 100mcg of fentanyl given in gradual 5ml aliquots provided adequate anaesthesia for surgery. Intraoperatively she experienced nausea, vomiting and abnormal hypotension.
- A phenylephrine infusion of 100 mls/hr (20mcg/ml) and multiple boluses of metaraminol were used to maintain her blood pressure.
- She had no features suggestive of a high block and remained conscious.

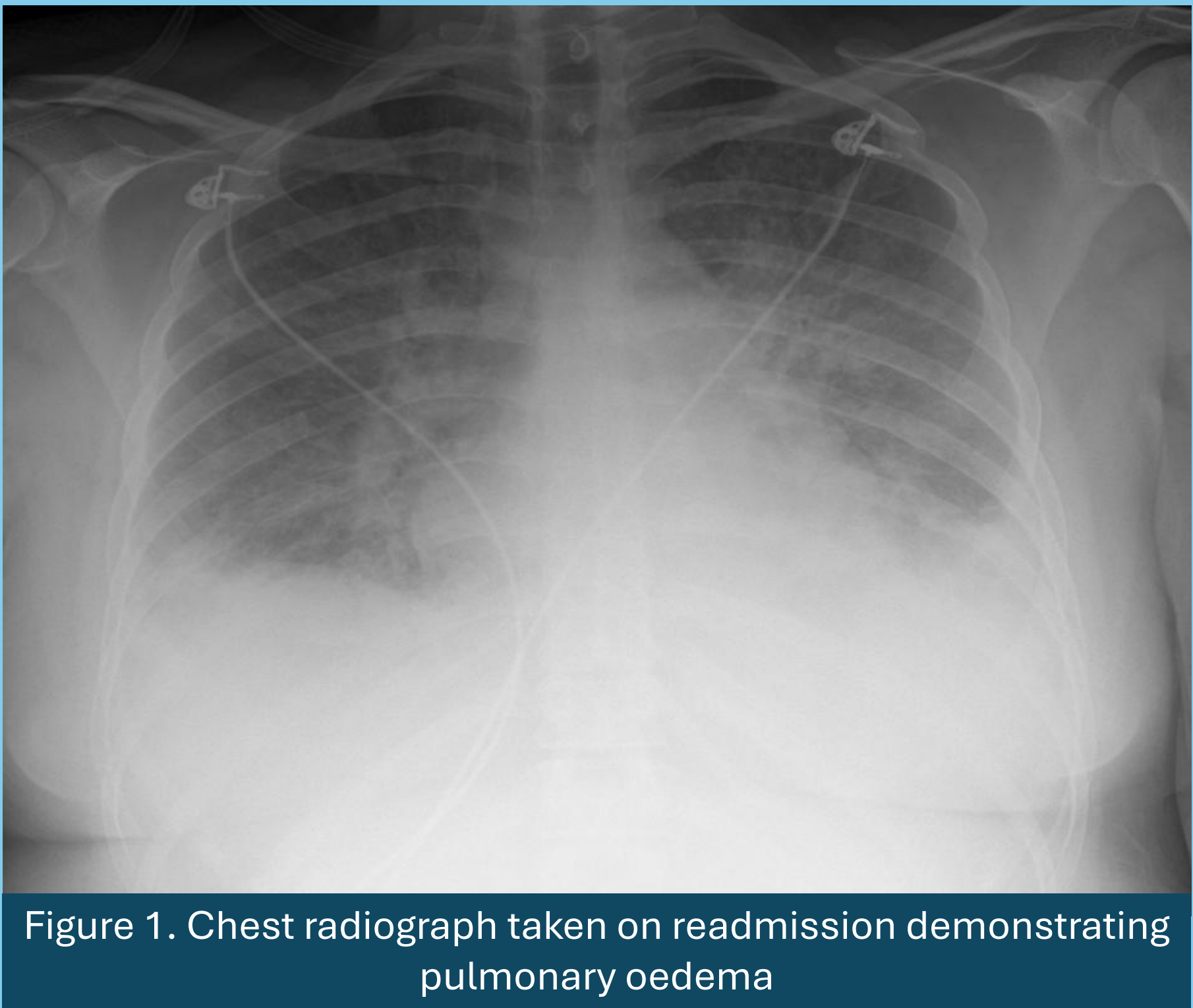


Figure 1. Chest radiograph taken on readmission demonstrating pulmonary oedema

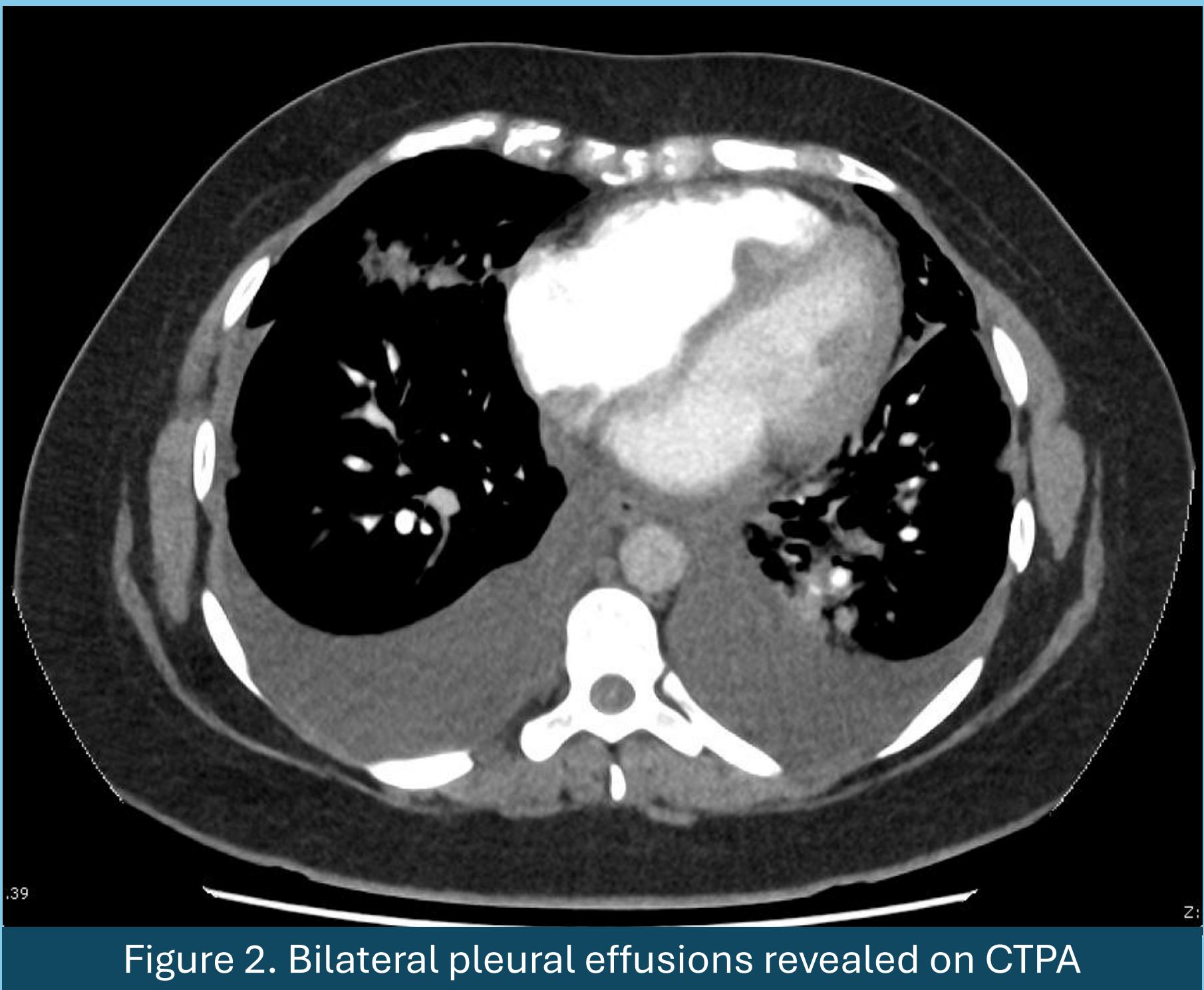


Figure 2. Bilateral pleural effusions revealed on CTPA

Case Report

- Syntocinon boluses and infusions were used as uterotonics to prevent post partum haemorrhage (PPH) without issue.
- After delivery, the vasopressor requirement improved and recovery was uneventful.
- After discharge with routine care, she represented with positional dyspnoea, increased cough and a new oxygen requirement.
- Chest radiographs revealed widespread haziness with blunting of costophrenic angles. [Figure 1]
- Computed tomography showed widespread pulmonary oedema and large bilateral effusions. [Figure 2]
- Echocardiography revealed severe rheumatic mitral stenosis with the classical “hockey stick” appearance of the anterior mitral valve (MV) leaflet and a dilated left atrium LA. The pressure and half-time measurements were also in keeping with severe mitral stenosis [Figures 3, 4, 5] [2]
- The patient received medical management with diuretics, beta blockers and anticoagulation.
- They later underwent balloon valvuloplasty at a tertiary centre and have since recovered well.

Discussion

- This was an unexpected and rare pathology given the patient demographic.
- Our patient, being undiagnosed, was fortunate to have a good outcome out of hours without thorough perioperative planning.
- Early epidural analgesia, progressive titration of local anaesthetic during top up and the use of alpha agonist vasopressors without chronotropic action; all worked to reduce symptoms of mitral stenosis by maintaining systemic vascular resistance (SVR) and avoiding tachycardia.
- It is possible that use of Syntocinon for induction contributed to symptoms.
- The use of Syntocinon post delivery as a uterotonic can cause tachycardia increasing cardiac output, worsening symptoms. However, it is preferable to managing PPH as fluid boluses are poorly tolerated in mitral stenosis.

Conclusion

- Good anaesthetic management of mitral stenosis in pregnancy involves limiting factors that increase cardiac output and maintaining systemic vascular resistance for coronary perfusion.
- Regional anaesthesia is proven to be safe in this cohort of patients with epidurals being preferred to spinals. [1]
- Early detection, referral to tertiary centres and planning with multidisciplinary team involvement is essential to coordinate medical and surgical interventions and minimise risk in this population. [1]

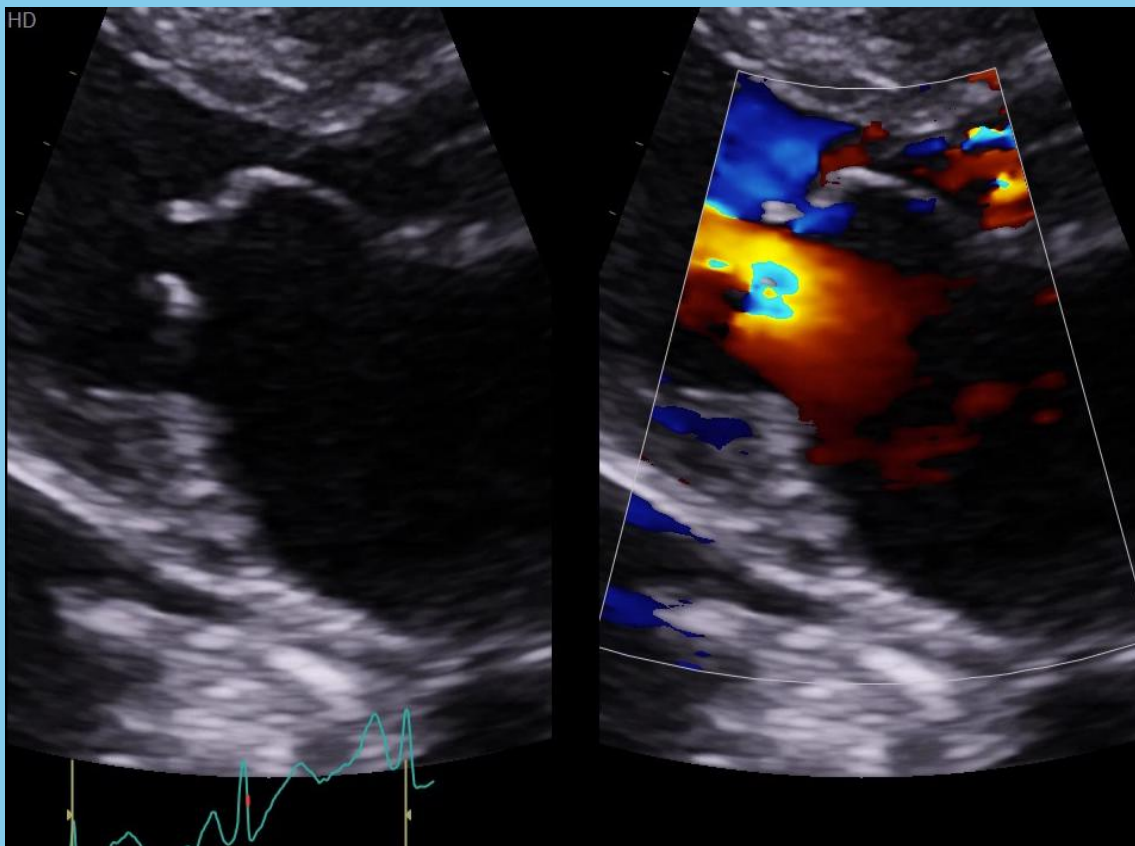


Figure 3. Echocardiography reveals dilated LA and rheumatic MV

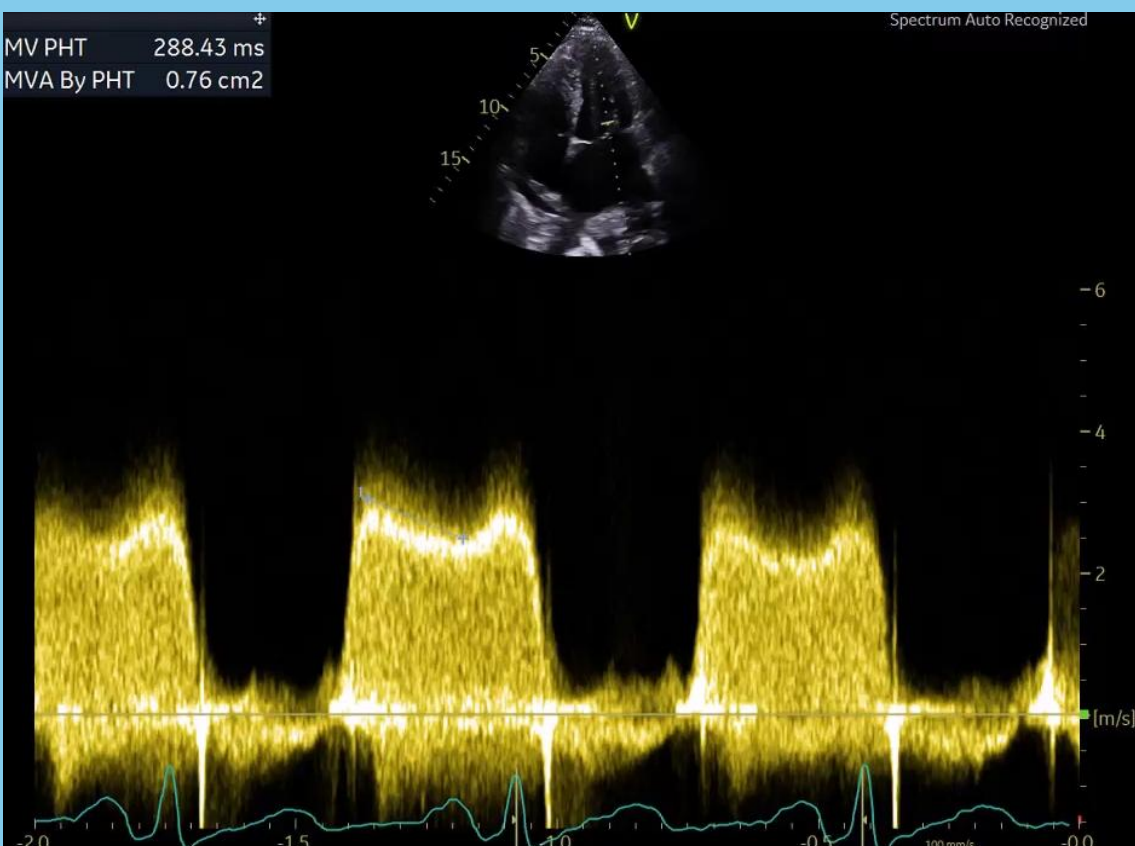


Figure 4. Raised MV pressure half time of 288 ms and calculated MV Area of 0.76 cm²

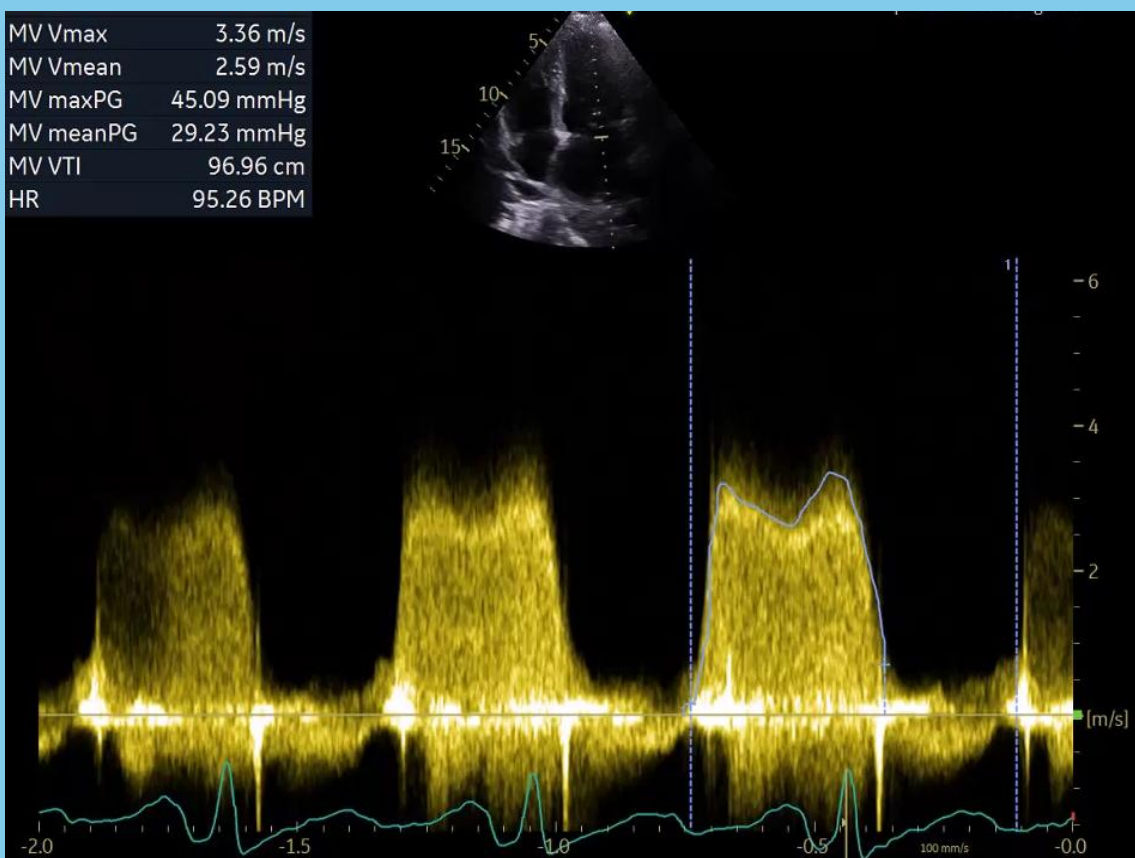


Figure 5. Raised mean MV pressure gradient of 29.23 mmHg

References:
1. Burt, Christiana C.Durbridge, Jacqueline et al. Management of cardiac disease in pregnancy Continuing Education in Anaesthesia, Critical Care and Pain, April 2009, Volume 9, Issue 2, 44 - 47
2. Robinson, S., Ring, L., Augustine, D.X. et al. The assessment of mitral valve disease: a guideline from the British Society of Echocardiography. *Echo Res Pract* 8, G87–G136 (2021).