

BACKGROUND

Cardiovascular disease is steadily increasing in the United States and is now one of the leading causes of death in pregnant women. In addition to women with congenital heart disease having improved survival, there is also increased frequency of cardiovascular risk factors in women of child-bearing age [1, 2]. This has led to an overall increase in women with pre-existing cardiac disease having children.

These cardiac conditions can gravely affect maternal hemodynamics, oxygenation and fetal status. Thus, managing the physiologic changes of pregnancy, as well as the underlying cardiac pathology, as anesthesiologists is crucial to successful vaginal or cesarean delivery in our patients. Here we present the case of a parturient with a history of myocardial infarct (MI), prior in-stent thrombosis and ischemic cardiomyopathy.

CASE DESCRIPTION

43 year old G1P1 admitted at 24+6 weeks gestation for preeclampsia with severe features by blood pressure

- PMH: chronic hypertension, class III obesity, type II Diabetes, OSA, asthma, history of myocardial infarct s/p RCA drug-eluting stent with prior in-stent thrombosis and ischemic cardiomyopathy (EF 41-49% on recent echo).
- Fetus was found to have absent end-diastolic flow and decision was made for primary cesarean section at 27 + 0 weeks gestational age
- Anticoagulation had been held for 7 days prior to C-section by decision per MFM

Intraoperative Management

- Arterial line placed
- Lumbar epidural placed and slowly dosed with 3 ml incremental doses of 0.5% bupivacaine over 20 minutes, for total of 18 ml
- Conservative fluid management for a total of 1200 ml crystalloid
- Fetus delivered uneventfully but patient developed dyspnea and O2 desaturation to low 90s during closure due to presumed fluid overload
- TTE and lung ultrasound utilized

Postoperative course

- Placed on BiPAP and given IV Lasix
- Remaining hospital course was uneventful and discharged on day 20

CASE IMAGING AND CONSIDERATIONS

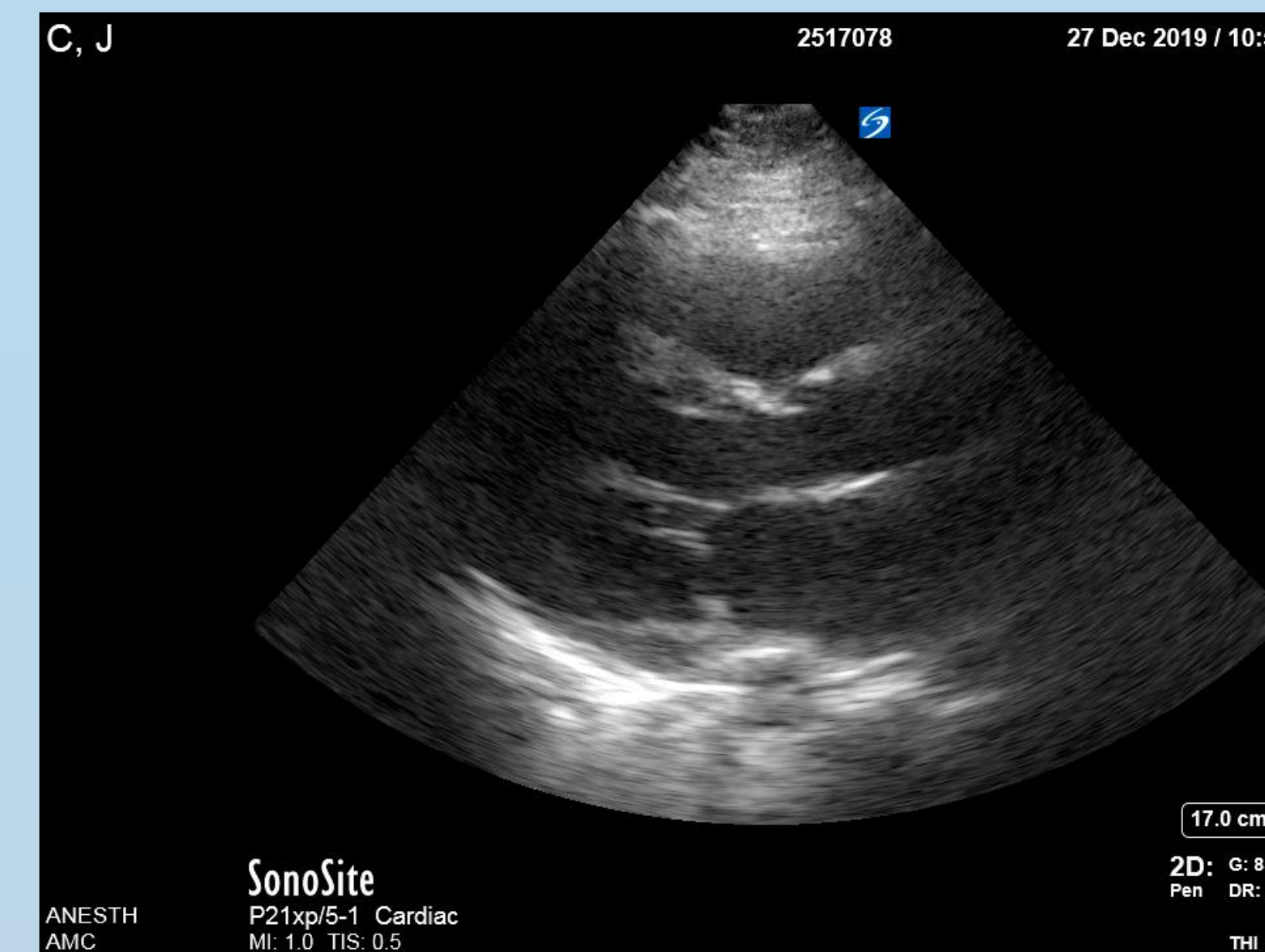


Figure 1. TTE Parasternal Long Axis View. Intraoperative TTE was performed to assess cardiac function following fetal delivery. Imaging demonstrated mildly depressed LVEF, which was similar to the patient's baseline function.

Given that her cardiac function was not grossly changed from preoperative assessment, lung ultrasound utilized to assess fluid status and etiology of dyspnea. B-lines were clearly noted on multiple views of the lungs, as seen in Figure 2. It is well documented that B-lines relate to increased fluid density within lung tissue. This suggested that pulmonary edema was likely the etiology of her dyspnea and hypoxia following delivery, as a result of autotransfusion.



Figure 3. Intravascular volume assessment via IVC measurement. Plethoric IVC measured at >2 cm in diameter.

The use of transthoracic echocardiography in the perioperative setting is becoming increasingly useful in evaluating and quickly diagnosing cardiopulmonary pathologies in parturients [3]. The parasternal long axis view is acquired by placing the transducer in the 3rd or 4th intercostal space on the left chest next to the sternum. This view is particularly valuable in assessing function of the LV. Additionally, it offers a look at the interventricular septum, as well as the aortic root. Figure 1 demonstrates the parasternal long axis view in our patient, which showed a mildly depressed LV function consistent with patient's baseline cardiac function. Use of TTE allowed us to evaluate her real-time cardiac function in the setting of new onset dyspnea following delivery.

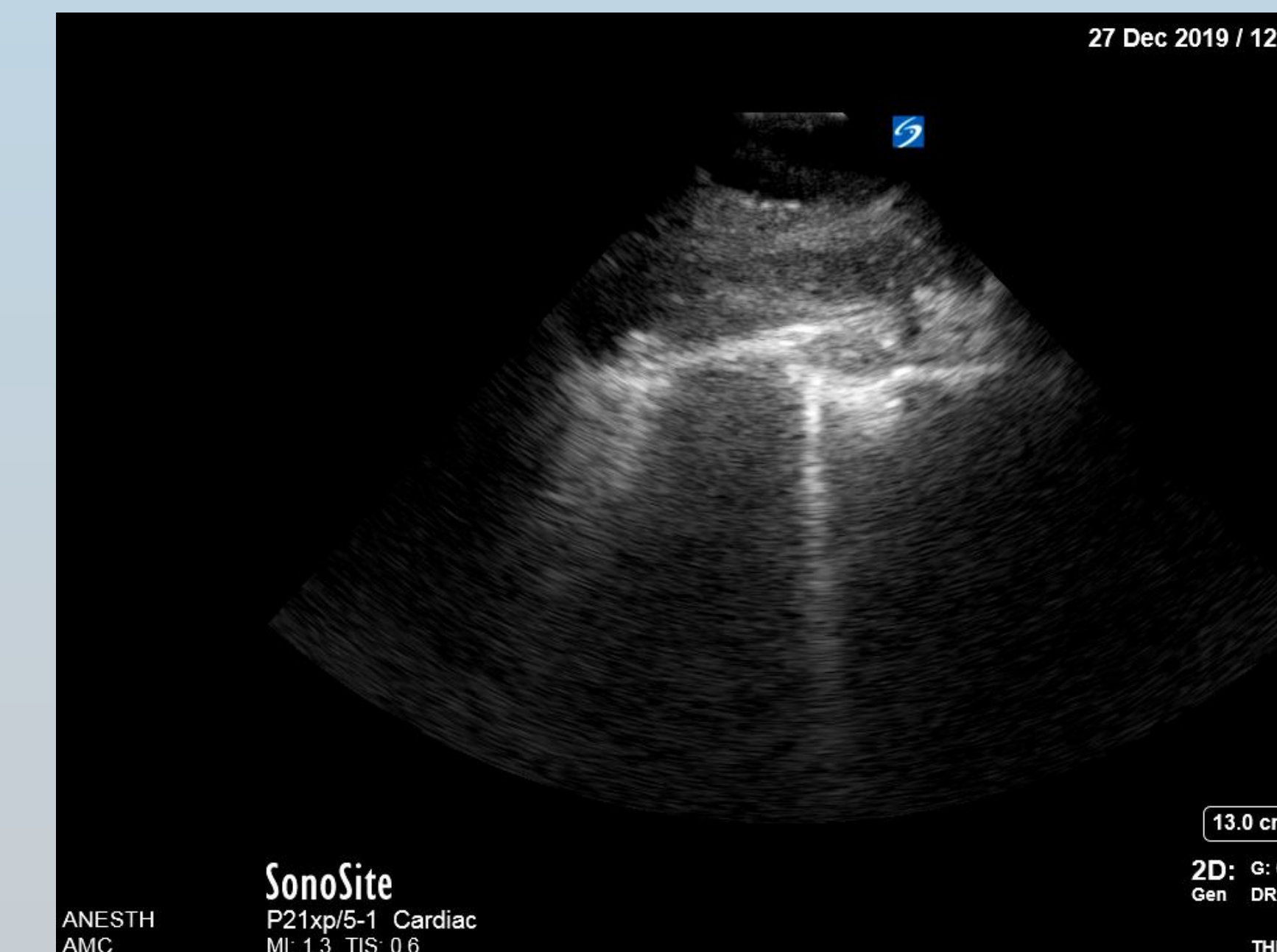


Figure 2. TTE Imaging of B-Lines. When aeration of the lung decreases and lung density increases due to exudate and increased interstitial fluid, ultrasound beams are reflected at deeper zones. They reverberate "B Lines," as seen above.

The patient's fluid status was further assessed via IVC measurement (Figure 3). Conventionally, the patient's IVC is typically 1.5-2.0 cm in diameter and collapses more than 50% upon inspiration. Our assessment of this patient demonstrated a plethoric IVC, which was measured greater than 2 cm in diameter.

CASE MANAGEMENT AND DISCUSSION

Pregnancy and delivery have a huge effect on the cardiovascular system in the parturient, particularly in those with underlying cardiac disease.

- Slowly dosed lumbar epidural was utilized as it provided the most stable hemodynamic profile by minimizing sympathetic response and decreasing risks associated with general anesthesia in morbidly obese parturient
- Given this patient's history of prior in-stent thrombosis, careful consideration was given by all teams regarding the timing of cessation of anticoagulation
- The use of TTE and lung ultrasound were utilized to assess real-time myocardial function and fluid status and help guide intraoperative and post-operative care
- Multidisciplinary approach involving MFM, OB, Anesthesia and nursing crucial in providing safe care

CONCLUSION

Cardiovascular conditions are the leading cause of maternal death in the USA [4]. It is becoming more common to care for women of childbearing age with cardiac disease, as risk factors such as advanced maternal age, obesity, diabetes and hypertension continue to rise. The safe management of delivery in women with heart disease requires a multi-disciplinary approach to anesthetic and obstetric care. Perioperative point-of-care echocardiography is an important tool that may be used to assess maternal cardiac function and fluid status during the peripartum period.

REFERENCES

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