Perioperative challenges in a pregnant patient having large left atrial clot: A case report. A Case Report

Case Report

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ABSTRACT

Background: Left atrial thrombus during pregnancy in mitral valve replacement status case is a rare condition..

Case presentation: We report a 25-year-old pregnant patient who presented at 19 weeks of her first pregnancy with breathing difficulty. Although she had been prescribed anticoagulation medications post-surgery, She had discontinued them for past 2 months and subsequently presented with atrial fibrillation with a large left atrial clot. She underwent two emergency non-cardiac surgeries under general anesthesia.

Conclusion: We conclude that the post-mitral valve replacement patient in cardiac failure with a large left atrial clot and atrial fibrillation requires immediate and aggressive medicinal or surgical care due to the life-threatening nature of the situation.

Key Words: Left atrial clot, mitral valve replacement, pregnancy.

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BACKGROUND

Left atrial thrombus in mitral valve replacement (MVR) status during pregnancy is infrequent and sudden death may occur by thrombus impaction to the mitral valve orifice and systemic embolization[1]. Large left atrial clots pose perioperative challenges like hemodynamic instability, arrhythmia and thromboembolic event[2]. We are going to describe the anesthetic management in a patient having a large left atrial thrombus.

CASE PRESENTATION

A 25-year-old female, weighing 50 kg and in the 19th week of her first pregnancy, presented to the obstetric department with a complaint of difficulty in breathing for the past four days. The mitral valve replacement was done four years ago with a 33 MJ St. Jude Medical mechanical heart valve for severe rheumatic mitral stenosis with pulmonary arterial hypertension. She had been prescribed antithrombotic medications, she had poor compliance with her prescribed medications (Warfarin 3 mg, Aspirin 75 mg, Torsemide 10 mg and Digoxin 0.25 mg) over the past two months of her pregnancy. She was conscious and oriented with a blood pressure of 142/90 mm Hg and an irregularly irregular heart rate of 110 - 130 beats/min. Auscultation revealed bilateral rales at the lung base with tachypnoea. Her electrocardiogram showed absent P waves and irregular rhythm suggestive of atrial fibrillation. Transthoracic echocardiography showed decreased mitral leaflet mobility with a large left atrial clot (5 x 4 cm) attached to the free left atrial wall within 6.4 cm sized left atrium. The right ventricular systolic pressure was 50 mm Hg and estimated pulmonary artery pressure of 75 mm Hg with a normal-sized right atrium and ventricle with a diastolic gradient of 28/3 mm Hg Figure 1. An ultrasound revealed a viable foetus with central placenta previa. She was started on furosemide 20 mg every 8 hours, tab. digoxin 0.25 mg once a day, tab. metoprolol 25 mg once a day and inj. enoxaparin 40 mg subcutaneously every 12 hours. Her oxygen saturation was 95 % on oxygen at a flow rate of 2 litres/min via nasal prongs. Case was discussed among the multidisciplinary teams for the possible perioperative risks to mother and foetus. The discussed management options included two approaches: re-do mitral valve replacement surgery versus medical thrombolysis. In this case, doing on-pump valve replacement surgery carried a high risk of perioperative mother mortality and fetal loss. On the other hand, medical thrombolysis carried the risk of complications such as intracranial hemorrhage, cerebrovascular accident, haematuria, bleeding per vaginum and, notably, the possibility of fetal loss. Cardiothoracic surgeons deferred Re-do surgery and suggested thrombolysis as the primary lifesaving procedure. Following the administration of thrombolysis, with a streptokinase 250,000 IU intravenous

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bolus, followed by a continuous infusion of 100,000 IU/hr, the patient showed significant symptomatic improvement. The diastolic gradient was successfully reduced to 7/4 mmHg after 24 hours. However, due to the occurrence of bleeding per vagina, the decision was made to discontinue the streptokinase infusion. Consequently, the size of the clot was reduced to 4.5 x 3 cm as confirmed by ultrasound doppler. Unfortunately, the ultrasound revealed the absence of fetal cardiac activity. An emergency open hysterotomy was planned and preferred over dilatation and evacuation among the team members due to absent fetal cardiac activity.

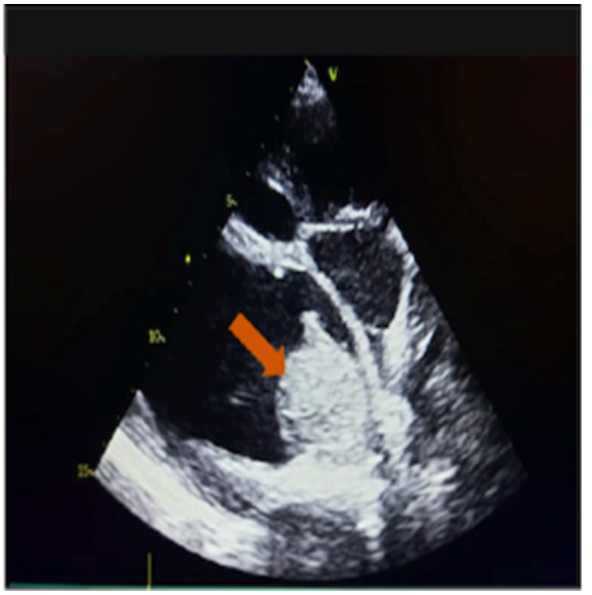

Figure 1: 2D Echo showing large left atrial clot.

In the operating room, the standard ASA monitors were applied and baseline vitals were recorded. Anesthesia was induced using fentanyl at a dose of 2 µg/kg, etomidate at 0.3 mg/kg and atracurium at 0.5 mg/kg, followed by endotracheal intubation. Subsequently, an ultrasound-guided central venous catheter was placed in the right internal jugular vein and a left radial arterial line was secured. Anesthesia was maintained using a combination of oxygen, air, sevoflurane and intermittent doses of atracurium. During the operation, there was an episode of hypotension, prompting the initiation of a noradrenaline infusion at a rate of 0.1 µg/kg/min to manage the low blood pressure. During hypotension, the central venous pressure was 4 mm Hg and the heart rate was 120 beats per minute. Intermittent bolus dosages of 5 mg of esmolol were administered for tachycardia. The total intraoperative blood loss was measured to be 800 ml, which was effectively managed by the administration of two units of packed red blood cells and crystalloid fluids. After six hours, the trachea was extubated. To ensure anticoagulation, a heparin infusion was initiated and activated prothrombin time was monitored every 6 hours. However, on the fourth postoperative day, the patient experienced severe abdominal pain and a drop in blood pressure to 80/50 mm Hg. Noradrenaline infusion was started alongside crystalloids. Ultrasonography of the abdomen raised suspicion of hemoperitoneum with uterine perforation, leading to the decision for an emergency laparotomy. Protamine sulphate 20 mg was given to reverse the anticoagulant effects of heparin. General anesthesia was induced using a titrated dose of inj. fentanyl at 2 µg/kg, etomidate at 0.3 mg/kg and atracurium at 0.5 mg/kg and intubated with a 7.5 mm ID cuffed endotracheal tube. Throughout the procedure, anesthesia was maintained using a combination of oxygen, air, sevoflurane and intermittent doses of atracurium. An open total abdominal hysterectomy was performed in view of uterine perforation, during which the heart rate fluctuated between 130 - 150 beats per minute. Blood loss amounted to 600 ml, which was replenished with a packed red blood cell transfusion and 1000 ml of ringer's lactate. Transthoracic echocardiography was used to assess the cardiac function and status of thrombus. She was transferred back to the intensive care unit with continued ventilatory support and on noradrenaline infusion dose of 0.2 µg/kg/min. The next day after surgery, the trachea was extubated and the patient remained hemodynamically stable while maintaining adequate saturation on room air. Following therapeutic anticoagulation, the heparin injection was discontinued and replaced with oral warfarin. The patient was discharged in a stable condition and advised to follow up regularly.

DISCUSSION

Mechanical prosthetic valves are known to be thrombogenic and pregnancy induces a hypercoagulable state. Patients with prosthetic heart valves on anticoagulation therapy face a higher risk of thromboembolism, miscarriage and premature birth. Adverse outcomes during pregnancies among these patients are more frequent. A meta-analysis conducted by Lawley et al., which included 499 pregnancies in women with heart valve prostheses, estimated maternal mortality rates at 1.2/100 pregnancies, with the mechanical valves subgroup at 1.8/100 and the bio prosthetic subgroup at 0.7/100. The overall rates of pregnancy loss, perinatal mortality and thromboembolism were estimated at 20.8/100 pregnancies, 5.0/100 births and 9.3/100 pregnancies, respectively[3]. The Giant left atrium is characterized by a considerable enlargement of the left atrium with a diameter exceeding 65 mm. It is most commonly associated with long-standing rheumatic mitral valve disease and is related to enlargement of the left atrium as a compensatory mechanism due to increased intracavitary pressure and volume. Such an enlargement is beneficial as it reduces pulmonary congestion. Therefore, it protects the lung from pulmonary hypertension and

edema[4, 5]. Pregnancy-induced physiological hemodynamic changes increase the risk of cardiac complications for patients with valvular repair or replacements[6].

Left atrial thrombus development in patients with prosthetic heart valves can be attributed to several possible mechanisms. These include impaired ventricular filling during diastole leading to blood stasis in the atrium, restricted mobility of the mitral leaflets, the presence of atrial fibrillation, inflammatory processes or endocardial abnormalities[7]. In our case, several risk factors contributed to the development of a large atrial clot following mitral MVR. These factors included a giant left atrium, the presence of atrial fibrillation, poor compliance with anticoagulant medication post-MVR and the additional procoagulant state induced by pregnancy. Such patients are at a heightened risk of systemic thromboembolism, underscoring the importance of early detection and prompt treatment with a high level of suspicion. CARPREG II risk index (Cardiac Disease in pregnancy) demonstrated occurrence > 41 % for primary cardiac event risk during her pregnancy due to history of prior cardiac events, presence of mechanical valves and pulmonary artery hypertension[8]. Transthoracic echocardiography serves as the primary screening test for detecting left atrial thrombus. Once diagnosed, management options may include anticoagulation, thrombolytic treatment, endovascular intervention or open-heart surgery, depending on the severity and clinical context[9, 10]. Anticoagulation is generally considered the first-line therapy for managing left atrial clot. However, in cases where medical management fails, there is limited evidence supporting or opposing aggressive approaches to remove the thrombus. In our patient's case, re-do surgery for evacuation of the left atrial clot was deferred due to her poor general condition, which posed a high risk of intraoperative and postoperative mortality for both the mother. As a lifesaving measure, thrombolysis with streptokinase was chosen as the primary procedure, followed by anticoagulation therapy. The anesthetic management of such cases presents numerous challenges due to various risk factors. These include the potential for thrombus embolization during the perioperative period, the risk of sudden obstruction of the prosthetic valve leaflet resulting in a stuck valve, the presence of arrhythmias, pulmonary arterial hypertension, significant hemodynamic instability and an increased likelihood of bleeding due to ongoing heparin infusion for anticoagulation. Furthermore, our patient was receiving heparin, digoxin and diuretic therapy. She presented with atrial fibrillation, with a heart rate ranging from 110 - 130 beats per minute for over seven days, along with a large left atrial thrombi. Consequently, our approach involved utilizing rate-controlling medications such as digoxin and esmolol to manage the ventricular rate without attempting to restore the arrhythmia to sinus rhythm. This approach aimed to balance the need for rate control with minimizing any adverse effects during anesthesia[11, 12]. Cardioversion was withheld to reduce the risk of possible left atrium thrombus dislodgement[13].

CONCLUSION

In conclusion, managing a post-mitral valve replacement patient in cardiac failure with a large left atrial clot and atrial fibrillation demands urgent and aggressive medical or surgical intervention due to the life-threatening nature of the condition.

LIST OF ABBREVIATIONS

- **MVR:** Mitral valve replacement.
- **ASA:** American society of Anesthesiologists.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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