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ANESTHETIC CHALLENGES IN A PARTURIENT WITH ATRIAL SEPTAL ANEURYSM FOR EMERGENCY CESAREAN SECTION UNDER SPINAL ANESTHESIA

Anaesthesiology

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ABSTRACT

Atrial septal aneurysm (ASA) is a well-defined, saccular congenital defect of the atrial septum, which is frequently known to be associated with congenital heart defects (atrial septal defects, patent foramen ovale), valvular pathologies (mitral valve prolapse), and clinical conditions including stroke, thromboembolism, and cardiac arrhythmias. [1–3] Atrial septal aneurysm is a well-recognized cardiac abnormality even though rare. The general prevalence of ASA ranges between 2 to 3%.[2] ASA increased the risks of maternal morbidities such as atrial arrhythmias, systemic embolism, and myocardial dysfunction up to heart failure.4 In our case, we report the anesthetic management of a parturient with an isolated interatrial septal aneurysm undergoing an emergency cesarean section under regional subarachnoid block with perioperative transthoracic echocardiography monitoring.

KEYWORDS

Atrial septal aneurysm; Cesarean section; subarachnoid block; transthoracic echocardiography

CASE DETAILS

A 33-year-old, G2P1L1 @ 39 weeks period of gestation, with no comorbidities, presented to casualty with complaints of abdominal pain for 1 day. No complaints of chest pain, palpitation, syncope. During her regular antenatal check-up at 34 weeks, she was incidentally diagnosed to have an interatrial septal aneurysm. The cardiologist suggested no active intervention. She was planned for an emergency lower segment cesarean section because of maternal unwillingness to trial labor after cesarean section. On examination, her blood pressure -121/78 mm Hg, PR -88/min, and RASpO2 - 98%. On auscultation, S1S2 was present with no added murmur. Other systemic examination with normal range. Her reports showed hemoglobin of 11.5gm/dl, a total leucocyte count of 9960, and a platelet count of 1, 54,000 cc/m3. ECG showed normal sinus rhythm at a rate of 90/min. A transthoracic echocardiography study revealed an isolated Type 1R interatrial septal aneurysm of 25mm with 10mm excursion, no shunt flow across aneurysm, intact IAS, and IVS, EF of 65%, normal valves, normal atrial and ventricles dimensions, no thrombus, and regional wall motion abnormalities.

Informed written consent was taken. Anti-aspiration prophylaxis was given. She was shifted in left lateral position. Emergency drugs and vasopressors were kept ready. Standard ASA monitors - NIBP, ECG, and SpO2 and baseline vitals of BP 124/74mm Hg, PR 102/min, and RASpO2 97% were noted. Under strict aseptic precautions, 18-gauge intravenous cannula was secured in the right hand. Subarachnoid block was administered as the patient was hemodynamic stable with normal sinus rhythm. 10 mg of 0.5% hyperbaric bupivacaine was injected into the subarachnoid space, targeting a sensory level of T4 along with 300 ml co-loading of RL. Oxygen was supplemented at 6L/min via a facemask. Injection oxytocin 0.3U/min infusion being continued with maintenance fluid. Baby delivered, and cried immediately after birth. Intraoperative echo showed decreased right and left atrial size due to decreased preload as a result of the spinal blockade, while there was no change noted in aneurysm excursion and any possible shunt flow across it. The duration of surgery was 1hr and blood loss was 400ml. One episode of hypotension to 90/60 mm Hg was immediately treated with a bolus dose of intravenous phenylephrine 20mcg to increase blood pressure to 116/70mm Hg. No episode of arrhythmia or thrombo-embolic phenomenon was noted during the perioperative period. The patient was observed in the post-anesthesia care unit, was shifted to the intensive care unit for observation. A Post-op echo was done to detect any abnormalities. She was discharged the next day and advised to follow up if symptomatic.

DISCUSSION

Interatrial septal aneurysm or atrial septal aneurysm (ASA) is an abnormal protrusion of the interatrial septum, which can be limited to the fossa ovale or involve the entire inter-atrial septum.[5,6] ASA is diagnosed if protrusion of the interatrial septum is >15 mm into the left or right atrium or phasic excursion >15 mm during the respiratory cycle and the base of the aneurysm is at least 15 mm in diameter.[2] It can be secondary to interatrial pressure difference or maybe the result of a primary malformation involving the fossa ovalis region or the entire septum. Even though it may be of clinical insignificance in asymptomatic patients, studies have linked it with peripheral embolism and cardioembolic stroke, pulmonary embolism, and atrial arrhythmias.[7] Yetkin et al showed the Percentage of patients suffering from Atrial Premature Complex (3.9% vs 0.4%, p < .001), Ventricular Premature Complex (4.9% vs 2.0%, p ¼ .01), Supraventricular Tachycardia (14.9% vs 4.9%, p < .001) and paroxysmal AF (2.9% vs 1.2%, p ¼ .02) was higher in ASA patients compared to non-ASA patients. There was no difference between the groups in terms of permanent AF, LBBB, ventricular tachycardia, bradyarrhythmia, and WPW Syndrome.[2] The presence of ASA is indeed a structural element favoring the occurrence of atrial tachycardia and this is probably due to the abnormalities of both functional and anatomical characteristics of the atrium, including dispersion of the action potential and appearance of re-entrant circuits.[1] Medical therapy with antiplatelet agents or anticoagulants and surgical or percutaneous closure is done for the prevention of recurrent strokes in ASA patients with patent foramen ovale (PFO) and ostium Secundum atrial septal defect (ASD). Specific anti-arrhythmic is given in case of atrial arrhythmia.

Cardiovascular changes, which occur during pregnancy and peripartum period may affect the pressure gradient across the atrial septal aneurysm causing its undulating movement or formation of Left to right shunt flow. Plasma volume increases by 40-50%, heart rate by 20-25%, Cardiac output by 30-50% during pregnancy, and further 20-30% during labor and immediately after delivery representing a significant change in body hemodynamics.[8] The mode of anesthesia influences the hemodynamic changes during delivery in a significant manner. The perioperative goals of management comprised analgesia, hemodynamic monitoring, and optimizing cardiovascular and respiratory functions by detection of arrhythmia, and thromboembolic phenomenon. Neuraxial blocks are commonly practiced for stable patients. The cardiac grid to be maintained during subarachnoid block is a) Avoid increase in heart rate. Heart rate and blood pressure should be within 20% of baseline values. b) Myocardial contractility should be maintained c) Preload at normal or supranormal by co-loading with crystalloids and vasopressors to compensate for decreased preload as a

result of the spinal blockade. d) Avoid increase in Pulmonary Vascular Resistance. E) Maintain systemic vascular resistance to maintain the afterload. Preoperative echo revealed the diagnosis and helped to formulate our anesthetic plan, intraoperative echo along with ECG ruled out any arrhythmia, emboli, and pressure gradient across the aneurysm. The highest incidence of major adverse cardiac events is usually in the postoperative period for which monitoring in intensive care was done.

Summary

The presence of an atrial septal aneurysm during pregnancy poses dynamic perioperative anesthetic challenges, which require meticulous planning and vigilant monitoring. Serial Transthoracic echocardiography enables to monitor the complications in real time for prompt intervention. Preoperative diagnosis even in asymptomatic points to its specific concern and helps in consideration of possible perioperative complications to manage such cases successfully.

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