Anaesthetic Management for A Patient Presenting for Caesarean Delivery with A giant Thymoma – A Case Report

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Presentation of a thymoma during pregnancy means that safe delivery becomes more challenging. We present a 33-year-old pregnant woman who was diagnosed with a large thymoma causing marked compression of the tracheobronchial tree and right atrium. After various multidisciplinary meetings she presented for elective caesarean section delivery at 31 weeks of gestation. A combined spinal-epidural anaesthesia was performed, along with colloid pre- and co-loading, and vasopressor support. The delivery was uneventful. The possibility of catastrophic complications was foreseen. Therefore, all requirements for the possibility of airway or haemodynamic collapse were planned carefully, including the possibility of emergent cardiopulmonary bypass.

Key Words: Anaesthesiology; case report**;** neuraxial anaesthesia; pregnancy; Thymoma

Introduction

Mediastinal tumours in pregnancy are rare.[1] Timing and method of delivery together with post-partum level of care involve multidisciplinary decisions and is guided by parturient safety and foetal wellbeing. It is not clear whether general anaesthesia or regional anaesthesia is the best for caesarean delivery in a patient with large anterior mediastinal mass. [1] Our manuscript describes the difficulties involved in the management of a pregnant woman presenting with a giant mediastinal mass and the importance of a multidisciplinary approach.

Case presentation

We report the case of a 33-year-old pregnant woman (gravid 1 para 0), previously healthy with optimum functional capacity, who presented to the emergency room with cough, shortness of breath and chest pain at 22 weeks and 4 days of pregnancy. She was diagnosed with COVID-19 pneumonia. Due to the severity of her symptoms, she was hospitalised, and a computed tomography was performed revealing a heterogeneous right-sided pericardiac mass.

Image 1: *Chest CT revealing a mediastinal mass*

Subsequent staging exhibited a Masaoka IVa (table 1) lymphocytic thymoma (25 by 17 by 17cm) compressing the right heart, great veins, lung tissue and diaphragm. Myocardial systolic function was maintained. She was also diagnosed with myasthenia gravis. The patient refused the proposed neo-adjuvant chemotherapy, radiotherapy, and subsequent surgical resection

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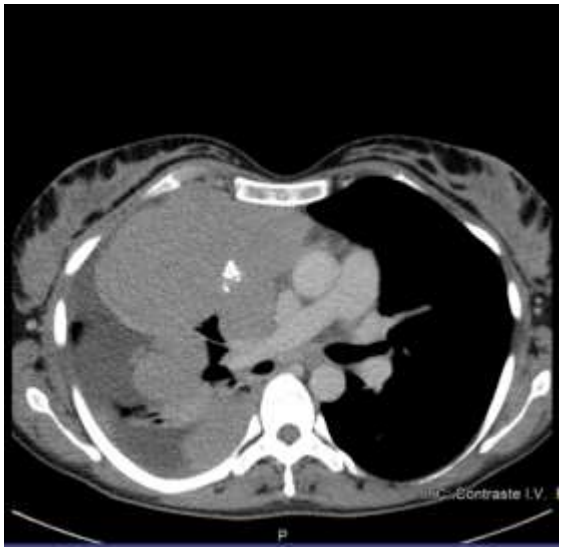
owing to concerns on foetal well-being. Caesarean section at 31 weeks of gestation at a tertiary level care hospital with cardiothoracic surgery and intensive care support was planned. The patient was then referred to our centre.

Image 2: *Chest CT revealing a mediastinal mass*



Pre-operative management

Pre-operative assessment included evaluation of respiratory capacity, haemodynamic status and physical examination. The patient had shallow breathing with normal peripheral oxygen saturations and orthopnoea when supine. Laboratory tests were unremarkable.

The case was discussed with the cardiothoracic team and the intensive care unit. The risk of collapse was deemed to be low considering her previous functional status, haemodynamic stability, good respiratory function, and absence of clinically evident muscle weakness.

A combined spinal-epidural neuraxial technique (CSEA) was considered the safest anaesthetic technique.

Intra-operative management

Standard ASA monitoring with continuous invasive blood pressure monitoring before the anaesthetic technique was employed. Two large bore 16G venous accesses were cannulated. CSEA was performed in the sitting position. Before initiation of the technique, pre-loading of 500ml of intravenous colloid fluid and a low dose of a noradrenaline infusion (0.01mcg/kg/min) was initiated. The blood bank was aware of the case and blood products were prepared.

Subarachnoid 12mg of ropivacaine at 0.75% and 2.5mcg of sufentanil was administered and the patient was then positioned with her back upright at 30º due to intolerance to the supine position. The noradrenaline infusion was maintained, and the sympathetic block did not result in any haemodynamic compromise. A block at the level of T8 was achieved, and additional fractionated top-ups of ropivacaine was administered via epidural catheter to achieve a T4 level sensory block. The delivery was uneventful.

Post-operative management

The patient remained stable and was discharged on the 2nd post-operative day to the regional oncology institute for prompt initiation of treatment for the lymphocytic thymoma.

Discussion

The challenges of this case are related to the anticipation and prevention of complications. Liaison with the cardiothoracic surgery team and the intensive care unit were intrinsic to the concerns presented in this case. Regional anaesthesia is preferable to general anaesthesia in most caesarean sections.[2] Regional anaesthesia allows the parturient to remain awake during delivery and less medication is transferred to the foetus, which in this case was to be delivered prematurely and with immature drug metabolism. In addition, avoidance of general anaesthesia with airway instrumentation in this case was fundamental, as the tumour compressed the right bronchial tree further reducing functional residual capacity and apnoeic time. Furthermore, the effects of loss of muscle tone during induction were unpredictable. Also, due to mediastinal mass compression of the right heart and great veins, hemodynamic collapse could occur during positive pressure ventilation.

A CSEA was the chosen anaesthetic technique, due to the greater certainty of block and a more rapid onset with lower doses of drug when compared to epidural blockade. The epidural catheter allowed us to complement the block and optimize post-operative analgesia.

Continuous spinal anaesthesia could also have been considered as this technique would have allowed for the usage of lower doses and more accurate titration of spinal anaesthesia. We opted for CSEA mainly due to a lower risk of post dural puncture headache[3] and a greater experience of this technique in our centre.

In some circumstances, *transverse abdominus plane* block has also been used for caesarean section delivery.[4] This was not our first-line option as visceral pain would not have been blocked, demanding sedative supplementation.
We anticipated that our anaesthetic technique would result in sympathectomy and reduction in preload. Therefore, a low-dose noradrenaline infusion was maintained and titrated to keep a mean arterial pressure of at least 75mmHg. To preserve preload and cardiac output, colloid pre- and co-loading was maintained and in the case of haemorrhage two large bore accesses had been secured preoperatively to allow for rapid infusions. The semi-recumbent positioning allowed for patient comfort, elimination of orthopnoea and a reduction of atrial compression by the thymoma. Two experienced obstetricians performed the surgery in this position, and the delivery of the foetus relieved diaphragmatic and aortocaval compression, improving maternal cardiopulmonary function.

General anaesthesia was only to be administered if the caesarean section became emergent, or if all regional options failed. In the case of cardiopulmonary collapse, emergent orotracheal intubation and cardiopulmonary bypass had been considered. In the case of pre-operative implantation of venoarterial extracorporeal membrane oxygenation (ECMO), peripheral access would have been necessary as central access was obstructed by the tumour. ECMO would require anticoagulation, aggravating intra-operative blood losses and contraindicating a neuraxial technique. Alternatively, prophylactic cannulation of the femoral artery and vein has also been described.[5] We considered this option would not reduce the time for extracorporeal support significantly in case of collapse.

An understanding of the physiology and pathology of anterior mediastinal masses is crucial for optimum perioperative management of these patients. In this case it was important to perform a successful neuraxial technique, ensure adequate preload and maintain systemic vascular resistance. Multidisciplinary involvement at a tertiary care centre allows for adequate planning, definition of intra-operative targets, prevention, and treatment of catastrophic complications.

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