

Anesthesia for cesarean delivery in a patient with large anterior mediastinal tumor presenting as intrathoracic airway compression

Yatish Bevinaguddaiah,
Shivakumar Shivanna,
Vinayak Seenappa Pujari,
Manjunath Abloodu
Chikkapillappa

Department of Anaesthesiology,
M S Ramaiah Medical College,
Bangalore, Karnataka, India

Address for correspondence:

Dr. Yatish Bevinaguddaiah,
Department of Anaesthesiology,
M S Ramaiah Medical College,
Bangalore, Karnataka, India.
E-mail: yatishseeni@yahoo.co.in

ABSTRACT

Anterior mediastinal mass is a rare pathology that presents considerable anesthetic challenges due to cardiopulmonary compromise. We present a case that was referred to us in the third trimester of pregnancy with severe breathlessness and orthopnea. An elective cesarean delivery was performed under combined spinal epidural anesthesia with a favorable outcome. We discuss the perioperative considerations in these patients with a review of the literature.

Key words: Anteriomediastinal mass, airway obstruction, cesarean delivery, combined spinal epidural analgesia, pregnancy

INTRODUCTION

Symptomatic anterior mediastinal mass in pregnancy is rare^[1] and cesarean delivery poses extreme challenges to the anesthesiologist and the obstetrician. Management of such patients requires a thorough understanding of the pathophysiological changes caused by these masses. We present a case of a large anterior mediastinal mass at 34 weeks of gestation with severe respiratory distress for cesarean delivery.

CASE REPORT

A 34-year-old primigravida at 34 weeks pregnancy with gestational diabetes and pre-eclampsia was transferred due to breathlessness and cough. The patient was apparently normal till the 5th month of gestation, when she developed cough and breathlessness. Cough was non-productive

and aggravated in the supine and left lateral positions. Breathlessness was insidious in onset, gradually progressive in nature and increasing in the supine position.

On examination, the patient was tachypneic and unable to lie supine. Peripheral oxygen saturation (SPO₂) was 92% on room air with a blood pressure of 150/90 mmHg and a pulse rate of 110/min. The airway examination was unremarkable with no hoarseness of voice. The trachea was shifted to the right with dull to percuss left hemithorax. The neck veins were suggestive of raised jugular venous pressure (JVP). Air entry was markedly diminished in the left hemithorax with scattered crepitations. Per-abdominal examination revealed the uterus to be of 36 weeks size with reassuring fetal heart sounds.

Chest X-ray showed opacity of the entire left hemithorax with tracheal deviation to the right [Figure 1]. The initial diagnosis was left basal pneumonitis with pleural effusion, and antibiotics and bronchodilators were started. An ultrasound (USG) of the chest revealed a well-defined mixed echogenous lesion in left hemithorax. A non-contrast computerized tomography (CT) of the thorax with abdominal shielding revealed a collapsed consolidation of the basal segment of the left lower lobe. A large, well-defined soft tissue, attenuating lesion measuring 110 mm × 90 mm × 100 mm was seen in the left hemithorax, abutting the anterior and lateral costal margins.

Access this article online

Quick Response Code:



Website:

www.saudija.org

DOI:

10.4103/1658-354X.140901

The mass was medially abutting the left mediastinal border, extending superiorly up to the first rib. Posteriorly, the mass was displacing the left main bronchus and its branches causing luminal compression [Figure 2]. Cardiovascular structures were displaced but appeared normal. An arterial blood sample breathing oxygen at 4 L/min showed normal values. Other biochemical investigations were within normal limits. Electrocardiography and echocardiography were normal. A provisional diagnosis of thymoma or lymphoma was made. A contrast-enhanced computerized tomography (CECT)-guided biopsy for histological diagnosis was warranted; however, it was deferred to post-delivery. An elective cesarean delivery was deemed to be a better choice in view of the gestational age of the fetus, better preparedness of the anesthetic/surgical teams and the potential improvement in functional residual capacity (FRC) post-delivery. The surgery was planned to be performed with a cardiopulmonary bypass (CPB) machine on standby.

Combined spinal epidural anesthesia (CSEA) was chosen as the anesthetic technique. Two 16-gauge intravenous lines were inserted in both upper limbs. The left radial artery and the right internal jugular vein (USG guided) were cannulated in a semi-sitting position. The central venous pressure (CVP) was 20 cm of water. The inguinal region was painted and draped for femoral vessels access in case of an emergency requirement for CPB. In the sitting position, an 18-gauge epidural catheter was sited at the L2-L3 interspace. Lumbar puncture was performed at the L3-L4 interspace using a 27-gauge quincke needle, and 1.5 cc of 0.5% hyperbaric bupivacaine was injected. An attempt to gradually lower the patient to a supine position resulted in the patient complaining of severe breathlessness. The patient was reverted to the semi-sitting position and hence an adequate level of anesthesia could not be obtained. Epidural anesthesia was then established with incremental doses of 0.5% ropivacaine. A sensory level of T4 was

achieved after a total dose of 75 mg over 15 min. The fetal heart rate was monitored throughout, and was reassuring. A healthy male baby was delivered 5 min after skin incision and oxytocin infusion was started. Intraoperatively, the patient continued to be tachypneic with SpO₂ above 95%. The approximate blood loss was 700 mL and a total of 1500 mL of crystalloids was administered.

Post-operatively, the patient was transferred to the Intensive Care Unit for further monitoring. Ropivacaine 0.1% infusion was started epidurally for post-operative analgesia. On the first post-operative day, air entry had improved in the left lower lung fields and the breathlessness had reduced. A CECT-guided biopsy of the mass was performed under local anesthesia on the 3rd post-operative day and a histological diagnosis of Hodgkin's lymphoma was made for which the patient was started on chemotherapy. The further post-operative course was uneventful.

DISCUSSION

The incidence of mediastinal masses is rare, with multiple causes. The most common anterior mediastinal masses include thymoma, lymphoma and germ cell tumors.^[1,2] Mediastinal masses in pregnancy are particularly rare, with the majority of them being Hodgkin's lymphoma (incidence of 1 in 1000-6000 pregnancies).^[3] The peak occurrence of Hodgkin's lymphoma lies in the female reproductive age.

Patients present with cough, chest pain, dyspnea, hoarseness, orthopnea, superior vena cava (SVC) syndrome, syncope and dysphagia. The symptoms are due to compression of the mediastinal structures, namely the tracheobronchial tree, pulmonary arteries, aortic arch, SVC and cardiac chambers.^[4] The initial diagnosis might be difficult due to the symptoms being attributed to the pregnancy and a reluctance to subject the patient to diagnostic radiology in view of fetal exposure concerns. The total maternal radiation exposure during pregnancy should be limited to less than 5 rads (chest X-ray exposure 0.2 rads). An exposure

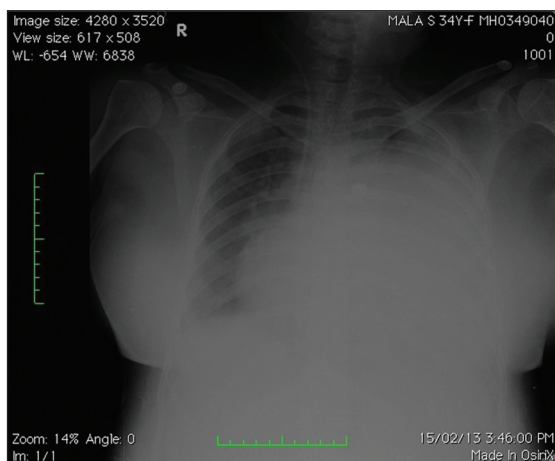


Figure 1: Chest X-ray showing opacity in the left hemithorax

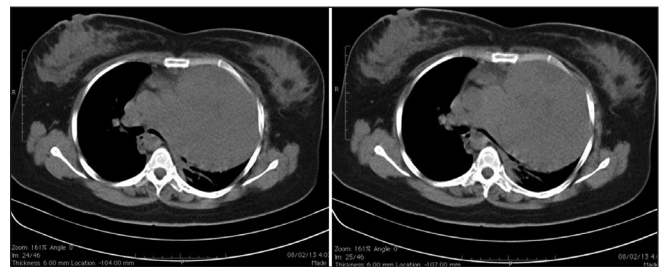


Figure 2: Computerized tomography of the thorax showing a mass in the left hemithorax with compression of the trachea and left main bronchus

greater than 5 rads has been associated with increased fetal risks.^[5] The physiological dyspnea of pregnancy begins in the first trimester and gradually plateaus or improves in the last trimester. Pathological dyspnea due to mediastinal mass is progressive, severe in the last trimester and usually associated with dry cough.^[5]

Postural variation in dyspnea is an important predictor of the degree of airway compression, and the position in which the symptoms are minimized should be identified pre-operatively. This “rescue” position can be rapidly instituted in case of difficult ventilation occurring after induction of anesthesia.^[6] Maintenance of the patency of the tracheobronchial tree in these patients is dependent on an upright posture. On assuming a supine posture, there is a potential for airway compression by the intrathoracic mass. Decreased FRC and loss of muscle tone due to the muscle relaxants adds to the increased risk of anesthesia in the supine position. Our patient had significant orthopnea and could not lie supine. This necessitated the surgery to be conducted in a semi-reclined position.

Signs of SVC obstruction like raised JVP, plethora of head and neck and prominent neck veins should be assessed. Lower limb intravenous access should be obtained in case of SVC obstruction. Diagnostic imaging studies should include CT thorax, cardiac magnetic resonance imaging and echocardiography to quantify the degree of compression of the airways and cardiovascular structures. Pre-operative pulmonary function tests and flow volume loops have been advised, although their usefulness is controversial.^[6,7] Flexible fiberoptic bronchoscopy to assess the degree of airway compression can be performed pre-operatively.^[2] Patients with tracheal compression of more than 50% are at a grave risk of total airway obstruction during induction of anesthesia, and the literature is replete with such examples.^[8] Our patient had tracheal displacement with more than 50% compression of the left main bronchi [Figure 2].

The perioperative management requires a multidisciplinary team of anesthesiologists, obstetricians and thoracic surgeons. Patients should be ideally managed in a tertiary care center that is equipped with CPB facilities as they are prone to sudden cardiovascular collapse. Delivery of the fetus by cesarean section rather than vaginal delivery is preferred to avoid increased intra-abdominal and intrathoracic pressures.

Anesthetic management of a pregnant patient with a large anterior mediastinal tumor poses a huge challenge. A high incidence of mortality and morbidity has been associated with general anesthesia (GA). Traditionally, most of these patients have been managed by maintaining spontaneous respiration during induction.^[8] Fatal airway collapse

requiring CPB has been reported in patients in whom spontaneous respiration was not maintained.^[9,10] Emergency airway equipment including fiberoptic bronchoscope, jet ventilator and rigid bronchoscope should always be available.^[5] In cases of airway obstruction more than 50%, it is advised by few authors to cannulate the femoral vessels in readiness for CPB.^[8]

In view of all the expected complications associated with GA, CSEA was employed in our patient. A carefully titrated epidural anesthesia helped us to achieve a gradual block with no incidence of hypotension. Intra-operative blood loss should be carefully replaced by fluids or blood with close CVP monitoring. Ergot alkaloids should be used with caution as they can precipitate profound vasoconstriction and consequently cardiovascular compromise. Phenylephrine is an appropriate vasopressor in these patients.

CONCLUSION

Management of anterior mediastinal mass in pregnancy is an anesthetic challenge. GA can worsen severe airway and vascular compression. CSEA is a safe alternative in these patients.

REFERENCES

1. Yoneda KY, Louie S, Shelton DK. Mediastinal tumors. *Curr Opin Pulm Med* 2001;7:226-33.
2. Narang S, Harte BH, Body SC. Anesthesia for patients with mediastinal mass. *Anesthesiol Clin North America* 2001;19:559-79.
3. Ward FT, Weiss RB. “Lymphoma and pregnancy,” *Semin Oncol* 1989;16:397-409.
4. Kanellakos GW. Perioperative Management of the pregnant patient with an anterior mediastinal mass. *Anesthesiol Clin* 2012;74958.
5. Crosby E. Clinical case discussion: Anesthesia for cesarean section in a parturient with a large intrathoracic tumour. *Can J Anaesth* 2001;48:575-83.
6. Blank RS, de Souza DG. Anesthetic management of patients with an anterior mediastinal mass: Continuing professional development. *Can J Anaesth* 2011;58:853-9.
7. Slinger P, Karsli C. Management of the patient with a large anterior mediastinal mass: Recurring myths. *Curr Opin Anaesthesiol* 2007;20:1-3.
8. Goh MH, Liu XY, Goh YS. Anterior mediastinal masses: An anaesthetic challenge. *Anesthesia* 1999;54:670-4.
9. Gothard JW. Anesthetic considerations for patients with anterior mediastinal masses. *Anesthesiol Clin* 2008;26:305-14.
10. Erdos G, Tzanova I. Perioperative anaesthetic management of mediastinal mass in adults. *Eur J Anaesthesiol* 2009;26:627-32.

How to cite this article: Bevinaguddaiah Y, Shivanna S, Pujari VS, Chikkapillappa MA. Anesthesia for cesarean delivery in a patient with large anterior mediastinal tumor presenting as intrathoracic airway compression. *Saudi J Anaesth* 2014;8:556-8.

Source of Support: Nil, **Conflict of Interest:** None declared.