

Anesthetic management of parturient with thoracic kyphoscoliosis, malaria and acute respiratory distress syndrome for urgent cesarean section

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Abstract

The management of cesarean section in kyphoscoliotic patient is challenging. The respiratory changes and increased metabolic demands due to pregnancy may compromise the limited respiratory reserves in such patients. Presence of other comorbidities like malaria and respiratory tract infection will further compromise the effective oxygenation. We report a case of kyphoscoliosis along with malaria and acute respiratory distress syndrome for urgent cesarean section.

Key words: Cesarean section, kyphoscoliosis, malaria, respiratory tract infection

Introduction

Kyphoscoliosis occurs due to disruption of balance between structural and dynamic components or neuromuscular elements of the spine. The respiratory system is compromised, and its severity depends on the severity of the kyphoscoliosis and concomitant respiratory disease.

Case Report

A 27-year-old, 45 kg female, G1P0L0A0, was admitted at 29 weeks of gestation with complaints of moderate grade fever associated with chills and rigors since 3 weeks, followed by development of cough and difficulty in breathing.

Her past history revealed gradually progressing thoracic kyphoscoliosis following poliomyelitis diagnosed at the age of

4 months. On admission, the patient was diagnosed to have signs and symptoms of ARDS with bilateral lung infiltrates in chest X-ray. Hemogram, renal and liver functions revealed no abnormality except for a total protein of 4.5 gm%, positive peripheral smear for malaria parasite (*Plasmodium falciparum*) and total leukocyte count of 14,700/mm³. Pulmonary function test revealed a restrictive lung disease (forced vital capacity [FVC], forced expiratory volume [FEV1] and FEV1/FVC were 67%, 58% and 110%, respectively). Other causes of fever such as typhoid, hepatitis, urinary tract infection and cholangitis were ruled out.

She was admitted to Intensive Care Unit (ICU) and ARDS was managed with intravenous antibiotics cefotaxim 1 g 8 hourly, levofloxacin 500 mg once in 24 h, amikacin 500 mg 12 hourly and metronidazole 500 mg 8 hourly. She also received oral artesunate. She was administered oxygen by face mask (5-6 L/min), steam inhalation, nebulization and chest physiotherapy. There was gradual worsening of her respiratory condition, subsequently leading to desaturation (SpO₂ 77%) with a respiratory rate (RR) of 50-60 breaths/min, and crepts on auscultation of her right chest. Her arterial blood gas (ABG) analysis revealed PO₂-64 mmHg, PCO₂-26 mmHg, SpO₂ of 88% for which noninvasive continuous positive airway pressure (CPAP) of 5 cmH₂O was applied with a FiO₂ of 40%. This led to an improvement of her respiratory condition; SpO₂ rose to 99% and the RR settled to 20-22 breaths/min. Repeat ABG revealed PO₂-96 mmHg, PCO₂-34 mmHg and SpO₂ 99%. She continued to remain on noninvasive CPAP for

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first 4 days, maintaining hemodynamics and was managed with intravenous antibiotic, steroids and nebulization with bronchodilators. In the ICU she developed hyponatremia (Na^+ 128 meq/L) and hypoproteinemia (total proteins 4.5 g/dL and albumin 1.8 g/dL). Hypoproteinemia was managed with albumin (20% 100 mL daily for 5 days) and hyponatremia with 0.9% normal saline administration.

During her ICU stay, fetal well-being was also monitored. She was administered intramuscular betamethasone (12 mg, 2 doses 24 h apart) for fetal lung maturity. Tocolytics were also prescribed for occasional uterine contractions (nifedipine 5-10 mg when required). On day 5th of her ICU stay, she had respiratory distress (RR-26-28 breaths/min) and started having labor pains. On examination, patient had uterine contractions and passage of meconium stained liquor per vaginum. This was followed by deterioration of her respiratory condition and desaturation (SpO_2 of 73%) even on the support of noninvasive CPAP of 5 cmH_2O . Her ABG revealed PO_2 -52 mmHg, PCO_2 -45 mmHg and SpO_2 of 82%. Fetal Doppler revealed fetal heart rate of 110 beats/min. In view of such critical condition, emergency lower segment cesarean section (LSCS) was planned. In the ICU emergent rapid sequence induction using thiopentone (200 mg) and succinylcholine (75 mg) was performed, followed by tracheal intubation. Patient was then shifted to the operating room in left lateral position with an endotracheal tube *in situ* on Bain's circuit and with manual assisted ventilation. During the surgery, patient remained hemodynamically stable with systolic blood pressure ranging 110-140 mmHg, diastolic blood pressure ranging 60-80 mmHg and heart rate ranging from 60 to 80 beats/min. She sustained blood loss of 600 mL that was replaced with balanced salt solution and 1 unit of packed red blood cells. A low birth weight (1181 g) female baby was delivered with an APGAR score of 7 and 8 at 1 and 5 min respectively. Baby was shifted to neonatal ICU for further management. In view of her poor lung condition, residual neuromuscular blockade was not reversed, and patient was shifted back to ICU. The lung condition further deteriorated, and ABG revealed-pH 7.321, PaO_2 59 mmHg, PaCO_2 46 mmHg, HCO_3 20 meq/L. The ventilatory management was done as per ARDS management guidelines. Her bronchial alveolar lavage cultures grew acinetobacter and urine culture revealed *Escherichia coli* that were managed with appropriate intravenous antibiotics. During this period in ICU, she required sedation with midazolam and morphine as well as intermittent neuromuscular blockade and inotropic support (noradrenalin 5-8 mg/kg). Over next 4 days, her lung

condition and ABG improved with the gradual increase in PaO_2 of 65 mmHg to 202 mmHg and $\text{PaO}_2/\text{FiO}_2$ ratio of 81.25-505. This led to gradual weaning of the patient off the ventilator and finally tracheal extubation 10 days later.

Discussion

Anesthetic management of the parturient with thoracic kyphoscoliosis, malaria and ARDS for emergency LSCS is challenging.

Pregnant patients with pulmonary compromise (kyphoscoliosis and ARDS in this case) may not tolerate increased metabolic demand generated by the fetus, placenta, and gravid uterus due to limited respiratory reserves.^[1] Labor pains result in marked hyperventilation causing a fall in PaCO_2 and respiratory alkalosis causing cerebral and uteroplacental vasoconstriction.^[1,2] This reduces the release of oxygen from hemoglobin that not only compromises maternal tissue oxygenation, but also has a deleterious effect on fetal oxygen transfer.

The presence of kyphoscoliosis in parturient may further leads to ventilation/perfusion mismatch and marked dyspnea. It can also interfere with provision of labor analgesia or regional anesthesia for cesarean section.^[3]

The risk of development of ARDS in a parturient is higher than in the nonpregnant population.^[4] Golden hour "right decision at right time" is paramount in the management of such cases.

We conclude that parturient with associated respiratory comorbidities needs timely management for a better outcome not only of the mother, but also of the fetus.

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