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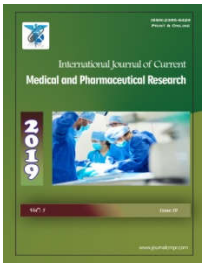

AN UNUSUAL HURDLE IN A DIFFICULT AIRWAY OF A SHORT STATURED KYPHOSCOLIOTIC PREGNANT PATIENT FOR UPPER SEGMENT CAESAREAN SECTION

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ABSTRACT

A middle aged thirty seven and half weeks pregnant dwarf with sever thoracic kyphoscoliosis presented for elective caesarean section in view of cephalopelvic disproportion. She had an anticipated anatomical difficult airway. Investigations revealed bilateral basal lung atelectasis, tricuspid regurgitation and mild pulmonary hypertension. low dose spinal anaesthesia with supplemental epidural anaesthesia allowed successful performance of surgery. Supplemental oxygen via face mask was provided but a steady rise in end tidal carbon dioxide appeared to indicate an impending airway disaster. The only corrective measure necessary was to change oxygen delivery device to low flow nasal prongs. This physiological difficult airway is attributable to the Haldene effect and hypoxic pulmonary vasoconstriction. Supplemental oxygen should be provided with caution in chronic restrictive lung cases to avoid maternal respiratory failure and subsequent foetal harm.

INTRODUCTION

Kyphoscoliosis in the parturient presents many challenges to the anaesthetist as well as to the obstetrician. Cardiovascular and respiratory compromise require careful planning for caesarean section. Review of literature has shown substantial number of successful cases of caesarean sections in kyphoscoliotic patients performed either under spinal or general anaesthesia with varied perioperative events(1,2,3,4). We report a challenging case with a difficult anatomical airway done under spinal andepidural anaesthesia. Recognising the physiological difficult airway in the early stages helped in avoiding going into the vortex of difficult airway management.

Case History

History & Examination: A 33-year-old year old, 128 cm in height,weighing 45 kg, primigravida was posted for elective upper segment caesarean section in view of cephalopelvic disproportion and malformed lower uterine segment. Non-compliant with antenatal care she presented herself at thirty seven and a half weeks of gestation complaining of decreased effort tolerance and breathlessness on exertion. Examined on the day of admission, she was conscious, oriented and mildly tachypnoeic. Airway assessment showed a short neck with no extension, mouth opening of 4 cm, thyromental distance 9 cm, buck teeth with zeroslux. Gibbuslike deformity of thoracic and lower cervical spine, pigeon chest deformity of thoracic cage(fig.1). Lumbar spine was mildly scoliotic with convex curvature to the left.Respiratory rate(RR) 18 per minute,blood pressure(BP) 120/86 mm Hg, base line saturation(SpO2) 94%. Auscultation revealed bilateral decreased air entry at bases with coarse crepts and ronchi in the rest of the lung field.Pansystolicmumur was heard in mitral and tricuspid area. Fetal heart sounds were normal.

Investigations: Her investigations were as follows, haemoglobin 9.4gm%, Complete blood count, renal and liver function tests were within normal limits, ECG showed left axis deviation, chest X-ray taken with abdominal shield showed bilateral severe crowding of ribs, Severe kyphotic thoracic spine and opacification of basal lung areas. Antero-posterior and lateral X-ray neck showed shortening and lossof normal cervical curvature(fig.2).2DEcho revealed mild tricuspid regurgitation and mild pulmonary hypertension and ejection fraction of 60%.Arterial blood gas (ABG)on room air was as follows, pH 7.45,pO2 98.6, pCO2 36.4, HCO_3 22.8, base excess(BE)12, SpO2 97.7%.

Optimization: Consultation with chest medicine and cardiology was sought. Optimization done with bronchodilators, nebulization, chest physiotherapy and one unit of packed blood cell transfusion. After five days of

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admission she was posted for surgery with ICU backup. Written informed consent was taken for high chance of ventilatory support and failure of neuraxialblock. We planned low dose spinal anaesthesia with supplemental epidural anaesthesia with the back up plan of general anaesthesia with difficult intubation cart keptready.

Anaesthetic Management: Patient was wheeled in left lateral position into the operation theatre and multipara monitor including electrocardiography(ECG), Pulse oximetry(SPO2), Non-invasive blood pressure (NIBP) and capnography (ETCO2) was attached. Supplemental oxygen via face mask was provided at 6 L/min.Co-loading with 500ml of ringer lactate solution was started intravenously. Under all aseptic precautions, in sitting position,it was not difficult to place an 18G epidural catheter in L3-4 intervertebral space via midline approach following which a low dose of 0.5 ml of 0.5% bupivacaine (heavy) intrathecal injection with 23G Quincke's needle was possible in L4-5 for subarachnoid block(SAB).Patient was made supine with right hip wedge. Due to inadequate SAB, supplemental epidural anaesthesia was given with incremental doses of a combination of 2%lignocaine and 0.5% bupivacaine. A total of 6ml 2% lignocaine and 5ml 0.5% bupivacaine was needed to achieve block till T6 dermatome. The entire induction of anaesthesia was achieved smoothly and all vital parameters were maintained.

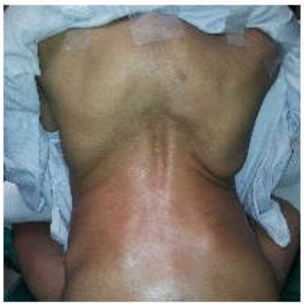

Figure 1 Severe thoracic kyphoscoliosis in parturient

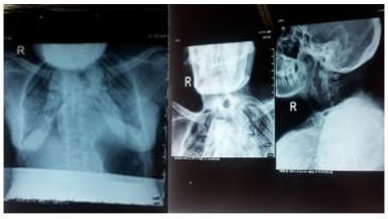

Figure 2 Radiological images taken with abdominal shield,
Chest X ray showing severe crowding of ribs, severe cervical- thoracic kyphosis and opacification of bilateral lung fields.
Neck X ray AP and Lateral view showing shortening and loss of normal cervical curvature

Intraoperative Events: Classical Caesarean section with Upper segment uterine incision was performed as lower segment was not well formed .Uterine incision to deliver interval was 2 minutes.A healthy female baby weighing 2.4 kg with Apgar score of 9/10 at 1 min was delivered. Pitocin(Oxytocin) infusion of 20 units helped in uterine involution and surgery was completed in 45 min. Haemodynamic parameters were well maintained and blood loss was in tolerable range. It was observed that there was a steady rise in ETCO2, by the end of surgery it increased from 37 to 70 mmHg, there was also a fall in SpO2 from 97 to 92 % and increase in respiratory rate from 18 to 25/ min. Patient became restless and anxious.

Postoperative Management: Urgent consultation with the chest medicine department was taken and the advice given was to replace oxygen supplementation with low flow (2 litres / min) nasal prongs. Within half an hour of replacement, ETCO2 fell from 70 to 34 mmHg. Supportive treatment included nebulization with levosalbutamol and ipratropium bromide and intravenous injections of aminophylline and hydrocortisone. ABG after 24 hr was as follows, pH 7.31, pCO2 38, pO2 97, HCO_3 22.8, BE 5, SpO2 97.Further recovery course was uneventful and she was discharged after a week.

DISCUSSION

Both pregnancy and kyphoscoliosis contribute to anatomical and physiological difficult airway(5,6).Chronic respiratory failure is caused by restrictive lung function in severe kyphoscoliosis involving thoracic cage(7). Supplemental oxygen(O_2) abolishes hypoxic pulmonary vasoconstriction causing increased blood flow to poorly ventilated alveoli(8). This increases ventilation perfusion mismatch and physiological dead space. Hence efficiency of elimination of carbon dioxide(CO_2) is diminished which leads to carbon dioxide retention. Secondly, due to the Haldeneeffect (9), haemoglobin in the circulating blood has a greater affinity for CO_2 than O_2. So, there is a difference in the amount of CO_2 carried in oxygenated blood and deoxygenated blood. When O_2 is administered, it induces rightward shift of CO_2 dissociation curve(10).The resultingaccumulated CO_2 is normally eliminated by increase in minute ventilation.But, in restrictive lung conditions, minute ventilation cannot increase and this causes CO_2 retention.

CONCLUSION

pregnancy in the presence of severe thoracic kyphoscolisis can exacerbate the restrictive lung pattern and both contribute to anatomical and physiological difficult airway. Supplemental oxygen providedduring regional anaesthesia in such cases should done with caution. Inspired oxygen concentration should be kept low to avoid potential maternal and neonatal respiratory impairment.

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