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Anesthetic Challenges In The Extremely Obese Parturient During Caesarean Section: A Case Report

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Abstract

Background: Obesity continues to be of global health concern. The increase in the prevalence of obesity in the general population extends to women of reproductive age. Class III obesity has challenging implications during anaesthesia and increases the risk of complications in pregnant women and their neonates.

Case Report: A pregnant 41yr-old hypertensive Class III obese patient with a BMI of 60 kg/m^2 was scheduled for emergency caesarean section because of poorly controlled hypertension at 36 weeks gestation. She had spinal anaesthesia for surgery and complained of blurry vision and difficulty breathing. She subsequently became hypoxic and hypotensive. She was placed in reverse Trendelenburg position, 100% oxygen was administered, and vasopressors and intravenous infusion were given. She eventually had caesarean delivery of a live male baby with good Apgar scores. The post-operative period was uneventful culminating in her discharge 5 days post-operation.

Conclusion: Complications of morbid obesity during anaesthesia should be pre-empted and promptly addressed to avert adverse maternal and fetal outcome

Keywords: Class III obesity, caesarean section, anaesthetic complications, parturient.

Introduction

Obesity is a pandemic of world interest and women of reproductive age are not excluded. **[1]**. The effect of obesity on maternal and fetal well-being is a significant health care problem of global concern. In the United States, it is estimated that half of pregnant women are obese. **[2]** Obesity is further sub-classified as class I for BMI 30–34.9 kg/m2, class II for BMI 35–39.9 kg/m2, and class III for BMI > 40 kg/m2. **[3]**

Obesity being a multi-systemic disease is associated with several comorbidities and parturients have a higher risk of obstetric and peripartum complications necessitating an operative delivery. **[4]** Establishing neuro-axial anaesthesia in extreme obesity can be challenging though it remains the preferred aesthetic technique for caesarean delivery in the obese. The neuro-axial technique avoids airway manipulation and the attendant risk of a difficult airway, minimizes the risk of aspiration, reduces the risk of cardiopulmonary depression, and reduces opioid consumption. It also decreases the risk of postoperative nausea and vomiting and decreases the risk of post-partum haemorrhage from uterine atony following inhalational aesthetic exposure. **[5,6,7]** We report the case of an extremely obese woman who had complications of spinal anaesthesia in preparation for a caesarean section.

Case report

A 41-year-old extremely obese (weight 150 kg and height of 1.58m with BMI=60.0kg/m2), G1P0 lady was scheduled for emergency caesarean section on account of severe hypertension at 36 weeks gestation. She had a prior history of chronic hypertension and moderately controlled gestational diabetes mellitus. Her medications included nifedipine 20mg daily, methyldopa 500mg 8hrly, and a mixture of insulin (20iu am / 12iu pm). Before delivery, she had been experiencing breathlessness on moderate exertion, orthopnoea, paroxysmal nocturnal dyspnoea, snoring, and morning fatigue suggestive of obstructive sleep apnoea syndrome (OSAS). The electro- and echocardiographic findings were essentially normal. Fasting blood glucose on the morning of surgery was 7.0 mmol/L. Other blood investigation results were within normal limits. The patient and her relatives were counselled on the technique of anaesthesia, possible risks, and complications associated with the procedure, and the preparations made to minimize the risk of such complications. Airway assessment revealed normal dentition and Mallampati II with thyro-mental distance less than 6 cm, a sterno-

mental distance less than 12cm, and an excessive breast mass all indicating the possibility of difficult intubation. She was classified as American Society of Anaesthesiologists (ASA) Class IV. In the theatre, baseline vital signs were measured and recorded. A full complement of drugs and instruments required to address difficult airway intubation were prepared along with those needed for the neuro-axial block. Preloading with 750 ml of normal saline was commenced before the insertion of epidural anaesthesia. She was positioned sitting with both feet resting on a stool before aseptic skin preparation of her back. The Tuffier's line and the scapula were used as anatomical landmarks due to difficulty in locating the lower thoracic and lumbar vertebral processes. Local infiltration of L3- L4 space and the overlying skin was achieved with 4mls of 1 % lignocaine. The epidural catheter was inserted according to standardized technique leaving 5cm in situ. She was repositioned supine with a 45-degree head up and 15 % lateral tilt. Plain bupivacaine (0.5 %) was administered in aliquots of 5ml totalling 20 ml. The procedure was abandoned after 40 minutes of the last dose of plain Marcaine without an analgesic/aesthetic effect and a Bromage score of 6. She was repositioned in a sitting posture for the spinal block which was achieved through the L4-L5 space using a standard sized 25G Quinkie spinal needle. A free backflow of cerebrospinal fluid was observed and 2mls [10 mg] of heavy Marcaine plus 25mcg of fentanyl was injected. She was repositioned supine with a 45-degree head-up and 15-degree lateral tilt on the operating table.

Following the achievement of the T6 sensory level 5 minutes after the spinal was established, she complained of visual blurring and difficulty breathing. She became hypotensive, (Mean arterial blood pressure dropped below 45mmHg) and hypoxic (SPO2 – dropped to about 90%on room air from the initial 97% baseline). She was maintained in the reverse Trendelenburg position. 100 % oxygen at 10 L/min was administered via a face mask, the normal saline infusion was increased, and ephedrine was given in aliquots. She thereafter became hemodynamically stable, and a caesarean section was performed successfully with the delivery of a live male baby with a birth weight of 2.5kg and Apgar scores 8 and 9 at one and five minutes respectively. Intra-vascular oxytocin 10 IU was given and 40iu was added to 500mls of 0.9 % normal saline to achieve adequate uterine contraction. Suppository misoprostol at 800microgram was administered for the prevention of primary postpartum haemorrhage. The surgery lasted about 125 minutes; she was transferred to the recovery room with the assistance of about 8 members of the attending team. Post-operative epidural analgesia was maintained for 14 hours. Suppository diclofenac 100mg for 12 hours and intravenous paracetamol infusion 1000 mg for 8 hours were given for analgesia following removal of the epidural catheter. Thrombo-prophylaxis was achieved with compression stockings and subcutaneous clexane 80mg daily and early ambulation commenced within 24 hours after surgery. She was discharged on the 5th day post-surgery with adequate counselling on the benefits of a weight loss schedule and exclusive breastfeeding for the patient. She was referred to the post-natal clinic for follow-up.

Discussion

Obesity is associated with a higher incidence of medical comorbidities. [4] The extremely obese patient presented above had features of obstructive sleep apnoea syndrome and had been on management for gestational diabetes mellitus and chronic hypertension and subsequently had a caesarean section because of uncontrolled hypertension. Anticipated perioperative challenges included difficulties with intravenous access, adequate blood pressure cuff for monitoring, optimal positioning of the patient, identifying landmarks for neuraxial blocks, and airway management **[5,7]**. We ensured two large-bore (size 18-G cannulas) peripheral venous accesses were established before surgery and an adequate-sized blood pressure cuff was in place.

Although neuraxial techniques are the preferred mode of anaesthesia for caesarean delivery in these patients **[5,6,7]**, there is an increased likelihood of multiple attempts at placement, increased risk of accidental Dural puncture, risk of epidural vein cannulation, and increased risk of failure of neuraxial placement **[6]**.

Epidural anaesthesia offers several advantages including an easily titratable local anaesthetic dose and level of anaesthesia, the ability to extend the block if the surgery gets prolonged, slower, and more easily controllable hemodynamic changes, and utilization of the catheter for postoperative analgesia **[5,7]**. Disadvantages of spinal anaesthesia include the time-limited nature of the block. A dense T4 level of spinal anaesthesia may cause intraoperative difficulties with ventilation **[6]**. Hence our initial option was an epidural technique. We had anticipated a possible epidural failure and had spinal anaesthesia as a second option as there is an increased risk of epidural failure in this patient population **[5,6]**. We planned an early block assessment to allow for backup plans to be initiated without delay. Good positioning is essential to optimize neuraxial placement. Neuraxial techniques may be technically easier in the sitting flexed position, rather than the lateral position in this patient population **[5]**. Hence both the initial epidural and the subsequent spinal anaesthesia were performed in the sitting position for supposed easier access.

Following epidural placement, the patient was allowed to return to a relaxed sitting position before securing the catheter to the skin, this is especially important in obese patients. When the patient is in the sitting position and flexion of the lumbar spine is optimized, the distance from the skin to the ligament flavum is minimized **[7]**. On returning to a relaxed sitting position this distance increases, and the skin and soft tissues may move caudad. If the catheter were to be

secured to the skin before the patient is allowed to return to a relaxed position, the catheter may be pulled back out of the epidural space by the distance that the soft tissues travel when returning to this position, even as the catheter mark at the skin stays constant. This could lead to complete failure of the epidural catheter if not recognized. To further minimize the risk of catheter dislodgement in our patient and also consider the logistics of moving our patient with regards to her BMI, epidural catheter placement was done in the operating theatre. **[8]**

Limited studies guide optimal neuraxial dosing in this patient population **[9]**. Pregnancy has been reported to enhance the sensitivity of nerves to local anaesthetics and to decrease anaesthetic requirements during regional anaesthesia Obese patients have reduced epidural space volumes due to increased intra-abdominal pressures when compared with normal patients **[9,10]**. Smaller amounts of epidural local anaesthetic may then be needed to provide sufficient analgesia or anaesthesia. Evidence examining longitudinal epidural spread in pregnancy is conflicting because there is no practical or reliable quantitative measure of the spread of the solution in the epidural space **[9]**. The site of injection of the local anaesthetic is the most important variable in determining the segmental anaesthetic coverage, with spread occurring in both the cephalad and caudad directions. A volume of 1-2 ml of local anaesthetic per dermatome is typically used **[9,10]**. After an optimal dose of plain bupivacaine 20mls at 0.5 % concentration given in incremental doses failed to achieve analgesia/anaesthesia 45 minutes after the last aliquots were delivered, the procedure was abandoned to avoid increasing the risk of toxicity and also avoid the time lag that may be required for the block to be established and a low dose spinal anaesthesia with bupivacaine/fentanyl was instituted. However, this combination of intrathecal bupivacaine/fentanyl can herald severe respiratory distress in the super morbidly obese patient. **[1]**. We had anticipated this occurrence in our morbidly obese patient hence the initial attempt at avoiding spinal anaesthesia. To mitigate this expected adverse event, our patient was adequately counselled before surgery to prepare her psychologically. She was able to easily follow our instructions and care plan. About 5 minutes after establishing the spinal block, she complained of blurring of vision, dizziness, and inability to breathe adequately. Timely oxygen support was instituted and continued, she was further propped up with pillows in the reverse Trendelenburg position with a left lateral tilt, vasopressors were given in aliquots, and fluids were increased till the patient was hemodynamically stable.

Apart from the documented effect of the combination of spinal bupivacaine /fentanyl on the respiratory system in the obese parturient, aortocaval compression in the supine position occurs during late pregnancy and may be more pronounced in the morbidly obese parturient. **[1]**. We recognized that our patient was at risk of aortocaval compression. The risk of occurrence was reduced by the combination of a left lateral pelvic tilt combined with the reverse Trendelenburg position.

Although the neuraxial technique was our choice, the team was fully prepared with a difficult airway trolley for invasive ventilation if required. This remains the minimum standard while planning neuraxial techniques for morbidly obese parturients, **[1,10]**.

Specialized bariatric equipment should be readily available for the care of these patients. These include operating tables, beds, and stretchers with appropriate weight limits. The use of operating table extenders should be considered to support redundant tissue and prevent skin or tissue injury **[1,10]**. Appropriate lifting equipment for the weight of our patient was not available at our centre. Preoperatively, the patient was wheeled to the theatre with a trolley, and on arrival in the operating suite; the patient descended from the trolley and climbed the operating trolley. After surgery, to reduce the risk of injury to personnel and patient, additional staff helped with the movement of the patient to the PACU and subsequently to the ward.

Caesarean section in the super morbidly obese patient is associated with increased operative time, a higher risk of intraoperative blood loss, and postpartum haemorrhage **[11]**. To reduce these risks, intravenous oxytocin 10iu bolus was given, 40iu continued as infusion and 800micro grams of suppository misoprostol were administered. Oxytocics are considered the first line uterotonic agent in the prevention and treatment of postpartum uterine atony **[12]**. There is considerable variation in clinical practice concerning the optimal dose and rate for use in caesarean sections in reducing intraoperative haemorrhage and reducing the risk of postpartum haemorrhage. The common practice is the continuous infusion of oxytocin at doses greater than 20 to 40 IU **[12]**. Our patient also had 1000mg of tranexamic acid which studies have shown to be effective in reducing the risk of both intra-operative blood loss and postpartum haemorrhage **[13]**

A multimodal analgesic regimen optimizes post-delivery analgesia, decreases opioid consumption, and encourages early ambulation. In our patient, the multi-modal analgesic approach was via the epidural catheter initially sited, suppository diclofenac at 200mg every 12 hours, and intravenous paracetamol at 900mg every 8 hours. **[5,7]**

Being at high risk of thromboembolism, the patient was on thromboembolic deterrent stockings, had subacute clexane 40mg 12 hourly for 48 hours and early ambulation was ensured. **[14]**

Weight reduction during the postpartum period was encouraged and breastfeeding which has also been advocated as an effective technique for weight loss post-delivery was emphasized. **[4,5]**

Conclusion

The management of a super morbidly obese patient for caesarean section presents logistic, obstetric, and anaesthetic challenges and the successful anaesthetic outcome is dependent on the anaesthetic team with a robust knowledge of the physiological changes associated with pregnancy, the pathophysiology, and anaesthetic considerations of morbidly obese parturients and effective multidisciplinary planning and communication.

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