

The Challenges of Single-Shot Spinal Anaesthesia for Cesarean Section in a Morbidly Obese Patient: A Case Report

Kwari Y. Danladi¹, Patience T. Sotunmbi¹, Olutosin A. Awolude², Kolawole A. Obisesan².

Departments of ¹Anaesthesia and ²Obstetrics & Gynaecology, University College Hospital, Ibadan.

Abstract

An unusual case of morbid obesity, severe hypertension and twin gestation at 36weeks in an unbooked multigravid patient was presented for cesarean section. She was referred from a private clinic to the obstetric emergency unit of the University College Hospital, Ibadan with history of hypertension in pregnancy. She was a known hypertensive for ten years and her blood pressure was poorly controlled due to non-compliance with medications and medical check-up. She had been having progressive visual loss over the ten year period and had lost three previous pregnancies. Following comprehensive clinical and radiological evaluation, she had a carefully planned single-shot spinal anaesthesia for cesarean delivery of a set of twin which was performed on a double operation table. She remained stable throughout the procedure and post operative period.

Key Words: Single-Shot Spinal Anaesthesia, Obesity, Hypertension, Cesarean Section

Introduction

The prevalence of significant obesity continues to rise in both developed and developing countries and is associated with an increased incidence of wide spectrum of medical and surgical pathologies¹. In developed countries, poverty is associated with greater prevalence whereas in the developing world it is affluence that carries the higher risk of obesity². The anaesthetist can expect to be presented frequently with obese patients in the operating theatre, ICU or resuscitation room. Such patients may provide the anaesthetist with considerable challenge. A thorough understanding of the pathophysiology and specific complications associated with this condition should allow more effective and safer treatment for this unique group of patients. The obese pregnant mother particularly presents with difficulties and challenges. The use of regional anaesthesia reduces the risk of difficult intubation and aspiration and provides safer and more effective post op analgesia. However, regional anaesthesia in them can be technically challenging because of difficulty in identifying the usual bony landmarks³.

Case Report

A 37 year old unbooked gravida seven, para four plus three, obese mother was referred from a private clinic to the obstetric emergency unit of the University College hospital Ibadan with history of chronic severe hypertension in pregnancy at gestational age of 36weeks. He was a known hypertensive for ten years with hypertensive retinopathy resulting in progressive visual loss. No history of cardiac or renal decompensation. Blood pressure control had been poor due to poor compliance with medication and follow-up. Preoperative assessment revealed an obese woman weighing 134kg, with a moderate height of 1.65m and a short neck. She was fully conscious, calm, well hydrated and not pale. Cardiovascular system examination

revealed a pulse rate of 96 beats per minute which was regular and of good volume. The blood pressure in the supine position taken with a standard adult cuff was 180/110 mmHg. She had been on nifedipine for the control of her blood pressure. The respiratory system was essentially normal while the abdomen was obese with gravid uterus containing multiple fetal parts. Examination of the lower back showed normal backbone but distorted bony landmarks due to excessive redundant fatty tissues. The airway was assessed as Mallampathy III and no dentures.

Investigations done include a packed cell volume of 35%, the electrolytes were normal and the urea was 25mg/dl. The USS result confirmed twin gestation, breech presentation of one of the twin, weight and their gestational ages. Chest X-ray, ECG, pulmonary function test, clotting profile and liver function test could not be done. The patient was assessed as morbid obesity (BMI of 49kgm⁻²) and severe hypertension in pregnancy. She was classified as ASA III.

Anaesthetic Management

She had a preoperative fast and prophylaxis against acid aspiration with oral ranitidine 150mg and metoclopramide 10mg given the night before surgery. Adequate anaesthetic preparation was made for single-shot subarachnoid block as well as for general anaesthesia. Difficult intubation was anticipated; therefore adequate preparation was made to overcome it by having a senior anaesthetist, endotracheal tubes and laryngoscopes of various sizes and a trained anaesthetic assistant readily available. Two intravenous lines were

Correspondence: Dr. P. T. Sotunmbi, Department of Anaesthesia, University College Hospital, Ibadan.

E-mail: sotunmbipt@yahoo.com

skillfully established with wide-bore canulae on both forearms and the patient was preloaded with 750mls of normal saline. Baseline vital signs of blood pressure, pulse rate and arterial oxygen saturation (SaO₂) were obtained using automatic electronic monitor and the patient was placed in a sitting on a double operation table with the help of the anaesthetic technician. Under aseptic condition, the subarachnoid space was accessed via L3/L4 lumbar space with size 25G Quinke's needle after second attempt. The patient was placed immediately in supine position with a lateral tilt on the center of the double operation table. Care was taken to protect pressure points against hard surfaces by applying cushions. Complete block was achieved up to the level of xiphoid sternum (T₆) using three millimeters of heavy bupivacaine. Within 30 minutes of skin incision, a set of twin was delivered with weight and Apgar score of 2.0kg, 1.85kg and 7¹ 9⁵, 5¹ 8⁵ respectively. The procedure lasted for one and a half hours, and estimated total blood loss of about 400mls which was balanced with 2liters of normal saline. Blood pressure, heart rate and SaO₂ were monitored automatically using electronic monitor throughout the procedure. The blood pressure dropped from a baseline of 180/100mmHg to 130/70mmHg on establishing the block. Supplemental oxygen was administered by face mask using the anaesthetic machine before the delivery of the babies. She remained clinically stable and pain-free throughout the procedure and postoperative period. Postoperative analgesia was achieved with intramuscular pethidine 100mg 8 hourly which was changed to oral paracetamol

1g 8 hourly on the third postoperative day. Prophylactic antibiotic therapy was achieved with intravenous augmentin 600mg 6hourly. Early ambulation and physiotherapy was recommended to prevent deep vein thrombosis.

Discussion

Obesity is a condition of excess body fat. Accurate measurement of body fat content is difficult and requires sophisticated technique such as CT scanning or magnetic resonance imaging. Useful estimate however can be obtained by evaluating weight for a given height e.g. ideal body weight (IBW) and body mass index (BMI). Body mass index is a more robust measure of the relationship between weight and height and is widely used in clinical and epidemiological studies⁴. BMI = Body weight in kg / height² in meters. BMI of <25kgm⁻² is considered normal, 25-30kgm⁻² is overweight but low risk of serious medical complications, 30-35kgm⁻² is obesity, >35kgm⁻² is morbid obesity, while >55gkgm⁻² is super morbid obesity. Morbidity and mortality rises sharply when BMI is greater than 30kgm⁻²⁵. Other factors such as young age and pattern of adipose tissue distribution affect medical risk. The android or central type of fat distribution is associated with more metabolic complications such as dyslipideamias, glucose intolerance and higher incidence of mortality from ischemic heart diseases than peripheral or gynaecoid type of fat distribution^{1,3}. The obese pregnant patient present particular difficulties which include:

PICTURE OF OBESE PATIENT



1. Increased risk of chronic hypertension, pre-eclampsia and diabetes⁶.
2. Higher incidence of difficult labour with increased likelihood of instrumental delivery and cesarean section.
3. Cesarean operation tends to be longer with higher incidence of postoperative complications, including greater blood loss, DVT and wound infection or dehiscence⁷.
4. Increased risk of anaesthesia related morbidity and mortality during cesarean section and in particular increased risk of failed intubation and gastric aspiration during procedure under GA.
5. Increased incidence of multiple, failed attempt at establishing epidural or spinal anaesthesia.
6. Increased risk of fetal morbidity and mortality, with some studies showing an increased incidence of fetal distress.
7. Supine and Trendelenburg positions further reduce FRC, increasing the possibility of hypoxemia.
8. Some studies have shown greater cephalad spread of local anaesthetics during spinal and epidural anaesthesia⁸.
9. Loss of intercostal muscle functions during spinal anaesthesia leading to respiratory difficulty.
10. Possible severe reduction in cardiac output with GA; related to profound aorto-caval compression and the use of PEEP.

If at all possible, GA should be avoided in the pregnant obese patient. If it is absolutely essential, then a difficult intubation should be anticipated, so that necessary assistance and appropriate equipment be made readily available. A clear action plan must have been formulated for the possibility of a failed intubation. The mother's safety must come first if a failed intubation is deemed likely. Establishment of regional anaesthesia in the obese can be technically challenging because of difficulty in identifying the usual bony landmarks as experienced in this patient. (See Fig. 1). However, the use of regional anaesthesia in the obese reduces the risk from difficult intubation and acid aspiration as well as provides safer and effective postoperative analgesia.

All obese patients should receive prophylaxis against

acid aspiration even if they do not present with symptoms of heartburns or reflux. A combination of H₂-blocker e.g. ranitidine 150mg orally and a prokinetic e.g. metoclopramide 10mg orally given 12hrs and 2hrs before surgery will reduce the risk of aspiration pneumonitis⁹. Opioids and sedative premedicants may cause respiratory depression in the obese and should be avoided. Intramuscular and subcutaneous injection routes should be avoided since absorption is very unreliable. Establishment of intravenous lines may be problem because of excessive subcutaneous tissues. Surgical venous cut-down may be necessary.

Positioning of obese patients on the operating table can be challenging to the anaesthetist and theatre staff⁷. Specially designed table may be required or two normal tables may be placed side by side as was done for the patient under discussion. (See fig. 2). Obese patients should be anaesthetized on the operation table to avoid unnecessary transfers and associated risks to both staff and patients. Particular care should be paid to protection of pressure areas because the risk of pressure sores and neural injury is greater in the obese. Appropriate manpower should always be available when moving morbidly obese patients and local lifting policies should be adhered to.

Invasive arterial blood pressure monitoring has been advocated for all but the most minor procedure in the morbidly obese. If a non invasive cuff is to be used, it should be of an appropriate size. Pulse oximetry, ECG, capnography and monitoring of neuromuscular block are all mandatory. The use of CVP and pulmonary flotation catheter should be considered in patients undergoing extensive surgery or those with serious cardiorespiratory diseases¹⁰.

Conclusion

The pregnant obese patients present a great challenge the physician anaesthetist, surgeon and theatre staffs. A thorough understanding of pathophysiology and specific complications associated with the condition should allow more effective and safer treatment for this unique group of patient as demonstrated above.

References

1. Adams JP, Murphy PG; Obesity in anaesthesia and intensive care. *Br J Anaesth*, 2000; 85: 95-108.
2. Sobal J, Stunkard A. Socio-economic status of obesity: a review of literature. *Psychol Bull*, 1989; 105: 260-75.
3. Hood DD, Dewan DM. Anaesthetic and obstetric outcome in morbidly obese parturient. *Anesthesiology*, 1993; 79: 1210-18.
4. Hsied SD, Yoshinaga H. Abdominal fat distribution and coronary heart disease risk factors in men: waist/height ratio as a single and useful predictor. *Int J Obes Related Metab Disorders*, 1995; 19: 585-9.
5. Garrison RJ, Castilli WP. Weight and 30 year mortality of men in the Framingham study. *Ann Int Med*, 1985; 103: 1006-9.
6. Shenkman Z, Shir Y, Brodsky JP. Perioperative management of the obese patient. *Br J Anaesth*, 1993; 70: 349-59.
7. Cooper JR, Brodsky JB. Anaesthetic management of morbidly obese patient. *Semin Anaesth*, 1987; 6: 260-704.
8. Pitkanen MT. Body mass and spread of spinal anaesthesia with bupivacaine. *Anesth Analg*, 1987; 66: 127-31.
9. Villa P, Valles J, Canet J, Metro A, Vidal F. Acid aspiration prophylaxis in morbidly obese patients. *Anaesthesia*, 1991; 46: 967-9.
10. Alexander JK. Obesity and cardiac performance. *Am J Cardiol*, 1964; 14: 860-5.