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Elective Caesarean In Case Of Morbid Obesity Associated With Gestational Hypertension: An Anaesthetic Challenge

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Abstract:
Introduction: *Obstetric anaesthetists are faced with the unique situation of providing anaesthesia for caesarean sections, where anaesthetists have to provide care for both the mother and the unborn baby. There has been a move towards more caesarean sections being performed under regional anaesthesia compared to general anaesthesia. New techniques for regional anaesthesia, such as the combined spinal epidural (CSE) anaesthesia and the continuous spinal anaesthesia, offer specific advantages. Maternal co-morbidities such as obesity and pre-eclampsia also present a challenge to the obstetric anaesthetists.*
Case Report: *We are presenting a case report of 25 year old primi female who was successfully delivered by elective caesarean section under CSE anaesthesia in view of morbid obesity with superimposed PIH with diabetes mellitus and hypothyroidism.*
Conclusion: *Morbid obesity along with Pre-eclampsia is a great challenge to anaesthetic as well as obstetric practice. Regional anaesthesia especially CSE whenever possible is a noble choice in these kind of patients though the choice of anaesthesia should be determined by comparing the risks and benefits for an individual patient and the choice of the anaesthetist.*
Keywords: *Combined Spinal Epidural Anaesthesia, Diabetes, Elective Caesarean, Hypertension, Hypothyroidism, Obesity,*

I. Introduction

Obstetric anaesthetists are faced with the unique situation of providing anaesthesia for caesarean sections, where anaesthetists have to provide care for both the mother and the unborn baby. A team approach is vital to ensure optimal outcome while ensuring that the labour process is a safe and pleasant experience for the parturient. There has been an increasing trend in the caesarean section rate in the last two decades not just in developed countries but also in developing countries [1,2]. The reason for this rise is multi-factorial. A possible reason is an increase in elective caesarean sections due to the preference of patients and obstetricians [2].

There has been a move towards more caesarean sections being performed under regional anaesthesia compared to general anaesthesia [3]. New techniques for regional anaesthesia, such as the combined spinal epidural (CSE) anaesthesia and the continuous spinal anaesthesia, offer specific advantages. Maternal co-morbidities such as obesity and pre-eclampsia also present a challenge to the obstetric anaesthetists.

Preeclampsia is a multisystem disorder that is associated with higher maternal morbidity and mortality. For instance, severe preeclampsia could lead to eclamptic seizures and cerebral haemorrhage. Historically, regional anaesthesia was avoided in the severe preeclamptic patient. The main reason for this was because it was postulated that a patient may have profound hypotension following a regional block. Furthermore, fluids administered to treat hypotension would worsen pulmonary oedema [4]. However, it has been found that neuraxial anaesthesia actually provides more stable hemodynamics with fewer swings in blood pressure in the preeclamptic patient [5]. The need for vasopressors during regional anaesthesia in women with severe but haemodynamically stabilized preeclampsia is usually lower compared with healthy parturients [6]. With cautious fluid administration, the risk of pulmonary oedema can be reduced significantly.

A pregnant woman is generally considered obese when her body mass index (BMI) is 30 kg/m^2 or greater [7]. Overweight (BMI: 25-29.9 kg/m^2) and obese women are at increased risk of several pregnancy related complications, including higher incidence of hypertension, coronary artery disease, cerebrovascular disease, gallstones, gestational diabetes mellitus, preeclampsia, eclampsia, caesarean delivery, and postpartum weight retention [8,9]. In addition, there is potential intrapartum, intra-operative, and postoperative complications and difficulties related to anaesthetic management. Similarly, foetuses of these women are at increased risk of prematurity, still birth, macrosomia, congenital anomalies, possible birth injury, and childhood obesity [10,11].

We are hereby presenting a case report of morbidly obese pregnant female (BMI: $\geq$ 40 kg/m^2) with gestational hypertension who was delivered by elective caesarean section under Combined Spinal Epidural Anaesthesia.

II. Case Report

A 25 year old primi female was presented to us at 36 weeks of gestation (2/4/14). Her weight was 125 kg & height was 160 cm (BMI - 48.8 kg/m^2). The patient is a known case of hypothyroidism and diabetes mellitus (type 2). Patient developed hypertension during 2nd month of gestation. There was no history & clinical findings suggestive of Cushing's syndrome, polycystic ovarian disease, etc.

During the admission, patient was on T. Aldonet (500mg qid), T. labetalol (100mg bd), T. Nicardia (20 mg BD) and T. Eltroxin (25mg OD).

An elective caesarean section was planned in view of primi para with morbid obesity with superimposed PIH with DM (type 2) and hypothyroidism. Pre-anaesthetic airway assessment revealed Mallampati grade III, short neck, limited flexion &extension of neck, thyromental distance of 5 cm, predicting a difficult airway. Her BP was 150/110 and pulse rate was 90 beats per minute (b.p.m). Peripheral edema was present. Cardiovascular, respiratory, CNS and GI systems were normal on clinical examination. The routine haematological investigations, blood biochemistry, liver function tests, coagulation profile, thyroid function tests and ECG were within normal limits. Her urine examination revealed > 5g of protein/ 24 hour.

A diagnosis of ASA grade IIIE with severe pre-eclampsia in morbidly obese obstetric patient was made. The patient was counselled for surgery & anaesthetic procedure was explained to the patient in her own language and high risk written informed consent was obtained. Combined Spinal Epidural Anaesthesia (CSE) was planned as anticipated difficult intubation was present on 12/4/14. However, drugs for general anaesthesia, difficult airway cart, suction machines etc. were kept ready.

In the OT, standard monitoring devices like ECG leads, NIBP and SPO2 were attached. Pre operatively her pulse rate was 102 b.p.m., BP 168/106 mm Hg, and SPO2 98% on room air. An intravenous line was secured with 18 gauge cannula. Inj Ringer lactate was started. Intravenous Ranitidine 50 mg and metoclopramide10 mg were given for aspiration prophylaxis. Patient was catheterized under all aseptic precaution. Patient was put in sitting position. Patient's back was edematous and she was quite obese so it was very difficult to identify midline. Measuring tape and Verbal communication with the patient was used, to identify the midline.

CSE was given through single space dual needle technique [13]. A Portex® Minipack® (Smiths Medical ASD, Inc., USA) epidural set was used for epidural block and 26 G pencil point spinal needle (length 95 mm) was used for Subarachnoid Block (SAB). The spinal needle was introduced through the midline route and after a successful dural puncture stilette was re-inserted into the spinal needle. The epidural space was then located at the same inter-vertebral space using 16 G Tuohy's needle by the paramedian route and epidural catheter was inserted. SAB was performed by removal of spinal needle stilette and intrathecal injection of 2.5 ml of 0.5% hyperbaric bupivacaine.

We measured maternal blood pressure every 3-5 min for at least 30 min after drug injection. Intern doctors recorded vital signs every 15 min until at least 2 h after delivery. The height of sensory block was achieved up toT4 level. Intra operatively Oxygen was given to the patient by facemask. After anaesthesia her BP remained in the range of 140-150 mm of Hg systolic and 90-95 mm of Hg diastolic.

A male baby was delivered with birth weight of 3.04 kg, and APGAR score of 5, 7 at 1 and 5 minutes. Surgery lasted for 30 min. At the end of surgery, her pulse rate was 86 bpm, BP was 140/90 mm Hg and SpO2 on room air was 98%. Patient was shifted to the postoperative ward. She spent 12 days in hospital after operation without any complication.

III. Discussion

Combined Spinal Epidural Anaesthesia (CSE) method combines the advantages of both the regional techniques. It is able to produce a quick and dense block while allowing an anaesthetist to administer subsequent doses of local anaesthetics via the epidural catheter should the need arise. The epidural catheter can also be used for postoperative analgesia.

This method is especially useful in patients with certain medical conditions, such as high-risk cardiac patients, where it is necessary to titrate the block height carefully. A teaching maternity unit in the United Kingdom recently performed an audit including 3,519 elective caesarean sections using the CSE technique over a 10-year period. The result showed a need for conversion to general anaesthesia of only 0.23% [14].

Obesity and preeclampsia can seriously endanger the life of both mother and foetus. Morbid obesity accentuates the physiological changes associated with pregnancy like supine hypotension syndrome, increased severity of gastric reflux, difficult airway, deep vein thrombosis and the high incidence of concurrent medical problems or superimposed antenatal diseases including preeclampsia and gestational diabetes.

An obese patient poses a challenge to the anaesthetist as it carries a high morbidity and mortality. In obese parturient, abdominal weight restricts the movement of diaphragm and reduces chest wall compliance promotes airway closure in the dependent portion of the lung [15]. In these patient increase O2 consumption, decreased functional residual capacity (FRC), increased CC (closing capacity) to FRC and increased ventilation

perfusion mismatch all increase the incidence of hypoxia. A clear relationship exists between obesity and death from cardiovascular causes. Drenick et al. [16] demonstrated a 12-fold higher mortality among obese patients between the ages of 25 and 34 than in nonobese patients in the same age range; due to cardiovascular disease. Tsueda et al. described two obese patients who experienced acute cardiovascular collapse after assuming the supine position [17].

Obese patients have a reduced cerebrospinal fluid (CSF) volume [18] which increases the risk of a high spinal block [19]. In our patient CSE was given, although it was technically difficult because of patient's subcutaneous fat and edema. The benefits included rapid onset of reliable, high quality surgical anaesthesia and avoidance of complication related to general anaesthesia, in addition of the fact that the mother remains awake and can protect her airway, airway manipulation is not required and the incidence of acid aspiration is decreased.

Although regional anaesthesia remains the most common technique for caesarean delivery section; however, there may be technique failure in a morbidly obese patient. Navarro-Vargas et al. reported a case of morbidly obese patient scheduled for caesarean delivery and tubal ligation [20]. These authors used general anaesthesia as the spinal and epidural techniques were unsuccessful.

Pre-eclampsia is a disorder that occurs in pregnancy after 20 weeks of gestation which manifests as hypertension and proteinuria, may progress to eclampsia and may regress following delivery. Obesity is a primary risk factor for preeclampsia, and risk escalates with increasing body mass index [21]. There are a number of potential problems relating to pre-eclampsia like cerebrovascular accident, renal failure, pulmonary edema, placental abruption, HELLP syndrome etc. In the 2003-2005 CEMACH report, the leading cause of death in women with preeclampsia was intracranial haemorrhage [22]. Generalized edema can involve the airway and obscure visualization of anatomic landmarks at laryngoscopy. Either of the two techniques – general anaesthesia (GA) or central neuraxial blockade (CNB) may be employed for anaesthesia. GA is often considered unsafe in patients with PIH, because of potentially difficult airway or risk of failed intubation, hypertensive response to laryngoscopy and intubation, risk of aspiration pneumonitis, drug interactions between magnesium and non-depolarizing muscle relaxants (NDMRs) leading to enhanced sensitivity to NDMRs, and impaired villous blood supply. So, we opted for regional anaesthesia in this patient. Thromboembolism and pulmonary complications are the greatest postoperative risk. Early mobilization and incentive spirometry is key in preventing postoperative complications with consideration of hypoxia, positioning, fluid intake output, chest physiotherapy, and analgesia.

IV. Conclusion

Morbid obesity along with Pre-eclampsia is a great challenge to anaesthetic as well as obstetric practice. There is problem of establishing regional blocks because of difficulties in identifying landmarks. In spite of that, Regional anaesthesia specially CSE whenever possible is a noble choice in these kind of patients though the choice of anaesthesia should be determined by comparing the risks and benefits for an individual patient and the choice of the anaesthetist.

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