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Obese Parturient: Anaesthesiologist's Nightmare

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Obesity is increasing in general population, and especially in pregnant mothers, which significantly increases the risk of maternal and fetal complications. Body Mass Index (BMI) is a simple index of weight-for-height, which is calculated by dividing weight in kilogram by the square of the height in metre (kg/m^2).

World Health Organization (WHO) classification of obesity [1]:

Body Mass Index	Classification
< 18.5	Underweight
18.5–24.9	Normal
25.0–29.9	Overweight
30.0–34.9	Obese 1
35.0–39.9	Obese 2
> 40.0	Obese 3 ('morbid obesity')

Obesity in pregnancy is defined as BMI ≥ 30 or more at first antenatal consultation [2]. Obese parturients often require anaesthesia due to their higher rate of obstetric complications like preeclampsia, gestational diabetes mellitus often requiring intervention including cesarean delivery.

Pregnant women with BMI ≥ 40 should have antenatal consultation with obstetric anaesthetist, so that potential difficulties with venous access, regional orgeneral anaesthesia can be identified. Anaesthetic plan for labour and delivery should be discussed and documented.

Increasing obesity is a significant risk factor for anaesthesia related maternal morbidity and mortality. Multiple attempts for regional anaesthesia and failure of epidural cannulation increase with BMI.

Maternal obesity increase the risk difficult endotracheal intubation, aspiration of gastric contents and postoperative atelectasis [3]. These women are also more likely to have co-morbidites such as hypertension, ischaemic heart disease and gestational diabetes. Obesity is associated with high risk of thromboembolism during the antenatal and postnatal period. Woman with BMI ≥ 30 should be given low molecular weight heparin (LMWH) antenatally, and continued six weeks postpartum.

Labour and Delivery

In women with obesity, there is increased risk of slow labour progression, shoulder dystocia, emergency caesarean section and primary postpartum haemorrhage [4]. As caesarean section is technically difficult with a high risk of anaesthetic complications, the mode of delivery should be planned according to the circumstances. Obesity is a risk factor for unsuccessful VBAC and carries greater risk for uterine rupture during trial of labour.

In the absence of obstetric or medical indications, obesity alone is not an indication for induction of labour and normal delivery should be encouraged. The anaesthetist should be informed when a woman with BMI ≥ 40 is admitted to the labour ward as intervention can be anticipated, which helps to identify difficulties with regional or general anaesthesia early, and prepare accordingly.

Operating table with safe working load and appropriate patient transfer equipment with manpower should be available for the in and out transfer. Venous access should be established early in labour as it is likely to be difficult in an emergency situation. Due to the increased risk of wound infection, they should receive prophylactic antibiotics at the time of surgery.

Conduct of Anaesthesia

The management plan with relevant investigations (ECG, echocardiography, pulmonary function tests) should be documented. Guidelines on the management of obese parturients include

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- Early intravenous access
- Thomboprophylaxis
- Early institution of labour analgesia
- Antiaspiration prophylaxis

Equipments

- Appropriate operating table or lateral extensions of the table and arm boards
- Trained staff for transfer of patients.
- Wide blood pressure cuffs (cuff width of 20% diameter of the arm). Intra arterial blood pressure if problems with NIBP.
- Large compression stockings/ mechanical calf compressors for DVT prophylaxis.
- Long spinal /epidural needles. Epidural needle may be used as an introducer for spinal needle. Ultra sound to assist location of the epidural and spinal space may be especially useful where surface landmarks are difficult to identify.

Labour Analgesia

As obese women are at high risk for instrumental and caesarean delivery, a working epidural may reduce the chances for general anaesthesia. It can provide effective pain relief and decrease the cardiorespiratory work during labour. Regional analgesia can also help the placement of a fetal scalp electrode as trans-abdominal monitoring of the fetal heart is often not possible. It is preferable to be performed early in labour and may be easier in the sitting position. Ultrasound may be beneficial in aiding epidural insertion.

Risks of epidural/spinals in obese parturients:

- Difficult placement
- Risk of displacement of epidural catheter
- Risk of inadvertent dural tap
- Higher block levels

Alternative analgesia includes:

- Entonox (50% nitrous oxide in oxygen)
- Intra muscular opiates.
- Patient controlled intravenous analgesia with short acting drugs like remifentanil

Anaesthesia for LSCS

Regional Anaesthesia

Though technically difficult to perform and have additional risks in obese parturient, it is often preferable than general anaesthesia.

- Obese women at high risk of intervention should have early epidural analgesia and monitored throughout labour. Unintentional high blockade is more common in the obese, which can be life threatening.
- In those without a working epidural, combined spinal epidural (CSE) may be preferable to single shot spinal anaesthesia as surgery is often difficult and prolonged in the obese. CSE technique with a smaller dose of spinal anaesthetic with epidural top up to the required level may be preferable. The epidural needle can be used as a spinal introducer. A spinal catheter can be technically difficult, but has the advantage of providing a block that can be extended.
- Left uterine tilt may be difficult in the obese patient.
- If the patient find difficult to lie flat, head up tilt and oxygen may be required.

General Anaesthesia

General anaesthesia presents many challenges and should be avoided if possible. In anticipated difficult airway, early epidural placement should be advised. Aorto-caval compression should be avoided by leftward uterine tilt as in regional anaesthesia.

Airway and Ventilation Challenges

The airway should be thoroughly assessed as failed intubation is more common in both pregnancy and obesity [5]. They are at high risk of regurgitation and pulmonary aspiration. Due to reduced FRC and increased oxygen consumption, obese women desaturate rapidly.

Positioning for intubation can be difficult in the obese parturient. The 'ramped' position with pillows under the upper thoracic region and head is often preferred.

A slight 'head up' position may be more comfortable and improves the FRC. In this position, the anaesthetist may need to stand on a step behind the patient.

Pre-oxygenation by 3 minutes of tidal volume breathing or 4-6 vital capacity breaths of 100% oxygen with a tight fitting face mask is advised.

Full range of difficult intubation equipment should be available, including bougies, stylets, different laryngoscopes. A short-handled or polio laryngoscope is often useful.

Rapid sequence intubation with pre-oxygenation, thiopentone, suxamethonium and cricoids pressure is usual. Suxamethonium dose should be based on the total body weight, with a dose of 1- 1.5mg/Kg. Rocuronium which can be reversed with sugamedex is a good alternative to suxamethonium.

Awake fibreoptic intubation is an option if difficult intubation is predicted, but nasal bleeding is more likely in these patients due to mucosal congestion and coagulation abnormalities.

Once intubated, airway pressures may be high. Positive End Expiratory Pressure (PEEP) and head up position may improve respiratory compliance and oxygenation.

Extubation: In the obese, it may be preferable to extubate awake with head up position to optimise ventilation. Neuromuscular monitoring helps in assessing the reversal of blockade before extubation. Postoperative ventilation should be considered in those who cannot maintain a safe airway.

Analgesia: Effective analgesia is essential to manage post operative pain, and mobilisation to reduce the risk of thromboembolic complications. Simple analgesia e.g. paracetamol and non-steroidal anti-inflammatory drugs, if not contraindicated, help to reduce the requirements for opioids. Local anaesthetics as wound infiltration, bilateral ilio-ingunial blocks or transverses abdominis plane (TAP) blocks could be used.

Post Operative Care

Transfer to a High Dependency Unit helps in appropriate monitoring and CPAP administration. Post-operative oxygen therapy with CPAP should be continued for 24-48 hours [6]. Early mobilisation helps the respiratory mechanics and prevention of thromboembolic complications. Low molecular heparin thromboprophylaxis (e.g. enoxaparin 40mg daily) for 5-7 days or until mobilization is advised. Heparin should be given 4 hours after spinal, epidural insertion or removal of epidural catheter to avoid the risk of spinal/epidural haematoma.

Summary

Obesity is associated with physiological changes which can result in a reduced ability to cope with the demands of pregnancy, labour and delivery. These women are at high risk and present a real challenge to the anaesthetist. Management should be planned in advance with necessary equipment and expertise for a safe maternal and neonatal outcome.

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