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### Case report

## Regional anaesthesia—Still a comfortable choice in morbidly obese parturient<sup>☆</sup>

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#### ABSTRACT

Obesity has been identified as a significant risk factor for anaesthesia related morbidity/mortality in obstetrics. Obesity compounds most of the physiological changes in pregnancy. The obese parturients are at increased risk of having either concurrent medical problems or superimposed antenatal diseases including preeclampsia and gestational diabetes. These patients need thorough preoperative assessment, meticulous preparation and preparation for difficult airway as incidence of failed intubation is many times higher in these patients. Regional anaesthesia whenever possible is the best choice in this group of patients.

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### Anestesia regional: todavía una alternativa adecuada en la parturienta con obesidad mórbida

#### RESUMEN

La obesidad se ha identificado como un factor importante de riesgo de morbimortalidad relacionada con anestesia en obstetricia. La obesidad acentúa la mayoría de los cambios fisiológicos del embarazo. Las parturientas obesas tienen un mayor riesgo de presentar problemas médicos concomitantes o enfermedades prenatales, entre ellas la preeclampsia y la diabetes gestacional. Estas pacientes requieren valoración preoperatoria minuciosa, una preparación meticulosa y alistamiento para una vía aérea difícil, puesto que la incidencia de intubación fallida es mucho más alta en ellas. Siempre que sea posible, la anestesia regionales la mejor alternativa en este grupo de pacientes.

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## Introduction

The population of obese people and so also obese pregnant patients is increasing world wide and it would not be long before when anaesthetists will be more commonly faced with managing obese parturients with a large spectrum of comorbidities. Obesity compounds most of the physiological changes of pregnancy. Obese parturients have severely limited physiological reserve and a higher risk of emergency surgical intervention. Hence the anaesthetic risks increase greatly. A thorough understanding of the physiology, associated conditions and morbidity, available options for anaesthesia and possible complications is therefore important. These patients need thorough preoperative assessment and management for difficult airway as incidence of failed intubation is many times higher than non obese patients and regional anaesthesia, whenever possible, is the best choice in these patients.<sup>1</sup> We encountered such a parturient who was successfully managed with subarachnoid block.

## Case report

A 36-year-old female G<sub>2</sub>P<sub>1</sub> presented at 37 weeks of gestation for an emergency caesarean section for meconium stained liquor. She developed preeclampsia at 36 weeks of gestation for which she was put on medical treatment. Her past history revealed a caesarean section 4 years back under spinal anaesthesia (at that time she weighed 90 kg) and history of burns of upper limbs 3 years back for which split skin grafting was done. She was 157.5 cm tall and weighed 135 kg (BMI 54.4 kg/m<sup>2</sup>). Blood pressure was 150/90 mm Hg and pulse was 100/min. Cardiovascular and respiratory systems were unremarkable. Airway assessment revealed MPG III, short neck, limited flexion and extension of neck, thyromental distance of 5 cm, sternomental distance of 7 cm and neck circumference of 14.5 cm, predicting a difficult airway. Her blood biochemistry including TSH (thyroid stimulating hormone) was normal. Electrocardiography was within normal limits. Subarachnoid block was planned for the procedure. However, difficult airway cart was kept ready. The anaesthetic procedure was explained to the patient and high risk written and informed consent was obtained. Ranitidine and metoclopramide were given as aspiration prophylaxis. In the operating room standard monitors were attached in addition to invasive blood pressure monitoring and intravenous line was secured. Verbal communication with the patient was used to identify the midline. Subarachnoid block was given in sitting position with difficulty as the 9 cm needle was just adequate to reach the subarachnoid space using 1.4 ml of 0.5% hyperbaric bupivacaine. Adequate sensory block was achieved upto T<sub>4</sub>. Intraoperatively bradycardia and hypotension were corrected by atropine and ephedrine along with vasopressor support. After delivery of baby, the patient complained of numbness in her upper limbs. Level of sensory block was reassessed and it was found at the level of C<sub>8</sub>. Patient was reassured and vigilant monitoring was continued with particular watch on respiration and vitals. Surgery lasted for 2 h. Once regression of the block at T<sub>12</sub> was achieved, the patient was sent to intensive care unit for close monitoring

and shifted to ward on next day. She was discharged on the 10th postoperative day in stable condition. Stay was longer than expected due to infection in stitch line.

## Discussion

Morbid obesity accentuates the physiological changes associated with pregnancy like difficult airway, supine hypotension syndrome and increased severity of gastric reflux. In addition, obese parturients are at increased risk of having either concurrent medical problems or superimposed antenatal diseases including preeclampsia and gestational diabetes.<sup>2</sup> Patients should be thoroughly evaluated preoperatively with special emphasis on cardiovascular system, respiratory system and airway and managed accordingly. A plan of airway management should be formulated regardless of primary anaesthetic technique chosen.

Perioperative issues such as transfers, intravenous access, difficulty in measuring non-invasive blood pressure, difficult spinal, epidural and difficult airway should be anticipated and planned for. Unless the length of the cuff exceeds the circumference of the arm by 20%, systolic and diastolic blood pressure measurements may overestimate true maternal blood pressure. Direct arterial blood pressure measurement may be useful in the morbidly obese patients where sphygmomanometry is often inaccurate. So we used invasive blood pressure monitoring in addition to monitoring of non-invasive blood pressure. To prevent a venous thromboembolic event pneumatic compression devices should be placed on the calves preoperatively. Pneumatic compression stockings should be placed on the lower extremities of all obese parturients prior to and during surgery as prophylaxis against DVT (deep vein thrombosis), ensuring that the compression stockings remain in place until the patient is fully ambulatory. For short out patient procedures, this is probably sufficient prophylaxis. For longer surgeries or surgeries to be performed under general anaesthesia, heparin prophylaxis is recommended. Most authors recommend unfractionated heparin 5000 IU or LMWH (low molecular weight heparin) every 12 hourly starting before surgery and continuing until the patient is ambulatory.<sup>3</sup>

All morbidly obese parturients undergoing caesarean section should be placed in a ramped position with left uterine displacement regardless of primary anaesthetic technique chosen. Regional anaesthesia, whenever possible, is the best choice. The literature regarding maternal morbidity and mortality strongly emphasizes the increased safety of regional anaesthesia versus general anaesthesia for obstetrical patients.<sup>4,5</sup> The advantages of regional anaesthesia include the following: the mother is awake and can protect her airway, airway manipulation is not required and the incidence of acid aspiration is decreased. So we chose regional anaesthesia.

Even within the general population of obstetrical patients, the administration of general anaesthesia poses increased risk for pulmonary aspiration of gastric content, which remains the leading cause of anaesthetic related death.<sup>6</sup> This fact has even greater significance for morbidly obese parturient patients, in whom the risks of airway problems and aspiration are greater than for those without this condition.

However, the data from investigations in the USA and UK show a very low risk of maternal and neonatal death associated with anaesthesia for caesarean section. Therefore it is not possible to state that one type of anaesthesia is safer for mother or neonate without considering the complete scenario.<sup>7</sup>

Regardless of anaesthetic technique chosen, preparation for general anaesthesia and difficult intubation including lower size endotracheal tubes, assortment of laryngeal mask airways, short handled laryngoscope and fiberoptic bronchoscope must be in place in addition to experienced hands.

Technical problems associated with regional anaesthesia in the morbidly obese parturients include difficulties in patient positioning, identification of anatomical landmarks and more frequent dislodgement of epidural catheters. The sitting position is more preferred because the line joining the occiput or the prominence of C<sub>7</sub> and the gluteal cleft can be used to approximate the position of the midline in sitting position, which allows the fat of the back to settle laterally and symmetrically and improves the identification of the midline.<sup>3</sup> Verbal communication with the patient was used to identify the midline in our case. Patient can help guide to the midline by telling if she senses pressure from needle advancement to right or left.

Though epidural anaesthesia offers several advantages like the ability to titrate the dose to achieve the desired level of analgesia, ability to extend the block for prolonged surgery, a decreased incidence and slow speed of developing hypotension and utilisation for postoperative analgesia. The reason for opting spinal anaesthesia was concern about obtaining an inadequate sensory block with the epidural anaesthesia. Generally, a T<sub>4</sub>-S<sub>5</sub> sensory block is needed for adequate anaesthesia during caesarean section. Because of the difficulty associated with blocking sacral nerve roots, epidural block may be inadequate in upto 25% of patients.<sup>8</sup> Also, there is an increased risk of intravenous placement of epidural catheter due to engorged epidural veins and decrease in epidural space in addition to dislodgement of epidural catheter.

Single shot spinal anaesthesia remains the most common type of anaesthesia for caesarean section. The advantages of using subarachnoid block include a dense reliable block of rapid onset. However, technical difficulties comprise of potential for high spinal blockade, profound dense thoracic motor blockade leading to cardiorespiratory compromise and inability to prolong the blockade.<sup>3</sup> High spinal blockade occurred in our case for which vigilant monitoring was done and the patient was reassured. Higher block may be due to decreased cerebrospinal fluid volume because of engorged epidural venous plexus, exaggerated curvature of lumbar spine, pelvic fat and hormonal changes of pregnancy.

Continuous spinal anaesthesia (CSA) technique offers several advantages over single shot spinal anaesthesia like fewer haemodynamic alterations and side effects by enabling the reduction and fractionation of the induction dose through a catheter. Initially microcatheters were recommended (28G) for CSA but two main problems have been reported with the use of microcatheters, i.e. inadequate anaesthesia and neurotoxic effects, i.e. cauda equina syndrome.<sup>9</sup> For these reasons use of epidural catheter as spinal catheter is gaining acceptance nowadays. The slow onset block of the sympathetic system with this technique allows the cardiovascular system

to adapt more easily than when the block is more abrupt as in single dose spinal anaesthesia. Coker LL<sup>10</sup> used continuous spinal anaesthesia for caesarean section for a morbidly obese parturient patient with epidural needle and catheter. The development of postdural puncture headache (PDPH) after a dural puncture with an epidural needle can occur; however, the incidence of PDPH in the morbidly obese patient is far less likely.<sup>11</sup>

Although regional anaesthesia remains the most common technique for caesarean section; however, there may be technique failure in a morbidly obese patient. Navarro-Vargas et al.<sup>12</sup> reported a case of morbidly obese patient scheduled for caesarean delivery and tubal ligation. These authors had to use general anaesthesia as the spinal and epidural techniques were unsuccessful.

If general anaesthesia is required, the airway should be secured awake by using fiberoptic bronchoscopy ideally performed by an experienced endoscopist. The route of fiberoptic intubation is important in pregnant patients. The nasal mucosa is friable during pregnancy and nasal intubation may be problematic because of bleeding. Therefore oral route is preferred. Landmarks for blocks (e.g. superior laryngeal, transtracheal) will be obscure, so nebulised 4% lidocaine should be considered for topical anaesthesia. The preoxygenation and denitrogenation is crucial in these patients before induction of anaesthesia. Positioning is extremely important: the head, neck and shoulders should be raised, there should be a straight line between the sternal notch and external auditory meatus and the patient should be in reverse trendelenburg position.<sup>3</sup> Dense intraoperative neuromuscular blockade is best achieved by titrating intermediate acting agents using a neuromuscular monitor. Extubation should be done awake in reverse trendelenburg position.

Thromboembolism and pulmonary complications are the greatest postoperative risk. Mobilisation and incentive spirometry are key in preventing postoperative complications.

To conclude, the physiological and anatomical changes caused by both obesity and pregnancy increase the potential of difficult airway, difficult mask ventilation and rapid desaturation during the apneic phase. Regional anaesthesia whenever possible is the best choice in these patients. However, the choice of anaesthesia should be determined by the presence of clinical risk factors and the choice of individual patient and practitioner.

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## Conflicts of interest

The authors have no conflicts of interest to declare.

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