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Neuraxial Anesthesia for Cesarean Section in the Obese Patient

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Abstract

Obesity increases the possibility of maternal-fetal complications during pregnancy. In addition, the provision of anesthesia for cesarean section in this population becomes a challenge for the anesthesiologist, because it increases the difficulty of procedures such as the placement of monitors, intravenous catheters and both regional and general anesthesia. Neuraxial anesthesia is the technique of choice for cesarean section in most of these patients.

Keywords: Obesity; Combined spinal-epidural anesthesia; Anesthetic management; Pregnant; Cesarean section

Introduction

One-third of women of childbearing age are obese (BMI>30mg/kg^2) and 8% of these are extremely obese (BMI>40mg/kg^2) [1]. Obesity and even morbid obesity increases the chance of maternal and fetal complications during pregnancy (Gestational diabetes mellitus, preeclampsia, increase the risk of cesarean delivery, prematurity, abortion, fetal macrosomia, postoperative infections, and thromboembolic events). Furthermore, administration of anesthesia for cesarean section in the obese pregnant is riskier than in pregnant patients who are not. It increases the difficulty of procedures such as placement of monitors, intravenous catheters and both anesthetic techniques (neuraxial as general) [2,3]. Therefore the knowledge of physiology in the obese pregnant woman by the anesthesiologist is of vital importance for the anesthetic management and the success of the cesarean section.

Discussion

The physiological changes associated with pregnancy are accentuated with obesity; Respiratory changes such as the combination of the upper airway edema with the increase of adipose tissue contributes to the increase the incidence of difficult airway in these patients. In addition, the reduction of the functional residual capacity and the increase of the critical capacity of closure reduces the reserve of oxygen, even at rest morbid obese patients has an increase respiratory work [4]. At the cardiovascular system, for each 100g of increase of fatty tissue the cardiac output increases from 30-50ml/min. Approximately 60% of obese patients have mild to moderate hypertension [5] and the risk of cardiac ischemia and arrhythmias increases [4]. The effect of compression of the aorta and cava by the gravid uterus is exacerbated in the obese pregnant by the adipose panniculus, and as a consequence hypotension and bradycardia which leads to decreased placental uterine flow and fetal asphyxia. At the gastrointestinal system, the increase in adipose panniculus at the abdominal level increases the incidence of gastroesophageal reflux in pregnant women in labor [5]. All these changes during pregnancy associated with obesity imply a greater challenge for the anesthesiologist.

Anesthetic Considerations

Pre-operative considerations

Ideally, an early pre-anesthetic visit should be available for all obese pregnant women, which allows having a multidisciplinary team for its management. In relation to blood pressure measurement, obese patients often require the use of large-sized cuffs. According to the AHA recommendations, for arm circumferences >34cm a bladder measuring 16cm in width should be used up to a circumference of 44cm and a bladder of 20cm for circumferences from 45 to 52cm. However, upper arms shorter than 20cm can be found in at least 20% of individuals, an extra-large arm cannot be correctly cuffed. For these people, the AHA recommends a 16cm wide bladder, but obviously this increases the likelihood of inaccurate BP measurement, a valid alternative may be the use of devices that measure BP at the forearm [6]. In case of risk of bleeding or difficulty in measurement, the use of invasive blood pressure will be required. Prophylaxis for Broncho aspiration should be done in all patients. Within these, ranitidine has the best success rate, the addition of metoclopramide can improve the effect, with limited evidence [7]. ACOG recommends that antibiotic prophylaxis should be administered within 60 minutes before the start of the cesarean delivery, a single dose of

1-g intravenous dose of cefazolin as prophylaxis may be considered for women weighing 80kg or less. Increasing the dose to 2 for patients weighing 80kg or more is recommended; however, the benefit of administering 3g in obstetric patients weighing 120kg or more has not yet been established [8].

Intra-operative considerations

Anatomical changes in obese pregnant women make it difficult to determine anatomical references for the choice of the neuraxial puncture site, access to the airway and placement of venous and arterial catheters [9]. The anesthetic recommendation for cesarean section in an obese pregnant woman is the neuraxial technique. For the ease of handling of the needles by the anesthesiologist, it is preferred to use a longer needle [7,9]. With these needles, the operator must be aware that small changes in the approach angle at the puncture site translate into significant deviations in the trajectory of the needle towards its neuraxial objective, so the use of ultrasound to calculate the distance to the epidural space and reduce the bad placement of epidural catheters can be of great help [7]. In of spinal puncture, the use of lumbar ultrasound has shown that it reduces the number of attempts, and redirections of the needle [10].

In relation to the anesthetic technique, a combined spinal-epidural or continuous spinal technique offers advantages: reduces the difficulty when using a Tuohy needle as an introducer, definitive confirmation of CSF and the insertion of a catheter, which allows the extension of the analgesia or its conversion to surgical anesthesia (if it has been used in labor analgesia). Also, in that case, it is known that it has a higher rate of success for the placement of the epidural catheter. In both cases, problems with the level of blockade or of requiring the extension of anesthesia due to prolonged operative times, a volume expansion technique can be performed at the epidural or spinal level, in addition to postoperative analgesia. The combined spinal epidural technique is the technique of choice in the anesthetic management of pregnant women with morbid obesity, this guarantees better anesthetic quality compared to epidural anesthesia, and the use of smaller volumes of local anesthetic [9].

Post-operative considerations

Among the main postoperative complications are present; Postpartum Hemorrhage (PPH) and infection, which contributes to an increase in health costs [7,11]. In the study by Magann et al. [4], they evaluated the effects of the increase in BMI and obstetric complications. The risk of PPH, surgical site infection and thromboembolism events were higher in pregnant women with BMI>35mg/Kg^2 [4]. The Royal College of Obstetricians and Gynecologists suggests the temporary use of intermittent compression devices and/or UFH and LMWH as prophylaxis in obese pregnant women undergoing cesarean section and early ambulation to prevent thromboembolic events [7,12].

Conclusions

The anesthetic considerations to be taken in the obese pregnant are diverse, so it is important to consider an anesthetic evaluation in the antenatal period and in the early period of labor that allows identifying and optimizing some comorbidity and guaranteeing the availability of the multidisciplinary team. Early analgesia during labor is recommended. The technical difficulties associated with regional anesthesia have made the use of ultrasound a valuable tool in this type of patients. The CSE anesthetic technique is considered the most appropriate for cesarean section, (limits hemodynamic instability due to its flexibility in titrating the level of the blockade, as well as the prolongation of anesthesia time).

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