Original Article

Evaluation of Efficiency of Regional Anesthesia for C-section in Obese Women

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ABSTRACT:

Background: Obesity is associated with prolonged labor and with significant maternal, fetal, and neonatal complications.The fact that obesity is associated with an increased risk of death during pregnancy is most concerning. **Aim:**To evaluate efficiency of regional anesthesia for C-section in obese women.**Materials and method:**The present study was conducted in the Department of Anesthesiology of the Medical institute. We retrospectively viewed the medical records of obese pregnant female patients who underwent cesarean sections at the Obstetric Center of the medical institute. In the study, inclusion of anesthetic forms of the Anesthesiology service of CAISM referring to charts pregnant (BMI$\geq$ 30 kg/m^2) was done. A total of 39 patient's medical records were reviewed for the study.The patients were divided into three classes, class 1, 2 and 3. The mean operative time for each class was recorded and compared to other classes. The data was recorded and analyzed. **Results:** A total of 39 patient's medical records were viewed for the current study. The mean age of the patients was 29.4$\pm$8.12 years, mean weight was 79.8 $\pm$ 8.9 kg, mean height was 1.61$\pm$2.6 m and mean BMI was 36.23$\pm$6.32 kg/m^2. We observed that maximum no of patients belonged to ASA II physical status (n=21) whereas minimum patients belonged to ASA IV physical status (n=3). We observed that maximum mean operative time was seen in patients with Class 3 obesity and least was seen in Class 1 obese patients.**Conclusion:**The pregnant obese women are more prone to operative difficulties. The mean operative time is increased in obese pregnant women and also, rate of complications is more in patients with BMI < 40 kg/m^2.
Keywords: C-section, obese, pregnant women, complications.

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INTRODUCTION:

Obesity is a global epidemic. The World Health Organization, and the National Heart, Lung and Blood Institute use body mass index (BMI) to define normal weight as BMI 18.9–24.9 kg/m2, overweight as BMI 25–29.9 kg/m2, and obese as BMI >30 kg/m2.[1] Although any BMI >30 kg/m2 is obese, three further classes can be described: BMI 30–34.9 kg/m2 (obesity class 1), BMI 35–39.9 kg/m2 (obesity class II), and BMI >40 kg/m2 (obesity class III).[2] Other nomenclature may be found in the literature including morbid obesity (BMI >40 kg/m2) and super obesity (BMI >50 kg/m2). There is no definition of obesity specific to pregnancy, and BMI classifications have limitations in certain populations such as those with advanced age, athletes, and in pregnancy. Therefore, in 2009, the Institute of Medicine updated their recommendations for managing obesity in pregnancy. It is now recommended that obstetricians evaluate gestational weight gain based on prepregnancy BMI and gestational age.[3]It is a multisystem disease with several associated comorbidities. In addition to these comorbidities, obesity is associated with prolonged labor and with significant maternal, fetal, and neonatal complications.[4-6] The fact that obesity is associated with an increased risk of death during pregnancy is most concerning. Hence, the present study was planned to evaluate efficiency of regional anesthesia for C-section in obese women.

MATERIALS AND METHOD:

The present study was conducted in the Department of Anesthesiology of the Medical institute. The ethical clearance for the protocol of the study was obtained from the ethical committee of the institute. We retrospectively viewed the medical records of obese pregnant female patients who underwent cesarean sections at the Obstetric Center of the medical institute. In the study, inclusion of anesthetic forms of the Anesthesiology service of CAISM referring to charts pregnant (BMI$\geq$ 30 kg/m^2) was done. Only those patients were included that received caesarean section under spinal anesthesia. Patients in which caesarean section was performed following labor analgesia were

excluded from the study. A total of 39 patient's medical records were reviewed for the study.

The demographic data of the patients such as age, weight, height, BMI, ASA status of patient, difficulty experienced in spinal puncture and anesthetic complications was recorded. The patients were classified on the basis of class of obesity. The patients were divided into three classes, class 1, 2 and 3. The mean operative time for each class was recorded and compared to other classes. The data was recorded and analyzed.

The statistical analysis of the data was done using SPSS (version 20.0) for windows. The significance of the data was checked using Chi-square test and Student's T-test. A p-value ≤ 0.05 was predefined to be statistically significant.

RESULTS:

A total of 39 patient's medical records were viewed for the current study. **Table 1** shows various demographic characteristics of the patients. The mean age of the patients was 29.4 ± 8.12 years, mean weight was 79.8 ± 8.9 kg, mean height was 1.61 ± 2.6 m and mean BMI was 36.23 ± 6.32 kg/m^2. **Table 2** shows the frequency of patients in different ASA status and class of obesity. We observed that maximum no of patients belonged to ASA II physical status (n=21) whereas minimum patients belonged to ASA IV physical status (n=3). Similarly, maximum number of patients belonged to obesity class 2 and minimum to class 1. **Table 3** shows mean operative time for patients belonging to different obesity class. We observed that maximum mean operative time was seen in patients with Class 3 obesity and least was seen in Class 1 obese patients. The results were statistically significant with p value <0.05 **[Fig 1]**.

**Table 1:** Demographic data of the patients

Variables	Mean values
Age (years)	29.4 ± 8.12
Weight (kg)	79.8 ± 8.9
Height (m)	1.61 ± 2.6
BMI (kg/m^2)	36.23 ± 6.32

Table 2: Frequency of patients in different ASA status and class of obesity

	No. of patients
ASA status	
• ASA I	6
• ASA II	21
• ASA III	9
• ASA IV	3
Obesity	
• Class 1	9
• Class 2	19
• Class 3	11

Table 3: Mean anesthetic period for patients belonging to different obesity class

Class of obesity	Mean operative period	p-value
Class 1	77.32 ± 9.32	0.001
Class 2	84.41 ± 11.71	
Class 3	88.81 ± 15.32	
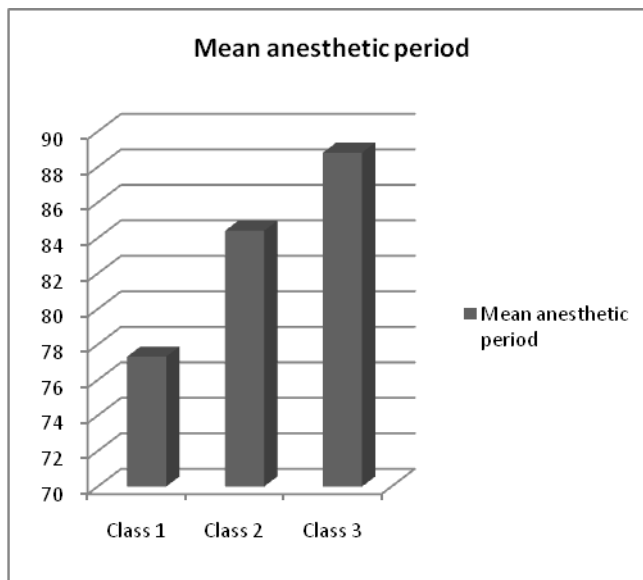
Figure 1: Representing mean anesthetic period for Class I, II and III obese women

DISCUSSION:

The present study was conducted to evaluate the efficiency of regional anesthesia for C-section in obese women. A total of 39 patient's medical records were analysed in this study. We observed that maximum mean operative time was seen in patients with Class 3 obesity. The mean operative time experienced by Class 1 obese patients was least. The results were statistically significant with p value <0.05. The results were consistent with studies conducted by other researchers. Rodrigues F et al identified anesthetic techniques, and their difficulties and complications in patients with BMI $\geq$ 30 kg.m(-2) undergoing cesarean sections. The study intends to support the development of new protocols and more adequate conducts for this population of pregnant women. This was a retrospective study of data and anesthetic complications in obese patients older than 18 years of age who underwent cesarean sections from January 2004 to December 2006; variables investigated included: age, weight, height, BMI, physical status (ASA), anesthetic techniques, difficulties in palpation and puncturing, hemodynamic complications (bleeding and hypotension), and anesthetic complications. Three hundred and fifteen anesthetic forms were evaluated. Mean age was 29.1 years, mean BMI 39.25, and the majority of patients was classified

as ASA II (63.2%). Spinal anesthesia charts used more often, difficulty to puncture was reported in 47 procedures, and difficulty to palpate was reported in 31 procedures. The authors concluded that the technical difficulties as well as hypotension, bleeding, and surgical time were more frequent in patients with higher degrees of obesity.An X et al assessed the safety and risk of obese women undergoing CS delivery with various perioperative anesthetic methods. Seven hundred ninety parturient women underwent CS under general anesthesia (GA), intraspinal anesthesia including epidural anesthesia (EA) and combined spinal-epidural anesthesia (CSEA). They were divided into morbid (n=255), severe (n=274), and non-obesity (n=261) groups. Between 2013 and 2016, 790 pregnant were assessed. Compared with the non-obesity group, there were significantly more fetal distress and higher body mass index (BMI) in the morbid obesity group. Significantly more patients showed preeclampsia, multifetation, amniotic fluid abnormality, and high bleeding amounts in the morbid obesity group compared with the non-obesity group; more patients were administered EA and GA compared with the non-obesity group. More post-anesthesia care unit (PACU) patients were found in the severe obesity group no more than the non-obesity group. Significantly increased anesthesia puncture times for 5>n≥3 and n≥5 were obtained in the morbid obesity group, with more patients in the puncture sitting position, compared with the non-obesity group. It was concluded that GA, EA, and CSEA are safe and effective in severely or morbidly obese patients. Morbidly obese parturient show increased likelihood for fetal distress, PACU, sitting position puncture, puncture difficulty, and other pregnancy complications. There were more anesthesia puncture times in morbidly obese patients.[7,8]

Tonidandel A et al updated information on outcomes in the morbidly obese pregnant population. They hypothesized that morbidly obese women would still have higher complication and failure rates compared to matched controls and that general anesthesia would be less commonly used than in the previous study. The medical records of 230 patients weighing >136 kg (300 pounds) were compared to matched controls: the next patient delivered by the same obstetrician with a weight <113 kg (250 pounds). The mean body mass index of the morbidly obese group was 53.4 ± 6.6 kg/m² [corrected] compared to 31.1±5.4 kg/m2 in the control group. Fifty percent of morbidly obese women required cesarean delivery compared to 32% of controls (P < 0.01). Morbidly obese patients had a longer first stage of labor, larger neonates, and were more likely to have a failed initial neuraxial technique for labor analgesia. The need for a replacement procedure for labor was 17%, significantly less than 20 years ago when 42% of catheters in morbidly obese women failed. Failure rates of neuraxial anesthesia for cesarean delivery were similar between groups. Neuraxial procedure times were greater in morbidly obese parturients. Morbidly obese women were less likely to receive general anesthesia compared to 20 years ago. They concluded that morbidly obese parturients are still at increased risk for antenatal comorbidities, failed labor analgesia, longer first stage of labor and operative delivery. Nani FS et al evaluated the incidence of hypotension according to the BMI. Forty-nine patients with pregestational BMI below 25 kg.m(-2) were included in the Eutrophia group, and 51 patients with BMI ≥ 25 kg.m(-2) were included in the Overweight group. After spinal anesthesia, blood pressure, volume of crystalloid infused, and dose of vasopressors used until delivery were recorded. A fall in systolic blood pressure below 100 mmHg or 10% reduction of the initial systolic blood pressure (SBP) was considered as hypotension and it was corrected by the administration of vasopressors. Episodes of hypotension were fewer in the Eutrophia group, as well as the amount of crystalloid administered, and use of vasopressors. As for associated diseases, we observed higher incidence of diabetes among obese pregnant women, however, differences in the incidence of pregnancy-induced hypertension (PIH) were not observe between both groups. In the study sample, pregestational BMI ≥ 25 kg.m(-2) was a risk factor for hypotension after spinal anesthesia in patients undergoing cesarean section. The same group of patients required higher doses of vasopressors. Those results indicate that the anesthetic techniques in those patients should be improved to reduce the consequences of post-spinal anesthesia hypotension, both in pregnant women and fetuses.[9,10]

CONCLUSION:
From the results of present study, we conclude that the pregnant obese women are more prone to operative difficulties. The mean operative time is increased in obese pregnant women and also, rate of complications is more in patients with BMI < 40 kg/m^2.

REFERENCES:
1. Obesity: preventing and managing the global epidemic Report of a WHO consultation. World Health Organ Tech Rep Ser. 2000;894:i–xii. 1–253.
2. Carpenter RL, Hogan QH, Liu SS, Crane B, Moore J. Lumbosacral cerebrospinal fluid volume is the primary determinant of sensory block extent and duration during spinal anesthesia. Anesthesiology. 1998;89(1):24–29.
3. Institute of Medicine. National Research Council Committee to Reexamine IOMPWG . The National Academies Collection: Reports funded by National Institutes of Health. In: Rasmussen KM, Yaktine AL, editors. Weight Gain During Pregnancy: Reexamining the Guidelines. Washington (DC): National Academies Press (US); 2009.
4. Kominiarek MA, Chauhan SP. Obesity before, during, and after pregnancy: a review and comparison of five national guidelines. Am J Perinatol. 2016;33(5):433–441.
5. Arendas K, Qiu Q, Gruslin A. Obesity in pregnancy: preconceptional to postpartum consequences. J ObstetGynaecol Can 2008; 30:477– 488.

6. Ray A, Hildreth A, Esen UI. Morbid obesity and intra-partum care. J ObstetGynaecol 2008; 28:301–304.
7. Rodrigues F, Brandão MJ. Regional anesthesia for cesarean section in obese pregnant women: a retrospective study. Rev Bras Anestesiol. 2011 Jan-Feb;61(1):13-20. doi: 10.1016/S0034-7094(11)70002-2.
8. An X, Zhao Y, Zhang Y, et al. Risk assessment of morbidly obese parturient in cesarean section delivery: A prospective, cohort, single-center study. Schaller. B, ed. Medicine. 2017;96(42):e8265. doi:10.1097/MD.0000000000008265.
9. Tonidandel A, Booth J, D'Angelo R, Harris L, Tonidandel S. Anesthetic and obstetric outcomes in morbidly obese parturients: a 20-year follow-up retrospective cohort study. Int J ObstetAnesth. 2014 Nov;23(4):357-64. doi: 10.1016/j.ijoa.2014.05.004. Epub 2014 Jun 4.
10. Nani FS, Torres ML. Correlation between the body mass index (BMI) of pregnant women and the development of hypotension after spinal anesthesia for cesarean section. Rev Bras Anestesiol. 2011 Jan-Feb;61(1):21-30. doi: 10.1016/S0034-7094(11)70003-4.