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ORIGINAL ARTICLE

A Retrospective study of efficacy of regional anesthesia for caesarean section in obese pregnant women

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ABSTRACT:

Background: Obesity in the pregnant woman is considered a high-risk state because it is associated with many short-term and long-term complications. Compared with normal weight patients, obese women have a higher prevalence of infertility, a higher rate of early miscarriage and more congenital abnormalities such as neural tube defects. **Aim:** The current study was planned to study the efficacy of regional anesthesia for regional anesthesia in pregnant 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. A total 0f 26 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 statistical analysis of the data was done using SPSS (version 20.0) for windows. **Results:** The mean age of the patients was 28.2±9.32 years, mean weight was 72.3 ± 6.8 kg, mean height was 1.58±3.9 m and mean BMI was 38.28+8.24 kg/m^2. The maximum number of patients belonged to ASA II physical status (n=16) whereas minimum patients belonged to ASA IV physical status (n=1). Similarly, maximum number of patients belonged to obesity class 2 and minimum to class 1. The maximum mean operative time was seen in patients with Class 3 obesity. **Conclusion:** Pregnant obese women are more prone to operative difficulties. mean operative time is increased in obese pregnant women and also, rate of complications is more in patients with BMI < 40 kg/m^2 .

Key words: Regional anesthesia, caesarean section, obese, pregnant women.

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Introduction:

Obesity is most commonly measured as a weight to height ratio and expressed as body mass index (BMI).[1] It is an internationally accepted method that provides a reliable way to assess obesity related health problems. The prevalence of obesity in adults is increasing worldwide, particularly among women of child bearing age. Therefore, anesthesiologists are increasingly faced with caring for obese patients and also obstetric obese patients. Obesity in the pregnant woman is considered a high-risk state because it is associated with many short-term and long-term complications.[2, 3] Compared with normal weight patients, obese women have a higher prevalence of infertility, a higher rate of early miscarriage and more congenital abnormalities such as neural tube defects. [4] Obese women have a higher initial epidural failure rate (42% versus 6%), secondary to increased adipose tissue which makes identification of appropriate landmarks difficult.[5] Physiological changes of pregnancy associated to those of obesity mean that pregnant women have limited physiological reserves, which are proportional to the degree and duration of obesity.[6, 7] Hence, the current study was planned to study the efficacy of regional anesthesia for regional anesthesia in pregnant obese women.

Materials and methods:

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≥ 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 0f 26 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 26 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 28.2±9.32 years, mean weight was 72.3 ± 6.8 kg, mean height was 1.58±3.9 m and mean BMI was 38.28+8.24 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=16) whereas minimum patients belonged to ASA IV physical status (n=1). Similarly, maximum number of patients belonged to obesity class 2 and minimum to class 1 **[Fig 1]**. **Table 3** shows mean operative time of patients belonging to different obesity class. 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 **[Fig 2]**. **Table 4** shows technical difficulties experienced by patients belonging to different BMI ranges. We observed that in the range of BMI 30-34.99 kg/m^2, 5 out of 6 patients were operated without any difficulty and 1 patient experienced palpation. In the BMI range of 35-39.99, 8 out of 10 patients were operated without any difficulty whereas palpation and puncture was experienced in 1 patient each. In the patients with BMI <40 kg/m^2, 6 out of 10 patients were operated without any difficulty whereas palpation and puncture was experienced in 2 patients each **[Fig 3]**.

Table 1: Demographic data of the patients

Variables	Mean values
Age (years)	28.2 ± 9.32
Weight (kg)	72.3 ± 6.8
Height (m)	1.58 ± 3.9
BMI (kg/m^2)	38.28±8.24

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

	No. of patients
ASA status	
• **ASA I**	4
• **ASA II**	16
• **ASA III**	5
• **ASA IV**	1
Obesity	
• **Class 1**	5
• **Class 2**	11
• **Class 3**	10

Table 3: Mean operative time of patients belonging to different obesity class

Class of obesity	Mean operative time	p-value
Class 1	79.28±10.02	0.001
Class 2	82.29±16.32	
Class 3	86.75±19.28	

Figure 1: Showing frequency of patients in different ASA status and class of obesity

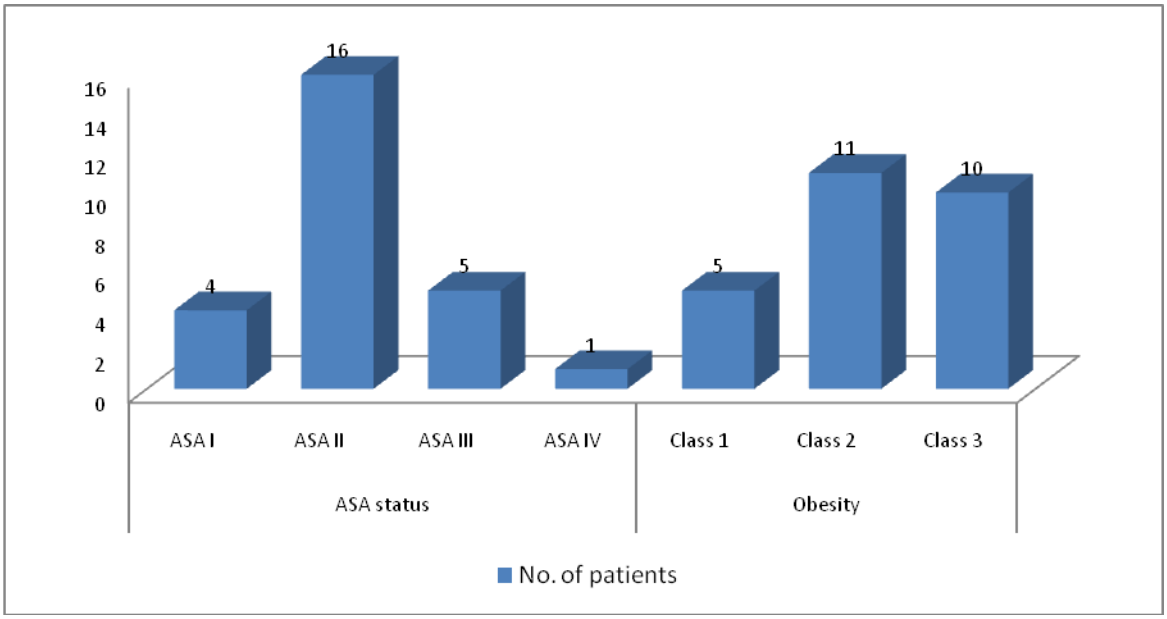


Figure 2: Showing means operative time of patients belonging to different obesity class

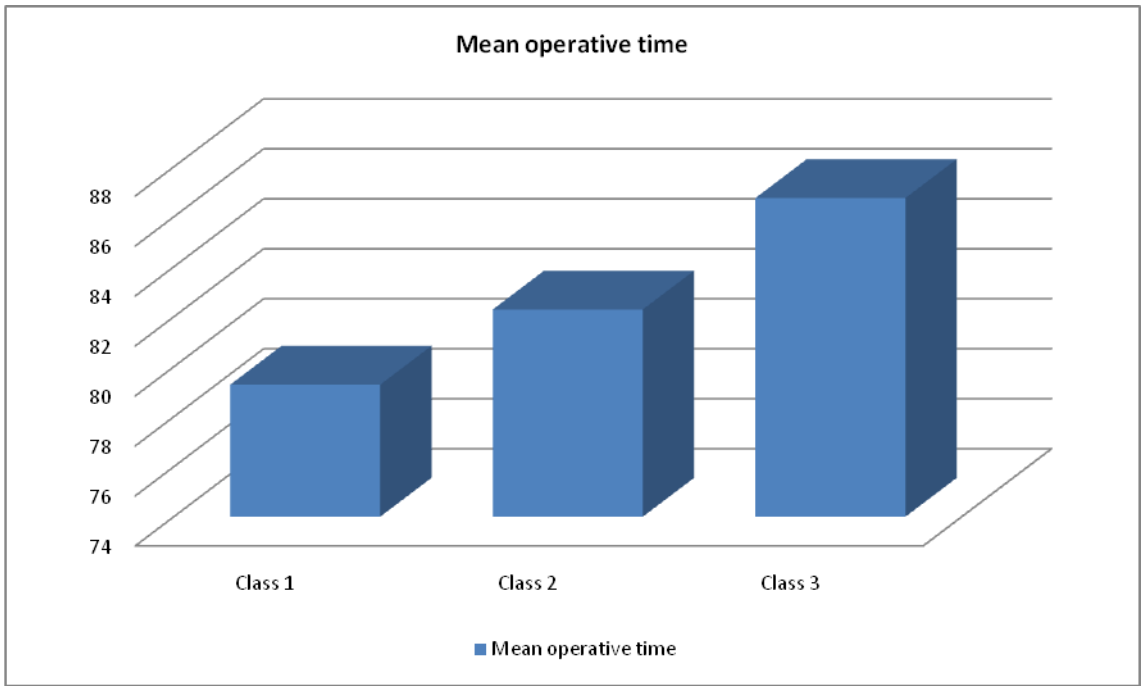
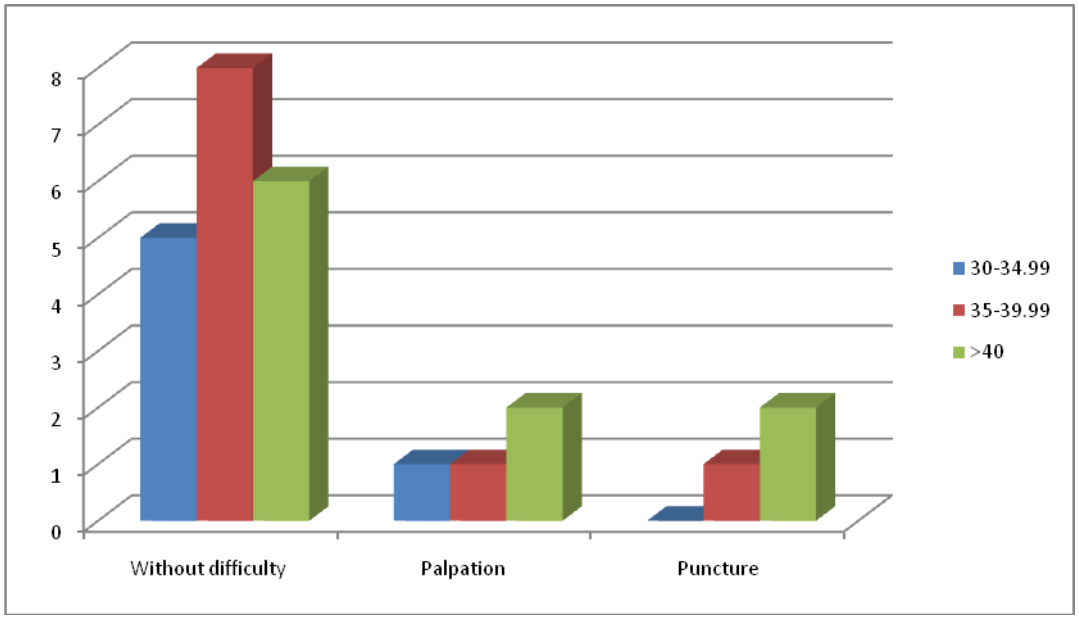


Table 4: Technical difficulties experienced by patients belonging to different BMI ranges

BMI	Without difficulty	Palpation	Puncture	Total
30-34.99	5	1	0	**6**
35-39.99	8	1	1	**10**
>40	6	2	2	**10**
Total	**19**	**4**	**3**	**26**

Figure 3: Showing technical difficulties experienced by patients belonging to different BMI ranges



Discussion:

The present study was conducted to assess the efficacy of regional anesthesia for caesarean section in obese pregnant women. A total of 26 patient's medical records were analysed in this study. The mean age of the patients was 28.2±9.32 years, mean weight was 72.3 ± 6.8 kg, mean height was 1.58±3.9 m and mean BMI was 38.28+8.24 kg/m^2. 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. Also, in the range of BMI 30-34.99 kg/m^2, 5 out of 6 patients were operated without any difficulty and 1 patient experienced palpation. In the BMI range of 35-39.99, 8 out of 10 patients were operated without any difficulty whereas palpation and puncture was experienced in 1 patient each. In the patients with BMI >40 kg/m^2, 6 out of 10 patients were operated without any difficulty. The results were consistent with studies conducted by other researchers. Tonidandel A et al compared the medical records of 230 patients weighing >136 kg (300 pounds) 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. 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. The authors concluded that morbidly obese parturients are still at increased risk for antenatal comorbidities, failed labor analgesia, longer first stage of labor and operative delivery. Replacement labor epidural catheters and general anesthesia for cesarean delivery are less commonly required anesthetic techniques compared to the original study. Hood DD et al compare the anesthetic and obstetric outcome in morbidly obese parturients and matched control parturients. Anesthesia records were prospectively collected for all patients delivering between September 1978 and November 1989 whose weight exceeded 136.4 kg (300 pounds) at the time of delivery. A retrospective control patient group was collected by matching the first patient weighing less than 136.4 kg, delivered in the same month by the same obstetrician, to the corresponding morbidly obese parturient. Anesthetic and obstetric outcome variables were extracted from medical records and analyzed. Sixty-two percent of 117 morbidly obese women underwent cesarean section, while only 24% of control patients delivered abdominally. Forty-eight percent of all laboring morbidly obese parturients required emergency cesarean section, compared with 9% of control laboring parturients. Epidural anesthesia was used successfully for labor and cesarean delivery in 74 of 79 morbidly obese women and 66 of 67 control patients. When compared with control patients, initial

epidural anesthesia failure was significantly more likely in morbidly obese women, requiring epidural catheter replacement. Difficult tracheal intubation occurred in 6 of 17 morbidly obese women, compared with 0 of 8 control women. Morbidly obese women had increased incidences of antepartum medical disease, prolonged cesarean section operation times, serious postoperative complications, and increased hospital stays. The authors concluded that the high incidences of antepartum medical disease and emergency cesarean section complicate anesthetic care in the morbidly obese parturients. Epidural anesthesia is feasible; however, the high initial failure rate necessitates early catheter placement, critical block assessment and catheter replacement when indicated, and provision for alternative airway management.[8, 9]

Al-Kubaisy W et al conducted study to determine the association between obesity and type of delivery.A cross-sectional study involving 404 pregnant women was carried out at Al-Yarmouk Teaching Hospital, Baghdad, Iraq. Women with hypertension, diabetes, preterm labor, fetal presentation other than cephalic presentation and multiple gestations were excluded from the study. BMI and past obstetric history were recorded.The overall rate of caesarean section (CS) was 38%. The overall mean body mass index (BMI) was 25.0 ± 4.52 Kg/m2 and it was significantly higher among women who delivered by cesarean section. Significantly high rate of CS was found in primigravida and multigravida women with high BMI. Moreover, all obese multigravid women with history of previous CS were delivered by CS. The rate of CS was higher in women with primary level education when compared to women with secondary or tertiary education. CS was significantly lower in women with a previous history of abortion. It was concluded that obese women with or without a previous history of CS are at a higher risk of having a CS and should therefore be considered as high risk and managed appropriately during pregnancy. Weight management prior to or during pregnancy could help reduce the need for CS. 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.[10, 11]

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.

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