

## Increasing Trend of Maternal Obesity in India: A Prospective Study, Department Of Anaesthesia, Andhra Medical College, Visakhapatnam

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**Summary:** Increase in the prevalence of maternal obesity, anaesthetic implications in obese mothers for LSCS : a prospective study.

**Background and Objectives:** the objective of the data gathering was to identify parturients with BMI>30kg/m<sup>2</sup> undergoing caesarean sections, study the technical difficulties and anaesthetic complications, maternal and foetal outcome.

**Method:** This is a prospective study of data of parturients with BMI>30 posted for operative delivery between June 2012 and June 2013 ; variables investigated included : age, weight, height, BMI, physical status[ASA], anaesthetic techniques , technical difficulties, hemodynamic complications and anaesthetic complications.

**Results:** Two hundred and sixty two anaesthetic forms were evaluated. Mean age was 27.4 years, mean BMI 38.7 and majority of patients was classified ASA II[79%].

**Conclusions:** The incidence of obesity is 10.3%. Technical difficulties , hypotension, bleeding, increase in surgical time, neonatal respiratory depression, and neonatal admission were more frequent in patients with higher degrees of obesity.

**Keywords:** pregnancy, High risk, obesity, morbid, spinal, epidural, caesarean section.

### I. Introduction

Obesity is defined as BMI>30kg/m<sup>2</sup>. Increasing prevalence of obesity has extended to pregnant patients as well. The change in lifestyle has caused increase in the prevalence of maternal obesity, increasing the peri operative morbidity. Maternal morbidity associated to obesity is increasing, due to hypertension[prior or pregnancy induced], diabetes mellitus[prior or gestational], sleep apnea, thromboembolic diseases, cardiomyopathies, higher incidence of caesarean sections, higher incidence of infections and bleeding. Physiological changes in pregnancy help to increase the physiological reserves, but these reserves are limited in maternal obesity, which are proportional to the degree and duration of obesity. The objective of this study was to observe the incidence of obesity in pregnancy, identify anaesthetic techniques and their difficulties and complications in patients with BMI>30kg/m<sup>2</sup> undergoing caesarean sections. Obesity is a risk factor for anaesthesia related maternal mortality. There is significant difficulty in airway management as well in obese parturients. This data assessment can help in management of obesity in pregnancy in future, in setting protocols to improve maternal and foetal outcomes in obese pregnant patients.

Table 1  
Classification of Obesity According to the WHO

Classification	BMI(kg.m-2)	Risk of co morbidities
Normal	18.5 – 24.9	Medium
Overweight	≥25	
Pre obese	25 – 29.9	Increased
Obese class 1	30 – 34.9	Moderate
Obese class 2	35-39.9	Severe
Obese class3	≥40	Very severe

## II. Methods

The study was approved by the ethics committee of Andhra Medical College and King George Hospital, Visakhapatnam and was conducted according to ethical rules of research involving humans established by resolution 196/96 of the National Health Council. The study was financed by the investigators.

This is a descriptive , prospective study on the incidence of obesity in pregnancy and anaesthetic implications and complications in caesarean sections in obese pregnant women undertaken in our institute from June 2012 to June 2013. It included anaesthetic forms of the anaesthesiology services provided to pregnant [BMI>30kg/m<sup>2</sup>] older than 18 years of age who underwent caesarean sections. Variables evaluated included age, weight, height, BMI, physical status [ASA], anaesthetic techniques, difficult airway, difficulty in regional techniques, hemodynamic complications [bleeding and hypotension] and anaesthetic complications .Chi square test and Annova were used to evaluate correlation and to compare continuous variables.A p<0.05 was considered statistically significant.

## III. Results

Total number of caesarean sections done in our institute between June 2012 to June2013 were 2546. No. of parturients undergoing elective LSCS -1645 [64.6%], No. of parturients undergoing emergency LSCS - 901[35.3%]. Among these, the parturients with BMI>30 are-262[10.3%].

Two hundred and sixty two parturients of ASA class I,II, III and IV[table 3] , who fulfilled the inclusion criteria, undergoing both elective and emergency caesarean sections, were evaluated in this study .

Table 1 shows the classification of obesity and the overall increasing incidence of morbidities with increasing obesity.

**Table 2 shows the demographic and anthropometric data. The parturients were classified as ASA I , II, III and into obesity class I, II, III as shown in table 3.**

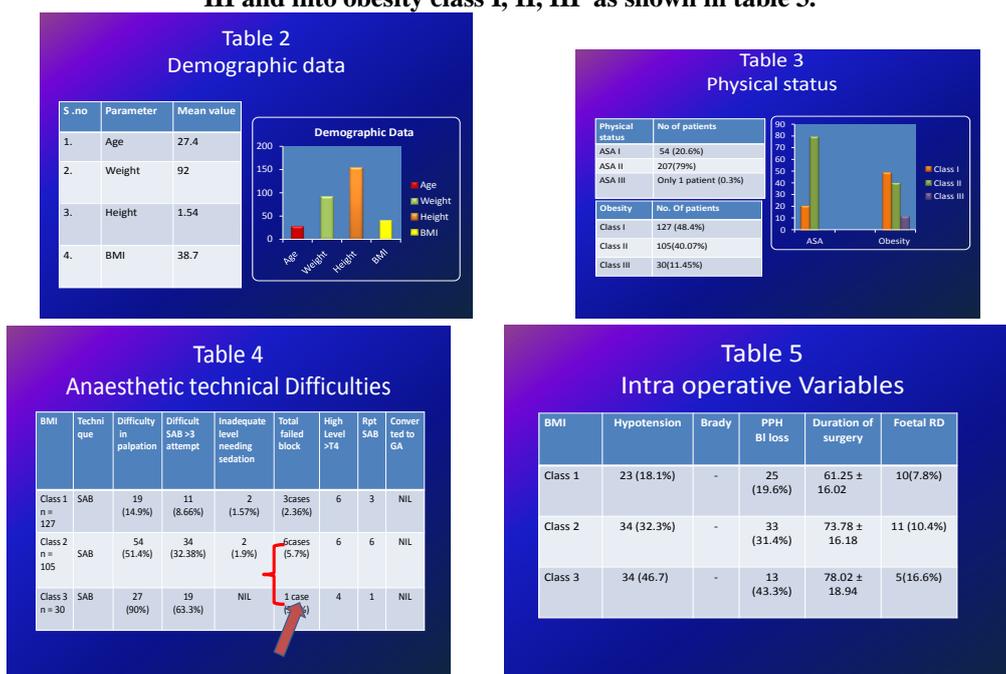


Table 5 shows complications observed during caesarean section in our study hypotension, hypoxia, bradycardia , postpartum hemorrhage and foetal distress. Hypotension was observed in 18.1% of class I, 32.3% of class II and 46.7% of class III obese parturients , which was statistically significant P =0.03 (p < 0.05). Hypoxia was not noticed in any case. Postpartum hemorrhage was observed in 19.6% in class I, 37.4% in class II and 43.3% in obesity class III parturients and these results were not statistically significant P=0.09. (p > 0.05 )

Foetal respiratory distress was observed in 7.8% in class I , 10.4% in class II and 16.6% in class III obese parturients , which was statistically not significant .

The mean surgical time was greater, the higher the degree of obesity and was statistically significant p=0.000(p<0.05). Table 5 shows that as the class of BMI increases from I to III, there was a statistically significant increase in the duration of the surgery.

In this study sub arachnoid block was the anaesthetic technique used for the surgery and general anaesthesia was resorted to only in case of difficulty in administering spinal block or in case of block failure.

No parturient in our study was administered general anaesthesia, as spinal block was achieved even in difficult cases with repeated attempts.

Technical difficulties like difficulty in palpation of lumbar spine and repeated attempts to achieve spinal block, total block failure with SAB achieved with repeat lumbar puncture, during the anaesthetic procedure were also observed in this study. Table 4 shows difficulty in palpation of lumbar spine in 14.9% of BMI class I, 51.4% of class II and 90% of class III. This was statistically significant  $p = 0.00$  ( $p < 0.05$ ). Repeated attempts ( $> 3$ ) to achieve spinal block was observed in this study and observed in 8.66% of parturients of class I, 32.38% in class II and 63.3% in class III and was statistically significant  $p = 0.00$ . ( $p < 0.05$ ).

Cases of total block failure observed in 3 (2.36%) of in obesity class I, 6 (5.7%) of class II and 1 (3.3%) of class III parturients. In all these occasions SAB could be achieved with repeat lumbar puncture and on no occasion they had to be converted to general anaesthesia.

Cases needing sedation for inadequate dermatomal block were also observed and seen in 2 cases (1.57%) in class I, 2 cases in class II (1.9%) and nil cases in class III parturients. None of them needed to be converted to general anaesthesia and these results were statistically not significant.

Total block failure was also observed in this study and found in 3 individuals (2.36%) in class I, 6 individuals (5.7%) of class II and 1 individual (3.3%) of class III obese parturients. Spinal arachnoid block was achieved by repeating the procedure and none of them was administered general anaesthesia.

#### **IV. Discussion**

Physiological reserves in pregnant women become limited in obesity, due to the already present physiological changes which occur in pregnancy. The supine positioning of the parturient during caesarean section brings about an insult to the maternal cardiovascular and respiratory reserves, due to the aortocaval compression, changes in lung volumes and capacities, cephalad retraction of the abdominal contents and fat, resulting in hypotension and V/Q mismatch<sup>4</sup>.

Spinal arachnoid blockade is the most common anesthetic technique used in caesarean section<sup>6</sup>. as it produces a reliable, dense neuraxial block with fast onset. In our study spinal block was the main technique used, with general anaesthesia only as a rescue measure in case of a complication due to spinal block. No parturient in our study was administered general anaesthesia.

Spinal arachnoid blockade can be very difficult in obese parturients due to difficulty in localising the midline in view of loss of landmarks and also due to their posture<sup>2</sup>. In our study difficulty in palpation of the spine was observed in 14.9% in class I, 51.4% in class II and 90% in class III obese parturients, which was statistically significant, asserting the well evident fact that as obesity increases, technical difficulty in administering anaesthesia also increases. Repeated attempts (more than 3) were made to achieve spinal block in obese parturients and was observed in 8.66% in class I, 32.38% in class II and 63.3% of class III parturients, which was statistically significant. There were also occasions of total block failure – 2.36% in class I, 5.7% in class II and 3.3% in class III obese parturients and this was statistically significant. Spinal block in these parturients was achieved with repeated attempts and none of them required general anaesthesia.

We also observed for requirement of sedation in inadequate level of blockade and noticed in 1.57% of class I, 1.9% of class II and nil cases in class III obese parturients. The occurrence of high level blockade ( $> T4$ ) was also seen in 6 of class I, 6 of class II and 4 of class III parturients. Though statistically not significant, these results once again reiterate the fact that as the degree of obesity increases the incidence of complications and morbidity increase<sup>5</sup>.

The incidence of hypotension was also on the rise as the obesity increased -18.1% in class I, 32.3% in class II and 46.7% in class III parturients, adding to the intraoperative anaesthetic complications. In the present study, the higher percentage of hypotension was observed in pregnant women with obesity class III, which might be due to greater extension of a higher sympathetic blockade caused by compression of the subarachnoid space by the pregnant abdomen associated with obesity<sup>3</sup>. In our study, bradycardia was not observed in any of the parturients.

In non-obese parturients the estimated duration of surgery is around 60 minutes as per the literature. This duration seems to be more in obesity and tends to increase as the BMI of the pregnant woman increases, as was observed in our study –  $61.25 \pm 16.02$  minutes in class I,  $73.78 \pm 16.18$  minutes in class II and  $78.02 \pm 18.94$  minutes in class III obesity. In our study the incidence of foetal respiratory distress was increased as the class of obesity changes from class I (7.8%), class II (10.4%) and class III (16.6%), which might probably be due to increase in the surgical time and also due to the exaggerated changes in physiological reserves as the obesity increases. It was also observed in our study that blood loss due to postpartum hemorrhage is 19.6% in class I, 31.4% in class II and 43.3% in class III obese parturients, showing that the risk of incidence of postpartum hemorrhage rises as the BMI increases.

As obesity is a growing health problem in the society, the anaesthesiologists are more at chance of encountering the problem in the operating room<sup>6</sup>. Hence he must be aware of the anaesthetic implications of

obesity and be well prepared to handle these patients ,by performing a preoperative evaluation , if possible develop a protocol for the follow up of the patient and develop a multidisciplinary team to minimize the technical difficulties and more so the maternal fetal risks during the caesarean section.

From our study ,spinal arachnoid blockade is an apt anaesthetic technique in obese parturients due to the simplicity in the procedure of administration, reliability and density of the block and fast onset , which coincides with the previous literature. It was also observed that higher the BMI, the greater the technical difficulties , bleeding , hypotension and operating time.

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