EFFECT OF OBESITY ON CESAREAN SECTION RATE

UZMA SHABAB, SHAGUFTA TAHIR

ABSTRACT

Objective — *To determine the frequency of cesarean section in obese pregnant women.*

Study design — *Descriptive study.*

Place & Duration of study — *Liaquat National Hospital Karachi, from October 2008- April 2009.*

Methodology — *Two hundred and forty four women were enrolled in the study. Both primigravida and multigravida with BMI 30 kg/m² or more, before 16 weeks of pregnancy were booked from out-patient department. Women with multiple pregnancies, previous cesarean section, pregnancies with medical disorders etc were excluded. Data was analyzed by using SPSS-10 version.*

Results — *Out of 244 women recruited, one hundred and forty (57.4%) women were primigravida and 104 (42.6%) multigravida. Mean BMI was 31.18kg/m² ±SD 1.17. Spontaneous labor started in 154 (63.1%), while labor was induced in 77 (31.6%). Thirteen patients (5.3%) were delivered by elective cesarean section. Spontaneous vaginal delivery occurred in 116 women (47.5%), instrumental delivery in 31(12.7%) and cesarean section in 97 women (39.8%). Mean BMI of patients delivered by spontaneous vaginal delivery (SVD) was 31.47kg/m², by instrumental 31.66kg/m², by cesarean section 32.33 kg/m² (p <0.001).*

Conclusions — *Obesity significantly increased the frequency of cesarean section especially in primigravida.*

Key words — *Obesity, Cesarean section, Risk factors.*

INTRODUCTION:

Obesity is defined as increase in body weight due to excessive fat accumulation. It is the most common nutritional disorder in the affluent industrialized and developed world.[1] A generally accepted definition of obesity is a body mass index more than 30kg/m.[1] The prevalence of obesity in the UK has tripled since 1980 and continued to rise. In US, the prevalence of overweight and obesity now exceeds more than 60% among adults and the latest data from the US National Center for Health Statistics shows that 30% of adults are obese. It is classified as sixth most important risk factor contributing to overall burden of diseases and is attributed to 30,000 deaths in the UK per year.[2] The World Health Organization describes obesity as: "one of the most blatantly visible, yet most neglected public health problem that threaten to overwhelm both, more and less developed countries." A recent study showed that one in 5 women booked for antenatal care between 2002-2004 were obese.[2] In Pakistan no data regarding incidence of obesity in pregnancy is available however, data from national health survey of Pakistan done during 1990-1999, showed the prevalence of obesity in reproductive age as 14% for women in rural areas while in urban areas prevalence was 37%.[3]

Maternal obesity is an independent risk factor for cesarean section. Leonie et al showed that cesarean section rate for obese pregnant woman was 35.2% as compared to 22.3% of normal weight.[4]

Correspondence:
Dr. Shagufta Tahir
Department of Obstetrics & Gynecology
Liaquat National Hospital & Medical College.
Karachi, Pakistan

The aim of our study was to find out the frequency of cesarean section in obese pregnant women .This knowledge will help to understand the burden of problem and the need for increase public awareness so that preventive measures may be stressed by reducing preconception weight in obese women.

METHODOLOGY:

A cross sectional study was conducted by collecting cases in the Department of Obstetrics & Gynecology Liaquat National Hospital over a period of 6 months from October 2008 to April 2009. A total of 244 women were booked in early pregnancy. The height and weight of women noted on first visit before 16 wks of gestation. The BMI was calculated. The inclusion criteria was women without co-morbid and singleton pregnancy, BMI 30 or > 30 kg/m². Women with previous cesarean section and associated medical disorders were excluded. Women enrolled in the study were evaluated routinely on every antenatal visit for weight gain and development of any complication of pregnancy like PIH or GDM etc. Fetal assessment on each visit was done by measuring fundal height, amount of liqor, fetal size and fetal heart sounds. Women admitted with labor pains were assessed during the course of labor by maintaining partogram. Labor was induced in women who developed pregnancy related complications.

Data was analyzed by SPSS 10. Mean and standard deviation were used for numerical values. Frequencies and percentages were computed for different modes of deliveries, cesarean section and its indications. Stratification was done on the basis of parity. It enabled to control the effect of this variable on outcome.

RESULTS:

Out of 244 women, primigravida were 140. The mean age of women was 29.13 ±SD 3.04 years and mean BMI was 31.83kg/m^2 ±SD 1.17 (table-I). 154/244(63%) women went into spontaneous labor and labor was induced in 77(32%) women due to various reasons including bad obstetric history, PIH, decreased amniotic fluid index, gestational diabetes, impaired GCT, pre-labor rupture of membranes, postdate pregnancies etc. Elective cesarean sections were done in 5%. The overall cesarean section rate was 39.8% (n 97). Mostly the cesarean sections (both elective and emergency) were done in women for non-progress of labor (38/97), fetal distress (n 20), failed induction of labor (n 12), mal-presentations (n 8), non- reactive CTG (n 7), large baby (n 3), refusal of trial of labor (n 3), abruption(n 2), obstructed labor(n 2), absent liqor (n 1) and placenta previa (n 1).

Table I: Characteristics of the Study Population

Variables	Minimum	Maximum	Mean + SD
Age (years)	22	40	29.13 + 3.04
BMI (kg/m^2)	30	36.8	31.83 + 1.17
Weight of Baby (Kg)	2.2	4.2	3.09 + 0.38

The overall vaginal deliveries were 47.5% (table II). The cesarean sections were significantly high in induced labor (52% - n 40/77). Vaginal deliveries took place in 37/77 women. It included both spontaneous vertex deliveries 31% (n 24) and instrumental deliveries 17% (n 13).

Table II: Labor Outcome

Variables	n	%
Mode of Delivery (n = 244)		
SVD	116	47.5
Instrumental delivery	31	12.7
Cesarean section	97	39.8
Type of cesarean section (n=97)		
Elective	20	21
Emergency	77	79
Outcome of Induced Labor (n = 77)		
SVD	24	31
Instrumental delivery	13	17
Cesarean section	40	52

The mean BMI of women who underwent cesarean section was 32.32 kg/m², in instrumental delivery 31.66 kg/m² and in SVD 31.47 kg/m². Spontaneous labor started in 72.1% of multigravida and 56.6% of primigrvida. The labor was induced in 43.4 % of primigravida and 27.9% of multigravida. The emergency cesarean section was done in 42.1% of primigravida and 17.1% of mutigrvida. The spontaneous delivery took place in 68% of multigravida and 32% of primigrvida. 17.1% of primigravida and 6.7 % of multigravida had instrumental deliveries. 52% primigravida's labor ended in cesarean section while only 25% of multigravida had cesarean delivery (table III). The higher rate of cesarean section seen in women with mean BMI 32.3kg/m^2 + 1.2 with $p < 0.001$.

DISCUSSION:

The obesity is frequently associated with higher rates of cesarean sections as studied earlier.[6] Similarly among various studies it was found that the obesity was significantly associated with higher

Table III: Comparison of Outcome of Labor

Variables	Primigravida (n = 140)	Multigravida (n = 104)
Onset of Labor		
Spontaneous labor	79 (56.4%)	75 (72.1%)
Instrumental delivery	56 (40%)	21 (20.2%)
Elective CS	5 (3.6%)	8 (7.7%)
Mode of Delivery		
SVD	45 (32.1%)	71 (68.3%)
Instrumental delivery	24 (17.1%)	7 (6.7%)
Cesarean section	71 (50.8%)	26 (25%)

rates of induction of labor.[5-10] Our study showed 31.6% of induction of labor. The various indications of induction of labor in order of frequency were post-date pregnancies, decrease fetal movement, pregnancy induced hypertension(PIH), and gestational diabetes(GDM). Induction of labor for post-date pregnancies was needed in 21 patients. The national primary cesarean delivery rate in United States is approximately 14.6%, ranging from a low of 11.5 % in Utah to as high of 24.3% in Mississippi.[14] In Australian obstetric population overall cesarean section rate is 22.3% and that of obesity is 35.2%.[2] In present study the overall frequency of cesarean section is 39.8% in women with BMI > 32.32 kg/m^2 which include both primigravida and multigravida patients. In this study separation of the morbidly obese women was not done. Cesarean section was performed electively without taking risk of labor stress.

The largest study by Crane et al came from the Central New York State Department of Health's electronic birth certificate of more than 19,000 deliveries. That study reported an increased risk of primary cesarean delivery among obese women, although this was less than that noted in the our study. The data from Crane et al was obtained by electronic birth certificates which may be less reliable because it did not tell the events of labor.[7]

In our study a higher frequency of cesarean section in obese women was noted. The emergency cesarean section rate was more in primigravida (42.1%) as compared to multigravida where it was 17.3%. Elective cesarean section rate was more or less same in both primigravida (8.7%) and multigravida (7.6 %). These values are higher than those found in other studies.[5,6] The main indications of cesarean section were similar to other study.[6]

A study showed that increase risk of surgical delivery is directly related to the increased risk of induction of labor.[10] The frequency of cesarean section increases by pregnancy related complications such as diabetes and hypertension.[15] Our findings suggest that obesity not only increases the risk of certain complications during pregnancy that lead to increase risk of cesarean delivery, but it also independently increases the risk of cesarean section.

Placental abnormalities such as placenta previa and placental abruption were not significantly associated with BMI. To date, no study has demonstrated an increased risk of placenta previa with obesity. Bianco et al reported an increase risk of placental abruption of 1.8 % versus 0.9% (p <05) between obese and non obese patients but in our study there was no significant relationship.[11]

The presence of excess intra abdominal adipose tissue itself could mechanically obstruct the progression of labor, contributing to failure to progress. If progress of labor is mechanically obstructed, this could overtime compromise fetoplacental circulation and cause fetal distress. The obese women theoretically may take more time to reach the optimal tissue oxytocin levels due to their larger body volume.[16] Increased risk of cesarean delivery for failure to progress could also be the consequence of difficult abdominal and vaginal examination of obese women in labor. Without accurate monitoring of progression in labor, operative delivery risk may increase.

Saunders and Paterson suggested that not going into spontaneous labor at term could be a risk marker for difficulties in the birth mechanism such as mal-position of occiput and impaired uterine contraction but this needs the proof.[17] Zhang et al reported reduction in contractility of the obese uterus in vitro and suggested that this may be due to increased cholesterol deposits in the myometrium.[8] On the other hand, Buhimschi et al found no difference in intrauterine pressure in the second stage of labor in obese and non obese.[12] Whatever the reason, there appears to be little doubt regarding the association between obesity and cesarean section rate.

The ideal time for baseline height and weight of a woman is before pregnancy or in early gestation. Most of the researchers have relied on the woman's recall of her pre-pregnancy weight, the reliability and standardization of which is very doubtful.[18] In this study the height and weight of women were recorded in early pregnancy. Still value recorded in pregnancy remains an approximation of the

pre-pregnancy weight, and therefore subject to bias. We found an even distribution of the weeks of antenatal visit among women thereby minimizing selection bias.

Krishnamoorthy et al suggested that all pregnancies in obese women should be acknowledged as high risk and managed according to strict guidelines.[19] Management should include pre-pregnancy counseling to reduce weight. What remains controversial is the effect of restriction of weight gain during pregnancy. Although the Institute of Medicine advocates weight restriction, there are others who believe that this lead to preterm delivery and intrauterine growth restriction of the baby while producing no decrease in cesarean section rates.[13]

CONCLUSIONS:

Obesity is associated with increased risk of cesarean sections. It exerts significant influence on the mode of delivery as both instrumental delivery rate as well as cesarean section rate increased. It also provide basis of an increased rate of induction of labor, further more this increased induction rate lead to increased cesarean section rate.

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