Original Article

Failed Induction of Labour (IoL) Due to Maternal Obesity

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Abstract

Objective: To determine the influence of maternal obesity on labour induction among pregnant women at tertiary care Hospital Karachi.

Methodology: This case series study was conducted at the Obstetrics and Gynaecology department of Jinnah Postgraduate Medical Centre, Karachi from October 2016 to October 2017. Women aged between 18-40 years, gestational age between 36-42 weeks on ultrasonography, alive singleton pregnancy and obese patients undergoing induction of labour and with cervix dilatation <2 cm were included. Prostaglandin E2 was inserted vaginally. Maximum two PGE2 doses were inserted depending on the Bishop score. Induction was considered failed when there was a failure to establish labour within 6 hours of the second vaginal prostaglandin treatment. All the data was recorded via study proforma.

Results: The mean age of patients was 29.08±5.66 years. Mean BMI was 35.89±4.06 kg/m2. Among indications of induction of labour, 47% were post term gestations, 32% were pre-labor rupture of membranes and 21% were maternal indications for labor induction. Failure of induction of labor was found to be 34%. There was a significant association of failure of labor induction with higher BMI and parity >2 (p=<0.05).

Conclusion: High body mass index, during pregnancy, increases the likelihood of prolonged pregnancy along with increased rates of failed induction of labor (IOL). The women with high BMI are more likely to undergo a failed IOL as compared to those with normal-BMI.

Keywords: Failure, Labour Induction, Pregnant Women, Obesity.

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Introduction

Obesity is a big health issue among adults throughout the world which increasingly creating more serious problems as compared to malnutrition.[1] Its prevalence has dramatically increased during the last four decades.[2] Prevalence of obesity estimated 13.5% all over the world,[3] and 17.1% in developing world.[4] Prevalence of obesity in 25-44 years was around 22% and 37% for men and women, respectively in Pakistan.[5] Obesity among women especially pregnant

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women has many dimensions.[7] There are many medical, surgical, and obstetrics complications including gestational diabetes, thromboembolism, hyperlipidemia and preeclampsia, higher rates of induction of labour (IOL) and its failure, operative vaginal delivery (OVD), shoulder dystocia, perineal lacerations of 3rd and 4rth degree as well as higher rates of cesarean delivery.[4,7] Furthermore, in obese females anesthetic complications such as challenging intubation and failed regional block are more frequent. In obese mothers, there are a growing number of infants large for gestational age (LGA), lower Apgar scores, and babies born with birth defects..[4,7] There is also evidence that the rising trend of maternal obesity may be contributing to escalating rates of induction of labor and cesarean section. IOL is a relatively common procedure such that around 20% of all deliveries performed through labour induction in the UK, [8] while in the US it was noted that between 1990 and 2012, the overall frequency of induction of labour (IOL) raised from 9.5 to 23.3%.[9] Intra-vaginal insertion of prostaglandin E1 (PGE1), Dinoprostone (PGE2), Misoprostol and intra-cervical insertion of a balloon catheter are the most widely accepted procedures for labour induction, particularly with an unfavorable cervix. IOL is done due to many maternal and fetal indications which do not lead to spontaneous Labour between 38-42 week gestational age.[10] The risk of failure of IOL increases if a woman is obese. A retrospective cohort study documented that at least 29% obese women (BMI 40kg/m2) had unsuccessful IOL as compared to 13% of females with normal BMI.[11] In a local study (conducted at Aga Khan University in Karachi), the rate of failed IOL was noted to be 18.1%.[12] Another retrospective study conducted in France (2011) found that IOL failed in more than half i-e; 53.7% of obese females compared to 34.2% of females with normal BMI.[13] When the labour induction is failed then deliveries are performed through an emergency cesarean section (C/S). Need for an emergency C/S ranges from 42% among nulliparous women to 14% among multiparous women after failure of induction of labour.[14] Obese women delivering their babies through C/S are much more inclined to suffer substantial mortality and morbidity during the postpartum period as compared to the females with normal BMI. As compared to the females with normal

weight, obese females are more likely to experience postoperative infection, postpartum haemorrhage and prolonged hospital stay following C/S. Due to unhealthy lifestyles, endocrinal pathologies & other reasons, obesity among females of reproductive age is increasing ultimately leading to complications in delivery like failed IOL and increased rate of C/S. This on one hand leads to increased risk of materno fetal morbidity & mortality while the increased burden on health facilities on the other hand. Despite this critical importance, it has not been investigated in our population. This argument presents a holistic rationale for this research. The present study will assess the extent of the burden of IOL failure attributed to obesity.

Methodology

The study was conducted at Obstetrics and Gynaecology department, Jinnah Postgraduate Medical Centre (JPMC), Karachi from 17th October 2015 to 16th October 2016. The sample size was taken the prevalence of failed labour induction 29%[11] in obese patients, with 95% level of significance, 9% margin of error, and by using the sample size calculator proposed by the WHO, the sample size of this study stand to be n =98~100. This study utilized Non-probability consecutive sampling method.

All the patients presented with of 3rd trimester of pregnancies, age between 18-40 years, gestational age between 36-42 weeks having alive single fetus confirmed through ultrasound, obese patients (BMI >29.9 kg/m^2) undergoing indicated induction (e.g., hypertensive disease, ruptured membranes) and a cervix dilated <2 cm were included. Women with previous history of cesarean section, dead fetuses, fetal congenital anomalies and intrauterine growth restriction (IUGR) were excluded. Informed consent was taken from each patient. Patients were kept in a lithotomy position, 3mg of Prostaglandin E2(PGE2) was introduced through vagina, and PGE2 dose was repeated following six hours. Based on the current labour room protocol, it was a standard procedure. Maximum two PGE2 doses were administered, as per Bishop Score, followed by amniotomy then Oxytocin infusion. Labour induction was considered to be failed when there was a failure to establish labour within 6 hours of the second vaginal prostaglandin (PE2)

treatment. Fetus was delivered through cesarean section. The decision for cesarean section was made by the consultant obstetrician who had at least 10 years' experience of handling these cases. Data regarding demographic variables like name, maternal age, gestational age, BMI, were noted on prescribe proforma by the researcher. Details regarding induction of labour (IOL indication, delivery method) were collected. The outcome variable was noted as a failure of IOL. All the data was recorded via study proforma. Entry and analysis of data was performed using SPSS 19. The continuous variables like maternal age, gestational age, parity, height, weight & BMI was expressed in mean and standard deviation. Categorical variables were expressed in the form of frequencies and percentages. To assess effect modifier, gestational age, parity, maternal age, BMI, socioeconomic status, educational level, and mode of delivery were stratified. Chi-square test was applied and p value <0.05 considered significant

Results

The study subjects were found to have an overall mean age of 29.08±5.66 years. The overall mean parity of study subjects was 1.86±1.02; with 38.67±1.50 weeks of mean gestational age. The mean BMI was 35.89±4.06 kg/m2. Out of all, 57% of study subjects belonged to the middle socioeconomic class. Out of 100 study subjects, 27% were illiterate, 56% had an education level of primary to matric, while rest of the 17% were intermediate to graduate. As per indications of induction of labour, 47% were post term gestations, 32% were pre-labor rupture of membranes and 21% had maternal indications of induction of labor. As per mode of delivery, most of the study subjects 40(40%) underwent cesarean section as shown in table I.

Table I: Descriptive statistics of demographic variables (n=100)

Variables		Statistics
Age (Mean±SD)		29.08±5.66 years
Parity (Mean±SD)		1.86±1.0
Gestational age (Mean±SD)		38.67±1.50 weeks
BMI (Mean±SD)		35.89±4.06 kg/m^2
Socioeconomic status	Poor	28(28%)
	Middle	57(57%)

	Upper	15(15%)
Educational status	Illiterate	27(27%)
	Primary to matric	56(56%)
	Inter. to graduation	17(17%)
Mode of delivery	NVD	30(30%)
	Assisted NVD	30(30%)
	Cesarean Section	40(40%)
Indication of induction of labor	Post Term Gestation	47(47%)
	Pre-labour Rupture of Membranes	32(32%)
	Maternal Indications of IOL	21(21%)

Failure of induction of labor was found in 34% of study subjects. Figure 1

Stratification for age, parity, gestational age, BMI, induction of labor, and mode of delivery was done to observe effect of these modifiers on failure of induction of labor. The results showed that there was significant association of failure of induction of labor with parity (p=0.001), BMI (p=0.000), and mode of delivery (p=0.000), while no significant association was found with age (p=0.905), gestational age (p=0.068), socio-economic status (p=0.863), education status (p=0.223), and indication for induction of labor (p=0.227).Table II
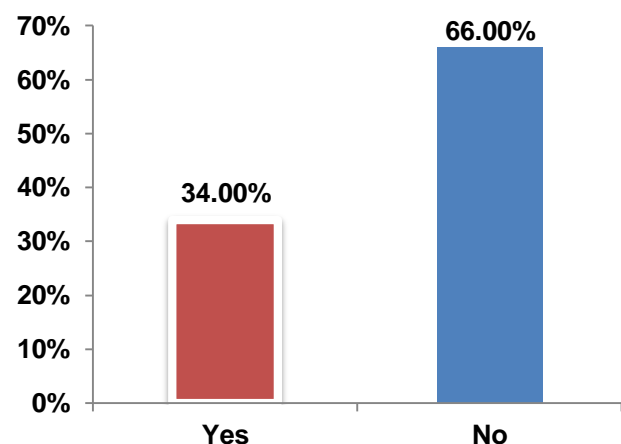

Figure 1. Frequency distribution of failure of induction of labor (IOL) (n=100)

Discussion

Obesity, as a national issue, needs the urgent attention of healthcare professionals and society, all together on resources. The well-being of females of reproductive age or at adolescence is affected overwhelmingly by this epidemic. The reproductive age of a female is a

Table II Failure of induction of labor (IOL) according to age, parity, gestational age, BMI and induction of labor (n=100)

Variables		Failure of IOL		Total	P-Value
		Yes	No		
Age (years)	≤30 years	20	38	58	0.905
	>30 years	14	28	42	
Parity	<2	21	19	40	0.001
	≥2	13	47	60	
Gestational age	≤38 weeks	22	30	52	0.068
	>38 weeks	12	36	48	
Mode of delivery	NVD	3	27	**30**	0.001
	Assisted VD	7	33	**40**	
	C-Section	24	6	**30**	
BMI	≤30 kg/m^2	12	49	61	0.0001
	>30 kg/m^2	22	17	39	
Indication for Induction of labor	Post Term gestation	20	27	**47**	0.227
	Pre-labor Rupture Of Membranes	8	24	**32**	
	Maternal Indications Of IOL	6	15	**21**	

time when she is at her peak health and thus most capable of adjusting to the intense physiological demands of gestation and childbirth. In this study among obese women failure of induction of labour was observed 34%. Consistently Polnaszek BE et al[15] reported that 40% of women having obesity observed with failed induction of labour, with obesity (class III) elevating the likelihoods of failure of class III IOL, further they observed obesity as an indicator of failed IOL. On other Maged AM et al[16] also conducted the study to observe the unsuccessful induction of labor (IOL) rate among obese females by taking non-obese as control, and they also found the obesity is the independent factor for the IOL failure and obesity had increased risk of labor duration. However, Little J et al[17]

also found similar findings regarding the failure of induction of labour and prolonged labour duration among obese women. Due to the elevated rates of post-dates and obstetric complications, obese females are more inclined to experience induction of labour as compared to females with normal BMI. Several obstetric complications are correlated with labour induction, including uterine tachysystole, meconium-stained amniotic fluid, fetal heart rate decelerations and no encouraging patterns of tracing the foetal cardiac rate, and a higher likelihood of uterine rupture.

In the current study, the study subjects were found to have a mean age of 29.08±5.66 years, mean gestational age was 38.67±1.50 weeks, and mean BMI was 35.89±4.06 kg/m2. Similarly, Yousuf F et al[18] reported that mean age of study participants was 27.61±4.31 years. On other hand Angeliki A et al also reported that obese women were found to have a mean age of 26.3±5.9 years. In another study by Shahi A et al[20] also found comparable findings regarding average maternal age and average gestational age.

In this study according to the mode of delivery rate of cesarean delivery was high. Similarly, Brenes-Monge A et al[21] also reported that the cesarean section was significantly associated with overweight and obesity as compared to normal ones. Another study showed that most obese females needed IOL, and also that IOL was related to higher frequency of caesarean delivery in such females. This relationship remained true when looking at the results of women who had a prolonged duration of pregnancy (total rate of induction involving a cesarean delivery for obese patients were 28.4%, in comparison to 18.9% for females with normal weight). While this C-section rate of 28.4% is high, however, notably important to note that >70 % of pregnant obese females who had prolonged pregnancy were delivered vaginally. IOL is thus a fair approach to prevent C-section, and in all females, elective C-section is not suggested.[11] Moreover, with adjusted odds ratios of 2.89, the extent of obesity had a substantial effect on the incidence of failed IOL in class III females. Parity and foetal weight are also essential factors in predicting the outcomes of induction. Females who have a planned caesarean delivery have a greater risk of morbidity than females who have a successful vaginal delivery. However, females who have a caesarean

delivery following a rupture of membranes or prolonged labour have the highest likelihood of morbidity[17]

Haemorrhage and infection rates are consistently higher within this group and tend to increase in pattern with increasing obesity-class. A study reported that obese females were found to be older, African American, from a lower socioeconomic background, and more inclined to have undergone infertility therapy. They were more inclined to suffer from medical problems including diabetes and chronic hypertension.[11] They also discovered that obese females were more prone to have a failed IOL than females of normal weight, also with failure rate rising as the class of obesity increases. The researchers moreover discovered that females within obesity of class III who had not had a previous vaginal delivery and also had infants with > 4500 grams of weight, had the highest rate of failed IOL (80%). When induction of labour is suggested, especially for obese females, it must be done only after counseling the females about the risks, benefits, likelihood, and alternatives of accomplishing a vaginal delivery.[11] Shahi A et al[20] also revealed that In pregnancy, overweight during the first trimester is related to a prolonged pregnancy as well as a higher likelihood of post-term pregnancy. They also proposed that modifiable weight during pregnancy would reduce the risk of pregnancy complications associated with obesity. To confirm these results, a multicenter study is deemed necessary. A single-center experience is one of the study's major limitations. Since the research was performed with a limited sample size as well as in an urban setting, the findings may not be generalized to larger populations.

Conclusion

A relatively high maternal BMI is related to a greater risk of prolonged pregnancy as well as a higher likelihood of failed IOL. Our study proposes that obese females are more inclined than their normal BMI counterparts to have a failed IOL. In addition, the extent of obesity has a major effect on the rate of failed IOL among females with class III obesity females.

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