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A Study of Risk Factors for Cesarean section in Induced Labour

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Abstract

Aim: This study aims to identify the pregnancies which are associated with greater risk of cesarean deliveries when induced at term and also to identify independent risk factors for cesarean delivery after induction of labour (IOL) and for predicting caesarean delivery

Methods: It is a cross-sectional study conducted in Raja Rajeswari Medical college and hospital. The study includes 500 women with a live singleton fetus in cephalic presentation who are attending our inpatient department and fulfilling inclusion and exclusion criteria and counselled for undergoing IOL. Informed written consents were obtained from women willing for study. Those patients who delivered by lower segment caesarean section (LSCS) after failed induction were analyzed to identify the risk factors for cesarean delivery. Categorical data were analysed using chi-square test and P <0.05 were considered significant.

Results: Among 500 mothers who have been induced for labour, 83.6%mothers had vaginal delivery and 16.4%(n=82) delivered by emergency LSCS and 2% having vacuum assisted vaginal delivery. In our study among obese patients 37.8% had emergency LSCS and 23% had vaginal delivery. 65.2% of pregnancy induced hypertension (PIH) and 51.2% of gestational Diabetes Mellitus (GDM) patients had emergency LSCS. 32.6% of premature rupture of membrane (PROM)and bishops score <6 had emergency LSCS.

Conclusion: The Risk factors like Obesity, GDM, PIH, Oligohydramnios, PROM, Bishop score <6 are at increased risk of emergency LSCS and its associated with maternal and fetal morbidity and mortality. counselling of women with these risk factors to undergo elective LSCS might reduce the morbidity of mother and fetus.

Keywords: Lower segment caesarean section, pregnancy induced hypertension, gestational Diabetes Mellitus

Introduction

Modern obstetrics offers the option of inducing labour when necessary, even though most patients go into spontaneous labour at the end of their pregnancy. When continuing a pregnancy provides a risk or threat to the pregnancy's outcome, labour induction is a clinical intervention that may offer significant benefits to the mother and newborn. Induction of labour has become one of the most common interventions in obstetrics. Induction of labour is done when it benefits to either mother or fetus outweighs those if continuing the pregnancy.

Thus, induction of labour (IOL) implies the stimulation of regular uterine contractions before the spontaneous onset of labour with or without ruptured membranes after 28 weeks of gestational age using mechanical or pharmacological methods in order to generate progressive cervical dilation and subsequent delivery. Additionally, induction of labour is the beginning of uterine contractions that leads to gradual cervical dilation, effacement of the cervix, and descent of the presenting part of the foetus, culminating in a successful vaginal birth of the infant.[1]

Elective lower segment caesarean section (LSCS) is a planned cesarean for maternal or fetal indications that arise in the antepartum period. It is done in a woman who has not gone into labour. Emergency LSCS is defined as caesarean delivery after failed induction, failed progress of labour, fetal asphyxia or due to other intra-partum maternal or fetal complications. Failed induction is when dilatation > 4cm is not achieved after a trail of oxytocin to a maximum of 40mU/min with adequate contractions for 12-18 hours (ACOG 2016) and also when failed to enter active phase of labor after 24 hours of induction with one cycle of dinoprostone vaginal gel (two doses) or one dinoprostone insert for 24 hours (NICE 2012). This study aims to identify the pregnancies which are associated with greater risk of cesarean deliveries when induced at term and to identify independent risk factors for cesarean delivery after induction of labour (IOL) and for predicting caesarean delivery

Materials and Methods

This is a single center, prospective, cross-sectional study conducted in tertiary care center located in a major city in south India. From January 2021 to June 2022, all live Singleton pregnancies with cephalic presentation that were induced and delivered by emergency LSCS after a failed induction, an arrest of labour, the need for an immediate delivery due to maternal compromise, or non-reassuring fetal status and willing to provide consent were included in the study. Patients who had previous LSCS, multifetal gestation, malpresentation, uterine scar (myomectomy), placenta Previa, contraindicated for vaginal delivery and not willing to give consent were excluded from the study. The study has received institutional ethics committee approval and adheres to the ethical standards set forth in the Helsinki Declaration. Maternal age and weight, history of obesity (body mass index > 30), anemia, pregnancy induced hypertension (PIH), gestational diabetes mellitus (GDM), oligohydramnios, premature rupture of membrane (PROM), bishops score, Parity Gestational age at delivery in weeks, Induction method like use of PGE2 gel, misoprostol and augmentation by syntocinon, Mode of delivery like vaginal delivery, vaginal delivery

with any other assisted mechanism, LSCS, Indication for LSCS other than Bishop score were analysed.

Statistical analysis

Categorical data of baseline characteristics are presented as frequency and percentages. Categorical variables were compared using chi square or Fisher's exact tests. All calculated 'p' values are two tailed and are set at statistical significance of 0.05 and all confidence intervals are set at 95% level. Statistical analysis was performed using the SPSS statistical package, version 25.0 (IBM Corp., Armonk, NY, USA)

Results

A cross sectional study was conducted to assess the indication of LSCS among induced labour and its associated risk factors among 500 mothers admitted in tertiary care hospital.

Table 1 shows the baseline clinical characteristics of the study population. Table 2 represents the indication for LSCS. In our study, 16.4% (n=82) delivered by emergency LSCS. Around 81.6% (n=408) had vaginal delivery and 2% (n=10) had vacuum assisted vaginal delivery. Birth weight more than 3kg had significantly higher risk of LSCS. In emergency LSCS and vaginal delivery 37.8% and 23% were obese respectively (p=0.005).

Among PIH 65.2% had emergency LSCS and 34.8% had vaginal delivery (p=0.001). 51.2% of GDM mothers were delivered by Emergency LSCS after induction and 48.8% were delivered by vaginal delivery (p-0.001).

In emergency LSCS all patients had bishop score less than 6 (p=0.001). 67.4% of PROM patients had emergency LSCS after induction and 32.6% had vaginal delivery (p=0.003). 63.6% of oligohydramnios mothers had emergency LSCS and 36.4% had vaginal delivery (p=0.002).

Discussion

Induction of labour is necessary in over one-fourth of pregnancies, there has never been a consensus on what constitutes a failure induction of labour. The risk factors for latent labour that are linked to successful labour inductions that result in vaginal deliveries and recommendations for uniformity in the diagnosis of failure inductions have only recently been investigated[2]. Ellis et al., investigated the impact of maternal obesity on the procedures and results of labour induction and concluded that obese women had an almost twofold increased risk of LSCS following the induction of labour compared to women of normal weight[3] which were similar to our study.

In our study, the prevalence of emergency LSCS after induced labour is 16.4% and studies have shown that women with GDM, the crude relative risk of a LSCS was 1.45 (95% CI 1.04-2.02) compared to Non GDM and suggests that GDM as an independent risk factor of emergency LSCS[4]. Khaskeli et al. conducted a study among 138 pregnant women with gestational hypertension. After labour was induced the risk of emergency LSCS was fairly high[5].In Conway's retrospective, case-controlled study, women who were induced for oligohydramnios had an increased rate of LSCS when compared women with oligohydramnios who were in spontaneous labor. The authors postulated that this increase was caused by the induction process itself.[6] So, induction of labour in oligohydramnios and its increased risk of LSCS was similar to our study results. In a prospective case-control research by Ethiraj et al., stated Oligohydramnios was a major risk factor for caesarean delivery in sync with our report, compared to other risk factors such preeclampsia, prenatal hypertension, post-dated pregnancy, and gestational

diabetes mellitus[7].A cohort study was conducted in Term naive females with vertex singleton pregnancies who underwent labour induction showed having a Bishop score of 5 or less was a major risk factor for caesarean birth (adjusted OR 2.32; 95% CI 1.66 -3.25). Maternal age of 30 years or older, a body mass index of 31 or higher, the use of epidural analgesia during the initial stage of labour, and a birth weight of 3,500 g or more were additional factors that significantly elevated the risk for caesarean delivery[8]. Ejigu et al. showed that failure to induce labour was strongly correlated with poor Bishop Score [AOR = 2.37 (1.16-4.84), Birth weight 4 kg [AOR = 2.12 (1.05-4.28)], and body mass index [AOR = 5.71 (3.26-10.01).[9] In our study, Bishop score <6 was risk factor of LSCS after induction.

Conclusion

Our study concludes that obesity, GDM, PIH, oligohydraminos, PROM and Bishop score <6 were independent risk factors of Emergency LSCS in induced labour. It will therefore be beneficial to counsel women with aforementioned risk factors to have elective LSCS.

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Table1: Baseline Characteristics

Baseline characteristics	Cesarean deliveryN= 82	Vaginal deliveryN= 408	P value
Maternal age (years)			
19-20	10.6%	89.4%	
21-30	16.3%	83.7%	0.4

31-40	19.2%	80.8%	
Obesity	37.8%	23%	0.005
PIH	65.2%	34.8%	0.001
GDM	51.2%	48.8%	0.001
Anaemia in pregnancy	21.6%	78.4%	0.1
Hypothyroid in pregnancy	21.1%	78.9%	0.2
Oligohydramnios	63.6%	36.4%	0.002
PROM	67.4%	32.6%	0.003
Mild CPD	36.8%	63.2%	0.08
Parity			
Primi	17.3%	83.7%	0.5
Gravida 2	15.3%	84.7%	
Gravida 3	15.7%	84.3%	
Gravida 4	15.6%	84.4%	
Gestational weeks			
35	12.5%	87.5%	0.7
36	13.4%	86.6%	
37	16.4%	83.6%	
38	20.2%	79.8%	
39	14.9%	85.1%	
40	25%	75%	
Bishop score			
≤6	100%	0	0.001
>6	2.3%	97.7%	

Abbreviations

PROM-premature rupture of membranes, PIH – pregnancy induced hypertension, GDM- Gestational diabetes mellitus, PROM- premature rupture of membrane, CPD-cephalo-pelvic disproportion.

Table 2: Indication of LSCS

Indication for LSCS	Number of patients (%)
Failed instrumental delivery	9 (11%)
Failed induction	16 (19.5%)
Fetal distress	17 (20.7%)
Non progression of labour	40 (48.8%)