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Incidence of and Risk Factors for the Failed Induction of Labour-A Prospective Observational Study

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Abstract: ***Introduction*:** Induction of labor (IOL) is an artificial stimulation of uterine contraction at 28 or more weeks of gestation but before spontaneous onset of labor to achieve vaginal delivery and it is a common practice in current obstetrics. IOL is a life-saving obstetrical intervention indicated only when the benefits of discontinuing the pregnancy outweigh the risks of continuation. ***Objective*:** To study the incidence of and risk factors for the failed induction of labour. ***Methodology*:** This is a prospective observational study conducted at Dept. of Obst & Gynae, Shaheed Tazuddin Ahmad Medical College & Hospital, Gazipur, Bangladesh from January to June 2022. Total 120 woman who were induced with dinoprostone gel and who ended up with caesarian section were included in the study. Factors which might be responsible for the failed labor induction were assessed. Women who were taken up for caesarian section for fetal distress were excluded from the study. ***Results*:** Total 120 women with failed labour induction were included in the study, and we found that majority of the women were primiparous (75%), in the age group of 25 to 29 years (60.8%), and we found that most common indication of doing IOL is post-dated pregnancy (30%). Unfavorable cervix with bishop's less than 5 was found in majority of the cases (28.3%). Other factors were gestational hypertension (19.1%), IUGR (10%), prolonged PROM (8.3%), gestational diabetes mellitus (8.3%), Rh negative pregnancy (3.3%). ***Conclusion*:** Induction of labour is an important obstetric procedure. There is a need to develop a protocol for the same. The success of induction of labour is determined by many maternal and fetal factors, which must all be taken into account to avoid unnecessary cesarean sections.

Keywords: Labour Induction, Caesarian Section, Primiparous, Unfavorable Cervix, Gestational Hypertension.

Research Paper

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INTRODUCTION

Induction of labor (IOL) is defined as the artificial initiation of labor before its spontaneous onset for the purpose of achieving a vaginal delivery [1]. Induction of labour (IOL) is one of the commonly performed obstetric procedure. Rate of Induction of labour has doubled in the past decade from 10 to 20%. In some institutions, the rate of IOL is as high as upto 40% [2]. Several factors are considered as predictors of induction failure such as Bishop's score < 6, nulliparity, gestational age < 41 weeks, maternal age > 30 years, pregnancy complicated by preeclampsia, premature rupture of membranes (PROM), isolated oligohydramnios, gestational diabetes, and hypertension [3-5]. There are several methods to induce labor. However, vaginal prostaglandin administration (PGE) is the preferred method in these patient groups. It induces or promotes cervical ripening and also stimulates myometrial activity [6]. Dinoprostone is a synthetic analogue of PGE2 and is commonly used in the form of immediate-release vaginal gel and sustained-release vaginal pessary. Common indications for labor induction include borderline low amniotic fluid index (AFI), reduced fetal movement, small-for-gestational age fetus, mild pregnancy-induced hypertension (PIH), good Bishop score, and impaired glucose tolerance at 36 weeks of gestation or later [7]. There are several methods to induce labor, but the most common methods,

especially in cases of poor cervical condition, include intravaginal introduction of dinoprostone (PGE2), misoprostol, a prostaglandin E1 (PGE1) analogue, or intracervical introduction of a balloon catheter [8]. However, in these categories of patients, vaginal administration of prostaglandins (PGE) is the preferred method, as they induce or promote cervical ripening and also stimulate myometrial activity. Dinoprostone is a synthetic analogue of PGE2 and is commonly used in the form of rapid-release vaginal gel and controlled-release vaginal pessary [8]. Induction of labor rarely fails. Risk factors include short height, BMI ≥ 40, and cervical dilation < 2 cm on admission. Nevertheless, most women with these risk factors do not experience failure of induction of labor. Several factors are considered predictors of failure of induction of labor, including: B. Bishop score <6 >30 years of age, pregnancy complicated by preeclampsia, premature rupture of membranes (PROM), isolated oligohydramnios, gestational diabetes mellitus, and hypertension [9]. The aim of our study is to investigate factors leading to failure of induction of labour.

MATERIALS AND METHODS

This is a prospective observational study conducted at Dept. of Obst & Gynae, Shaheed Tazuddin Ahmad Medical College & Hospital, Gazipur, Bangladesh from January to June 2022. Total 120 woman who were induced with dinoprostone gel and who ended up with caesarian section were included in the study. Data was collected regarding the maternal obstetrical parameters and pregnancy adverse conditions those contributed to failure of induction. The data pertaining to obstetric history were gravida status, gestational week, indication for the induction of labour, risk factors for failed induction of labour, bishop score after use of prostaglandin. Study was conducted for a period of 6 months. Factors which are responsible for the failed induction of labour were assessed. Women who were taken up for caesarian section for fetal distress were excluded from the study.

Data Analysis

All data obtained from the cases were analyzed using the SPSS (23.0 for Windows) program. Results were expressed as mean ± SD or rate. Comparisons between groups and subgroups were performed with analysis of variance (one-way ANOVA). Student's test was used for continuous variables and Fisher's exact test was used for categorical variables. A value of $p<0.05$ was regarded as statistically significant. OR and 95 % CI were calculated where appropriate.

RESULTS

Table 1: Distribution of number of cases of failed induction with respect to age

Age	No. of cases	%
14-19	4	3.3
20-24	38	31.6
25-29	73	60.8
30-34	4	3.3
35-39	1	0.8

In our study maximum number of failed inductions were seen in patients of age group 25 to 29.

Table 2: Distribution of number of cases of failed induction with respect to parity

Parity	No. of cases	%
0	90	75.0
1	22	18.3
2	8	6.7

Out of 120 cases, 75% were primigravidas and 25% were multigravidas.

Table 3: Indications for Induction of labour

Indications for IOL	No of cases	%
Post dated pregnancy	36	30.0
Oligohydramnios	14	11.6
Gestational hypertension	24	20.0
Gestational diabetes mellitus	16	13.3
IUGR	12	10.0
Rh negative pregnancy	6	5.0
Prolonged PROM	7	5.8
Severe pre-eclampsia	5	4.1

In the present study induction of labour was mainly done for postdated pregnancy in 30 percentage of the cases, for gestational hypertension in 20% cases, for severe preeclampsia in 4.1 % cases, for GDM in 13.3% cases, for oligohydramnios in 11.6 % of cases.

Table 4: Risk factors associated with failed induction

Risk factors	No. of cases	%
Poor bishop's score	34	28.3
Gestational hypertension	29	24.1
PROM	11	9.1
Gestational hypertension + gestational diabetes mellitus	13	10.8
IUGR	22	18.3
Gestational diabetes mellitus	10	8.3
Isolated oligohydramnios	7	5.8

In our study Poor bishop's score is the major contributing factor seen in 28.3% of the cases for the failed induction, next being gestational hypertension- 18.3%, IUGR- 18.3%, GDM in 8.3% and oligohydramnios in 5.8% of cases

DISCUSSION

There are several possible reasons why labour may be prolonged. During the latent phase, labour may be prolonged because the cervical expulsion is slow. During the active phase, labour may take longer or may not occur if the baby is too large, the birth canal is too small, or the woman's pelvis is too small. IOL is a common procedure performed in all obstetric facilities. Induction of labour is performed in 20% of pregnancies for a variety of reasons, but pregnancy after full term is the most common indication. Depending on the medical indications, induction of labor is performed at different times during pregnancy. In patients with gestational diabetes, labor is induced at 39 weeks of gestation to reduce the risks associated with fetal macrosomia [10]. In patients with term premature rupture of membranes (PROM), labor is induced to prevent fetal infection [11]. Preterm labor is primarily induced by PROM, hypertension, fetal growth restriction, small for gestational age, or reduced fetal movement [11]. Differences in the commonly used induction methods, such as oxytocin being common in the study area while misoprostol is common in some other settings, may also be a reason for the differences. The study showed that the likelihood of FIOL increases with maternal age. This may be because older mothers are at higher risk of complications such as PIH and DM. Failed induction of labor is defined as the absence of regular contractions and cervical changes for at least 24 hours after oxytocin administration, and membranes are artificially ruptured, if possible, without causing fetal heart rate abnormalities [12]. Often, premature rupture of membranes, weak contractions after labor, IUD and other conditions such as oligohydramnios, poor cervical consistency, pelvic contractions, and maternal stress in preeclampsia are factors in the decision to perform a cesarean section. Preeclampsia can cause fetal hypoxia, leading to reduced stress tolerance during labor [13]. Preterm women with a poor Bishop score are also one of the identified groups with high induction failure. Cervical condition at the start of induction is an important predictor, with the modified Bishop score being a widely used scoring system. Induction of labour results in high failure rate if the cervix is not ripe [14]. In the present research entitled a study of risk factors for the failed induction of labour 120 cases were studied. Several noteworthy factors have been observed. In our series of 120 cases we have observed that failed induction of labour is mainly seen in primigravidas in the age group of 25 to 29. Induction of labour was mainly done for postdated pregnancy in 30 percentage of the cases, for gestational hypertension in 20% cases, for severe preeclampsia in 4.1 % cases, for GDM in 13.3% cases, for oligohydramnios in 11.6% of cases. Poor bishop's score is the major contributing factor seen in 28.3 % of the cases for the failed induction, next being gestational hypertension- 19.1%, IUGR- 18.3%, GDM in 8.3% and oligohydramnios in 5.8% of cases. Pravati Tripathy *et al*., in their study on Prevalence and Predictors of Failed Induction found that the major reasons for cesarean section were poor progress, foetal distress, cephalo pelvic disproportion, oligohydramnios and meconeum staining [15]. The predictors of failure according to their study were gravida, number of doses and bishop score. Unfavorable bishops score accounted for 25% of the cases of failed induction which is comparable to our study where it is 28 %. In their study, induction of labor was mostly performed without pain or sharp pain and oligohydramnios, whereas in our study it was performed after birth. Emilio Giuliano *et al*., in their study of risk factors for failed induction of labor, found that maternal age was an independent significant variable determining the risk of cesarean section. Patients with mild preeclampsia had a three times higher risk of having a cesarean section [16]. According to their study, the most common sign was post-eclampsia, which is consistent with our study. Even the risk factors from their study are consistent with those found in our study. The success of labor induction depends on many maternal and fetal variables, all of which must be considered to avoid unnecessary cesarean sections. Therefore, induction of labor requires a comprehensive assessment of maternal and fetal status. In addition, FIOL is more likely in women for whom PROM is an indication for labor induction. This may be because PROM may affect

cervical ripening and the timing of labor induction. Due to the fear of infection, the cervix may not have enough time to ripen or reach the active stage of labor. Another explanation may be the fear of using cervical ripening techniques, especially mechanical cervical ripening techniques, for fear of infection.

CONCLUSIONS

In this study, we attempted to investigate risk factors associated with failure of induction of labor. IOL is performed for various reasons, but its incidence is 20%. Our results suggest that the incidence of cesarean section due to failure of induction of labor increases over time and that risk factors are poor Bishop score, pregnancy-induced hypertension, IUGR-18%, gestational diabetes mellitus, and oligohydramnios. Induction of labor is an important obstetric procedure. Protocols for this need to be developed. The success of induction of labour depends on many maternal factors, all of which must be considered to avoid unnecessary caesarean section.

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