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Original Research Article

PATTERNS OF INDUCTION OF LABOUR - AN OBSERVATIONAL STUDY IN A TERTIARY INSTITUTE OF CENTRAL KERALA

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Abstract

Background: Induction of labor refers to the iatrogenic stimulation of uterine contractions before the onset of spontaneous labor in order to achieve delivery of the fetus. Labor may be induced due to maternal or fetal indications or can be simply elective inductions. The rate of inducing labor and the method varies widely in different institutions depending on choices of obstetricians and indications for Induction. The present study is to assess indications for induction of labour and to different factors related to induction. We also aim to describe the delivery outcomes in both medical and elective induction of labor. **Materials and Methods:** Present study was a retrospective, observational, single centric, and hospital-based study conducted at the Department of Obstetrics and Gynaecology, Govt. Medical College, Palakkad. Total 300 pregnant women with singleton pregnancy who were planned for induction of labour were included in the study, whereas women with multiple pregnancy were excluded. All the inductions were started before the regular uterine contractions began, and cases with augmentation solely were also excluded. Data was captured using a predesigned semi-structured performa. **Result:** The mean age of the patients was 25.61 ± 4.14 years. The mode of induction of labour was prostaglandins in 232 (77.34%) patients whereas foley's catheter and prostaglandins were used in 68 (22.66%) cases. The dose of prostaglandins in most of cases was 100 µg in divided doses (40.33%). LSCS was done in 47 (15.67%) cases and the most common indication of LSCS was meconium-stained amniotic fluid (MSAF) with fetal distress in 10 (21.28%) cases. The NICU admission was observed in 39 (13%) cases and most common reason being respiratory distress (89.74%). The mean number of days of hospital stay was 3.06 ± 1.41 days. **Conclusion:** The aim of modern obstetrics is to reduce the maternal and fetal morbidity and mortality and to improve the perinatal outcome. Therefore, it is essential to monitor the indication for induction of labour, the method of induction, the gestational age at which elective induction can be planned to analyse the indications of LSCS and the reasons for NICU admission.

INTRODUCTION

Induction of labor refers to the iatrogenic stimulation of uterine contractions before the onset of spontaneous labor in order to achieve delivery of the fetus. Labor may be induced due to maternal or fetal indications or can be simply elective inductions. Induction of labor without a medical indication is termed as elective induction of labor and appears to be increasing rapidly. Induction of labour has been practiced since decades for medical and non-medical reasons to improve the maternal and fetal outcome.[1] According to the American College of Obstetricians and Gynecologists (ACOG), induction of labor is undertaken when, in the opinion of the physician, the risks of delivery to the mother or the fetus or both, are less than the risk of continuing the pregnancy.[2]

The rate of inducing labor and the method varies widely in different institutions depending on choices of obstetricians and indications for induction. Controversy exists regarding the methods of induction and also the potential benefits of elective induction at term. Proponents of elective induction argue that they are avoiding potential adverse outcomes associated with postdates, preeclampsia

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and term intrauterine fetal death of unknown causes.[3] It was suggested by Macer et al. that elective induction allows for better planning by the physician, patients, and their families.[4] The anxiety of some women may be reduced by the assurance that their personal physician may be present during the birth of their child. Others advocate elective induction to allow for daytime deliveries with optimal perinatal medical care personnel.[5]

Several studies have shown an increased rate of cesarean section related to elective inductions, especially studies with spontaneous onset of labor as comparison group, but these studies have the drawback that the study population used in these studies were inappropriate. Smith et al. found that when careful patient selection is made by an experienced clinician, planned delivery does not jeopardize the outcomes of either the mother or fetus compared to spontaneous labor.[5] This result was similar to that of Cole et al. who found no evidence that elective induction of labor increased fetal or maternal morbidity.[6]

Induction of labour has been in the practice since decades, but there are only few significant studies that shows the optimum method to use for induction, gestational age at which elective induction can be done, the maternal and perinatal outcomes. An understanding of the various factors that affects induction of labor and its effect on maternal and perinatal outcome would help clinicians and policymakers determine the benefits and harms, and thus define a reasonable role for induction of labor in current obstetric practice. The present study is to assess indications for induction of labour and to assess the different factors related to induction. We also aim to describe the delivery outcomes in both medical and elective induction of labor.

MATERIALS AND METHODS

Study design: Present study was a retrospective, observational, single centric, and hospital-based study conducted at the Department of Obstetrics and Gynaecology, Govt. Medical College, Palakkad. Total 300 pregnant women with singleton pregnancy who were planned for induction of labour were included in the study whereas women with multiple pregnancy were excluded. All the inductions were started before the regular uterine contractions started, and cases with augmentation solely were also excluded.

Data collection: The patients were admitted to the antenatal ward one day prior to induction. A reliable estimation of gestational age, presentation and foetal weight was done. Maternal biochemical investigations were carried out. Maternal pelvis assessment and clinical evaluation for possible cephalopelvic or feto-pelvic disproportion was done. Cervical status was assessed using modified Bishop scoring system to predict the likelihood of success and to select an appropriate method of induction of labour.

Induction of labour: Informed and written consent was taken. The possible risks associated with induction of labour were well explained and they were induced with either medical methods alone or a combination of medical and mechanical (foley's) depending on BISHOP's score. Maternal and fetal monitoring was done properly. Maternal vitals and contractions were monitored at regular intervals. Fetal heart rate was monitored with a non-stress test and intermittent auscultation. Maternal outcomes were assessed in terms of mode of delivery and complications.

Statistical Analysis: Data was recorded on physical proforma and then entered in the excel sheet. The data was analyzed using the SPSS software. Mean and standard deviation was calculated for the quantitative variables whereas qualitative variables are presented in form of number and percentage. Appropriate tables were used to depict the data.

RESULTS

The mean age of the patients was 25.61 ± 4.14 years. Anthropometric assessment revealed that mean weight of the patients was 62.92 ± 10.47 kg, mean height was 157.43 ± 5.29 cm, and mean BMI was 25.34 ± 3.71. Biochemical ingestions indicate mean Hb was 11.84 ± 1.31, mean RBS was 94.04 ± 14.54, mean PLT was 2.87 ± 0.62 and mean LCB was 4.54 ± 2.45. The most common blood group of mothers was O+ (35.3%) followed by A+ (27.7%), B+ (23.7%) whereas AB+ (8.3%), A- (2.3%), B- (1%) and O- (1.7%) were the rare blood groups [Table 1]

Maternal antenatal history indicate that 151 (50.33%) patients were primigravida, followed by 90 (30%) were G2, 43 (14.33%) were G3, 13 (4.33%) were G4 and 3 (1%) were G5. Gestation period was 37-37+6 weeks in 37 (12.33%) cases, 38-38+6 weeks in 82 (27%) cases, 39-39+6 weeks in 153 (51%) cases, and at EDD in 24 (8%) cases and at 40+ 2 weeks in 2 (0.6%) cases. Antenatal complications include anemia in 73 (24.33%) cases, gestational diabetes mellitus (GDM) in 36 (12%) cases, hypothyroid in 25 (8.33%) cases, intrauterine growth restriction (IUGR) in 23 (7.67%) cases, pregnancy-induced hypertension (PIH) in 45 (15%) cases, and oligohydramnios in 10 (3.33%) cases [Table 2].

The mode of induction of labour was prostaglandins in 232 (77.34%) patients whereas foley catheter and prostaglandins were used in 68 (22.66%) cases. The dose of prostaglandins was 25 µg in 7 (2.33%) patients, 50 µg in 91 (30.33%) patients, 75 µg (in divided doses) in 5 (1.67%) patients, 100 µg (in divided doses) in 121 (40.33%) patients, 125 µg (in divided doses) in 3 (1%) patients, 150 µg(in divided doses) in 69 (23%) patients, 200 µg(in divided doses) in 2 (0.67%) patients, and 250 µg(in divided doses) in 2 (0.67%) patients [Table 3].

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Table 1: Maternal clinical characteristics.

Variable	Domian	Mean/Number	SD/Percentage
Age		25.61	4.14
Anthropometric parameters	Weight (kg)	62.92	10.47
	Height (cm)	157.43	5.29
	BMI	25.34	3.71
Biochemical parameters	Hb	11.84	1.31
	RBS	94.04	14.54
	PLT	2.87	0.62
	LCB	4.54	2.45
Mother Blood group	O+	106	35.3
	A+	83	27.7
	B+	71	23.7
	AB+	25	8.3
	A-	7	2.3
	B-	3	1.0
	O-	5	1.7

Table 2: Maternal antenatal history.

Variable	Domain	Number	Percentage
Gravida	Primi	151	50.33
	G2	90	30
	G3	43	14.33
	G4	13	4.33
	G5	3	1
Gestation period	37-37+6	37	12.33
	38-38+6	83	28
	39-39+6	154	51
	40-40+2	26	8.67
Antenatal complications	Anemia	73	24.33
	GDM	36	12
	Hypothyroid	25	8.33
	IUGR	23	7.67
	PIH	45	15
	Oligohydramnios	10	3.33

Table 3: Induction of labour.

Variable	Domain	Number	Percentage
Mode of induction	Prostaglandins	232	77.34
	Foley catheter and Prostaglandins	68	22.66
Total Prostaglandin given in divided doses	25 µg	7	2.33
	50 µg	91	30.33
	75 µg	5	1.67
	100 µg	121	40.33
	125 µg	3	1
	150 µg	69	23
	200 µg	2	0.67
	250 µg	2	0.67

The mode of delivery was vaginal delivery in 232 (77.33%) cases, whereas forceps delivery was performed in 3 (1%) cases, vacuum delivery in 18 (6%) cases. Lower segment cesarean section (LSCS) was done in 47 (15.67%) cases. The indication of LSCS was meconium-stained amniotic fluid (MSAF) and fetal distress in 10 (21.28%) cases, fetal distress in 6 (12.77%) cases, MSAF and failed induction in 2 (4.26%) cases, cephalopelvic disproportion (CPD) and failed induction in 1 (2.13%) case, CPD and Gestational hypertension (GHTN) in 1 (2.13%) case, maternal demand in 1 (2.13%) case, and short primi and failure to progress in 1 (2.13%) case [Table 4].

Out of the total inductions done, 205 cases were induced electively, out of which 177(86%) were vaginal deliveries.33(14%) cases were delivered by ceserean section. Most common cause of CS in this group was failed induction 45%.

In our study most of the inductions were done in between 39-39+6 weeks (154). Of which 117 cases were elective cases and rest being medical. 85% delivered vaginally and 15% underwent cesarean section [Table 5].

The NICU admission was observed in 39 (13%) cases. Reason for NICU admission was respiratory distress (RD) in 35 (89.74%) cases, MSAF in 1 (2.56%) case, meconium aspiration in 1 (2.56%) case, referred to higher center in 1 (2.56%) case, and mild hypotonia in 1 (2.56%) case. The mean APGAR score was 7.89 ± 1.09, mean Birth weight was 2.84 ± 0.39, and mean blood loss was 378.87 ± 89.15. The mean number of days of hospital stay was 3.06 ± 1.41. Maternal complications include the traumatic postpartum hemorrhage (PPH) in 2 (13.33%) cases, atonic PPH in 4 (26.67%) cases, atonic and traumatic PPH in 4 (26.67%) cases, CPT in 1 (6.67%) case,

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mild atonicity in 1 (6.67%) case, manual removal of the placenta (MROP) in 2 (13.33%) cases, and prolonged labour in 1 (6.67%) case [Table 6].

Table 4: Mode of delivery and indications of CS.

Variable	Domain	Number	Percentage
Mode of delivery (N=300)	Vaginal delivery	232	77.33
	Vacuum delivery	18	6
	Forceps delivery	3	1
	LSCS	47	15.67
Indication of LSCS (N=47)	Failed induction	25	53.19
	MSAF and fetal distress	10	21.28
	Fetal distress	6	12.77
	MSAF and failed induction	2	4.26
	CPD and failed induction	1	2.13
	CPD and GHTN	1	2.13
	Maternal demand	1	2.13
	Short primi, failure to progress	1	2.13

Table 5: Table showing results of induction of labour and outcomes

	No. Of cases		Vaginal delivery		Caesarean section	
	Elective	Medical	Elective	Medical	Elective	Medical
$37\text{-}37^{+6}$	8	29	7	26	1	3
$38\text{-}38^{+6}$	43	40	38	30	5	10
$39\text{-}39^{+6}$	134	20	117	15	17	5
$40\text{-}40^{+2}$	20	6	14	4	6	2

Table 6: Maternal and fetal outcomes.

Variable	Domian	Number/Mean	Percentage/SD
NICU admission		39	13
Reason NICU Admission (N=39)	Respiratory distress (RD)	35	89.74
	MSAF	1	2.56
	Meconium aspiration	1	2.56
	Referred to higher center	1	2.56
	Mild hypotonia	1	2.56
APGAR score		7.89	1.09
Birth weight		2.84	0.39
Blood loss		378.87	89.15
Number of days of hospital stay		3.06	1.41
Maternal complications	Traumatic PPH	2	13.33
	Atonic PPH	4	26.67
	Atonic + traumatic PPH	4	26.67
	CPT	1	6.67
	Mild atonicity	1	6.67
	MROP	2	13.33
	Prolonged labour	1	6.67

DISCUSSION

Induction of labour is a stressful situation for the mother and the obstetrician. There is a dilemma and controversy about why to induce, when to induce and how to induce? With the apparent rising trends in Induction of Labor in the last few decades, the use and abuse of induction has become a source of heated controversies. There are various controversies regarding the relation of Bishop score and method of induction, advantages of induction over spontaneous labour, appropriate gestational age for induction, single or combination of method, method of induction in specific circumstances and the outcomes of mother and foetus.

The most of patients in the present study belong to third decade of their life. Most patients were primigravida (50.33) having a gestation period of 38-38+6 (27%) or 39-39+6 (51%). The most common antenatal complication was anemia (24.33%). Previously it has been reported that several maternal demographics (age at labour, parity and body mass index in early pregnancy), healthcare utilization (number of antenatal check-ups, duration of iron-folic acid supplementation and individuals managing childbirth) and socio-economic factors (religion, living below poverty line, maternal education and partner's occupation) were independently associated with labour induction.[7]

In present study, we take all the cases which required the induction of labour. However, in the previous study by Yadav et al. the prevalence of induction of labour was 9.96%.[8] The mode of induction of labour was prostaglandins in 232 (77.34%) patients whereas foley's catheter and prostaglandins were used in 68 (22.66%) cases. The dose of prostaglandins in most of cases was 100 µg (in divided doses) (40.33%). In the study by Sharda and Agrawal, majority (73%) women were induced with Dinoprostone gel.[9] In a study done by Maggi et al., 74% of women delivered

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vaginally following induction of labor with dinoprostone.[10]

The mode of delivery in present study was vaginal delivery in 232 (77.33%) cases, whereas forceps delivery was performed in 3 (1%) cases, vacuum delivery in 18 (6%) cases. Lower segment cesarean section (LSCS) was done in 47 (15.67%) cases. In the study by Yadav et al., 78 (57.78%) cases were delivered via vaginal delivery, 53 (39.26%) delivered by lower section caesarean section and 4 (2.96%) by instrumental delivery (8). A similar study reported vaginal delivery in 64.9%, LSCS in 25.8% and instrumental delivery in 9.30%.[11] In the study by Dagli and Fonseca, it was found that the rate of cesarean section was substantially higher in those patients who had been induced.[12] The most common indication of LSCS in present study was MSAF and fetal distress reported in 10 (21.28%) cases. In the previous study by Yadav et al. the most common indication for LSCS was failed induction in 47.09% followed by fetal distress in 39.06%.in the study by Lamichhane et al., the most common induction for LSCS was failed induction in 44% of cases followed by fetal distress in 29%.[13]

Postpartum hemorrhage (PPH) was found to be most common complication. Dagli and Fonseca also reported the PPH as most common complication.[12] It resulted from uterine hyper stimulation and post-partum uterine exhaustion predisposing to atony of the uterus. The NICU admission was observed in 39 (13%) cases and most common reason for NICU admission was respiratory distress (89.74%). In the study by Dagli and Fonseca, NICU admissions were found to be more in the control group (10%) than in those born via induction of labour (8%) (12). 22% were admitted in NICU in the study by Sharda and Agrawal.[9]

The aim of induction is to achieve a safe and successful vaginal delivery. A risk benefit analysis to gain the best outcome is made in each individual case. Therefore, it is essential to monitor the indication towards induction of labour, prostaglandins dose requirement, indications of LSCS and NICU admission to enhance the favorable pregnancy outcomes. The limitations of the study are that the study was conducted in a single centre, so this research cannot be generalized to all the other places. Also since this is a descriptive study, different analytical parameters could not be measured.

CONCLUSION

Induction of labour (IOL) plays a crucial role in modern obstetrics. Our study revealed that the majority of cases in our institution underwent elective induction while the remaining cases were due to medical indications. Among medical indication, the most common indication for induction of labour was PIH, followed by GDM. Notably, the cesarean section rates were lower in both groups. In this study we observed that maternal and fetal benefits were good when induction of labour is carried out at gestational age 39+ weeks and also cesearean section rates were lowest in this gestational age. The induction policy practiced at our institution shows promising results, which can be extrapolated to other health care settings.

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