Induction of Labour an Audit of Indications and Obstetrical Outcome in a Tertiary Care Hospital

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Objective: To examine the indications of induction of labour at Services Hospital Lahore, a tertiary care hospital and to study the maternal and fetal outcomes of this obstetrical intervention. **Study design::** This study involved a retrospective analysis of 100 patients with Bishop score of ≤ 6, admitted for induction of labour, done with Prostaglandin E_2 pessary (Dinoprostone 3mg), followed by amniotomy and / or oxytocin infusion. A comparison of indications and outcomes was made among nullipara and multipara. Data was analyzed by χ^2 and Student's *t* test. **Results:** The induction rate was 8% and the commonest indication was hypertensive disorders of pregnancy 42%, followed by prolonged pregnancy 22% and pre-labour rupture of membranes 21%. The mean induction to delivery interval was 21.2 hours for nullipara and 15.1 hours for parous women, $p = 0.001$ was statistically significant. The caesarean delivery rate was higher with induced labours in nullipara 52% than in multipara 22%, the difference was statistically significant. 21% babies born with induced labours had Apgar score ≤ 4 and 8% required admission in neonatal intensive care unit. 17% patients had postnatal or post-operative complications. There were no perinatal or maternal losses. **Conclusion**: It was concluded from the study that labour induction results in increased risk of operative delivery and longer hospital stay. Therefore, all obstetrical units should monitor the frequency of labour induction, scrutinize the indications and assess the impact of induction to determine the effect on caesarean delivery rate and perinatal outcome.

Key words: Labour induction, Prostaglandin E_2, Obstetrical outcomes.

Among the multitude of treatments and procedures in practice of medicine, induction of labour (IOL) is almost unique. While most other interventions are designed to alter a pathological process, it is designed to pre-empt a physiological process - labour defined as the onset of painful, regular uterine contractions leading to progressive cervical dilatation, effacement and delivery of baby[1].

Rationale of the study

The central issues in IOL are to determine why, when and how inductions are performed and what are the feto-maternal outcomes, which are assessed in this study in a tertiary care hospital. Labour is induced in one of every five pregnancies carried to viability and around 20% deliveries occurred by inducing labours in each year since 1989-90.[2] It is imperative that IOL be carried out for sound obstetrical and medical reasons, only when continuation of pregnancy represents a risk to fetus or mother. The aim of current study is to analyze the indications, benefits and risks of this intervention to the mother and to her baby.

Material and methods

A retrospective study was conducted on 100 women, 50 nullipara and 50 multipara, admitted in labour ward of Gynae unit 1, Services Hospital Lahore, for induction of labour from January 1st 2000 to January 1st 2001. The study was limited to singleton pregnancies after 37 completed weeks of gestation, with vertex presentation, a Bishop score of ≤ 6, with legitimate medical and obstetrical indications for IOL. Patients who were not a candidate for vaginal delivery and therefore IOL were excluded form this study. The decision for IOL was made by the physician in charge of labour ward, followed by an informed consent from the patient. The Antepartum, intrapartum and postnatal data was recorded on performas. IOL was done according to the Department's protocol by insertion of Prostaglandin E_2 (PGE_2) pessary (Dinoprostone 3 mg) in the posterior vaginal fornix. Patient was reassessed after 6 hours, if were not in adequate labour and the bishop score was ≤ 6, PGE_2 3 mg pessary was repeated, up to a maximum of three pessaries were inserted. If the Bishop score was > 6, further induction was done with amniotomy performed by Kocker's forceps at 3-4 cm cervical dilatation and / or administration of oxytocin infusion. As long as the patient and fetus were stable, after three doses of PGE_2 pessaries patients were given an overnight rest and reassessed the next morning to induce further with PGE_2 pessary, amniotomy or oxytocin infusion, but if labour was still not induced, it was recorded as case of failed induction.

Induction to onset of active labour and induction to delivery intervals were noted. Mode of delivery was recorded. Baby's weight and Apgar score was recorded by the paediatric resident. Postnatal maternal complications, neonatal complications and need for admission in neonatal intensive care were noted. Duration of hospital stay was recorded.

Results were tabulated and statistics of the sample were calculated and analyzed. Continuous variables were compared by Student *t* – test and Categoric variables were evaluated by Chi-square (χ^2) analysis. Statistical significance was established with $p < 0.05$.

Results

Services Hospital, Lahore is a tertiary care teaching hospital with a perinatal referral centre; the study was conducted in Gynae Unit 1. During the study period, a total of 2620 women were delivered in Gynae unit 1 and 210 patients were induced, giving an induction rate of 8% in the year 2000.

Majority of patients (42%) were induced for hypertensive disorders, with a diastolic blood pressure ≥ 110 mmHg with or without proteinuria at presentation. 21% women with prelabour rupture of membranes (PROM) were induced, who had failed to have spontaneous onset of labour after 24 hours of PROM. 22% women were induced for prolonged pregnancy after confirmation of gestation by early ultrasound record. Generally, more multipara than nullipara were induced for medical disorders such as hypertension and diabetes.

Table 1 shows indication of IOL and mode of delivery for each indication. There was a high operative delivery rate (37%) in induced patients and the risk for operative delivery for nullipara was significantly greater (p=<0.05) as shown in Table 2. It was analyzed in the study that the risk of C/S with IOL was, in part, a function of cervical ripeness assessed by Bishop score and partly is inherent in the indication of induction itself. Only 6% C/S were done for failed inductions, of which 5% were in nullipara with a poor pre-induction Bishop score.

Table-3 shows that 21% of babies were born with an Apgar score ≤ 4 at 1 minute of birth; these later recovered, but 8 babies with low Apgar score were admitted in intensive care nursery for management of apnea, meconium aspiration and to rule out sepsis. These were treated and discharged within a week. There were no perinatal losses.

Table 4 shows the postnatal complications in induced patients. 17% patients had complications following IOL. None of the patients developed uterine hyper-stimulation, despite the fact that the induced group included grand multipara. The mean duration of hospital was 4.78 days. The increased stay in induced patients compared to spontaneous onset of labour was associated with greater rate of operative interventions.

Table 1: Indications for induction of labour and mode of delivery.

Indications	Nullipara			Multipara			Total			Statistical Significance
	No	SVD	C/S	No	SVD	C/S	No	SVD	C/S	
Hypertension	13	5	8	17	15	2	30	20	10	
Pre-eclampsia	7	3	4	5	4	1	12	8	5	Chi-square test was applied
Prolonged pregnancy	12	6	6	10	7	3	22	13	9	Pearson $\chi^2 = 7.715$
PROM > 24 hours	13	5	8	8	4	4	21	9	12	
Diabetes	0	0	0	5	4	1	5	4	1	*P = 0.260* (2-sided)
Diagnosed IUD	2	2	0	1	2	0	3	3	0	
Fetal anomaly	3	3	0	4	4	0	7	7	0	

PROM* Prelabour rupture of membranes for more than 24 hours. IUD* Intrauterine fetal demise.

Table–2: Labour characteristics of patients delivered following induction of labour

Characteristic	Nullipara	Multipara	Total patients	Statistical significance
Vaginal vs Caesarean delivery (%)	24 vs 26	39 vs 11	63 vs 37	$p = 0.002(\chi^2$ analysis)
Mean Induction to delivery interval (hrs)	21.2	15.1	18.1	$p = 0.001(t$-test)
Vaginal Delivery at < 24 hours (n =)	21	34	55	$p = 0.000(\chi^2$ analysis)
Oxytocin use (n =)	22	6	28	$p = 0.000(\chi^2$ analysis)

Table- 3: Neonatal characteristics

Characteristics	Nullipara	Multipara	Total Patients	Statistical significance
Mean Apgar score at 1 minute	5.7	7	6.35	$p = 0.015$ (χ^2 analysis)
Mean Apgar score at 5 minutes	8.4	9.06	8.74	$p = 0.039(\chi^2$ analysis)
Admission to intensive nursery care	5	3	8	$p = 0.408$ (χ^2 analysis)
Mean Birth weight (kg)	3.14	3.25	3.195	$p = 0.301$ (t – test)

Table-4: Maternal complications in induced patients.

Complications	Nullipara		Multipara		Total Patients		Statistical Significance
	n=	%age	n=	%age	n=	%age	
Pyrexia	4	4	0	0	4	4	Chi-square analysis was used, showed Pearson χ^2 = 0.657 and $p = 0.957$
Postpartum haemorrhage	7	7	1	1	8	8	
Delayed recovery from anaesthesia	1	1	0	0	1	1	
Cervical tear	1	1	0	0	1	1	
Post C/S wound infection	3	3	0	0	3	3	

Discussion

Induction is a valuable obstetrical procedure and a reliable alternative to C/S when some delay in delivery is acceptable, but a liberal induction policy leads to an increased in operative delivery creating potential risks for both mother and her baby. In the current study induction rate remained low (8%) at Services Hospital Lahore compared to other centres, as majority of patients presenting at Services Hospital, a community health care centre belong to low socioeconomic class, or are uneducated and unaware of the option of having their labours induced on request, therefore no inductions were carried out for social indications or on maternal request.

The audit of indications of IOL in this study showed that most inductions were carried out for medical disorders to prevent worsening of disease or fetal compromise. This was in accordance with indications studied by Maqsood et al[3], Buccellatoet al[4], Kolderup et al[5] and Rizvi et al[6] IOL for good medical reasons such as pre-eclampsia, hypertension and diabetes is of unquestionable value, but for prolonged pregnancy is debatable. A steady increase occurs in the rate of stillbirths after 37 weeks gestation i.e. 0.35/1000 at 37 weeks against 2.12/1000 at 43 weeks, a six fold increase[7]. In our study 22% women were induced for prolonged pregnancy. The caesarean delivery rate was significantly high (9%) in these women. There were no still births, but 3 babies born at gestation greater than 42 weeks were admitted in intensive care nursery for transient bradycardia, apnea and meconium aspiration (congenital anomalies were ruled out). This is in accordance with the data from randomized controlled trials which favour a policy of induction of labour at 41+ weeks because of reduced perinatal mortality, decreased meconium staining of the amniotic fluid and a small decrease in caesarean section compared with conservative management. Proponents of a conservative approach argue that a conservative policy is safe, provided appropriate surveillance of fetus is performed[8].

Induction of labour, generally considered to be a safe procedure, is associated with certain risks. It remains true that each obstetric intervention enhances the prospects of further invention - "*the more we do, the more we do*". In some units one in every four nullipara who undergo IOL with PGE_2 have C/S[9] and a two-fold higher risk is documented[10]. C/S rate was found to be higher (37%) in this study in comparison to other studies, Maqsood et al[3] (22%), Yeast et al[11] (18.5%), Nunes et al[12] (13%). This was so because 38% inductions in current study were carried out in unbooked patients with complicating risk factors leading to C/S.

Postnatal and post-operative complications occurred in 17% patients. Complications were seen in patients with longer induction to delivery interval (>18 hours) or with operative delivery. Use of prostaglandins is reported to be associated with uterine hyperstimulation but none of the patients in study group had uterine hyperstimulation or uterine rupture and there was no maternal loss. The study concluded that use of PGE_2 is safe for IOL.

Neonatal outcome was measured by low Apgar score at 1 minute and 5 minute, and admission in neonatal intensive care unit. The mothers of neonates requiring admission were induced for hypertensive disorders (3%), prolonged pregnancy (2%), prelabour rupture of membranes (2%) and diabetes (1%). 7% of these babies were delivered by C/S and 1% was delivered vaginally. Indication of C/S was fetal distress in all the babies admitted in nursery. This showed that fetal distress leading to C/S did occur with IOL, because a risk factor for fetal compromise was inherent in the indication for IOL in these patients. The study demonstrates that there were neither serious adverse neonatal outcomes nor perinatal losses associated with IOL, but the importance of maternal and fetal surveillance during induction cannot be over-emphasized.

Among women with spontaneous onset of labour, nearly 70% deliver on the day of admission and 50% leave hospital by the day after delivery[13], but those undergoing planned prostaglandin IOL have an increased risk of instrumental or caesarean delivery and the mean hospital stay and thus healthcare cost is increased. In this study, induced women spent a mean of 4.78 days in hospital. This was because of increased in-hospital pre-delivery time and also post-operative stay in patients delivered by C/S (37%), who stayed for 4-7 days in hospital. 3% patients had wound infection and dehiscence warranting a 2 weeks hospital stay.

Conclusion

Induction of labour is a keystone in modern obstetric practice and a safe procedure, the safety and reliability of which has increased in recent years[14], and is performed when the mother or the baby is thought to be at risk should the pregnancy continue. IOL while potentially beneficial is associated with a higher rate of further intervention. Therefore, induction rate should be kept under check by following the unit's protocol for indications of IOL and subjectively scrutinizing every indication to avoid inductions for frivolous indications.

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