

Outcome of Surgical Induction of Labour in a Combined Military Hospital

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Abstract

Induction of labour is considered justified when the benefits of prompt delivery outweigh the consequences of Caesarian Section (CS). Literature on the effectiveness and safety of surgical induction of labour in term and postdated pregnancy is limited in Bangladesh. This study was aimed to assess the effectiveness and safety of surgical induction of labour in term and postdated pregnancy. This prospective clinical study was conducted in the in-patient Department of Obstetrics and Gynecology, Combined Military Hospital (CMH), Dhaka from July, 2005 to June 2006. A total of 100 pregnant women with term and postdated pregnancy were selected for the study by simple random sampling. The particulars of the patient, detailed menstrual and obstetric history, induction delivery interval, mode of delivery and foetal outcome and maternal complications were recorded. The results were analysed by Statistical Package for Social Science (SPSS) version 16.0. The mean±SD age of the participants was 25.79±6.16 years with a range of 18-38 years. The indication of Induction of labour included term pregnancy (79%) and postdated pregnancy (21%). Normal vaginal delivery was done in 78% cases, CS in 17% cases and vacuum extraction in 5% cases. Ninety three percent babies were born healthy, 6% were asphyxiated, perinatal death 2% and still born 1%. Oxygen inhalation was needed for 6% babies. Prolonged second stage (7%), post-partum haemorrhage (8%), maternal distress during labour (10%) and manual removal of placenta (12%) were the observed maternal complications. No significant difference was observed between term and post term pregnancy in term of normal vaginal delivery, vacuum extraction and lower uterine cesarean section. Induction of labour is beneficial for both term and postdated pregnancy with associated complications. Foetal outcome was good and maternal complications were acceptable.

Keywords: Surgical induction of labour, Post dated, Bishop's score Foetal outcome

Introduction

Induction of labour (IOL) is the stimulation of regular uterine contraction before the spontaneous onset of labour using mechanical or pharmacological methods in order to generate progressive cervical dilatation and subsequent delivery.¹ For induction of labour, the benefits of early delivery to either mother or fetus should outweigh the risks of pregnancy continuation.² The incidence of labour induction has continued to rise over the past several decades.³ The rate of labour induction varies from 9.5-33.7% of all pregnancies annually.⁴ Labour induction rates present a wide country variation and also present among obstetric units in the same geographic region or practitioners within the same hospital. This variability is the result of differences in the obstetric

protocols or the judgment of the individual physician regarding the appropriateness of obstetric interventions.⁵ In developed countries, the number of infants delivered at term following induction of labour can be as high as one in four deliveries.⁶ The World Health Organization (WHO) Global Survey on Maternal and Perinatal Health, conducted in 24 countries which included nearly 3,00,000 observations, showed that 9.6% of them were delivered by labour induction. The survey found that African countries have lower rates of induction of labour (lowest: Niger 1.4%) compared with Asian and Latin American countries (highest: Sri Lanka 35.5%).⁷ The rate of induction in Canada has increased steadily from 12.9% in 1991-1992 to 19.7% in 1999-2000. The rate reached a high of

23.7% in 2001-2002, decreased slightly to 21.8% in 2004-2005, and since then remained steady.⁸

However, all inductions are not successful and some may develop complications. In nullipara with an unfavorable cervix undergoing labour induction, caesarean delivery rate is more than 30%.⁹The increased risk of caesarean section after induced labour is well documented, but such obstetric intervention is considered justified when the benefits of prompt delivery outweigh the consequences of a caesarean section. Conditions such as postterm pregnancy, hypertensive disorders, intrauterine growth restriction and diabetes are commonly accepted indications for induction.²The increased frequency of obstetric interventions, such as induction of labour, appears to have contributed to the current trends in caesarean rates.¹⁰It is associated with doubling in caesarean section delivery rate compared with spontaneous labour.¹¹

However, there is evidence for an increase in the frequency of labour induction without any such agreed upon indication. This situation might lead to unnecessary caesarean deliveries and, consequently to a high risk of adverse outcomes for the mother and the child.¹² In the absence of a well-established clinical indication, the contribution of labour induction to caesarean rates among low-risk nulliparous women can approach 20%.¹³ Additionally, labour induction in itself increases in-hospital predelivery and labour time and costs beyond those that are related to surgery.¹⁴

Indications and contraindications for induction should be reviewed. Risks and benefits of labour induction should be discussed with the patient and relatives including the risk of caesarean delivery. Confirmation of gestational age is very important and fetal lung maturity status should be performed if indicated.²Routine antenatal ultrasound for confirmation of expected date of delivery has been shown to reduce induction rates for post dates (41+0 weeks) pregnancies after correction of dates.¹⁵A cervical examination should be performed and documented (Bishop score). Foetal presentation and position should be confirmed. Clinical pelvimetry should be performed and cephalopelvic

disproportion (CPD) should be ruled out. According to WHO guidelines, labour induction should be performed at a center, where qualified staff and OT facilities are available for caesarean section. Uterine activity and electronic fetal monitoring (EFM) should be done for all patients undergoing labour induction.²

Some of the methods of IOL are still used in current practices. Other methods such as vaginal or uterine douches, stimulant injections thrown into the rectum, and the use of ergot alkaloid have been abandoned because of their "ineffectiveness or poisonous effects on the infant"¹⁶ Prostaglandins act on the cervix to enable ripening by a number of different mechanisms. Multiple other agents have been advocated for cervical ripening, use of Foley's catheter is a favoured method in low resource setups.¹⁷ Misoprostol is an effective agent for cervical ripening.¹ Dinoprostone has been approved by FDA for cervical ripening in women at or near term with mean induction-delivery interval of 15.6 + 0.7 hours.¹⁸ Surgical induction of labour comprises artificial rupture of membrane (ARM) and stripping the membrane. These are the most commonly performed procedures in obstetrics for induction of labour. There is evidence that routine sweeping (stripping) of membranes promotes the onset of labour and that this simple technique decreases artificial rupture of membrane (ARM) rates. It is believed that the technique results in an increase of local production of prostaglandins.¹⁹ Amniotomy can be a simple and effective component of labour induction when the membrane are accessible and the cervix is favourable. A 2007 cochrane meta-analysis of 17 trials with 2566 women measured the safety of amniotomy and intravenous oxytocin for induction of labour. Amniotomy alone resulted in fewer vaginal deliveries in 24 hours than amniotomy plus oxytocin. Amniotomy and oxytocin resulted in fewer instrumental deliveries than placebo.²⁰

Although it is well documented that induction of labour increases the risk of caesarean, however such obstetric intervention is considered justified when the benefits of prompt delivery outweigh the consequences of a caesarean section. Conditions

such as post-term pregnancy, hypertensive disorders, intrauterine growth restriction and diabetes are commonly indications of IOL. Literature on the effectiveness and safety of surgical induction of labour in term and post dated pregnancy is limited in Bangladesh. So, this study was undertaken to observe the effectiveness and safety of surgical induction of labour in term and post-dated pregnancy. The ultimate objective was to reduce the rate of caesarean section in term and post dated pregnancy, to avoid postmaturity and its consequences and to improve the foetomaternal outcome.

Materials and methods

This prospective clinical study was conducted in the inpatient Department of Obstetrics and Gynaecology, Combined Military Hospital (CMH), Dhaka for a period of 12 month from July, 2005.

A total of 100 pregnant women with uncomplicated term and postdated pregnancy with cephalic presentation who were admitted for delivery during July 2005 to June 2006, were selected for the study by simple random sampling. Patients should have regular antenatal checkup and could be multi or primi with regular menstrual cycle previously. Patients with preterm labour, multiple pregnancies and malpresentations were excluded.

On admission, the particulars of the patient, such as name, age, parity, detailed history of pregnancy, menstrual history with last menstrual period and obstetric history were recorded. Family history, past medical and obstetric history and drug history were also noted. Pregnancy was dated according to last normal missed periods (LNMP) and confirmed by early ultrasound scan. Studied variables were recorded including patients profile, obstetric, medical and surgical history and gestational age. A thorough general physical examination was done followed by local examination, which included per abdomen examination and per vaginal examination. The indication for IOL of each case was noted and the method of induction was chosen according to the individual case. Induction was performed according to the pre-defined criteria and details of labour were

noted down. Mode of delivery and fetal outcome were recorded. Informed written consent was obtained from either the participants or their guardians. Ethical clearance was obtained from relevant authority. Data was recorded on a predesigned data collection sheet. The results were analyzed by Statistical Package for Social Science (SPSS) version 16.0. Relevant descriptive statistics, frequency and percentage were computed for qualitative data like mode of delivery, mode of induction and parity. Mean and standard deviation were computed for continuous variables like length of gestation in weeks, length of labour and Bishop score.

Results

The foetal and maternal outcome of 100 pregnant women who underwent surgical induction of labour was assessed.

Table I: Particulars of the patients

Particulars	Frequency(%)
<i>Age (in years)</i>	
≤20	26(26%)
21-35	72(72%)
>35	2(2%)
<i>Age (Mean±SD)</i>	25.79±6.16
<i>Range (years)</i>	18-38
<i>Gravidity state</i>	
Primi	51(51%)
Multi	49(49%)
<i>Socioeconomic condition</i>	
Lower	17(17%)
Middle	69(69%)
Upper	14(14%)
<i>Previous obstetric history</i>	
Normal vaginal delivery	36(36%)
Forceps delivery	2(2%)
Vacuum extraction	1(1%)
Abortion	11(11%)
MR	9(9%)
Perinatal death	3(3%)
Still born	2(2%)
IUD	2(2%)
<i>Pregnancy status</i>	
Term pregnancy	79(79%)
Postdated pregnancy	21(21%)

f= frequency

The mean±SD age of the participants was 25.79±6.16 years with a range of 18-38 years. Almost three-quarters (72%) of the patients were in age group 21-35 years, 26% were in age group <20 years and only 2% in age >35 years age group. Gravidity state of the participants were almost similar with primipara 51% and multipara 49%. More than two-thirds (69%) of the participants

belonged to middle class, 17% belonged to lower class and 14% to upper class (table I).

Previous obstetric history of multipara participants included normal vaginal delivery (36%), abortion (11%), MR (9%), perinatal death (3%), forceps delivery (2%), still born(2%), IUD (2%) and vacuum extraction (1%).

The indication of IOL included term pregnancy (79%) and postdated pregnancy (21%). Other associated conditions with term pregnancy were pre-eclampsia (7%), hypertensive disorder (2%), Rh incompatibility (2%) and diabetes (6%).

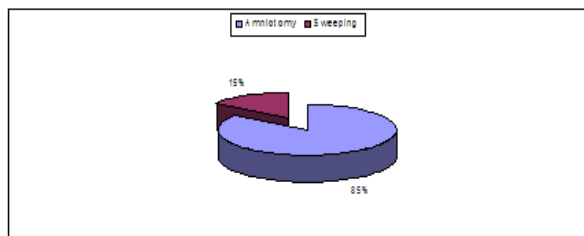


Figure 1: Type of induction of labour

For induction of labour amniotomy was done in 85% cases and sweeping in 15% cases (figure 2).

Table II: Mode of delivery and maternal details at amniotomy and sweeping

Mode of delivery	cause of intervention	Frequency (%)
<i>Normal vaginal delivery</i>		78(78%)
	with episiotomy	62(62%)
	without episiotomy	16(16%)
<i>Vacuum extraction</i>		5(5%)
	prolonged 2 nd stage of labour with maternal distress	3(3%)
	cord round the neck	1(1%)
	mal-rotation	1(1%)
<i>Lower uterine cesarean section</i>		17(17%)
	foetal distress (meconium stain liquor)	12(12%)
	cervical dystonia with foetal distress	1(1%)
	Occipito posterior with prolonged 1 st stage	2(2%)
	Deep transverse arrest with prolonged 1 st stage	2(2%)
Maternal details		
<i>Engagement of head</i>		
	Engaged	65(65%)
	Non-engaged	35(35%)
<i>Cervical dilatation</i>		
	<2	46(46%)
	2-4	54(54%)
	Mean±SD	2.535±1.13
<i>Bishop's score</i>		
	<5	4(4%)
	≥5	96(96%)
<i>Use of oxytocin</i>		
	with oxytocin	33(33%)
	without oxytocin	67(67%)

f= frequency

Normal vaginal delivery was done in 78% cases: 62% with episiotomy and 16% without episiotomy. Vacuum extraction was done in 5% cases: 3% due to prolonged 2nd stage of labour with maternal distress, 1% due to cord round the neck and 1% due to mal-rotation. Lower uterine cesarean section was needed in 17% cases: 12% had foetal distress (meconium stain liquor), 1% had cervical dystonia with foetal distress, 2% had occipito posterior with prolonged 1st stage and 2% had deep transverse arrest with prolonged 1st stage (table II).

At time of amniotomy and sweeping 65% of mothers had got engagement of the head of the fetus and 35% had not engaged. In 46% cases cervical dilatation was < 2 and others (54%) had 2-4 cervical dilatation. Bishop's score was <5 in 4% cases and ≥5 in 96% cases. Oxytocin was used in 33% cases and not in 67% cases (table II). No significant difference was observed between term and post term pregnancy in the term of normal vaginal delivery ($p=0.553$), vacuum extraction ($p=0.955$) and lower uterine cesarean section ($p=0.514$). Almost similar maternal conditions were observed in engagement of fetal head ($p=0.799$), cervical dilatation ($p=0.809$), Bishop's score ($p=0.841$), and use of oxytocin ($p=0.109$) between term and post term pregnancy (table II).

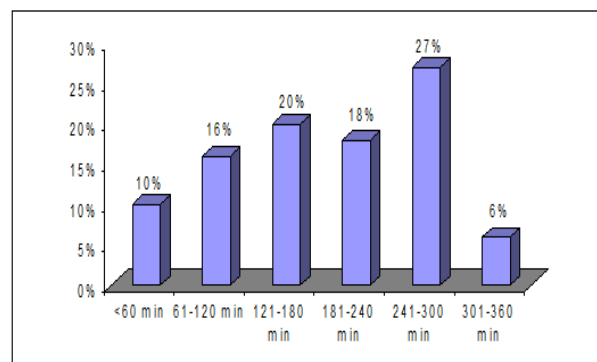


Figure 2: Amniotomy-delivery interval time (in minute)

The interval time between amniotomy-delivery were <60 minute in 10% participants with a mean±SD 51.2±10.6 minutes, 61-120 minutes in 16% cases with a mean±SD 94.1±13.8 minutes, 121-180 minutes in 20% cases with a mean±SD 166±17.9

minutes, 181-240 minutes in 18% cases with a mean±SD 211.9±12.0 minutes, 241-300 minutes in 18% cases with a mean±SD 211.9±12.0 minutes, 301-360 minutes in 6% cases with a mean±SD 343.3±13.7 minutes (figure-2).93% baby was born healthy, 6% were asphyxiated, perinatal death and still born were 2% and 1% respectively. The mean±SD birth weight of the babies was 3.05±0.588 Kg with 22% babies weigh <2.5 Kg, 77% weigh 2.5-4 Kg and 1% weigh >4Kg (table-III).

Table III: Foetal outcome

<i>Foetal outcome</i>	Term pregnancy (n=79) f(%)	Post term pregnancy (n=21) f(%)	Total f(%)	p value
Healthy baby	74(74%)	19(19%)	93(93%)	0.635
Still born	1(1%)	0(0%)	1(1%)	
Asphyxiated	3(3%)	1(1%)	4(6%)	
Perinatal death	1(1%)	1(1%)	2(2%)	
Birth weight				
<2.5kg	19(19%)	2(2%)	22(22%)	0.010
2.5-4 kg	60(60%)	17(17%)	77(77%)	
>4kg	0(0%)	2(2%)	1(1%)	
Mean±SD			3.05±0.588	
Apgar score (1 min)				
≤3	1(1%)	1(1%)	2(2%)	0.172
4-6	21(21%)	2(2%)	23(23%)	
≥7	57(57%)	18(18%)	75(75%)	
Apgar score (5 min)				
≤3	1(1%)	1(1%)	2(2%)	0.198
4-6	2(2%)	2(2%)	4(4%)	
≥7	76(76%)	18(18%)	94(94%)	
Mean±SD			7.52±1.51	

Three-quarters (75%) babies had 1 min Apgar score ≥7, 23% had 4-6 and 2% had ≤3. When 5 min-Apgar score was calculated, 95% babies had Apgar score ≥7, 4% had 4-6 and 1% had ≤3 (tableIII). The number babies with normal birth weight was significantly higher in post term pregnancy than term pregnancy ($p=0.010$). No significant difference was observed between term and post term pregnancy in the term of birth of healthy babies ($p=0.635$), Apgar score (1 min) ($p=0.172$) and Apgar score (5 min) ($p=0.198$).

Table IV: Foetal and maternal complications

<i>Foetal complication</i>	
No resuscitation needed	94(94%)
Resuscitation needed	6(6%)
O ₂ inhalation	
by nasal catheter	4(4%)
bag mask by intubations	2(2%)
Intrapartum foetal distress	
i) Meconium staining	12(12%)
ii) Cord around the neck	2(2%)
Babies referred to neonatal care unit	7(7%)
Asphyxia and low Apgar score	2(2%)
Low birth weight	12(12%)
Instrumental delivery	5(5%)
Rh-incompatibility	2(2%)
Admission	2(2%)
<i>Maternal complication</i>	
Cervical dystocia	1(1%)
Prolonged second stage	7(7%)
Cervical tear	3(3%)
Post-partum haemorrhage	8(8%)
i) Uterine atony	2(2%)
ii) Vaginal laceration	3(3%)
iii) Cervical tear	3(3%)
Manual removal of placenta	12(12%)
Instrumental delivery	1(1%)
Blood transfusion needed	2(2%)
Maternal distress during labour	10(10%)

f= frequency

No resuscitation was needed in 94% babies. 6% needed Oxygen inhalation: 4% by nasal catheter and 2% with bag mask by intubations. Intrapartum foetal distress was observed in 14% patients, 12% had meconium staining and 2% had cord around the neck. 7% babies referred to neonatal care unit, 2% had asphyxia and low Apgar score, 12% had low birth weight and Rh- incompatibility was found in 2% cases. Instrumental delivery was needed in 5% cases and 2% babies required admission (table-IV). Among the maternal complications, the common complications were prolonged second stage (7%), post-partum haemorrhage (8%), maternal distress during labour (10%) and manual removal of placenta (12%). the causes of post-partum haemorrhage included uterine atony (2%), vaginal laceration (3%) and cervical tear (3%). Other less frequent complications were cervical dystocia (1%), cervical tear (3%), instrumental delivery (1%) and blood transfusion (2%).

Discussion

Induction of labour is the artificial initiation of labour before its spontaneous onset of delivery of the foeto-placental unit. The frequency of induction varies with location and institution. When undertaken for appropriate reason, and by appropriate methods, induction is useful and benefits both mother and newborn. An ideal method of induction must be cost effective, must ensure efficacy and safety for the mother and the foetus with minimal induction delivery interval, and should be convenient for the patient and the medical staff.²¹ Induction is indicated when the risk of continuing the pregnancy, for the mother or the fetus, exceeds the risk associated with induction of labour and delivery. The management of labour determines to a great extent the outcome both for the mother and baby.²² Postdate induction is the leading indication for induction and deserves special consideration. The goal is the prevention of postterm pregnancy with its associated increased perinatal morbidity, mortality, operative delivery rates.²³ In the process of labour, the foetal and maternal conditions are closely monitored to prevent or promptly identify any problem and threat. However, many practices in the modern labour have come under question recently.²⁴ Amniotomy is believed to result in a shorter duration of labour by enhancing uterine contraction and also to reduce the incidence of dystocia.²⁴ Results of this study showed that all patients delivered within 6 hours who underwent amniotomy (figure 2).

Study concluded that amniotomy significantly reduced the duration of labour especially in the first stage of labour without affecting oxytocin requirements.²⁵

Mikkinet al conducted a study on amniotomy in 533 multiparous women and 157 nulliparous women and randomized them to either amniotomy or intent to conserve membranes. Duration of labour was reduced in both nulliparous and multiparous patients in amniotomy group and oxytocin was used less in the intervention arm.²⁶

Garite et al reported the reduction in duration of labour in addition with no difference in mode of delivery between the two groups. On the other hand, a study by Mechthild et al concluded that "the rupture of membranes shortened 1st stage of labour. This effect was larger than that of any other factor and more pronounced in multiparas. Studies observed that the oxytocin requirement for labour augmentation in the amniotomy group is slightly lower than for the control. This difference is likely to be due to the increased contractility of the uterus, which is said to result from better application of foetal head to the cervix following amniotomy in labour. Segal et al reported an increased incidence of foetal heart rate abnormality or foetal distress and thus cesarean section following amniotomy.²⁹

In the present study, the indication of IOL included term pregnancy (79%) and postdated pregnancy (21%). Other associated conditions with term pregnancy were pre-eclampsia (7%), hypertensive disorder (2%), Rh incompatibility (2%) and diabetes (6%) (table I). Boulvain et al also reported these conditions as the most common indications for IOL.

Out of the total, 78% of the patients delivered vaginally, vacuum extraction was done in 5% cases and 17% underwent cesarean section (table II), which is comparable to the study of Boulvain et al who reported vaginal delivery and cesarean in 87.88% and 12.12% of the patients, respectively.³⁰

In this study, prolonged second stage of labour (7%) and post-partum haemorrhage (8%) were most common complications (table IV). PPH and maternal pyrexia were the most common maternal complications observed and occurred in 5.66% and 2.36%, respectively in the study by Boulvain et al, whereas the study by Tan et al reported PPH and maternal pyrexia in 13.3% and 21%, respectively.^{30,31}

Conclusion

The study observed that IOL is beneficial for both primipara and multipara women as well as term and postdated pregnancy with associated complications. After IOL delivery was done in the most of the cases

by NVD. Foetal outcome was good. Maternal and foetal complications were acceptable. As surgical IOL is safe and effective, it should be used in proper indication to reduce the rate of caesarean section in term and postdated pregnancy, to avoid postmaturity and its consequences and to improve the fetomaternal outcome.

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