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Original Article

Obstetrics and Gynaecology Section

Fetomaternal Outcome in Medically Indicated Induction of Labour at Term Gestation

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ABSTRACT

Introduction: The medical induction of labour at term gestation has always been controversial and is based on conflicting evidences.

Aim: To determine the fetomaternal outcome of medical induction of labour at term gestation.

Materials and Methods: It was a retrospective observational study and manual and electronic data were retrieved from a tertiary care centre of Southern India. All women after 37th week of gestation with single live fetus in cephalic presentation with a Bishop score <6 and a reactive non-stress test having medical indications were induced with medical method. The primary outcome measures included number of women who went into spontaneous labour, incidence of failed induction, induction delivery interval and modes of delivery.

Results: A total of 602 patients were included in this study. The mean age, gravida and parity were 25.24±4, 1.4±0.6 and 1.45±0.84 respectively. Oligohydramnios was the commonest indication 174(28.9%) for labour induction, followed by diabetes 119(19.8%) and Premature Rupture Of Membrane (PROM) at term 77(12. 8%). Normal vaginal delivery was achieved in 406 (67.4%) of women. LSCS (lower segment caesarean section) was performed in 140(23.3%) of patients, while 56(9.3%) patient required instrumentation. The incidence of LSCS in oligohydramnios, gestational hypertension and diabetes was 40(23%), 16(23.1%) and 26 (21.8%) respectively. Furthermore, the fetomaternal outcomes were similar irrespective of gravidity and gestational age.

Conclusion: Medical methods of induction are safe and reliable and also do not increase the risk of foetal and maternal complications. Induction of labour for medical indication in term pregnancy does not increase the risk of caesarean delivery and adverse foetal and neonatal outcomes.

Keywords: Cesarean section, Delivery, Pregnancy, Prostaglandins

INTRODUCTION

Induction of labour is gradually increasing worldwide, irrespective of the indications and now, it is carried out in a quarter of pregnancies in the developed countries [1,2]. The beneficial effect of labour induction in term pregnancy has always been controversial [3-7]. However, in post term pregnancy, it has shown to improve maternal and foetal outcome [8,9]. In addition, labour induction for medical indications such as oligohydramnios, maternal diabetes, pregnancy related hypertension, Intrauterine Growth Restriction (IUGR) at term is prevalent with an optimism that it would significantly reduce maternal and foetal morbidity. These indications for labour induction are solely based upon literature with conflicting evidences [10-17]. Furthermore, studies refute the benefit of labour induction and have shown an increased incidence of caesarean section and instrumental delivery [18-20]. Traditionally, medical, surgical or combined methods have been in use for labour induction, however, prostaglandins remain the preferred choice for labour induction. The medical and surgical induction methods comprise of PGE1 (misoprostol), PGE2 gel (dinoprostone), oxytocin, Foleys catheter, laminaria tent, membrane stripping, amniotomy and extrauterine saline infusion [21,22]. In this retrospective study, we sought to analyse the fetomaternal outcomes of labour induction with medical methods in term pregnancy for medical indications. We further sought to find the common indications for induction in a tertiary care set up and to determine the rate of caesarean delivery and other fetomaternal outcomes according to medical indications, gravidity and age of gestation.

MATERIALS AND METHODS

It was a retrospective observational study carried in a tertiary care centre of Southern India. The institute ethics committee gave approval for retrieving and publication of data and waived off the requirement of consent from individual patient. The manual and electronic data entry of medical records of all term pregnancies who were induced during the period of 1st December 2013 - 31st December 2015 were retrieved from medical record department of the institute. All women after 37th week's gestation with single live fetus in cephalic presentation with a Bishop score <6 and a reactive non-stress test were included in this study. Patients were excluded if they had previous caesarean section, genital herpes, severe preeclampsia, heart disease, antepartum haemorrhage, severe co-morbid illness and pregnancy with foetal compromise. Preterm mothers were also excluded from the study. Demographic data and patient's characteristics were noted.

In this study, we followed our institute protocol of sequential prostaglandin administration {(PGE2 gel (0.5 mg-3 doses every 6th hourly; maximum of 3 doses) followed by sublingual PGE1 (25 mcg, 4th hourly; maximum of 5 doses); if necessary)} till Bishop Score reached 6 and if required oxytocin also. The number, dosages and sequences of prostaglandin gel (PGE2) and oral misoprostol were recorded. In addition, the requirement of oxytocin and total cost of drugs were also noted. The primary outcome measures included number of women who went into spontaneous labour, incidence of failed induction, induction delivery interval and modes of delivery. The secondary maternal outcomes were comprised of incidence of prolong labour, pyrexia, vomiting, diarrhoea, antepartum haemorrhage, postpartum haemorrhage, uterine hypertonus, tachysystole and hyperstimualtion. The secondary foetal and neonatal outcomes included heart rate abnormality, shoulder dystocia, meconium staining, APGAR score (1 minute and 5 minute), neonatal sepsis, Neonatal Intensive Care Unit (NICU) admission and other birth injuries.

STATISTICAL ANALYSIS

Demographic data and patient characteristics have been expressed as mean±SD, and/or number (%). The primary outcome and secondary outcome measures have been mentioned as number (%). Primary and secondary outcomes differences between primigravida and multigravida, 40 weeks gestation was compared using Chi-square test. Data was analysed using SPSS version 21.0 (IBM, Armonk, New York, US).

RESULTS

A total of 602 patients were included in this study. The mean age, gravida and parity were 25.24±4, 1.4±0.6 and 1.45±0.84 respectively. The demographic data and patient characteristics have been described in [Table/Fig-1]. Dose, frequency of administration of PGE2, PGE1 and oxytocin requirement is shown in [Table/Fig-2]. Majority (66.4%) of the patients were primigravida, 78.4% of the patients were <40 weeks of gestation. Oligohydamnios was the commonest indication 174(28.9%) for labour induction, followed by diabetes 119 (19.8%) and PROM 77(12.8%) [Table/Fig-3]. The mean pre-induction Bishop score, PGE2 gel (0.25 mg) dose and PGE1 (oral misoprostol 25 mcg) were 2.46±0.81, 2.88±0.41 and 2.39±0.73 respectively. The mean Induction-Delivery interval in primigravida was 34.4±6.8 hours while it was 26.7±7.9 hours in multigravida. Oxytocin augmentation was required in 108 (17.9%) and 18 (2.8%) of patients ended up in failed induction despite sequential multiple dose PG administration and oxytocin augmentation. Normal vaginal delivery was achieved in 406 (67.4%) of women. LSCS (lower segment cesarean section) was performed in 140 (23.3%) of patients, while 56 (9.3%) patient required instrumentation. The incidence of LSCS in oligohydramnios, gestational hypertension and diabetes was 40 (23%), 16 (23.1%) and 26(21.8%) respectively [Table/Fig-3]. Foetal distress was the most common reason for LSCS and instrumental delivery and its contribution was 41 (73.2%) and 93(66.4%) in instrumental delivery and LSCS respectively [Table/Fig-4]. Maternal and foetal outcomes have been enumerated in [Table/Fig-5]. Side effects of misoprostol observed in 24 (4%) of patients. The frequent one was fever, followed by vomiting and diarrhea and all patients responded to conservative treatment. Fetomaternal outcomes in primigravida and multigravida were comparable except for oxytocin augmentation and it was significantly higher in primigravida [Table/Fig-6]. Similarly, fetomaternal outcomes were also comparable in >40 weeks and <40 weeks of gestation [Table/Fig-7]. None of the patients had any episodes of hyperstimulation and tachysystole. NICU admission for more than 24 hours was only taken into consideration. Other

Gravida	Number (%), Total n=602	Parity	Number (%), Total n=197	Preinduction Bishop Score	Number (%), Total n=602
1	400 (66.4)	1	170 (86.3)	1	45 (7.5)
2	171 (28.4)	2	21 (10.6)	2	305 (50.7)
3	23 (3.8)	3	5 (2.5)	3	190 (31.6)
4	6 (1)	4	1 (0.5)	4	54 (9)
5	2 (0.3)	5	0 (0)	5	7 (1.2)
6	0 (0)	6	0 (0)	6	1 (0.2)

[Table/Fig-1]: Demographic data and patient characteristics.
Data has been expressed as N=number and percentage (%)

Frequency of administration of PGE2 gel (0.5mg)	Number (%) of patients	Frequency of administration of Tablet PGE1 (25mcg)	Number (%) of patients	Number (%) of patients who required oxytocin augmentation
1	19 (3.2)	1	19 (3.2)	108 (17.9)
2	34 (5.6)	2	67 (11.1)	
3	549 (91.2)	≥3	79 (13.1)	

[Table/Fig-2]: Dose, frequency of administration of PGE2, PGE1 and oxytocin requirement.
Data has been expressed as N=number and percentage (%)

Maternal Indications	Total Number = N (% of total patients = 602)	LSCS = N (% of Maternal Indications); n=140
Oligohydramnios	174 (28.9)	40 (23)
Gestational Hypertension	69 (11.5)	16 (23.1)
Diabetes	119 (19.8)	26 (21.8)
Postdatism	55 (9.1)	14 (25.4)
PROM	77 (12.8)	15 (19.5)
Prolonged Latent Phase	46 (7.6)	13 (28.3)
IUGR	25 (4.2)	4 (16)
Rh negative pregnancy	20 (3.3)	4 (20)
Reduced foetal movement	13 (2.2)	7 (53.8)
Bad obstetric history	4 (0.7)	1 (25)

[Table/Fig-3]: Maternal indications and incidence of LSCS.
Data has been expressed as N=number and percentage (%)

Indications for LSCS	Number (%); n=140	Indications for Instrumental Delivery	Number (%); n=56
Foetal Distress	93 (66.4)	Foetal Distress	41 (73.2)
Failure of Induction	17 (12.1)	Prolong 2nd Stage	7 (12.5)
Arrest/Descent	15 (10.7)	Maternal Exhaustion	6 (10.7)
Cephalopelvic Disproportion	11 (7.8)	Cut short 2nd Stage	2 (3.5)
Maternal Request	2 (1.4)		
Failed Instrument	2 (1.4)		

[Table/Fig-4]: Indications of LSCS (Lower Segment Cesarean Section) and instrumental delivery.
Data has been expressed as N=number and percentage (%)

Maternal Outcomes	Number (%)	Foetal Outcomes	Number (%)
Tachysystole	0(0)	Foetal distress	99 (16)
Hyperstimulation	0(0)	Shoulder dystocia	3 (0.6)
Antepatum haemorrhage	2(0.3)	Meconium staining of liquour	79 (13.1)
Postpartum haemorrhage	10(1.6)	Apgar '1(<7)	34 (5.7)
Side effects of drugs	24(4)	Apgar '5 (<7)	10 (1.6)
		Neonatal sepsis	2 (0.3)
		NICU admission	3 (0.9)
		Other birth Injury	4 (1.1)

[Table/Fig-5]: Maternal and foetal outcomes.
Data has been expressed as N= number and percentage (%)

Outcomes Variables	Primigravida; Total patients = 400	Multigravida; Total patients = 202	p-value
Oxytocin Augmentation	81	27	0.03
Foetal distress	66	34	0.91
Meconium Staining	47	32	0.27
APGAR<7; 1 min	25	9	0.36
APGAR<7; 5 min	6	4	0.66

[Table/Fig-6]: Comparison of fetomaternal outcomes in primigravida and multigravida
Data has been expressed in N= number, p<0.05 considered significant

Outcomes Variables	<40 weeks; Total patients = 472	>40 weeks; Total patients = 130	p-value
Oxytocin Augmentation	82	26	0.48
Foetal distress	78	22	0.91
Meconium Staining	60	19	0.71
APGAR<7; 1 min	29	5	0.31
APGAR<7; 5 min	10	0	0.09

[Table/Fig-7]: Comparision of fetomaternal outcomes in <40 weeks and >40 weeks of gestation.
Data has been expressed in N= number, p<0.05 considered significant

birth injuries were facial palsy (n=1), ear laceration (n=1) and clavicle fracture (n=2).

DISCUSSION

In this study, we observed 23.3% incidence of cesarean delivery with acceptable risk of adverse fetomaternal outcomes irrespective of gravidity and gestational period in women requiring induction of labour for medical indications. Previous studies had not claimed superiority of labour induction over expectant management in oligohydramnios, gestational diabetes, mild preeclampsia and intrauterine growth retardation. However, induction of labour has shown to improve fetomaternal outcome and also reduces the rate of LSCS beyond 41 weeks of gestation. [10-13]. In patients with PROM at term gestation, a lower incidence of chorioamnionitis, endometritis, shorter induction delivery interval, LSCS and NICU admission rate was observed [23-25]. The majority of the women in this study were primigravida 400 (66.4%) and were below 40 weeks of gestation 472(78.4%). A total of 140 (23.3 %) of the patients required LSCS, while 56(9.3%) of the patients required instrumental delivery. The incidence of LSCS had been found lower in the induction group (4%) than the expectant group (6.8%) even in uncomplicated pregnancy with unfavourable cervix at term gestation [26]. There are numerous studies with similar observation regarding lower rate of LSCS in the labour induction group [27-31]. The rate of LSCS was even lower in the labour induction group with favourable cervix [32,33]. Favourable cervix with high Bishop score facilitate the induction and lessen the rate of LSCS than the expectant management. However, studies had also documented a higher LSCS [15,34-36]. In our study, mean Bishop score was 2.46 and it did not indicate adequate cervical maturation. Cervical maturation seems essential before labour induction to lessen the risk of LSCS [37,38]. Previous studies have reported varying rate of LSCS in gestational diabetes (25%), pregnancy induced hypertension (14.3%), oligohydramnios (3.5%) and IUGR (14%) at term gestation [10,13,14,17]. We observed similar rate of LSCS for different medical indications in our study. Foetal distress had been noted as the most common reason for LSCS in both labour induction which is consistent with our study [17,31,39]. The increased proportion of labour induction did not lead to increased instrumental delivery and adverse perinatal outcomes [40]. However, increased risks of adverse neonatal outcomes were noticed after preventive induction of labour for non-urgent indication at 37-39 weeks of gestation [41]. The risk of other adverse maternal and perinatal outcomes such as side effects of prostaglandin, tachysystole, antepartum haemorrhage, postpartum haemorrhage, NICU admission, meconium stained liquor, APGAR score at 1 and 5 minute were comparable to the previous studies describing labour induction for medical indications [10-14,42]. Similar pregnancy and neonatal outcomes had also been observed in electively induced labour at term [43]. Furthermore, in this study, gravidity and age of gestation did not seem to influence the fetomaternal outcome after medical induction.

LIMITATION

This study has several limitations, the first one is its retrospective nature and the 2nd one is absence of a control group. However, in this study all women received similar treatment protocol (sequential prostaglandin administration, if required oxytocin also) for all medical indications, therefore, the subgroups (different medical indications) appeared comparable for assessment of fetomaternal outcomes.

CONCLUSION

Induction of labour for medical indication in term pregnancy does not increase the risk of caesarean delivery, adverse foetal and neonatal outcomes. Medical methods of induction are safe and reliable and also do not increase the risk of maternal complications. In addition, primigravida are not at higher risk of foetal distress and other neonatal complications than the multigravida.

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