



COMPARATIVE STUDY OF MATERNAL AND NEONATAL OUTCOME OF ELECTIVE INDUCTION OF LABOUR VS EXPECTANT MANAGEMENT AT 40- 40+6 WEEKS OF GESTATION

Gynaecology and Obstetrics

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ABSTRACT

OBJECTIVES: To compare and analyse in each group- delivery complications like postpartum haemorrhage, obstetric anal sphincter injury at 40-40+6 Week of Gestation. To compare and analyse in each group- perinatal outcomes, mainly perinatal mortality and special care unit admission.

METHODS: This prospective comparative observational study was conducted in the Department of Gynaecology & Obstetrics, R. G. Kar Medical College and Hospital. For my study I had taken a total of 276 mothers whom I had subdivided into 2 groups. Group A had 138 mothers who had induction of labour (I) by some method. Remaining 138 mothers were allocated to Group B who had only watchful expectancy with monitoring and labelled as expectant management group (EM).

RESULT: In group-A (I), 5(3.6%) patients had instrumental delivery in comparison to group B(EM) which had 15(10.9%) of instrumental delivery. LSCS was also higher in group B i.e 36(26.1%) as compared to group A i.e 25(18.1%). 108(78.3%) mothers had vaginal delivery who were induced whereas 87(63.0%) had vaginal delivery in expectant management group. Therefore, induction group had better outcome in terms of mode of delivery. It was also statistically significant ($p=0.0098$). The distribution on the basis of APGAR score at 5 minutes of babies in between two groups was significant.

CONCLUSION: Elective induction at 40+ weeks is associated with a lower rate of caesarean delivery and does not increase the risk of major complications for newborns and can be offered to mothers having low risk and crossed their expected date of delivery. The ACOG says elective induction at 40+ weeks is a reasonable option for healthy women. Induction of labour at 40+ weeks should not be routine for women but it is important to counsel them and let them decide whether they want to be induced and when.

KEYWORDS

Elective induction, Caesarean delivery, Labour, perinatal mortality.

INTRODUCTION

Post dated pregnancy is defined as one which has crossed the expected date of delivery. Pregnancy more than 42 weeks or more than 294 days is called post term pregnancy. Fernando Arias defined prolonged pregnancy as those pregnancies advancing beyond the expected date of delivery.¹ Prolongation of pregnancy complicates up to 10% of all pregnancies and carries an increased risk to mother and fetus. Perinatal mortality in postterm pregnancy is greater than that of term pregnancy in almost all studies reviewed.² The growth and survival of most post dated infants suggests that the placental function deteriorates with increasing length of gestation; thus the changes seen in fetuses affected with post maturity syndrome may not be explained by placental findings alone. Vorherr described critical reductions of fetal oxygen supply after 43rd week of gestation by cord blood oxygen content determinations.² The combination of continued fetal growth and arrested placental growth may lead to situation of decreasing placental nutrient reserve, compromised fetal circulation and eventually fetal distress. However, a recent electron microscopy study of placental changes in prolonged pregnancy suggests that the uteroplacental ischemia and not placental aging may be more important in the genesis of post maturity syndrome.³ Prolonged pregnancies are associated with an increased incidence of macrosomia. Macrosomic infants account for about 1% of term deliveries and 3-10% of post term deliveries. Post mature infants particularly with macrosomia are at increased risk of hypoglycemia. They also have increased chance of polycythemia.⁴ The maternal risks of postdated pregnancy are often underappreciated. These include an increase in labor dystocia (9-12% vs 2-7% at term), an increase in severe perineal injury (3rd and 4th degree perineal lacerations) related to macrosomia (3.3% vs 2.6% at term) and operative vaginal delivery, and a doubling in the rate of caesarean delivery (14% vs 7% at term).⁵ The latter is associated with higher risks of complications such as endometritis, hemorrhage, and thromboembolic disease.⁶ As there is fetal and maternal risk associated with post-dated pregnancy, need of induction is more with postdated pregnancy. There is general consideration that perinatal mortality and morbidity controversy is centred on adequacy of detecting different methods for the fetus at risk, the time when testing should be done, the method of monitoring, the 17 optimum time for delivery and mode of delivery. The availability of biophysical profile.

The availability of biophysical profile and electronic fetal monitoring

can affect the outcome of a given pregnancy. One recent systematic review showed that a policy of labor induction for women with postdated pregnancy compared with expectant management is associated with fewer perinatal deaths and fewer Caesarean sections.⁷ The World Health Organization and various guidelines throughout the world recommend induction of labour after 42 weeks.^{2,3} Although the overall probability of favourable perinatal outcomes between 40 and 42 weeks is good in high resource settings, the risk of adverse perinatal outcome increases gradually after 40 weeks.

With this background the present study was undertaken by me to find out incidence of postdated pregnancies, and the comparative outcomes in the form of associated maternal complications and perinatal morbidity and mortality in inducing labor vis a vis watchful expectancy in mothers carrying a pregnancy of 40 to 40+6 weeks. This period was chosen as majority of our mothers refused to continue their pregnancy past 41 weeks.

In this study, an attempt is made regarding comparing Maternal and Neonatal outcome in elective induction of labour group with expectant management group at 40- 40+6 weeks of gestation.

1. PRIMARY OBJECTIVE:

To compare and analyse in each group-mode of delivery (vaginal delivery and caesarean section) at 40-40+6 Week of Gestation.

2. SECONDARY OBJECTIVE:

- To compare and analyse in each group- delivery complications like postpartum haemorrhage, obstetric anal sphincter injury at 40-40+6 Week of Gestation.
- To compare and analyse in each group- perinatal outcomes, mainly perinatal mortality and special care unit admission.

MATERIALS AND METHODS

METHODOLOGY

- Study Design:** A prospective comparative observational study.
- Study setting & timelines:** Department of Gynaecology & Obstetrics, R. G. Kar Medical College and Hospital.
- Place of study:** Department of Gynaecology & Obstetrics, R. G. Kar Medical college and hospital.
- Period of study:** 12 months (January 2018 to June 2019)

- **Study population:** Pregnant women at 40- 40+6 week of gestation from antenatal OPD and labour room.
- **Study tools:**
- Stethoscope: For auscultation of foetal heart rate and maternal condition
- Ultrasound scan for biometry, umbilical artery Doppler, liquor volume: for assessment of fetal size, presentation and well-being
- Cardiotocograph: for assessment of fetal well-being and for detection of uterine tachysystole
- Intravenous access
- IV Oxytocin (5 IU), prostaglandin gel, oral/ vaginal misoprostol
- Supplemental oxygen, if required
- Baby resuscitation tools, if needed

Inclusion Criteria:

- Women were included with singleton pregnancy at 40- 40+6 weeks of gestation.
- Perinatal mortality, defined as stillbirth and death in the first week of life.
- prelabour rupture of membranes in the expectant management group if the rupture of membranes occurred after the gestation of induction of labour in the comparison group.

Exclusion Criteria:

1. malpresentation
2. abdominal pregnancy
3. placenta praevia
4. previous caesarean section
5. prelabour rupture of membranes
6. antepartum intrauterine death
7. pregnancy associated Chronic hypertension
8. pre eclampsia
9. eclampsia
10. Pre existing or gestational diabetes
11. Antepartum haemorrhage
12. Medical diseases in pregnancy (heart disease, lung disease, liver disease)
13. Congenital anomalies
14. deaths associated with congenital anomalies.

STATISTICAL ANALYSIS:

Continuous variable was analyzed by independent Student's 't' test or Mann-Whitney 'U' test depending on the data normality. Categorical data were analyzed by Chi Square or Fisher exact test as appropriate. The P value of <0.05 were considered as statistically significant.

RESULT AND DISCUSSION

For my study I had taken a total of 276 mothers whom I had subdivided into 2 groups. Group A had 138 mothers who had induction of labour (I) by some method. Remaining 138 mothers were allocated to Group B who had only watchful expectancy with monitoring and labeled as expectant management group (EM).

DEMOGRAPHIC PROFILE:

The mean age in Group A was 23.5725 ± 4.3979 years as compared to the mean age in Group B 21.5362 ± 2.8055 years. Thus, the mean age in Group A was higher than the mean age in Group B which was statistically significant. 68% of mothers belonged to age group of 20-30 years in Group A and 57.2% in Group B belong to the same age group. This is similar to the study by Dobariya PV et al 9 (2017) who found 69.05% in this age group.

Calculated BMI in both groups were below 25 kg/m² which was not significant. Obesity therefore was not a factor in my study.

In both the groups maximum number of mothers were third gravidae which was similar in both groups.

Therefore, the demographic profile of my study groups was comparably similar.

INDUCTION LABOUR AND DELIVERY:

Different procedures could be performed for induction of labour. A study by N. WINER in 2011⁸ found membrane sweeping and oxytocin to be of choice for favourable cervix. Vaginal prostaglandin E₂ was effective whatever the cervical conditions were. Misoprostol at a minimal dose of 25µg seemed to be safe and effective. Following these guidelines, I had induced the mothers in Group A by a single or a

combination of the abovementioned methods. 37% had induction by PGE₂ gel supplemented later by ARM and oxytocin. 17.4% were by PGE₂ gel alone and 13.8% by oxytocin alone. Misoprostol 25µg vaginally was given in 3.6% of the mothers.

In my study 78.3% mothers had a normal vaginal delivery and 3.6% had instrumental delivery. Therefore 81.9% was terminated vaginally. In Group B mothers' vaginal termination was in 73.9%, caesarean delivery was 18.1% in Group A and 26.1% in Group B. This is similar to the study by Grobman in 2018 who found the frequency of caesarean delivery significantly lower in the induction group.⁹ Sinkey RG in 2018 also found that caesarean section rates were higher in the expectant management arm.¹⁰ Palatnik in 2019 found that elective induction of labor between 40th and 41st weeks was not associated with lower odds of caesarean delivery.¹¹

MATERNAL COMPLICATIONS:

Majority of the mothers in both groups did not have any complications as was expected in a tertiary level care facility with meticulous monitoring. Post partum haemorrhage was slightly more in group A than group B but was not statistically significant. Perineal Injury and postcaesarean section wound gaping was minimal in both groups.

Complications were slightly higher in Group B though not statistically significant. This is similar to a study Sinkey RG in 2018 who found an increase in maternal morbidity among the expectant management arm (21.2% versus 16.5%, $p < 0.01$) in his study.¹⁰

NEONATAL OUTCOME AND NICU ADMISSION:

In my study APGAR score assessed at 1 minute and 5 minutes between two groups were found to be lower in Group B in comparison to Group A. This association was found to be statistically significant.

In group-A the mean birth weight (mean $\pm$ SD.) of patients was $2.7819 \pm .4453$. In group-B the mean birth weight (mean $\pm$ SD) of patients was $2.7775 \pm .4053$. Distribution of mean birth weight in years in between the two groups was not statistically significant ($p = 0.9325$).

In my study 20.3% babies developed complications in Group A while 28.3% developed complications in Group B. This was attributable to the fact that birth asphyxia was more in Group B which was statistically significant.

Majority of the babies were discharged with mothers in satisfactory condition. Perinatal death was 2.2% in group A versus 4.3% in group-B but it was not statistically significant ($p = 0.4978930741$).

There is paucity of information from prospective RCTs examining neonatal outcomes in the setting of elective induction of labour. In the study by Caughey AB et al 2009 who were electively induced had better overall outcomes among both mothers and neonates.¹² Hussain AA et al in 2011 had concluded that induction of labour appears to be an effective way of reducing perinatal morbidity and mortality associated with postdated pregnancies.¹³ The study by KHEIR AE et al 12 in 2016 showed significant difference in APGAR score between the two groups being lower in the expectant management arm but did not reveal any significant difference in neonatal outcome with regards to birth weight, need for resuscitation (NICU admission) and neonatal mortality. My study had a similar conclusion.¹⁴

Table 1: Distribution on The Basis of Time Of Induction Of Labour and Method of induction In Group A (Induction Group)

		No of participants	Percentage
Gestational age	40	18	13%
	40+1	44	31%
	40+2	11	7.90%
	40+3	23	16%
	40+4	12	8.60%
	40+5	15	10.80%
	40+6	15	10.80%
	Total	138	100.0%
Method of induction of labour	Misoprostol	5	3.6%
	Oxytocin	19	13.8%
	Oxytocin + ARM	17	12.3%

	PG E2 gel	24	17.4%
	PG E2 gel + Oxytocin	22	15.9%
	PG E2 gel + Oxytocin+ ARM	51	37.0%
	Total	138	100.0%

Table 2: Distribution on The Basis of Apgar Score At 1 Minutes and APGAR Score 5 Minutes Of Babies In Between Two Groups

		Group-A (I)	Group-B (EM)	TOTAL	Chi-square value	p-value
APGAR SCORE AT 1 MIN	0 to 3	4(2.89%)	10(7.23%)	14(10.1%)	6.10399	0.04726
	4 to 6	23(16.65%)	34(24.6%)	57(41.3%)		
	7 to 10	111(80.4%)	94(68.11%)	205(74.2%)		
	TOTAL	138(100%)	138(100%)	276(100%)		
APGAR SCORE AT 5 MIN	0 to 3	1(0.72%)	4(2.89%)	5(3.6%)	6.14582	0.04629
	4 to 6	13(9.45)	27(19.5%)	39(28%)		
	7 to 10	111(80.4%)	107(77.5%)	227(82.2)		
	TOTAL	138(100%)	138(100%)	276(100%)		

Table 3: Distribution on The Basis Of MOD, Maternal Complication and Perinatal Morbidity In Between Two Groups

		Group -A (I)	Group -B (EM)	TOTAL	Chi-square value	p-value
MOD	Instrumental Delivery	5	15	20	9.2451	0.0098
		Row %	25.0	75.0		
		Col %	3.6	10.9		
	LSCS	25	36	61		
		Row %	41.0	59.0		
		Col %	18.1	26.1		
	VD	108	87	195		
		Row %	55.4	44.6		
		Col %	78.3	63.0		
	TOTAL	138	138	276		
		Row %	50.0	50.0		
		Col %	100.0	100.0		
MATERNAL COMPLICATION	NONE	121	113	234	7.6735	0.0533
		Row %	51.7	48.3		
		Col %	87.7	81.9		
	Perineal Injury	2	8	10		
		Row %	20.0	80.0		
		Col %	1.4	5.8		
	PPH	12	8	20		
		Row %	60.0	40.0		
		Col %	8.7	5.8		
	Post Caesarean Section Wound Gaping	3	9	12		
		Row %	25.0	75.0		
		Col %	2.2	6.5		
	TOTAL	138	138	276		
		Row %	50.0	50.0		
		Col %	100.0	100.0		
PERINATAL MORBIDITY	Birth Asphyxia	11	24	35	8.6575	0.0342
		Row %	31.4	68.6		
		Col %	8.0	17.4		
	Jaundice	11	5	16		
		Row %	68.8	31.3		
		Col %	8.0	3.6		
	Sepsis	6	10	16		
		Row %	37.5	62.5		
		Col %	4.3	7.2		
	NONE	110	99	209		
		Row %	52.6	47.4		
		Col %	79.7	71.7		
	TOTAL	138	138	276		
		Row %	50.0	50.0		
		Col %	100.0	100.0		

CONCLUSION

- This was a prospective observational study to evaluate the perinatal and maternal outcome between two groups of mothers with identical demographic parameters who had an elective induction in one arm of study (Group A) and watchful expectancy

in the other arm (Group B) at gestational age of 40-40+6 weeks.

- Majority of mothers were induced by vaginal PGE2 gel. Oxytocin and Misoprostol 25µg vaginally were also used.
- Majority of mothers who were induced had a vaginal delivery. While caesarean delivery rate was slightly higher in mothers belonging to the expectant management group.
- Maternal morbidity was slightly higher in expectant management arm but was not statistically significant.
- Perinatal morbidity especially in terms of birth asphyxia as adjudged by the APGAR score at 1 minute and 5 minutes were higher in the expectant management group and was statistically significant but it did not affect the perinatal mortality.
- This study was undertaken to examine the risks and benefits of a woman choosing labour induction at 40+ weeks rather than waiting for labour to begin naturally and a comparative analysis was made.
- My analysis suggests that elective induction at 40+ weeks is associated with a lower rate of caesarean delivery and does not increase the risk of major complications for newborns and can be offered to mothers having low risk and crossed their expected date of delivery.
- The ACOG says elective induction at 40+ weeks is a reasonable option for healthy women.
- Therefore, I conclude that induction of labour at 40+ weeks should not be routine for women but it is important to counsel them and let them decide whether they want to be induced and when.

REFERENCES

- Campbell MK, Ostbye T, Irgens LM. Post-term birth: risk factors and outcomes in a 10-year cohort of Norwegian births. *J Obstet. Gynecol.* 1997;89(4):543-8.
- Eden RD, Seifert LS, Winegar A. Perinatal characteristics of uncomplicated postdate pregnancies. *Obstet. Gynecol.* 1987;69:296-9.
- Gulmezoglu AM, Crowther CA, Middleton P, et al; Induction of labour for improving birth outcomes for women at or beyond term. *Cochrane Database Syst Rev.* 2012;6:CD004945.
- Allahyar, J. & Galan, H. "Premature Rupture of the Membranes.," also American College of Obstetrics and Gynecologists.
- Mishanina, E; Rogozinska, E; Thattai, T; Uddin-Khan, R; Khan, KS; Meads, C (Jun 10, 2014). "Use of labour induction and risk of cesarean delivery: a systematic review and meta-analysis". *CMAJ : Canadian Medical Association Journal.* 186 (9): 665-73.
- Budden, A; Chen, LJ; Henry, A (Oct 9, 2014). "High-dose versus low-dose oxytocin infusion regimens for induction of labour at term". *The Cochrane Database of Systematic Reviews.* 10(10): CD009701.
- Guinn, D. A.; Davies, J. K.; Jones, R. O.; Sullivan, L.; Wolf, D. (2004). "Labor induction in women with an unfavorable Bishop score: Randomized controlled trial of intrauterine Foley catheter with concurrent oxytocin infusion versus Foley catheter with extra-amniotic saline infusion with concurrent oxytocin infusion". *American Journal of Obstetrics and Gynecology.* 191 (1): 225-229.
- Winer N. Different methods for the induction of labour in postterm pregnancy. *Journal de gynecologie, obstetrique et biologie de la reproduction.* 2011Dec;40(8):796-811.
- Grobman WA, Rice MM, Reddy UM, Tita AT, Silver RM, Mallett G, Hill K, Thom EA, El-Sayed YY, Perez-Delboy A, Rouse DJ. Labor induction versus expectant management in low-risk nulliparous women. *New England Journal of Medicine.* 2018 Aug 9;379(6):513-23.
- Sinkey RG, Lacevic J, Reljic T, Hozo I, Gibson KS, Odibo AO, Djulbegovic B, Lockwood CJ. Elective induction of labor at 39 weeks among nulliparous women: The impact on maternal and neonatal risk. *PLoS one.* 2018 Apr 25;13(4):e0193169.
- Palatnik A, Kominiarek MA. Outcomes of Elective Induction of Labor versus Expectant Management among Obese Women at ≥ 39 Weeks. *American journal of perinatology.* 2019 Apr 30.
- Caughey AB, Sundaram V, Kaimal AJ, Cheng YW, Gienger A, Little SE, Lee JF, Wong L, Shaffer BL, Tran SH, Padula A. Maternal and neonatal outcomes of elective induction of labor: Evidence report/technology assessment. 2009 Mar(176):1.
- Hussain AA, Yakoob MY, Imdad A, Bhutta ZA. Elective induction for pregnancies at or beyond 41 weeks of gestation and its impact on stillbirths: a systematic review with meta-analysis. *BMC Public Health.* 2011 Dec;11(3):S5.
- Khair Ae, Mohamed Ra, Osman Nm, Ali Rb. Comparison of Neonatal Outcome Associated with Induced Labour Versus Planned Vaginal Delivery in a Low-Risk Obstetric Population. *Journal of Disease and Global Health.* 2016 Aug 25;8(3):98-104.