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Delivery Outcome in Spontaneous and Induced Labour: A Prospective Comparative Study

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***Abstract*: Induction of labour is the most common procedures during pregnancy1 .Labour induction is the artificial initiation of uterine contraction prior to their spontaneous onset by using cervical ripeners, leading to progressive dilatation and effacement of cervix and delivery of baby1. In this study I have compared delivery outcomes in spontaneous and induced labour. Although there are many drugs and forms available for induction of labour, this study uses vaginal misoprostol tablets for induction of labour. Tablet misoprostol is a prostaglandin analogue-specifically, a synthetic prostaglandin E1(PGE1) have been routinely used for induction of labour nowadays 2 .**

***Keywords*: Apgar score, caesarean, delivery, induced, misoprostol, neonate, partograph, spontaneous, vaginal**

1. Introduction

Data from the national centre for health statistics for the last decade indicate that the rate of labour induction has increased gradually from 9% to 20%. This increase has been noted both at community hospitals and at the tertiary care hospitals2. When concerns for the wellbeing of the mother arises, primary indications for induction include active medical disorders, being well beyond the due date and prolonged ruptured membranes1. Induction is also justified when the fetus is at risk. Over recent decades, more and more pregnant women around the world have undergone induction of labour to deliver their babies. As per WHO, in developed countries, upto 25% of all deliveries at term now involve induction of labour. In developing countries, the rates are generally lower, but in some settings they can be as high as those observed in developed countries. Varakshi et al 4 conducted a trial on women induced with PGE1 and PGE2 and compared them and reported that PGE1 is more effective the intracervical PGE2 in bringing about labour and delivery. Jeffry et al 5analysed 3715 term nulliparous deliveries and concluded that older women are at higher risk of caesarean delivery whether labout is spontaneous or induced and it was mainly done for failure to progress and fetal distress. Bishop 6 devised a cervical scoring system for nulliparous patient with planned elective induction of labour in which 0-3point are given of each of five factors. He determined that when the total score was at least 9, the likelihood of vaginal delivery after labour induction was similar to that observed in Patients with spontaneous onset of labour. Yeast et al 7 reviewed 7001 consecutive inductions and stated that the use of inductions methods has significantly increased and more than 40% of patients needed induction. Caesarean delivery remains low in this facility inspite of marked increase in operative delivery for nulliparous women who underwent induction.

Brindley et al 8 after analyzing various methods of induction came to a conclusion that medical control of labour is often necessary in modern obstetrics. The status of cervix dictates the method of induction and influences its success. Calkins 9observed a series of 1250 consecutive labours and reported that cervical resistance is beyond question a factor of great importance in determining the length of first stage of labour. He also noted assessing cervical softness and labour intensity on scales of 1 to 5 seemed to have clinical merit.

A. Aim

- To compare the delivery outcome in each group

B. Objectives

- To compare the duration of latent and active phase of labour in each group
- To compare the mode of delivery
- To compare neonatal apgar score at 1 and 5 minutes in each group
- To compare number of NICU admissions in each group

C. Sample size

Minimum sample size of 70 women per group were included to study the mean difference of active phase in spontaneous and induced labour by 1.23 hours with standard deviation of 1.98hours at 1% risk and 80% power.

D. Materials, Methodology and Study Technique

This study was carried out in Labour room and operation theatre of department of obstetrics and gynecology department and NICU of pediatric department of Jamnabai General Hospital, Vadodara from January to March 2021. It included 140 women, 70 in each group(‘S’ for spontaneous, ‘I’ for induced) with singleton pregnancy, vertex presentation,

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completed 37weeks and excluded those with previous LSCS or myomectomy, breech and other abnormal presentations, multiple pregnancy, cord prolapse, placenta previa, abruption placenta, preterm and eclampsia. Basic assessment for the risk factors were done in antenatal patients with spontaneous onset of labour and those patients who had uncomplicated term gestation were included in the study. The purpose and protocol of the study were explained and informed and written consent was obtained for the same. Those patients fulfilling the inclusion criteria but without spontaneous labour were put in induced labour group who were later induced with tab misoprostol (PGE1) pvafter obtaining informed consent.

Progress of labour was monitored by modified WHO partograph. Those who came with spontaneous labour initial pv was done for pelvic assessment and to assess the bishop score, patient was then allowed to progress on her own, next pv was repeated after 4 hrs or when there was draining. Once the patient entered into active phase, active management of labour was done. In the induced group, following a basic pelvic assessment (to rule out CPD), bishop score was assessed. If the score was less than 4 or if there is another indication for induction, tab misoprostol 25mcg was kept pv. The patient was then reassessed after onset of labour or draining pv or after 6 hrs whichever was earliest. The decision for further induction was decided according to the bishop score, and if it was unfavourable then the dose of misoprostol was repeated, maximum 3 doses at 4 hourly interval was used. After achieving a post induction score of 6 or above, labour was accelerated with oxytocin and artificial rupture of membranes. In the interval period, fetal heart rate monitoring was done to assess fetalwell being. A failed induction was labelled as those who failed to enter the active phase of labour after a maximum of 3 doses of misoprostol. Such patients were then delivered by caesarean section or instrumental delivery depending upon the modified bishop score of the patient. Likewise, trial of vaginal delivery was interrupted in both the groups at any stage when there arouse an indication for immediate termination ofpregnancy. After delivery neonatal apgar score at 1 and 5 minutes and any NICU admissions were assessed in both groups.

2. Results and Discussion

This study was carried out between Januarys to march 2021 in OBG department of Jamnabai general hospital, Vadodara consisted of 140 deliveries out of which 70 (50%) women were in spontaneous and 70 (50%) women were in induced group. To the best of my knowledge, no studies have compared spontaneous and induced labour in this institute so far.

Labour is induced when delivery of the pregnancy would be benefit to the health of the mother or the fetus or both. The induction is justified when the benefits to either the mother or fetus outweigh those of continuing pregnancy 1. Present study comprises of women who were relatively low risk. The average maternal age for this study was around 24.29years, this corresponds favourably to studies conducted by Johnson et al11. The mean gestational age was 39.56 weeksin present study, which was clinically samein both groups (p-value>0.05). Considering parity with mode of onset of labour, there was significantly higher parity in spontaneous labour group, 49 (70%) multigravidas and 21(30%)primigravidas had spontaneous labour whereas 21(30%) multigravida and 49(70%)primigravida were induced with tab misoprostol. These results are in comparison to the study by Heffner et al 12 where 30% primigravida had induced labour and 27% multigravida had induced labour.

Regarding the mode of delivery, this study demonstrates that women in spontaneous labour group had high chance (97.1%) of normal vaginal delivery than those in induced group (71.4%). The primary caesarean rate was 13.6%. Induced group had 25.7% caesarean rate compared to 1.4% for spontaneous group. The finding of this study of modest increase in caesarean rate among women with induced labour is concurrent with the results of Heffner et al 12. He did observe that caesarean delivery rate was 24.7% in induced labour group and 13.7% in spontaneous group. Also instrumental delivery (vacuum delivery) was more in induced group (2.9%) as compared to spontaneous group (1.4%). Indications for caesarean delivery were not statistically different among the two groups. Meconium stained liquor (MSL) was the most common indication being 40.91%, followed by non-progression of labour (NPOL) 22.73%, fetal distress 22.73%, and failed induction 9.1% and so on. This is in contrast to the study by Johnson et al 11 where failure to progress was the most common indication 51% followed by fetal distress 29.1%.However the indication for casaerean did not differ significantly between the two groups. Median latent phase was less in spontaneous labour (5.25hrs) and more in induced labour (6.25hrs). The median duration of active phase was longer in induced group (2.5 hrs) as compared to shorter duration in spontaneous group (2 hrs). The median duration of latent and active phase not varied significantly in both the groups (p-value>0.05). This is in contradictory to the findings of James et al 10 who reported that duration of active phase was similar in both groups. Also the number of patients in active phase was more in spontaneous group (69) as compared to induced group (53) while more number of patients were in latent phase in induced group (58) as compared to very less number of patients in latent phase in spontaneous group (8).

A. SCondition of New-Born and APGAR score

All the babies were live born and there were no neonatal deaths in both the groups with no significant differences in apgar scores of the newborns in both groups. The mean apgar score at 1 min was 6.80 in the induced group and 6.63 in the spontaneous group, while the mean 5 minsapgar score was 8.90 in induced group and 8.85 in spontaneous group which were not significantly different (p-value>0.05). This suggest that induction does not lead to fetal distress.This is in consistent with the previous studies suggesting no difference in perinatal morbidity. Admission to NICU were almost equal in induced and spontaneous groups (p-value>0.05). There were 24.3% admissions in spontaneous and 28.4% in induced group. This was in contradictory to the result derived by James et al10 where 17.4% admissions were in spontaneous group and 9.1%

in induced group.

3. Conclusion

So, taking into account both maternal and neonatal outcomes, we concluded that there is a strong association between induction of labour and caesarean delivery compared to spontaneous labour. Also the duration of latent and active phase is shorter in spontaneous as compared to induced labour. Considering the neonatal status, induction did not increase the perinatal morbidity. Hence, the obstetrician plays a crucial role in selecting the cases precisely for induction, choosing the correct method of induction so that unnecessary interventions like caesarean and operative deliveries can be minimised and maternal morbidities can be kept at minimum.

4. Compliance with Ethical Standards

- *Conflict of interest*: The authors declare that they have no conflict of interest.
- *Ethical Approval:* All procedures performed in the study were in accordance with the ethical standards of the institution research committee.
- *Informed Consent*: Informed consent was obtained from all individual participants included in the study.

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