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A RANDOMIZED COMPARATIVE STUDY OF PROGRESS OF LABOUR AND FETAL OUTCOME OF DELIVERY AMONGST SPONTANEOUS VERSUS INDUCED LABOUR IN TERM PREGNANCY PRIMI GRAVIDA OF USING MODIFIED WHO PARTOGRAPH IN THE DEPARTMENT OF OBSTETRICS AND GYNECOLOGY SMS MEDICAL COLLEGE, JAIPUR

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Abstract

Background: Childbirth is the period from the onset of regular uterine contraction until expulsion of placenta. The process by which this normally occurs is called labour. Induction of labour is the artificial initiation of uterine contraction prior to their spontaneous onset, leading to progressive dilatation and effacement of the cervix and delivery of the baby. Labour induction is indicated where the benefits to either the mother or the fetus outweighs the benefit of continuing pregnancy.

Methods: Hospital based Prospective type of cross sectional study conducted at Department of Obstetrics and Gynaecology, S.M.S Medical College, Jaipur, Rajasthan. We assessed the following perinatal outcomes: at 1st and 5th minute APGAR score; birth weight; birth injuries; respiratory distress syndrome; admission to the NICU; number of days in NICU; neonatal deaths taking place in hospital within the first week of life; stillbirth or intrauterine death.

Results: The highest percentage of babies were in the weight category of 2500 to 3499 grams in both groups, 83.3% in spontaneous and 76.7% in induced group, followed by ≥3500 gram and <2500 gram respectively. There is no statistical significant difference in weight of babies between the groups (P=0.64). In induced group ≤7 APGAR Score at 1 minute is 1.1%, and 7.8% in spontaneous group. There is statistically significant increase in Spontaneous group (P < 0.05). In induced group ≤7 Apgar score at 5 minutes is 0%, and 5.6% in spontaneous group. ≤7 APGAR score at 5minutes is significantly higher in Spontaneous group (P < 0.05). 3.3% of Induced group babies needed Admission to NICU compared to 2.2% in Spontaneous group, there is no statistically significant difference between groups (P = 0.684)

Conclusion: We conclude from this study that though requirement of Augmentation for progress of Labour was more in induced group and Instrumentation rate of Caesarean section was also high in induced group. But the Neonatal outcome of Labour if monitored with modified WHO Partograph is less than Spontaneous group and also duration of labour is shorter in induced labour.

Keywords: WHO Partograph, Induction, Neonatal outcome.

Introduction

Obstetrics is the health science that deals with pregnancy and child birth and post-partum period. It deals with two lives, the mother and the fetus. Most of the women during their reproductive years are healthy and have an uncomplicated delivery of a healthy baby at term with spontaneous onset of labor.[1]

Childbirth is the period from the onset of regular uterine contraction until expulsion of placenta. The process by which this normally occurs is called labour.[1] WHO defines normal birth as: spontaneous in onset, low risk at the start of labour and remaining so throughout labour and delivery.

When the situation arises to interrupt the pregnancy in interest of the mother or fetus or both, where the continuation of pregnancy will pose an adverse outcome for mother and child, induction of labor is one of the means. It is among the most common obstetric interventions being done now,[1] recent

studies shows that it is carried out in 32.1% of pregnancies in India,[2] which has shown to decrease perinatal mortality.[3]

There is scarcity of literature comparing spontaneous versus induced labour among nulliparous women. It is pertinent to compare the outcome of labour among these groups using World Health Organization (WHO) partograph. The first WHO partograph or 'Composite partograph', covers a latent phase of labour of up to 8 hours and an active phase beginning when the cervical dilatation reaches 3 cm. The active phase is provided with an alert line and an action line, drawn 4 hours apart on the partograph as aids to monitoring labour. This partograph is based on the principle that during active labour, the rate of cervical dilation should not be slower than 1 cm/hour. A lag time of 4 hours between slowing of labour and the need for intervention is unlikely to compromise the foetus or the mother and avoids unnecessary intervention. Moreover, differentiating the latent phase from false labour being difficult, diagnosis is often made in retrospect.[4]

To overcome these disadvantages, a WHO 'Modified Partograph' was introduced by removing the latent phase and considering the beginning of active phase at 4 cm dilatation of cervix instead of 3 cm. There were some other minor changes like, considering two squares in 1 hour instead of one square in 1 hour in cervical dilatation curve.[4]

WHO further modified the partograph for the third time, this time for used by skilled attendants in health centers. This simplified partograph is color coded. The area to the left of the alert line in the cervicograph is colored green, representing normal progress. The area to the right of the action line is colored red indicating dangerously slow progress in labour. The area in between the alert and action line is coloured amber, indicating the need for greater vigilance.[4]

With this background, the present study was conducted to determine the progress of labour and outcome of delivery amongst spontaneous versus Induced labour in Primi Gravida with gestational age between 40 - 42 weeks of gestation using modified WHO Partograph in cases admitted in Department of Obstetrics and Gynecology at SMS Medical College Hospital, Jaipur.

Materials and methods

Place of Study: A tertiary care Centre, Department of Obstetrics and Gynaecology, S.M.S Medical College, Jaipur, Rajasthan.

Study Design: Hospital based Prospective type of cross sectional study.

Study Period: From December 2017 onwards till the sample size achieved or 1 year which is earlier plus two months for data analysis and compilation.

Sample Size:The primary variable tested was induction delivery, with reference to previous studies, a 15% difference in induction delivery interval between any of two groups for a type-1 error 0.05 and a power of 90%. A sample size is calculated by using Open Epi software version 3.01, Sample size of 180 was calculated to detect a significant difference.

The study population will be divided into two groups:

- Labour induced with vaginal prostaglandin (Misoprostol) and who reached ≥4 cm dilatation.
- Spontaneous onset of labour, who reached ≥4 cm dilatation.

Study Population: All women who came to the labour room at SMS Medical College Hospital, Jaipur during the study period are screened for eligibility criteria for induction in the study.

Purpose of Study: The purpose of my study is to compare the obstetrical outcome in spontaneous versus induced labour in term pregnancy primigavidae and thereby ascertain which is better in term of progress of labour need of augmentation and feto-maternal outcome.

Inclusion Criteria:

For Induced group:

- Primigravida with term pregnancy
- Live singleton pregnancy
- Vertex presentation
- Active phase of labour with cervical dilation ≥4 cm

For Spontaneous group:

- Primigravida with term pregnancy.
- Live singleton pregnancy.
- Vertex presentation.

Exclusion Criteria:

1. Women who had recognised contraindication to induction of labour, including malpresentation,

abdominal pregnancy, placenta praevia or previous scars on uterus.

2. Women who undergone for infertility treatment.
3. Women aged >35 years.
4. Cases of multiple pregnancy.
5. Any cases referred intrapartum and postpartum.

Methodology: Women recruited into the study in labour room of SMS Medical College Hospital. Cases recruited when cases required induction and controls when they came in spontaneous labour after considering inclusion and exclusion criteria. The study included information after signature of a consent form from the women who came in the labour room for induction of labour during my study period. Progress of delivery is monitored using Modified WHO Partograph, assessed for requirement of augmentation, then mother and baby are followed up after delivery in the wards or in NICU for outcome upto the time of discharge.

We assessed the following perinatal outcomes: at 1st and 5th minute APGAR score; birth weight; birth injuries; respiratory distress syndrome; admission to the NICU; number of days in NICU; neonatal deaths taking place in hospital within the first week of life; stillbirth or intrauterine death.

Data Collection: A pre designed pre tested semi structured questionnaire to collect data on the required variables was designed based on the previous literature. The questionnaire was scrutinized by the Faculty of Department of Obstetrics and Gynaecology, SMS Medical College Hospital, Jaipur, necessary changes were made in finalized proforma.

Results

Majority of the cases in both group are in the age group of 21-50 years i.e. 58.9% in Spontaneous group and 53.3% in Induced group, followed by 26-30 years age group (31.1% in Spontaneous group and 35.6% in Induced group), followed by ≤20 years and > 30 years respectively, and there is no significant age difference between two groups.

Table 1: Distribution of Cases according to Modified Bishop's Score (at the time of admission)

Modified Bishop's score		Spontaneous	Induced	Total
≤6	N	62	76	138
	%	68.9%	84.4%	76.7%
>6	N	28	14	42
	%	31.1%	15.6%	23.3%
Total	N	90	90	180
	%	100.0%	100.0%	100.0%
Pearson Chi-Square = 6.087			P<0.05	

84.4% of induced group had unfavourable cervix (bishop score ≤6) at the time of admission compared to 68.9% in spontaneous group. This difference was statistically significant (P = 0.05).

Table 2: Distribution of Cases according to Need for Augmentation

Augmentation		Spontaneous	Induced	Total
Yes	N	35	55	90
	%	38.9%	61.1%	50%
No	N	55	35	90
	%	61.1%	38.9%	50%
Total	N	90	90	180
	%	100.0%	100.0%	100.0%
Pearson Chi-Square= 8.889, P<0.05				

61.1% of Induced group cases required Augmentation whereas only 38.9% of Spontaneous group cases required augmentation, there is statistically significant increase in Induced group (P<0.05).

Table 3: Distribution of Cases according to Cervicograph

Cervicograph		Spontaneous	Induced	Total
Reaching/ Crossing action line	N	13	30	90
	%	14.4%	33.3%	50%
Normal	N	77	60	90
	%	85.6%	66.7%	50%
Total	N	90	90	180
	%	100.0%	100.0%	100.0%
Pearson Chi-Square= 8.83 P<0.05				

33.3% cases of Induced group Reached/ Crossed action line compared to only 14.4% cases in Spontaneous group, there is statistically significant difference between group (P<0.05).

Table 4: Distribution of cases according to Birth weight

Birth weight		Spontaneous	Induced	Total
<2500	n	5	10	15
	%	5.6%	11.1%	8.3%
2500-3499	n	75	69	144
	%	83.3%	76.7%	80.0%
≥3500	n	10	11	21
	%	11.1%	12.2%	11.7%
Total	n	90	90	180
	%	100.0%	100.0%	100.0%
χ^2=1.964, P=0.374				

The highest percentage of babies were in the weight category of 2500 to 3499 grams in both groups, 83.3% in spontaneous and 76.7% in induced group, followed by ≥3500 gram and <2500 gram respectively. There is no statistical significant difference in weight of babies between the groups (P=0.64).

Table 5: Distribution of Cases according to APGAR Score at 1 min

APGAR Score at 1min		Spontaneous	Induced	Total
≤7	n	7	1	8
	%	7.8%	0.0%	4.4%
>7	n	83	89	172
	%	92.2%	98.9%	95.6%
Total	n	90	90	180
	%	100.0%	100.0%	100.0%
t = 3.27, P<0.05				

In induced group ≤7 APGAR Score at 1 minute is 1.1%, and 7.8% in spontaneous group. There is statistically significant increase in Spontaneous group (P < 0.05).

Table 6: Distribution of Cases according to APGAR Score at 5 min.

APGAR score at 5min		Spontaneous	Induced	Total
≤7	n	5	0	5
	%	5.6%	0.0%	2.8%
>7	n	85	90	175
	%	94.4%	100.0%	97.2%
Total	n	90	90	180
	%	100.0%	100.0%	100.0%
Mid-P exact= 3.291., P<0.05				

In induced group ≤7 APGAR Score at 5 minutes is 0%, and 5.6% in spontaneous group. ≤7 APGAR score at 5minutes is significantly higher in Spontaneous group (P < 0.05).

Table 7: Distribution of Cases according to Respiratory distress syndrome

RDS		Spontaneous	Induced	Total
Yes	n	7	1	8
	%	7.8%	1.1%	4.4%
No	n	83	89	172
	%	92.2%	98.9%	95.6%
Total	n	90	90	180
	%	100.0%	100.0%	100.0%
Pearson Chi-Square= 3.045			P<0.05	

1.1% of Induced group babies developed Respiratory Distress Syndrome compared to 7.8% in Spontaneous group, there is statistically significant increase in the cases of RDS in Spontaneous Group (P<0.05)

Table 8: Distribution of Cases according to Need for resuscitation

Need for resuscitation		Spontaneous	Induced	Total
Yes	n	1	1	2
	%	1.1%	1.1%	1.1%
No	n	89	89	178
	%	98.9%	98.9%	98.9%
Total	n	90	90	180
	%	100.0%	100.0%	100.0%
Pearson Chi-Square= 0.505, P=0.999				

1.1% babies each in Induced group and Spontaneous group needed resuscitation after birth.

Table 9: Distribution of Cases according to Admission to NICU

Admission to NICU		Spontaneous	Induced	Total
Yes	n	2	3	5
	%	2.2%	3.3%	2.8%
No	n	88	87	175
	%	97.8%	96.7%	97.2%
Total	n	90	90	180
	%	100.0%	100.0%	100.0%
Pearson Chi-Square= 0.205, P=0.684				

3.3% of Induced group babies needed Admission to NICU compared to 2.2% in Spontaneous group, there is no statistically significant difference between groups (P = 0.684)

Discussion

Induction of labour is one of the common interventions in obstetrics and is not without risk. In many circumstances, induction of labour may either result in an increase or a decrease in maternal or perinatal morbidity.

A retrospective cohort study conducted by Osmundson S et al, have concluded that there were no significant differences in Apgar score less than 7 at 5 minutes[5]

Another study conducted by Yadav P et al[4], shows that there is no statistically significant difference in APGAR score at 1 minute (P=0.763) and 5 minutes (0.733) between the groups.

But, in our study in spontaneous group ≤7 APGAR SCORE at 1 minute was significantly (P<0.05) higher (7.8%) than in induced group (1.1%). And ≤7 APGAR SCORE at 5 minute also significantly higher (P<0.055) in Spontaneous group (5.6%) compared to Induced group (0%). Better APGAR score in induced labour due to use of the modified WHO Partograph.

Darney BG et al, conducted a retrospective cohort study in 2006 to compare elective induction of labor at term with expectant management. Elective induction was not associated with increased odds of respiratory distress at any term gestational age[6]. Glantz JC compared spontaneously laboring women (n = 10,608) with women who underwent electively induced labor (n = 1,241)[6].

Similarly, in our study in spontaneous group RDS is higher (7.8%) than in induced group (1.1%). This difference was statistically significant (P<0.05). Lesser RDS in induced group may be due to timely and actively intervention.

Prysak M et al, conducted a retrospective case-control study of term elective inductions with vertex presentations conducted for 461 case-control pairs. Elective induction did not significantly increase the rate of NICU admission (4.6% versus control 3.9%)[7]. One another retrospective cohort study conducted by Osmundson S et al, have concluded that there were no significant differences in neonatal intensive care unit admission[5].

Cammu H et al, a matched cohort study from 1996 through 1997, 7683 women with elective induced labor and 7683 women with spontaneous labor transfer of the baby to the neonatal ward (10.7% vs 9.4%) were significantly more common (P<.01) when labor was induced electively. The difference in neonatal admission could be attributed to a higher admission rate for maternal convenience when the women had a cesarean delivery[8].

In our study in induced group admission to NICU was higher (3.3%) than in spontaneous group (2.2%). This difference was not statistically significant (P=0.684). This difference in neonatal admission could be attributed to a higher admission rate for maternal convenience when the women had a cesarean delivery.

Darney BG et al, conducted a retrospective cohort study in 2006 to compare elective induction of labor at term with expectant management. Elective induction was associated with increased odds of hyperbilirubinemia at 37 and 38 weeks of gestation[6].

In our study no baby had birth injury and Stillbirth or intrauterine death in both groups.

Conclusion

We conclude from this study that though requirement of Augmentation for progress of Labour was more in induced group and Instrumentation rate of Caesarean section was also high in induced group. But the Neonatal outcome of Labour if monitored with modified WHO Partograph is less than Spontaneous group and also duration of labour is shorter in induced labour.

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