

# Effect of cardiotocographic monitoring prior to induction of labor

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## ABSTRACT

**Aim:** To assess the role of intermittent cardiotocographic monitoring of induction of labor while using misoprostol in pregnancy of 41 weeks or more.

**Methods:** This is hospital based descriptive study conducted from December 2017 to March 2018. CTG was done before each transvaginal administration of misoprostol in 113 primigravida patients at Paropakar Maternity Women's Hospital in Kathmandu. Variables studied were indications of induction, mode of delivery, Apgar score and neonatal admissions.

**Results:** 11.5% of CTGs were non-reassuring who underwent Cesarean Section and had significantly low Apgar at 1 minute but only 46% of neonates required resuscitation. Liquor was thick meconium in 61.5% of non-reassuring CTGs. Total twelve (10.6%) of neonate needed resuscitation of which six (6%) neonate in reassuring CTG where as 46.1% of neonate needed resuscitation in non-reassuring. NICU admission rate was 7.96% in total and 33.3% of neonate with non-reassuring CTG who needed resuscitation. However there was no neonatal mortality during this period.

**Conclusions:** Intrapartum cardiotocography can prevent fetal compromise early.

**Keywords:** Apgar score, caesarean section, cardiotocography, induction, resuscitation

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## INTRODUCTION

Induction is meant as to initiate contractions before spontaneous onset of labor with or without rupture of amniotic membrane. It is indicated when the benefit to either mother or fetus outweighs the further continuation of pregnancy.<sup>1</sup> The common indications include post-term pregnancy, pre-labor rupture of membrane, hypertensive disorder, oligohydramnios, and various maternal medical conditions.<sup>1</sup>

Cardiotocography (CTG) is an antenatal record of the fetal heart rate (FHR) that utilizes the physical principle of the Doppler Effect to detect fetal heart motion. RCOG has set criteria for interpretation of CTG that has been used as a guide to decide fetal status at that moment. CTG could be normal (reassuring), non-reassuring and abnormal based on various parameters like baseline FHS (110-160 bpm), variability (5-25), at least two accelerations and absence of deceleration.<sup>2</sup>

Misoprostol has been used for cervical ripening.

According to FIGO, misoprostol of 25 µg can be kept 6 hourly. Misoprostol (PGE1) is cheap, stable, easily administered (oral, vaginal or rectal) and has less side effects; has short induction-delivery interval; less need of oxytocin and less failure of induction in comparison to Dinoprostone (PGE2).<sup>1</sup>

Common indication for induction is postdated pregnancy and the incidence of induction of labour in primigravida 41 weeks and above ranges from 8% to 10% at Paropakar Maternity and Women's Hospital, Thapathali

## METHODS

A hospital based descriptive study was conducted in Paropakar Maternity and Women's Hospital, Thapathali from December 2017 to March 2018 following ethical approval. 113 primigravida with gestational period of 41 weeks or more of age between 20-34 years were induced with misoprostol, prostaglandins allergy, previous uterine surgery,

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medical conditions such as cardiac disease, asthma, glaucoma, thromboembolism, chronic renal disease, psychiatric illness, fetal anomaly and intrauterine fetal death, multiple pregnancies, cephalo-pelvic disproportion, obstetric conditions like antepartum hemorrhage, malpresentation and HIV, HBsAg reactive patients were excluded.

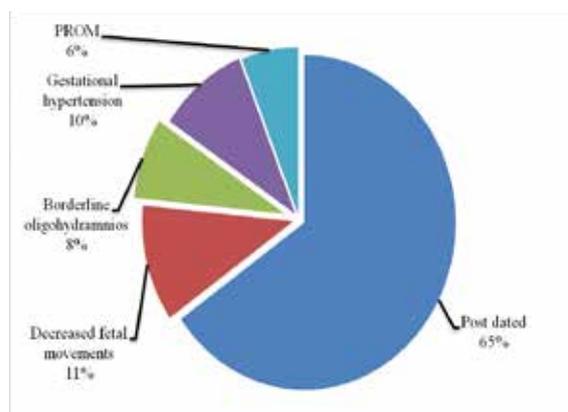
CTG was done before each transvaginal administration of misoprostol. Interpretation was done on basis of RCOG criteria. According to the hospital practice, two doses of the tab Misoprostol of 25 microgram were kept in the posterior fornix under aseptic precautions 6 hours apart.

Patient was followed up through the labour process and progress was plotted in partograph. AROM was done if SROM didn't occur in all the patients to note the color of liquor in active phase of labour. The mode of delivery was decided according to the partograph and obstetric indications. Apgar score at one and five minutes of birth was noted. All neonates were traced till discharge from the hospital. Neonatal admission, cause of admission, complications, duration of hospital stay and final outcome were monitored.

CTG pattern before misoprostol insertion was the main outcome indicator. Secondary measures were interval from the start of induction to vaginal delivery, induction to delivery time, mode of delivery, number of caesarean deliveries and maternal complications. Other outcome measures were Apgar score (at 5 minutes), NICU admission, neonatal death and incidence of meconium stained liquor. All data entered were analyzed by using SPSS 21 and results were expressed in the forms of tables, chart and diagrams.

## RESULTS

Among 113 cases of primigravida of 41 weeks and above of gestation, the median maternal age was  $23.42 \pm 2.9$  years (range 20-24) and the common indication for induction of labour was postdated (65%) followed by decreased fetal movements, gestational hypertension, boderline oligohydramnios and PROM. [Figure-1]

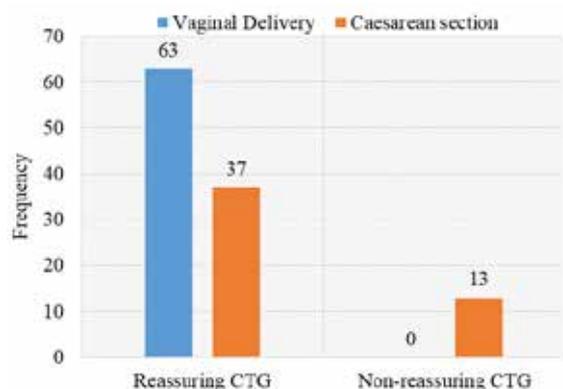


**Figure-1: Pie chart showing indication for induction (N=113)**

Seventy eight (69%) of cases required 2 doses of misoprostol where as thirty five(31%) of cases delivered with single dose of misoprostol and the mean induction to delivery time interval was  $19.98 \pm 10.58$  hrs. Sixty two (54.9%) cases delivered within 4-18hrs of induction and fifty one (45.1%) delivered after 18hrs of induction. There was no case of precipitate labour.

CTG done before first dose of misoprostol were reassuring. Before 2<sup>nd</sup> dose of misoprostol thirteen (14%) cases had non-reassuring CTG out of which five (38%) cases of decelerations, three (23%) fetal bradycardia and two (15.3%) fetal tachycardia. Liquor when evaluated showed sixty six (58.4%), twenty six (23%), twelve (10.6%) and one (1%) of clear, thick meconium, moderate and bloody respectively. Among patients with thick meconium stained liquor eight (44.4%) had non-reassuring CTG.

Sixty three (55.75%) patients delivered vaginally with three (5%) vaccum and one (1%) forceps and fifty (44.25%) underwent caesarean section. Among caesarean section thirty seven (74%) were done in reassuring CTG with other indications and thirteen (26%) for non-reassuring CTG. However there is no vaginal delivery among non-reassuring CTG. [Figure-2]



**Figure-2: Mode of deliveries according to CTG pattern**

Among 113 deliveries, twelve (10.6%) needed resuscitation and nine (7.96%) NICU admission. However there was no neonatal mortality during this period. [Table-1]

**Table-1: Neonatal parameters based on type of CTG**

Parameters	Reassuring CTG	Non-reassuring CTG	Total
Apgar 1min < 7	17	8	25
Apgar 1min ≥ 7	83	5	88
Apgar 5min < 7	9	3	12
Apgar 5min ≥ 7	91	10	101
Neonatal resuscitation	6	6	12
NICU admission	7	2	9

## DISCUSSION

Different studies have offered different and at times diametrically opposite recommendation.

In a study by Sandhu et al showed that CTG could be used to identify patients likely to develop adverse fetal outcomes and help in optimal utilization of labour resources.<sup>3</sup> For cervical ripening and labour induction, misoprostol is effective which has been endorsed by the ACOG<sup>4</sup> and RCOG.<sup>2</sup>

Elati A et al included mean age of 24.65±4.42yrs and all were primigravida similar to this study<sup>5</sup> but study by Nassar et al had done similar studies and the mean age was 29.3±6yrs, however they had included both primigravida as well multigravida.<sup>6</sup>

According to WHO recommendations the common indications for induction of labour includes postdated, PROM, hypertensive disorders, maternal

medical complications, fetal death, fetal growth restriction<sup>7</sup> which this study also showed. However, Sanchez-Ramos L et al<sup>8</sup> and Nasser et al<sup>6</sup> reported that pregnancy induced hypertension and medical conditions along with postdated pregnancy were the most common indications for labour induction respectively.

Study by Boucha F et al,<sup>9</sup> Nasser et al,<sup>6</sup> Bartusevicius et al<sup>10</sup>, and Osmundson et al<sup>11</sup> showed similar results as this study regarding induction to delivery time. In various studies by Rahman H et al<sup>12</sup>, Athota S et al,<sup>13</sup> Devane D et al,<sup>14</sup> Asghar S et al,<sup>15</sup> Alfirevic Z et al<sup>16</sup> and Umber F et al<sup>17</sup> had found that there was significant increase in the operative vaginal delivery and c-section associated with continuous cardiotocography.

Study by Athota S et al<sup>13</sup>, Umber F et al<sup>17</sup> Zahran et al<sup>18</sup> Syeda et al<sup>19</sup> Bartusevicius et al<sup>10</sup> had incidence of meconium stained liquor lower than compared to this study which were 18.6% in group 1 and 21.3% in group 2, 19 (19%), 13.8%, 16%, 27% respectively.

Our study compared the neonatal outcomes in terms of Apgar score at 1 minute, NICU admission, and meconium stained liquor. In the study by Athota S. et al<sup>13</sup> and Daly N et al<sup>20</sup> had similar findings as this study whereas study by Umber F et al<sup>17</sup> and Zahran et al<sup>18</sup> more number of normal babies with good APGAR.

In the study by Athota S. NICU admission rate was 13.3% in group 1 and 21.3% in group 2. Neonatal death rate was 4% in group 2 whereas there were no neonatal deaths in Group 1.<sup>13</sup> In study by Syeda et al<sup>19</sup> (1%), Zahran et al<sup>18</sup> (2%) of babies required NICU admission these results were similar to our study. In a study done by Chew FT et al showed higher perinatal death(1.5%).<sup>21</sup> But in a study done by Saastad E et al shows that only 4% newborn had an Apgar <7 at one minute and they recovered and all 92% of the newborn had Apgar > 7 at 5 minute.<sup>22</sup>

Our finding was similar with the study done by Rahman H et al<sup>12</sup> and Daly N et al<sup>20</sup> where the incidence of NICU admission was significantly high in babies delivered from mother with abnormal NST group 62% and 33.5% respectively.

Limitation of this study was that it was conducted within a short duration of time. The study was

conducted in a single center and sample size was small. The cause of NICU admission has not been mentioned clearly.

## CONCLUSIONS

Patients whose labour induction was done with misoprostol more than 50% in non-reassuring

CTG had thick meconium stained liquor. So by early detecting fetal compromise, we can reduce neonate morbidity and mortality. There is significant relationship between CTG results and mode of delivery or Apgar score like more vaginal deliveries and good Apgar score in reactive CTG. There was no neonatal mortality.

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