www.jmscr.igmpublication.org Impact Factor 3.79
ISSN (e)-2347-176x
crossref DOI: http://dx.doi.org/10.18535/jmscr/v3i8.06

IGM Publication Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Value of CTG M Onitoring in Misoprotol Induction Cases for Better Perinatal Outcome

Authors
Athota Smitha[*1], Nagasree. M.G.S[2]
[1*]Assistant Professor, [2]Assistant Professor
Department of Obstetrics and Gynaecology, Konaseema Hospital And Research Foundation, Amalapuram, East Godavari, A.P.
Corresponding Author
Dr. Athota Smitha
Assistant Professor, Depat of Obstetrics and Gynaecology , KIMS Medical College and research foundation.
Email: *dr_smitha98@yahoo.co.in*

ABSTRACT
Purpose: *To study the efficacy of Misoprostol for induction of labour, to know induction delivery interval in the patients induced with misoprostol and to assess the role of intermittent CTG monitoring in induction of labour.*
Materials and methods: *During the 8 months study period a total number of 150 women were studied. 25 mcg of misoprostol was used for induction of labour. 75 women in Group-1 FHR was monitored using intermittent CTG and group-2 other 75 with intermittent auscultation using a stethoscope. These women were compared with respect to age, parity, cervical status, mode of delivery, induction delivery interval, the total number of doses required, incidence of meconium, various fetal heart rate patterns, maternal and fetal complications.*
Results*: Induction of labour was required in 60% in group 1 and 76% in group 2 who were primigravidae. The incidence of meconium stained liquor was 18.6% in group 1 and 21.3% in group 2. The operative vaginal delivery rate was 4% in group 1 and 2% in group 2. The incidence of APGAR <7 was 5.3% in group 1 and 9% in group 2. 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.*
Conclusion*: Intermittent CTG monitoring of fetal heart rate is better than intermittent auscultation in deducting fetal distress early in labour and thus avoiding neonatal morbidity and mortality.*
Key words: *Misoprostol, CTG monitoring, Fetal heart rate*

INTRODUCTION

Induction of labour constitutes initiating effective uterine contractions which will help in cervical dilatation and eventually ending in delivery of the baby either vaginally or abdominally. A number of clinical conditions often pose potential risks to the mother and the baby if pregnancy is continued to term (40 weeks) and beyond and so induction of labour is indicated or opted for. Induction of labour is indicated when continuation of pregnancy is associated with increased risks to the mother or fetus. Labour may be induced prematurely at or near term or after.

Various indications for induction of labour are toxemia of pregnancy, intepartum haemorrage, intrauterine death, post dated pregnancy, premature rupture of membranes, severe intrauterine growth retardation, significant maternal medical problems such as diabetes mellitus with pregnancy at term. Fetal congenital malformations like hydrocephaly, anencephaly etc.

Absolute contraindications to labour induction are placenta previa or vasaprevia, transverse fetal lie, prolapsed umbilical cord or cord presentation, prior classical uterine incision, pelvic structural abnormality, active genital infections and invasive cervical cancer.

There are other methods of induction of labour were as In the present study misoprostol, PGE1 analogue 25 mcg vaginally was used for induction of labour. The main advantages of PGE1 in comparison to PGE2 are stability at room temperature, inexpensive, readily accessible, reduced induction – delivery interval and reduced need for oxytocin augmentation because it has also got uterine contractile property in addition to ripening of the cervix. The disadvantages of PGE1 are hyperstimulation, fetal distress / death, meconium stained liquor.

In the current situation, almost all women are monitored cardiotocographically, which probably significantly increases the number of Caesarean sections for "fetal indications"[1]. FIGO guidelines for reading CTG records introduce in obstetrics unique terminology and interpretation ante and intrapartal cardiogram. These guidelines are descriptive in character, and allow assessment of CTG as normal, suspected and pathological [2].

Advantage of cardiotocography as generally accepted, and certainly the most widely used non-invasive method of monitoring fetal comes out from the fact that for its implementation there are no contraindications and the CTG findings can be written that is documented [3]. There is significant correlation between pathological CTG and the state of the newborn evaluated by Apgar score [4], the existence of acidosis[5], hypoxic-ischemic encephalopathy [6] and subsequent neuromotor development [7].

The present study was undertaken to detect hyperstimulation and fetal distress early in labour using intermittent cardiotocogrphy and intervention undertaken to reduce the perinatal mortality and morbidity. The incidence of fetal distress and meconium stained liquor and fetal demise is more with 50 mcg misoprostol, but it is less with 25 mcg . so this prospective study is conducted with 25 mcg misoprostol.

MATERIALS AND METHODS

This study was conducted at Konaseema hospital and research foundation, Eastgodavari, Andhrapradesh, from May 2014 to December 2014. Study include 150 women who were randomly selected for induction of labour for various reasons. 25 mcg misoprostol intravaginally was used for induction of labour. These women were divided into two groups.

First group consisted of women who were followed with intermittent CTG monitoring of fetal heart rate every 2 to 2.5 hrs till delivery. In between the recordings fetal heart rate was auscultated every 15 – 30 minutes. Intermittent CTG was used but not continuous CTG monitoring because it was cost effective. Second group consisted of women in whom FHR was monitored by intermittent auscultation using a stethoscope. It was done every 30 minutes in the first stage of labour and every 15 minutes in the active stage and for a full minute after a contraction.

Inclusion criteria: Those women with 37 completed weeks, singleton pregnancy, vertex presentation and with no contraindications for vaginal delivery and after eliminating fetal compromise by doing a baseline NST and preinductional USG.

Exclusion criteria: Those women less than 37 completed weeks, twin pregnancy , abnormal presentation of fetus, with contraindications for vaginal delivery, Fetuses with congenital anomalies and those with fetal compromise were eliminated.

The gestational age was confirmed by USG along with it liquor content and placental localization and placental insufficiency was ruled out. Women who were taken as a part of the study were subjected to basic pelvic examination for pelvic assessment and to know Bishops score. Women with advanced Bishop's score were also included in the study. Each woman had received 25 mcg of misoprostol (every 3rd hourly) placed digitally in the posterior fornix of the vagina under strict aseptic precautions. Then FHR monitoring is done by either intermittent CTG or intermittent auscultation.

The progress of labour assessed every 3rd hourly before repeating the next dose of 25 mcg of misoprostol, both abdominally and vaginally. In group 1 if FHR pattern comes as suspicious or abnormal then early ARM is done to note the colour of liquor. If clear liquor was obtained then patient was allowed to continue vaginal delivery and labour followed with CTG monitoring. if liquor was meconium stained , amnioinfusion is given and depending on whether heavy MSL or light MSL and whether early in labour or late in labour patient was taken for caesarean section.

In group 2 FHR monitored with stethoscope and ARM was done at 3- 4 cm of cervical dilatation and depending on the colour of liquor and its correlation with FHR. Accordingly patient was taken for caesarean section or allowed to continue for vaginal delivery.

After the baby is delivered, birth APGAR score at 1 min and 5 minutes was recorded. Babies with meconium stained liquor and any other complication were shifted to NICU for observation of condition till the time of discharge.

Outcome is measured in terms of:

1. Time interval from the onset of induction to delivery.
2. Number of misoprostol doses.
3. Any need for augmentation with oxytocin
4. Mode of delivery vaginal/ instrumental or caesarean section and indication for the same.
5. Uterine contraction abnormalities.
6. FHR abnormalities on CTG tracings.
7. Incidence of meconium stained liquor in relation to various abnormal CTG tracings.
8. Incidence of fetal distress.
9. Perinatal outcome in respect to APGAR score as associated with admission to NICU and perinatal mortality.
10. post partum bloodloss.

RESULTS

During the 8 months study period a total number of 150 women were studied. 25 mcg of misoprostol was used for induction of labour. In 75 women FHR was monitored using intermittent CTG and rest 75 with intermittent auscultation using a stethoscope. These women were compared with respect to age, parity, cervical status, mode of delivery, induction delivery interval, the total number of doses required, incidence of meconium, various fetal heart rate patterns, maternal and fetal complications.

Table – 1: Demographic Characteristics

Characteristics	Group – I	Group – I I
Age in Yrs		
< 20 Yrs.	1 (1.3%)	9 (12%)
20 – 25 Yrs.	54 (72 %)	53 (70.6%)
26 – 30 Yrs.	15 (20%)	12 (16%)
> 30 Yrs.	5 (6.6%)	1 (1.3%)
Patient information		
Booked	34 (45.3%)	31 (41.3%)
Un-Booked	41 (54.6%)	44 (58.6%)
Gravida		
Primi gravid	45 (60%)	57 (76%)
Second	21 (28%)	14 (18.6 %)
Third	6 (8 %)	2 (2.6%)
Fourth	3 (4%)	2 (2.6%)
Bishop's score		
unripe cervix ≤ 4 primi multi	 12(16%) 13(17.3%)	 23(30.6%) 6(8%)
ripe cervix ≥ 4 primi multi	 33(44%) 17(22.6%)	 34(45.3%) 12(16%)

Table – 1 shows that induction of labour was required in most of Un-Booked Cases, Shows that 90 % of the Cases belong to the age group 20 – 30 yrs. This shows 60 % in Group – I and 76 % in Group – II were Primigravidae who required induction of labour.

It shows that 66.6% in Group – I and 61.3% cases in Group – II had ripe cervix at the beginning of induction of labour.

Table–2: Indications For Induction of Labour:

Indications	Group – I	Group – II
Post Dated Pregnancy	34 (45.3%)	46 (61.3 %)
Preeclampsia	25 (33.3 %)	20 (26.6%)
Premature Rupture of Membranes	13 (17.3%)	8 (10.6%)
Oligohydramnios	3 (4 %)	1 (1.3 %)

The most common indication for induction of labour are, Post dated pregnancy, preeclampsia and premature rupture of membranes, Preeclampsia was seen in 33.3 % in Group-I and 26.6% in Group – II.

Table–3: Doses and Time of Action with Misoprostol

	Group – I		**Group – II**	
	Primi	**multi**	**Primi**	**multi**
Number Of Doses Of Misoprostol (25 mcg)				
1 Dose	23(30%)	23(30%)	17 (22%)	7(9%)
2 Doses	17(22%)	6(8%)	24 (32%)	9(12%)
3 Doses	5 (6%)	1(1.3%)	16(21 .3%)	2(2.6%)
Induction – Delivery Interval (Time In Hours)				
< 6 Hrs.	17(22.6)	3(4%)	3(4%)	1(1.3%)
7 – 12 Hrs.	17(22.6%)	22(29.3%)	21(28%)	8(10.6%)
13 – 18 Hrs.	4(5.3%)	3(4%)	11(14.6%)	4(5.3%)

Table-4: Multifactorial Analyses In Group - 1

Baseline FHR	**No. of Cases**	**% (Percentage)**
120 – 160	69	92
100- 119	2	2.6
161- 180	4	5.3
< 100	-	-
> 180	-	-
Distribution Of Accelerations		
0	4	5.3
1-3	10	13.3
>3	61	81.3
Distribution Of FHR Variability		
< 5	2	2.6
5 – 10	4	5.3
> 10	69	92
Distribution Of Decelerations		
>3	14	18.6
1-3	4	5.3
0	57	76

Table-5: Incidence of Meconium Stained Liquor In Various FHR Patterns In Group 1

	Normal FHR	**Suspicious FHR**	**Abnormal FHR**
Meconium Stained Liquor In Various FHR Patterns			
Clear liquor	53(70.6%)	1(1.3%)	7(9%)
MSL early			
Thin	1(1.3%)	2(2.6%)	3(4%)
Thick	----	----	4(5%)
Late	3(4%)	1(1.3%)	
Mode Of Delivery In Various FHR Pattern			
SPVD	53(70.6%)	4(5%)	4(5%)
Outlet forceps	3(4%)		
Caesarean section	1(1.3%)		10(13.3%)

Table 6: Neonatal Complications

Birth weight	**Group I**	**Group II**
< 2kg	3(4%)	2(2.6%)
2-2.5kg	4(5.3%)	11(14.6%)
2.6 – 3 kg	53(70.6%)	38(50.6%)
>3 kg	15(20%)	24(32%)
Apgar scores		
< 7	4(5.3%)	7(9%)
>7	71(94.6%)	68(90.6%)
Admission to NICU	14(18.6%)	13(17.3%)
Neonatal deaths	-	3 (4%)

Majority of babies were admitted to NICU in v/o MSL and the other reasons being low APGAR , low birth weight and delayed cry. The perinatal mortality was 4% in group 2 whereas there were no neonatal deaths in group-1**.**

Table-7 : Incidence Tachy Systole and Hypertonicity In Group 1

	No. Of Cases	**Colour Of Liquor**	
		Clear	**MSL**
Tachysystole	3(4%)	3(4%)	
Hypertonicity	12(16%)	7(9%)	5(6%)
Hypertonicity + tachysystole	9(12%)	6(8%)	3(4%)

Table-8: Risk Factors Associated With Abnormal CTG

Preeclampsia	8(57%)
Cord around the neck	6(42.8%)
Oligohydramnios	1(7.1%)
Post dates	4(28.5%)

Abnormal CTG was associated with 57.1% of cases of preeclampsia and cord around the neck was seen in 42.8% of abnormal CTG tracings.

DISCUSSION

Electronic fetal monitoring for recording of the fetal heart rate in labour is an useful aid for early diagnosis of fetal compromise or fetal distress. The recording of the FHR which provides information about baseline variability, reactivity and deceleration not detectable with intermittent auscultation, led obstetricians to expect improved diagnosis of fetal hypoxia in labour when compared with intermittent auscultation.

Therefore this study was conducted to compare intermittent CTG monitoring of induced labour with Misoprostol with those monitored by intermittent auscultation. The incidence of meconium stained liquor, mode of delivery and perinatal outcome in terms of apgar scores, NICU admissions and perinatal deaths were compared.

Induction of labour was required in 45.3% of booked cases in group 1 and 41.3% of booked cases in group 2. In most of unbooked cases the main reason was post dated pregnancy which was confirmed by early ultrasonography and menstrual history. In booked cases the most common indication was toxemia of pregnancy.

Analyzing the age wise distribution, induction of labour was common in age group 20- 25 yrs which constituted 72% in group 1 and 70.6% in group 2. 60% in group 1 and 52% in group 2 were primigravidae who required induction of labour. Comparing the Bishop's score 66.6% in group 1 and 61.3% cases in group 2 had a Bishops score >4 at the beginning of labour. 44% in group 1 and 45.3% in group 2 were primigravidae with Bishops score >4.(Table-1)

Analyzing the various indications for induction of labour: in group 1 most common indications were preeclampsia (33.3%), post dated pregnancy (32%) and premature rupture of membranes (17.3%). In group 2 the most common indications were post dated pregnancy (50.6%), preeclapsia (26.6%) and premature rupture of membranes (10.6%).(Table-2)

91% 0f cases in group 1 and 76% of cases in group 2 required only 2 doses of misoprostol. The average number of doses of Misoprostol required in group 1 was 1.5 and group 2 it was 2.0.In group 1 16% of cases and 21.3% in group 2 required oxytocin augmentation along with misoprostol, of these 91% in group 1 and 95% in group 2 were primigravidae. This was compared to Sanchez – Ramos et al[8] where 29.4% of cases required oxytocin augmentation. (Table-3)

As shown in table 3, 94 % in group 1 and 80% of cases in group 2 delivered within 24 hrs. In group 1 78.6% and 43.6% in group 2 delivered within 12 hrs of starting induction. This was comparable to Sanchez –Ramos etal[8] where 37.6% cases delivered in <12 hrs. The average induction delivery interval was 9.8 hrs in group 1 and 15.4 hrs in group 2.

Analyzing the various modes of delivery, the caesarean section rate was 14.6% in group 1 and 18.6% in group 2(Table-4). The operative vaginal delivery rate was 4% in group 1 and 2% in group 2. Comparison of caesarean section rates in various studies with present study where CTG monitoring was used[,9,10,11].

Studies	Caesarean Section Percentages
Chauhan SP etal[12]	52%
Mahomed etal[13]	28%
Garcie etal[14]	22%
Wing etal[15]	19.3%
Alexander etal[16]	18%
Present study	14.6%

This shows that even though intermittent CTG was used there was no increase in caesarean section rate.

In group 1 early ARM was done when suspicious or abnormal FHR patterns were detected, thus detecting fetal distress early. But in group 2 ARM was done at 3 cm of cervical dilatation (Table-5). The incidence of meconium stained liquor was 18.6% in group 1 and 21.3% in group 2. In group 1 when early ARM was done 13.3% had meconium stained liquor early in labour. This has led to decreased number of babies with apgar score <7, whereas in group 2 more cases of MSL was detected late in labour resulting in more number of babies with apgar score <7. (Table-6)

The various uterine contractile abnormalities seen were in group 1 Tachysystole – 4%, hypertonicity -16% and both were seen in 16% of cases. Immediately after recognizing these, active intervention was undertaken and the incidence of meconium stained liquor was less (10%).(Table-7)

Comparison of tachysystole and hypertonicity in various studies

Various studies	**Tachysatole**	**Hypertonicity**
Sanchez Ramos etal[11]	34.4%	-
Toppozada etal[17]	10%	30%
Alexander etal[15]	9%	17%
Present study	16%	16%

The incidence of meconium stained liquor in various FHR patterns in group 1 were 5.3% in normal FHR, 3.9% in suspicious FHR and 9% in abnormal FHR. In those with normal FHR most of MSL occurred late in labour and none had apgar score <7.

The various modes of delivery in various FHR patterns are LSCS rate was 13.3% in abnormal CTG and only 1.3% in normal FHR pattern.

The various indications for caesarean section in group 1 are: abnormal CTG with fetal distress in 63.63%, failure to progress (18,1%) and failed induction (18.1%). In group 2 various indications are fetal distress in 57.14% , failure to progress (21.4%) and failed induction (21.4%).(Table-8)

In the present study, apgar score <7 at 5 min was 5.3% in group 1 and 9% in group 2. This shows that detecting fetal distress early, the birth apgar score can be improved. The admission rate to NICU was 13.3% in group 1 and 21.3% in group 2. This was similar to that of Alexander et al who reported the number of babies with apgar <7 was 2% and NICU admission rate to be 10%.

In the present study there were no neonatal deaths in the intermittent CTG group, but there were 3

neonatal deaths in the intermittent auscultation. In two cases where 2 doses of misoprostol was used, MSL was detected late in labour. outlet forceps was applied for both cases. The apgar score was 2 at 1min and babies could not be revived. In one case preeclampsia was present. The third was epilepsy complicating pregnancy. MSL was found in late stage of labour, apgar <7 and baby died after 1 day i.e., early perinatal death due to meconium aspiration syndrome.

In the present study neonatal death rate was 4% in group 2 which was comparable to that of Mahomed et al[12] where neonatal death rate was 2.5% in the CTG group and 4.4% in the intermittent auscultation group. The neonatal deaths were due to fetal asphyxia and delay in delivery.

Hence, intermittent CTG monitoring of fetal heart rate is better than intermittent auscultation in deducting fetal distress early in labour and thus avoiding neonatal morbidity and mortality.

CONCLUSION

Hence to conclude, intermittent CTG is an useful aid in detecting fetal distress and early fetal compromise. Therefore with early intervention neonatal morbidity and mortality is reduced. The results were comparable to continuous CTG monitoring. Intermittent CTG is cost effective than continuous CTG monitoring and it suits to our hospital needs where induction rate is 10-15% and with a delivery rate of 2500 per month. Therefore intermittent CTG is better than intermittent auscultation.

REFERENCES

1. Dražančić A. Kardiotokografija - njeni dosezi i pretkazljivost. Gynaecol Perinatol. 2006;15(2):71–87.
2. Harni V, Gudelj M, Šemnički N. Kardiotokografija: od otkrića kucaja čedinjeg srca do FIGO smjernica.Gynaecol Perinatol. 2006;15(1):19–29.
3. Low JA. Intrapartum fetal asphyxia: Definition, diagnosis and classification. Am J Obstet Gynecol. 1999;176(5):957–959.
4. Wilken HP, Hackel B, Wilken H. Klinishe Erfahrungen mit dem antepartalen CTg - Auswertererfahren nach fisher, Hammacher, Hodr und Kubli. Zentralbl Gynekol. 1980;102:909–914.
5. Ivanišević M. Kardiotokografija i pH-metrija kod fetalne asfiksije i acidoze. XVII Perinatalni dani.Gynaecol Perinatol. 1999;(Suppl.1):61–64.
6. Škrablin S, Dražančić A, Letica-Protega N, Tadić V. Trudnoća i porod u novorođenčadi s encefalopatijom u ranom neonatal-nom razdoblju. LiječVjesn. 1992;114:10–15.
7. Nelson KB, Dambrosia JM, Tiny TY, Grehter JK. Uncertain value of electrinc fetal monitoring in predicting cerebral palsy. N Engl J Med. 1996;334:613–618.
8. Sanchez-Ramos L, Kaunitz AM , Del Valle GO, Delke I, Schroeder DA, Briones DK, Labour induction with the PGE1 Analogue. Misoprostol versus oxytocin; a randomized trail. Obstet Gynecol 1993 ; 332- 336.
9. Sifakis S, Angelakis E, Avgoustinakis E et al. Cochrane meta-analysis on misoprostol. A randomised comparison between intravaginal misoprostol and prostaglandin E2 for labour induction. Arch Gynaecology Obstet 2007;27:263- 267.
10. Dodd JM, Crowther CA, Robinson JS, Oral misoprostol for induction of labour at term: randomized controlled trial. BMJ 2006; 332: 509 – 513. 2.
11. G.M ires, F. Williams, P Howie .Randomised controlled trail of CTG versus Doppler auscultation of fetal heart in low risk obstetric population. BMJ 2001: 16 : 322
12. Chauhan SP, Sanderson M, Hendrix NW, et al. Perinatal outcome and amniotic fluid index in the antepartum and intrapartum periods: a meta-analysis. Am J Obstet Gynecol. 1999;181(6):1473–1478

13. Mahomed K, Nyoni R, Mulambo T et al. (1994) Randomised controlled trial of intrapartum fetal heart rate monitoring. British Medical Jou. 308(6927): 497-503
14. Garcia J, Corry M, Macdonald D, Elbourne D et al. (1985) Mothers' views of continuous electronic fetal heart monitoring and intermittent auscultation in a randomised controlled trial. Birth 12:79-86
15. Wing Deborah A. MD : Ortiz – Omphroy , Grabriele. MD: Paul, Richard H. MD. Effect of vaginal misoprostol versus dinoprostone on cervical ripening and labour induction.AJOG(1997) 177(3) :612-618.
16. Alexandre Megalo, Patrick Petignat, Patrick Hohlfeld, Influence of misoprostol or prostaglandin E2 for induction of labor on the incidence of pathological CTG tracing: a randomized trial, European Journal of Obstetrics & Gynecology and Reproductive Biology, vol.116,1, 2004, p. 34-38
17. Toppozada M.K, M.Y.M.Anwar, H.A. Hassan, W.S.EL.Gazaerly, International journal of gynecology and obstetrics 56 (1997) 135- 139.