ORIGINAL ARTICLE

Methods of Induction of Labour at the University Of Maiduguri Teaching Hospital, Maiduguri: A 4-Year Review

Bako B G *MBBS, FWACS*, **Obed J Y** *MBBS, FWACS*, **Sanusi I** *MBBS*
Department of Obstetrics and Gynaecology, University of Maiduguri Teaching Hospital, P.M.B 1414, Maiduguri, Borno State, Nigeria

Abstract

Background: *Induction of labour is an important intervention in obstetrics. Misoprostol is increasingly being used for induction of labour in many obstetric units and it may replace the traditional Foleys catheter/oxytocin protocol.*

Method: *This was a retrospective study of the 3 methods of induction of labour used at the University of Maiduguri Teaching Hospital (UMTH). A total of 468 women had induction of labour during the study period. Two hundred and twenty eight of them had induction with 50µg of misoprostol, 57 women had 100µg of misoprostol while 183 women had extra-amniotic Foleys catheter with oxytocin infusion.*

Result: *Induction of labour constituted 6.6% (468/7086) of all deliveries during the study period. The commonest indication for induction of labour was prolonged pregnancy in 46.8%, followed by pregnancy induced hypertension in 33.5%.*

There was no difference in the achievement of vaginal delivery between the 3 methods of induction of labour (x^2=1.13, p=0.57). The mean induction delivery time was shortest for those induced with 100µg of misoprostol (6.38±2.25 hours), followed by 8.16±3.58 hours in those induced with 50ug of misoprostol and 9.73±4.32.43 hours in those induced with Foleys catheter/oxytocin (p<0.001). The babies delivered to women induced with 100µg of misoprostol were more asphyxiated 12.3% (7/57) compared to 9.2% (21/228) and 6.6% (12/183) in the 50ug misoprostol and Foleys catheter/oxytocin respectively and was statistically significant (x^2=23.08, p=0.01). The short induction delivery time in the group with 100µg of misoprostol was advantageous but there was an associated higher risk of birth asphyxia, stillbirth, uterine hyperstimulation, perineal tear and uterine rupture. The normal delivery outcome was not significantly different from those induced with 50µg of misoprostol and those induced with Foleys catheter/oxytocin (x^2=1.24, p=0.94). Normal delivery rate was significantly higher in those induced with 50µg of misoprostol compared with those induced with 100µg of misoprostol (x^2=14.38, p=0.01)

Conclusion: *Misoprostol appears to be safe and may be a suitable alternative for induction of labour by the traditional Foleys catheter/oxytocin protocol. The 50µg dosing of misoprostol is safer than the 100µg.*

Key words: *Misoprostol, Foleys catheter, Oxytocin, UMTH.*

Date accepted for publication 11th March 2008
Nig J Med 2008; 139 - 142

INTRODUCTION

Induction of labour is always an obstetric challenge, more so in a woman with unfavourable cervix. Over the years various agents have been use to ripen the cervix in order to achieve a successful induction of labour. Mechanical methods such as amniotomy, natural and synthetic laminaria-tent and balloon-tipped catheter are effective in causing cervical ripening but they have also been used for many years to induce labour[1]. Foleys catheter with 30 50 ml balloon is commonly used to cause mechanical dilatation of unripe cervix[2], but in most cases oxytocin is required to accomplish the process of labour induction. This protocol is cumbersome and puts a lot of demand on the staff especially with regards to mixing and monitoring the oxytocin titration.

In 1968, Karim and colleagues were the first to report the use of prostaglandin for labour induction[3] and subsequently Margulies et al in 1992 suggested that the synthetic analogue of PGE1, Misprostol (Cytotec, Searle Pharmaceuticals, Chicago, IL) might be effective for induction of labor[4]. The misoprostol has the advantage of achieving cervical ripening similar to that of Foleys catheter and at the same time induce labour.[5-9] More recently transvaginal misoprostol has gained acceptance as an effective and safe method of induction of labour.[10] The misoprostol is increasingly being used for induction of labour in many obstetric units and because of its one-stop action it may replace the traditional Foleys catheter/oxytocin method.

The objective of induction of labour is to achieve delivery of a potentially at risk baby that will be better managed

Correspondence to **Dr Baba Gana Bako,** *E-mail: babaganabako@yahoo.com*

out of the uterus than inside as well as to reduce maternal morbidity. Thus even today, the main purpose of induction of labour is to effect delivery as a strategy to prevent perinatal morbidity and mortality. To achieve this goal, a delicate balance between uterine activity, cervical dilatation rate and response of the fetus should be taken into consideration.[11]

The aim of this study was therefore to review the methods of induction of labour in our institution and to determine which method was more effective and had fewer complications.

SUBJECTS AND METHODS

This retrospective study included 468 women who had induction of labour in the department of obstetrics and gynaecology of the University of Maiduguri Teaching Hospital over a 4 year period from January 2002 to December 2005. There were 228 women who had induction of labour with 50 µg of misoprostol placed intravaginally. Because 50-µg tablets were not available, a ¼ of the 200µg tablet was sliced by the pharmacist, using a pill cutter. Fifty seven women were induced with 100µg (half tablet) placed in the posterior fornix of the vagina. The procedure was done under aseptic condition with the patient placed in dorsal position. A vaginal examination was done to assess the Bishop's score then misoprostol was placed at the posterior fornix. After the procedure the patients were asked to stay in recumbent position for 30 minutes. Fetal heart rate was monitored using intermittent auscultation with pinnard stethoscope every 15 minutes and uterine contractions monitored every 30 minutes for 2-4 hours before patients were allowed to ambulate. The misoprostol was repeated every 6 hours for a maximum of 4 doses. Subsequent doses were withheld if labour ensued.

A 16F Foleys catheter with a 30-50 ml balloon was used in 183 women. The patients were placed in dorsal position and a sterile speculum passed. The catheter was inserted into the extra-amniotic space. Care was taken to avoid contact of the vagina or ectocervix with the catheter as it was passed into the cervical canal under direct visualisation. Once past the internal os, 30-50 ml of sterile water was used to inflate the balloon. Traction was applied by taping the end of the catheter to the medial side of the knee or thigh and the catheter was allowed over night (8-12 hours) .[12] The following morning vaginal examination was repeated to assess the cervix and also check for expulsion of the balloon. Once the catheter was expelled from the cervix and/or the Bishops score >6, intravenous oxytocin was begun and titrated. The oxytocin was started at 2mu/min and increased every 30 minutes to 4, 8, 16, 32 mu/min until adequate uterine contractions were achieved. Labour was monitored using the WHO partograph. Only patients with unfavourable cervix (Bishops score of 4 or less) and without spontaneous labour before the induction of labour were included in the study. Information including; age, parity, indication for induction, method used, induction delivery interval and birth outcome were obtained from the obstetric ward register, labour ward register, operation theatre register and the patient's case notes recovered from the medical records department. These information were coded and transferred on to a proforma designed for the study, this was then entered into an IBM compatible PC for analysis using SPSS version 11.0 for window statistical package. Analysis was carried out for descriptive statistics and presented as tables. Frequencies and proportions were compared using Chi-square test. While two means were compared using student ttest and multiple means compared using ANOVA. Statistical significance was set at $p<0.05$.

Efficacy of the methods was measured in terms of achieving vaginal delivery and safety in birth outcome. Normal vaginal deliveries were those vaginal deliveries without any maternal or perinatal morbidity. Babies born with Apgar scores of 7-10 were considered normal, while asphyxiated babies were neonates with 5th minute Apgar scores less than 7. Ethical clearance was obtained from the hospital Ethics and Research Committee.

RESULTS

There were 468 cases of induction of labour out of the 7,086 deliveries during the study period, giving an incidence of 6.6%. The mean age of the patients was 29.7 ± 13.4 years and 49.8% were nulliparous. Vaginal delivery was achieved in 90.8% (425/468) of all cases. The common indications for induction of labour were prolonged pregnancy (46.8%) and pregnancy induced hypertension (33.5%). Intrauterine growth restriction, diabetes mellitus, intrauterine fetal death and other disorders of pregnancy constituted the remaining 19.7% as shown in Table I.

Table I: Indications for Induction of labour

	Indication	Frequency	Percentage
1.	Prolonged pregnancy	219	46.8%
2.	Pregnancy induced hypertension	157	33.5%
3.	Intrauterine growth restriction	24	5.1%
4.	Diabetes mellitus	24	5.1%
5.	Intrauterine fetal death	21	4.5%
6.	Others*	23	4.9%
	Total	468	100%

(*others= Bad obstetrics history, antepartum haemorrhage, elective inductions)

Table II: Methods of Induction of labour and subsequent course of labour

Method of IOL	VD (%)	C/S (%)	Total (%)
1. 50ug	210(92.1)	18(7.9)	228(100)
2. 100ug	52(91.2)	5(8.8)	57(100)
3. FCO*	163(89.1)	20(10.9)	183(100)
Total	425(90.8)	43(9.2)	468(100)
	z=1.13	p=0.57	

VD: vaginal delivery. C/S: caesarean section. FCO= Foleys catheter/oxytocin

Table III: Methods of induction of labour and induction delivery interval.

Method of IOL	Mean IDI** in hours
1. 100 g	6.38±2.25
2. 50 g	8.16±3.58
3. FCO*	9.73±4.32
P<0.001	

*FCO= Foleys catheter/oxytocin, **IDI=induction delivery interval

Table IV: Complications/Delivery outcome versus method of Induction of labour.

Complication	50ug (%)	100ug (%)	FCO* (%)	Total(%)
1. Birth asphyxia	21(9.2)	7(12.3)	12(6.6)	40(8.5)
2. Stillborn	1(0.4)	2(3.5)	1(0.5)	4(0.8)
3. Uterine rupture	3(1.3)	1(1.8)	2((1.1)	6(1.3)
4. Hyperstimulation	5(2.2)	5(8.8)	3(1.6)	13(2.8)
5. Perineal tear	11(4.8)	6(10.5)	9(4.9)	26(5.6)
6. Normal	187(82.1)	36(63.2)	156(85.2)	379(80.9)
Total	228(100)	57(100)	183(100)	468(100)
z=21.48, p=0.02				

*FCO=Foleys catheter/oxytocin

Two main methods of induction of labour were used, transvaginal misoprostol in 60.9% and intracervical Foleys catheter/oxytocin in 39.1%. Two different doses of misoprostol were used, 50ug in 48.7% and 100ug in 12.2% of cases.

Table II shows the methods of induction of labour and subsequent course of labour. Vaginal delivery was achieved in (92.1%)210/228 of those induced with 50µg of misoprostol, (91.2%)52/57 among those induced with 100µg of misoprostol while (89.1%)163/183 achieved vaginal delivery in the Foleys catheter/oxytocin group. (X^2=1.13, p=0.56).

Table III: Shows the induction delivery interval in hours. The mean induction delivery interval was shortest for those induced with 100µg (6.38±2.25 hours) followed by 8.16±3.58 hours in those induced with 50µg of misoprostol. Those induced with Foleys catheter/oxytocin had the longest induction delivery time of 9.73±4.32 hours (P<0.001).

Table IV compares the delivery outcome with the method of induction of labour. Significantly more of the babies delivered to women induced with 100 µg of misoprostol were asphyxiated 12.3% (7/57) compared to 9.2% (21/228) and 6.6% (12/183) in the 50 µg misoprostol and Foleys catheter/oxytocin respectively (x^2=21.48, p=0.02). Similarly perineal tear was highest among those induced with 100 µg of misoprostol 10.5% (6/57) compared to 4.8% (11/228) and 4.9% (9/183) of those induced with 50 µg of misoprostol and Foleys catheter/oxytocin respectively.

The delivery outcome were normal in 85.2% (156/183) of those induced with Foleys catheter/oxytocin and 82.1% (187/228) of those induced with 50 µg of misoprostol while only 63.2% (36/57) had normal deliveries. The normal delivery outcome was not statistically different in those induced with 50µg of misoprostol and those induced with Foleys catheter/oxytocin (x^2=1.24, p=0.94). Normal delivery rate was significantly higher in those induced with 50µg of misoprostol compared with those induced with 100µg of misoprostol (x^2=14.38, p=0.013)

DISCUSSION

Induction of labour accounted for 6.6% of all deliveries during the study period. This is higher than 3% reported in Sokoto, Nigeria[13] but falls within the range of 5 15% reported in Ghana[14]. The higher induction rate may be due to a more liberal induction of labour, especially for indications like prolonged pregnancy in our institution. There is also a recent increase in the use of misoprostol for induction of labour because of the perceived safety of the use of the drug, in addition to its cheapness and availability. The safety of the use of misoprostol and Foleys catheter/oxytocin for induction of labour in low resource setting like ours has been reported by other workers[12,15].

Over 80% of the inductions of labour in our unit were done for prolonged pregnancy and pregnancy induced hypertension. This study showed an increase in induction of labour for prolonged pregnancy which was the second leading indication for induction of labour in an earlier study in the same institution when it accounted for 29.5%[12] against 46.8% in this study.

The 3 methods of induction of labour had similar efficacy in achieving vaginal delivery as there was no significant difference in the rate of vaginal delivery and caesarean section (x^2=1.13, P=0.57). However, induction with 100µg of misoprostol showed a shorter

induction-delivery interval compared with induction of labour with either 50µg of misoprostol or Foleys catheter/oxytocin(P<0.001). The short induction-delivery time in the group with 100µg of misoprostol was advantageous but there was an associated higher rate of birth asphyxia of 12.3% compared to 9.2% and 6.6% in the 50µg misoprostol and Foley catheter/oxytocin respectively (x^2=23.08, P=0.01). Similar finding of better fetal outcome and less need for resuscitation when 50µg of misoprostol is compared with 100µg has been reported in Kinsgton, Jamaica[16]. In the same vein there was also a higher rate of perineal tear as 10.5% of those induced with 100µg of misoprostol sustained tears compared to 4.8% and 4.9% of those induced with 50µg of misoprostol and Foleys catheter/oxytocin respectively. Induction with 50µg of misoprostol resulted in shorter induction-delivery intervals than the Foleys catheter/oxytocin induction (p<0.001), however the 2 methods had similar normal delivery rates (x^2=1.23, p=0.94).

Concerning limitation, this retrospective study is shrouded by selection bias and therefore the delivery outcomes may be confounded by differences in inherent risk factors in the 3 groups of women. To avoid that limitation a large randomised controlled trial is necessary.

CONCLUSION

Misoprostol is a potent agent for induction of labour. The 50µg dosing may be a suitable alternative to the traditional Foleys catheter/oxytocin because of their similar safety profile. In addition it is cheaper, easier to use and leads to a faster delivery. The 100µg of misoprostol should be avoided because of the associated morbidities. A randomised controlled trial comparing the 50µg misoprostol and Foleys catheter/oxytocin induction protocol is required to answer this important question.

REFERENCES

1. Trofatter KF. Cervical ripening. Clin Obstet Gynecol 1992;35:47686.
2. Atad J, Bornstein J, Calderon I, et al. Non pharmaceutical ripening of the unfavorable cervix and induction of labor by a novel double balloon device. Obstet Gynecol 1991;77:14652.
3. Karim SMM, Trussele RR, Patel RC, Hillier K. Response of pregnant human uterus to prostaglandin F2 alpha induction of labour. BMJ 1968;4:6213.
4. Margulies M, Perez GC, Voto LS : Misoprostol to Induce labour. Lancet, 1992;339:64.
5. Milchev N, Kuzmanov B, Terzhumanov R : Cytotec an effective drug for induction of labour. Akush Ginekol (sofiia), 2003;42(3):9-11.
6. Adeniji OA, Olayemi OI, Adeniji OI et al. Pre-induction cervical ripening : transcervical Foleys catheter versus intravaginal misoprostol. J Obstet Gynaecol, 2005;25(2):134-9.
7. Tabowei TO, Oboro VO : Low dose intravaginal misoprostol versus intracervical balloon catheter for pre-induction cervical ripening. East Afr Med J, 2003 Feb;80(2):91-4.
8. Greybush M, Singleton C, Atlas RO, Balducci J, Rust OA : Preinduction cervical ripening techniques compared. J Reprod Med, 2001 Jan 46;(1):11-7.
9. Sciscione AC, Nguyen L, Manley J et al : A Randomized Comparison of Transcervical Foley Catheter to Intravaginal Misoprostol for Preinduction Cervical Ripening . Obstet Gynaecol, 2001; 97:603-607.
10. Bartusevicius A, Barcaite E, Nadisauskiene R : Oral, vaginal and sublingual misoprostol for induction of labor. Int J Gynaecol Obstet, 2005 Oct;91(1):2-9.
11. Orhue AAE : Induction of labour. Trop J Obstet Gynaecol, 1997;14(1):1-15.
12. Idrissa A, Kyari O, Kawuwa MB, Usman HA : Preparation for induction of labour with an unfavourable cervix using Foley's catheter. J Obstet Gynaecol, 2007;27(2):157-158.
13. Ekele BA, Oyetunji JA : Induction of Labour at Usmanu Danfodio University Teaching Hospital, Sokoto. Trop J Obstet Gynaecol 2002:19(2);74-77.
14. Kwawukume EY. Induction and Augmentation of Labour. In Comprehensive Obstetrics in the Tropics(Ed) Kwawukume EY and Emuveyan EE.Asante & Hittscher printing press limited, Dansoman. 2002, pp129-134.
15. Kwawukume EY, Ayertey RP : The Use of Misoprostol for Induction of Labour in Low-Resource Setting. Trop J Obstet Gynaecol, 2002, 19: 78-81.
16. Rockhead C, Fletcher H, Reid M, Morgan O : A comparison of two methods of labour induction with vaginal misoprostol. Int J Gynaecol Obstet, 2003:80(3);271-277.