SciMedCentral

Medical Journal of Obstetrics and Gynecology

Research Article

Amniotomy or Preservation of Membranes- What is More Effective? A Randomised Prospective Observational Study at a Tertiary Hospital Of Central India

Anshul Pahwa*

Department of Obstetrics and Gynaecology, ShriVasantrao Naik Medical College and Hospital, India

***Corresponding author**

Anshul Pahwa, Department of Obstetrics and Gynaecology, ShriVasantrao Naik Medical College and Hospital, 34/3 Murai Mohalla, Chhawni, Indore, Madhya Prdesh, India (452001); Tel: 9130193505; Email: anshulpahwa.2007@gmail.com

Submitted: 28 June 2021

Accepted: 26 July 2021

Published: 28 July 2021

ISSN: 2333-6439

Keywords

- Amniotomy
- Labour
- Oxytocin
- Maternal outcome
- Perinatal outcome
- augmentation

Abstract

Background: Amniotomy is one of the most commonly performed obstetric procedure with conflicting results.

Aim: To evaluate and compare the effect of amniotomy with spontaneous rupture of membranes on labour, maternal and perinatal outcome.

Methods: 200 Primipara at term with singleton uncomplicated pregnancy with spontaneous onset of labour were enrolled under the study. Cases were randomized by the chit box system to either the study group (ARM group) or control group (SRM group).Study group were offered amniotomy at cervical dilatation of 4 cm. Prior to Amniotomy, fetal lie, presentation, engagement of head, fetal heart sounds were noted. Labour progress of both the groups were monitored with the help of the partogram.

Results: The mean duration of labour from randomization to delivery in amniotomy group was 3.24± 2.17 hours as compared to 4.4 ± 1.07 hours in the control group, the difference being statistically significant(p value<0.001). 22% of the patients in the amniotomy group required augmentation with oxytocin as compared to 38% in the control group (P value<0.05). Both the groups were comparable with respect to mode of delivery, indications of ceaserean section, mean birth weight, APGAR score at 5 mins, NICU admissions.

Discussion: Amniotomy reduces the duration of first stage of labour, with no impact on second and third stage of labour and neonatal outcome.

Conclusion: Though Amniotomy is effective in reducing the length of labour and requirement of oxytocin augmentation, it confers no added advantages with respect to other maternal and neonatal outcomes. Selective rather than routine amniotomy might prove to be more beneficial.

STATEMENT OF SIGNIFICANCE

Problem or issue- Effect of amniotomy on labour characteristics and its comparison to conservation of membranes

What is already known- Studies conducted so far has shown non-conclusive results regarding what is preferable in an uncomplicated primipara - amniotomy or conservation of membranes. Few studies came out with the idea favouring amniotomy whereas other studies reported no difference in labour characteristics with amniotomy.

What this paper ads- Till now, very few studies had addressed this topic. With this study, we tried to derive conclusions of effect of amniotomy versus conservation of membranes on labour in our population and compared with other researches to substantiate the results known till now.

INTRODUCTION

Amniotomy is one of the most commonly performed procedure in modern obstetrics with the primary aim of accelerating labour and preventing dystocia in women with spontaneous labour [1,2]. It has been performed by obstetrical providers for at least a few hundred years, with uncertain results.

Amniotomy, also known as artificial rupture of membranes (ARM) is the intentional rupture of the amniotic sac by an obstetrical provider. It was introduced in the mideighteenth century, first being described in 1756 by an English obstetrician, Thomas Denman [3]. Later, O'Driscoll and Meagher (1968), introduced amniotomy as a component of active management of labour with a goal of "prevention of prolonged labour (dystocia)" [4].

The rationale behind this intentional rupture of the sac have been multiple and include, but are not limited to, induction and augmentation of labour, assessment of colour of amniotic fluid, oppurtunity for more direct monitoring of fetal status. The mechanism by which amniotomy speeds up the labour remains unclear. It is thought that when the membranes are ruptured, the production and release of prostaglandins and oxytocin increases, resulting in stronger contractions and faster cervical dilatation [5]. On the contrary, ARM is associated with potential risk of cord prolapse, variable decelerations due to cord compression and in rare instances with chorioamnionitis.

While certain obstetricians supported the idea of amniotomy to hasten the labour, there were/are other who felt that ARM is not that useful as it is thought to be. Eastman in the 1930's suggested that the 'bag of water' surrounding the fetus played the principal role in the cervical dilatation and was therefore indispensable to normal labour [5] .The thought of pressure from intact membranes(PG E2 release from amnion) contributing to the ripening, effacement and dilatation of the cervix was supported by many [6,7]. Moreover, the pressure exerted by the membranes stimulates oxytocin surges in much the same way as pressure from the fetal presenting part [7].

The routine use of this procedure has been controversial in the literature. Some studies have shown significant reduction in the labour duration but no effect on other outcome measures [8,9], while few have shown no consistent significant effect of the intervention on labour duration and other outcome measures [1,10].

Hence, this study was undertaken to evaluate and compare the effect of Amniotomy and spontaneous rupture of membrane on labour duration, mode of delivery, indication of LSCS and neonatal outcomes.

MATERIALS AND METHODS

This comparative, prospective, randomised, interventional study was conducted on 200 Primipara women admitted to labour room between August 2019 to January 2020. The study was approved by the Ethical committee of the institution and was conducted in accordance to the Consort guidelines.

The Inclusion criteria were Primipara at term (>37 weeks), singleton pregnancy, cephalic presentation with reassuring fetal heart and intact membranes in spontaneous labour (cervical dilatation≥4 cm) with adequate pelvis.

Exclusion criteria - Multipara, non-cephalic presentations, cervical dilatation >6 cm, previous caesarean section, cord presentation and medical diseases complicating pregnancy such as diabetes mellitus, preeclampsia, HIV infection.

On admission to labour room, detailed history of women was obtained & general and obstetric examination was performed. Women fulfilling the selection criteria were provided information sheet and written informed consent was taken. They were randomly assigned to study group (ARM) or control group by chit box system.

In the study group, before the procedure, each woman was allowed to empty her bladder. Fetal lie, presentation, engagement of head and fetal heart sounds were confirmed. Under all aseptic precautions, amniotomy was performed with Kocher's forceps. Immediately after amniotomy, cord prolapse was ruled out before removing finger and fetal heart sounds were reassessed. In the control group, membranes were allowed to rupture spontaneously. In both the groups, labour progress was monitored with partogram and fetal heart rate with intermittent auscultation.

Oxytocin augmentation was commenced for every participant that had rate of cervical dilatation <1cm in 4 hours (slow progress) and stable feto-maternal condition irrespective of her group. Oxytocin was started as per standard protocol with 4miu/min and increasing at regular interval of 30 minutes to achieve adequate uterine contractions of 3-5 contractions in 10 minutes, each lasting 40-45 seconds.

The following outcomes were studied and compared among the groups-primary being the duration of labour and secondary being need for pitocin augmentation, mode of delivery, indication of LSCS, Apgar score at the end of 1 and 5 min, NICU admission.

Statistical analysis carried out with the help of SPSS (version 20) for Windows package (SPSS Science, Chicago, IL, USA). Results were analysed statistically with chi square test and unpaired student T test. Differences with p-value<0.05 were considered statistically significant with the confidence limit of 95%.

RESULTS

A total of 200 primipara at term with spontaneous labour fulfilling the inclusion criteria were enrolled under the study to evaluate and compare the effects of artificial rupture of membranes(study group) to spontaneous rupture of membranes(Control group) on labour characteristics and maternal and fetal outcome.. Participants of both the groups were comparable in terms of age, parity and gestational age as shown in Table1 and 2.

The Mean age of participants in the amniotomy group was 22.5 ± 2.24 years while in the control group, it was 23.28 ± 2.28. Mean gestational age in the amniotomy group was 38.94 ± 1.26 as compared to 39.28 ± 1.38 in the SRM group. The mean cervical dilatation at randomization for the amniotomy group was 4.6 ± 0.49 (range 4 -5) cm while that of the control group was 4.7 ± 0.46 (range 4 -5) cm.

Oxytocin augmentation was needed in 22% of the amniotomy group as compared to 38% in the control group. In all, vaginal birth occured in 89% (81% spontaneous and 8% vacuum), and 90% (79% spontaneous and 11 % vacuum) of the population in the amniotomy group and control group respectively. Amniotomy group underwent ceasar in 11% of the cases, out of which 7 were for non- progress and 4 were for fetal distress, whereas 10% underwent ceasar in the control group (5 for non- progress, 4 for fetal distress, 1 for cord prolapse).The mean duration of labour in amniotomy group was 3.24 ± 2.17 hours as compared to 4.4 ± 1.07 hours in the control group, the difference being statistically significant (p value<0.001). Though there was no difference in the duration of second stage and third stage of labour between the groups (Table 3 and Table 4).

The mean birth weight of the neonates were similar among

Table 1: Distribution of basic characteristics of Primigravida in both the groups.

Variable	Sub-group	Amniotomy (n=100)	SRM (n=100)	p value
AGE(years)	≤20	11	09	
	21-25	34	35	0.86
	26-30	05	06	
Gestational age (in weeks)	37-37.6	03	06	
	38-38.6	08	09	0.36
	>39	39	35	

Table 2: Baseline Characteristics of the admitted Primigravida patient.

Variable	ARM group	SRM group	P value
	(n=100)	(n=100)	
AGE(in years)	22.5±2.24	23.28±2.28	0.86
Gestational Age (in weeks)	38.94±1.26	39.28±1.38	0.36
Dilatation at randomization(cm)	4.6 ± 0.49	4.7 ± 0.46	0.15

Table 3: Comparison of Labour characteristics and delivery outcome.

	Amniotomy Group (n=100)	Control Group(n=100)	P value
Oxytocin augmentation	22	38	0.007
Vaginal delivery	81	79	0.36
Vacuum	08	11	0.24
Ceaserean delivery	11	10	0.41

Table 4: Comparison of randomisation to delivery time interval between the groups.

Interval from randomization to delivery	Amniotomy (n=100)	Control group	P value
<1 hour	2	0	0.36
1-2 hours	12	06	
2-3 hours	18	14	
3-4 hours	30	24	
4-5 hours	28	50	
>6 hours	10	08	

Table 5: Comparison of Neonatal outcome among the groups.

	Amniotomy group (n=100)	Control group (n=100)	P value
Birth weight (kg)	2.4±0.35	2.5±0.35	0.99
Apgar at 5 minutes	<7 - 04	<7 - 05	0.37
	>7 - 96	>7 - 95	
NICU admissions	06	04	0.27

the groups, being 2.4 ± 0.35 kg in amniotomy group and 2.5 ± 0.35 in the control group. No significant difference was observed between the groups for NICU admissions and Apgar score at the end of 1minute and 5 minute as illustrated in Table 5.

DISCUSSION

The decision when to rupture in an otherwise uncomplicated labour has been a matter of debate since long. Amniotomy has been a standard practice and widely advocated to augment labour with varied results.

In some centres, it is advocated and performed routinely in all women and in many centres, it is reserved for women whose labours have become prolonged. This study was undertaken to evaluate and compare the effects of amniotomy (study group), with spontaneous rupture of membranes (control group), on maternal and neonatal outcomes. 200 primipara who fulfilled the inclusion criteria and provided consent were enrolled under the study.

In the present study, amniotomy was preferred at 4-5 cm as head is usually well applied to cervix at this dilatation which

avoids complication like cord prolapse and subjective variations in per vaginal findings are comparatively less.

Duration of labour was shortened in the amniotomy group as compared to the control group. The mean duration of labour was 3.24 ± 2.17 hours in the study group and 4.4 ± 1.07 hours in the control group, the difference being statistically significant (p value<0.001). There was no difference in the duration of second stage and third stage of labour between the groups. Similar findings have been reported in the studies by Onah et al. [11], Bellard et al. [12], Zandvakili et al. [13], Goffinct et al. [14], Fraser et al [8]. On the contrary, A recent systematic review under Cochrane database [1] of 5 trials involving 1127 women had reported no statistically significant co-relation between amniotomy and reduction in the length of the first stage of labour (mean difference (MD) -20.43 minutes, 95% confidence interval (CI)-95.93to55.06). The above observation holds for both primiparous and multiparous sub-groups; however, the observed high heterogeneity among the included trials might have impacted on the outcome of the review. Similarly, in studies by Johnson et al. [10] and Cammu et al. [15], no significant difference was found in the length of first stage of labour after amniotomy in uncomplicated nulliparous pregnancies. Most trials suggest that the advantage of rupturing membranes is that labour will be slightly shorter. It is unknown if a shorter labour confers any clinical benefit, and it may condense the total uterine work to a shorter time period, making labour more painful and creating more fetal heart rate abnormalities. This small gain may be offset by disadvantages of iatrogenic interference [10].

In the present study, Oxytocin augmentation was more often required in the control group than amniotomy group, the difference being statistically significant (P value<0.05). This could be explained by the well-known effect of amniotomy on uterine contractions. Similar findings has been reported in the studies conducted by Bellard et al. [12], Fraser et al. [8], meta analysis [1].

There was no significant difference between the groups for the mode of delivery. Rates of vaginal birth, instrumental delivery, ceasarean section are comparable among the groups. Similar findings have been documented in the various studies [1,11,12,8,10,14,15]. Even the indication of ceasarean section were comparable among both the groups; similar findings were reported in other studies [1,12]. Studies by Fraser et al. [8], and Goffinct F et al. [14], reported that the number of caesarean sections for fetal distress as either the only indication or as a contributing indication was greater in the amniotomy group than in the control group. The most plausible explanation is that amniotomy increases cardiotocographic abnormalities and the early recognition of meconium lowers the threshold for an earlier operative delivery.

No significant difference in the perinatal outcomes was observed in both the groups. The birth weight of babies, Apgar score at the end of 1 min & 5 min were comparable among both the groups. The proportion of babies requiring NICU admissions were also comparable. Out of 6 admissions in the amniotomy group, 3 were admitted due to low birth weight and other 3 due to respiratory distress. Out of 4 admissions in the control group, 3 were admitted for low birth weight and 1 for respiratory distress. Similar findings have been documented by other authors [1,11,12,13,8,10]. A study by Joshi et al. [16], reported that although planned amniotomy does not have any adverse effect on the perinatal outcome as compared to control group still early detection of MSL by ARM prevents worsening of perinatal outcome in terms of incidence of MFAS(Meconium fluid aspiration syndrome) and duration of NICU admission as compared to expectant management.

CONCLUSION

Amniotomy is effective in reducing the length of first stage of labour and requirement of oxytocin augmentation. It confers no added advantages with respect to other maternal and neonatal outcomes. Study with bigger sample size will be needed to further solidfy the conclusion.

Judicious use of amniotomy especially in patients with protracted labour will help in reducing maternal and neonatal morbidity and mortality.

CLINICAL SIGNIFICANCE

Prolonged labour has been associated with significant maternal and neonatal morbidity and mortality. A simple intervention like Amniotomy hasten the labour process and thus reduce the incidence of dysfunctional labour, rate of ceaserean section for dysfunctional labour. Additionally, early detection of meconium stain liquor by ARM prevents worsening of perinatal outcome in terms of incidence of MFAS (Meconium fluid aspiration syndrome), and duration of NICU admission.

LIMITATIONS

1. It is a single centre study.
2. Bishop's score at the time of randomization was not considered.

ACKNOWLEDGEMENT

The authors acknowledge the support rendered by colleagues, junior residents, staff and women who participated in the study.

REFERENCES

1. Smyth RM, Markham C, Dowswell T. Amniotomy for shortening spontaneous labour. Cochrane Database Syst Rev. 2013; 6: CD006167.
2. Rogers R, Gilson GJ, Miller AC, Izquierdo LE, Cur- ret LB, Qualls CR. Active management in labour. Does it make a difference? Am J Obstet Gynecol. 1997; 177: 599- 605.
3. Calder AA. Chapter 20. Normal labour. In: Edmonds DK editor(s). Dewhurst's Textbook of Obstetrics and Gynaecology for Postgraduates. 6th Edition. Blackwell Science. 1999.
4. O'Driscoll K, Foley M, MacDonald D. Active management of labour as an alternative to cesarean section for dystocia. Obtset gynecol. 1984; 63: 48590.
5. Busowski JD, Parsons MT. Amniotomy to induce labour. Clin Obstet Gynecol. 1995; 38: 246-258.
6. Caldeyro-Barcia R. The effects of rupture of membranes on fetal heart rate patterns. Int J Gynecol Obstet. 1972; 10: 169-172.
7. Vincent M. Amniotomy: to do or not to do?. Midwifery. 2005; 8: 228-229.

8. Fraser WD, Marcoux S, Moutquin JM, Christen A. Effect of early amniotomy on the risk of dysto- cia in nulliparous women. The Canadian Early Amniotomy Study Group. N Engl J Med. 1993; 328: 1145- 1149.

9. Ajadi MA, Kuti O, Orji E, Ogunniyi SO, Sule SS. The effect of amniotomy on the outcome of the spontaneous labour in uncomplicated pregnancy. J Obstet Gynaecol. 2006; 26: 631-634.

10. Johnson N, Lilford R, Guthrie K, Thornton J, Bark- er M, Kelly M. Randomized trial comparing a policy of early amniotomy with selective amniotomy in uncomplicated labour at term. Br J Obstet Gynaecol. 1997; 104: 340-346.

11. Livinus N. Onah, Cyril C. Dim, Uchenna I. Nwagha, Benjamin C. Ozumba. Effect of early amniotomy on the outcome of spontaneous labour: a randomized controlled trial of pregnant women in Enugu, South-east Nigeria. African Health Sci. 2015; 15: 1097-1103.

12. MB Bellard, Patil Kamal, Patil Rajeshwari. Does Artificial Rupture of Membranes Reduce duration of labour in Primigravidae: A Randomised Controlled Trial. South Asian Federation of Obstet Gynecol. 2010; 2: 37-39.

13. Farnaz Zandvakili, Sholeh Shahgheibi, Fariba Farhadifar, Fariba Seyedoshohadaei, Ameneh Khalili. Effect of early amniotomy on labor outcome in nulliparous women: a randomized clinical trial. Curr Issues Pharm Med Sci. 2019; 4: 189-192.

14. Goffinct F, Fraser W, Marcoux S, Bréart G, Moutquin JM, Daris M, et al. Early amniotomy increases the frequency of fetal heart rate abnormalities. BJOG. 1997; 104: 548-553.

15. Hendrick Cammu, Eddy Van Eeckhout. A Randomised controlled Trial of early versus delayed use of amniotomy and oxytocin infusion in Nulliparous labour. BJOG. 1996; 103: 313-318.

16. Shachi Joshi, Rutul Kapadia, Ajesh Desai. Impact of planned amniotomy on perinatal outcome: a randomized control trial. Int J Reprod Contracept Obstet Gynecol. 2017; 6: 2741-2744.

Cite this article

Pahwa A (2021) Amniotomy or Preservation of Membranes- What is More Effective? A Randomised Prospective Observational Study at a Tertiary Hospital Of Central India. Med J Obstet Gynecol 9(2): 1150.