Journal of Medicine, Physiology and Biophysics
ISSN 2422-8427 An International Peer-reviewed Journal
Vol.37, 2017

Mean Duration of Active Phase of Labour between Amniotomy [Artificial Rupture of Membranes (AROM)] and Spontaneous Rupture of Membranes (SRM) in Primigravida

Dr. Anum Zara, Mbbs
House Officer, Nishtar Hospital, Multan

Dr. Javaria Iqbal, Mbbs
House Officer, Nishtar Hospital, Multan

Nighat Nazar, Mbbs
House Officer, Combined Military Hospital, Multan

Abstract
Background: Labor is "the presence of uterine contractions of sufficient frequency, duration, and intensity to cause demonstrable effacement and dilation of the cervix" whose evaluation of progress is restricted to episodes of rudimentary examination of cervix while prospectively pointing the onset of labor still remains a challenge. This randomized trial was done to ascertain the short duration of labor in primigravida in active phase labor. **Objectives:** To compare the mean duration of active phase of labour between amniotomy [artificial rupture of membranes (AROM)] and spontaneous rupture of membranes (SRM) in primigravida. **Materials and methods:** A total 120 patients who were admitted in Labour room of Department of Obstetrics & Gynaecology, Nishtar Hospital, Multan in this randomized controlled Trial. In group A patients, Amniotomy (also referred to as artificial rupture of membranes [AROM]) was performed by using Kocker's forceps in a controlled manner under aseptic measures with prophylactic antibiotics cover. Color of liquor was noted. In group B, patients with spontaneous rupture of membranes (SRM) were included. In both groups, labor was followed by keeping record of fetal heart sounds and vaginal examination one hourly to see the progress of labor. Duration of labor was noted in every patient of both groups as per partogram. All the data was entered and analyzed by using SPSS version 20.0. **Results:** Our study comprised of a total of 120 primigravida females in active phase of labor. Mean age of our study cases was 25.13 ± 2.61 years ranging 22- 31 years. Mean gestational age of our study cases was 38.41± 1.18 weeks (ranging 37 – 41 weeks). Mean body mass index (BMI) of our study cases was noted to be 23.89 ± 1.66 kg/m^2. Mean duration of active phase of labor in our study was noted to be 5.14 ± 0.83 hours. Mean duration of active phase of labor in group A was 4.61 ± 0.59 hours while that of in group B was 5.67 ± 0.70 hours (p= 0. 000). **Conclusion:** Artificial rupture of membrane is safe, reliable and cost effective modality when employed in primigravida. Our study results indicate that artificial rupture of membrane in active phase of labor in primigravida is associated with significant reduction in duration of labor which reduces fetomaternal morbidity and mortality. Artificial rupture of membrane can be effectively employed to decrease hospital costs which is not only beneficial to the suffering families but also a relief for hospital authorities as well as healthcare professionals.
Keywords: Primigravida, Spontaneous rupture, duration of labor, artificial rupture of membranes.

Introduction

Labour is a process of childbirth which starts with the onset of regular, painful and effective (causing cervical effacement and dilatation) uterine contractions leading to the delivery of babies, expulsion of membranes and placenta.[1] Prolonged duration of labor leads to increase in perinatal morbidity and mortality [2] as it is associated with higher risks of maternal exhaustion, primary postpartum hemorrhage, septicemia, fetal distress and birth asphyxia. Hence it demands early detection as well as appropriate management led by expert team. [3,4] Various methods which may help to increase uterine contractions i.e. amniotomy and use of oxytocins enhance cervical dilation [5] . Amniotomy which is also referred to as "artificial rupture of membranes (AROM)] is the procedure by which the amniotic sac is deliberately ruptured so as to cause the release of amniotic fluid"[6] leads to increase in levels of prostaglamdin E2 (PGE2) and rise in levels of oxytocin [5,7]. For past several decades, AROM has been employed for shortening the duration of labor by healthcare professionals. It has been reported to improve favorable outcome in addition to reduce duration of labor [8-10]. Bellad MB et al[9] has shown a significant difference in mean duration of labor between amniotomy [artificial rupture of membranes (ARM)] and spontaneous rupture of membranes (SRM) i.e. 4.76 ± 1.64 hours versus 5.66 ± 1.85 hours respectively.

As the prolonged labour is associated with different fetomaternal complications like cord compression, perinatal asphyxia, fetal distress, maternal exhaustion and emotional draining so, there must be a need of some procedure for reducing the active phase of labor in order to achieve the good fetomaternal outcome. The purpose

of this study is to compare the mean duration of active phase of labor between amniotomy [artificial rupture of membranes (AROM)] and spontaneous rupture of membranes (SRM) in primigravida. Based on the results of this study, the method with shorter duration of active phase of labour could be opted in our routine practice guidelines for reducing the fetomaternal complications due to prolonged labour, thus in turn decreases the morbidity and mortality of the mother as well as fetus. Moreover, it also helps to overcome the patient's burden by less monitoring time, shorter hospital stay and beds availability to other patients.

Materials and methods:

A total 120 patients who were admitted in Labour room of Department of Obstetrics & Gynaecology, Nishtar Hospital, Multan from June 2014 to June 2015. All primigravida with alive singleton pregnancy, and cephalic presentation (assessed on ultrasonography) who had come in active phase of labour were included. Age 21-35 years, Gestational age 37 to 41^{+6} weeks as assessed by LMP, Patient having adequate liquor on scan and normal CTG were included in our study. Patients with premature rupture of membranes, if color of the liquor was green or blood stained, patient having any medical disorder such as hypertension, Diabetes, Cardiac disease and Asthma and Obstetrical complication associated with pregnancy or having fetal compromise were excluded from our study. Patients were randomly divided in 2 groups. In group A patients, Amniotomy (also referred to as artificial rupture of membranes [AROM]) was performed by using Kocker's forceps in a controlled manner under aseptic measures with prophylactic antibiotics cover. Color of liquor was noted. In group B, patients with spontaneous rupture of membranes (SRM) were included. In both groups, labor was followed by keeping record of fetal heart sounds and vaginal examination one hourly to see the progress of labor. Duration of labor was noted in every patient of both groups as per partogram. Primigravida was defined as the women who conceived for the first time. Term pregnancy was defined as gestational age of 37 weeks to 41^{+6} weeks (assessed on LMP). Active phase of labour was defined as women with 3-4 cm cervical dilatation (assessed on vaginal examination) with regular uterine contractions, 3-5 contractions per 10 minutes, with each contraction lasting for 30-50 seconds. Amniotomy (artificial rupture of membranes) was artificial rupture of amniotic sac to release amniotic fluid by using Kocker's forceps in a controlled manner under aseptic measures with prophylactic antibiotics cover. Spontaneous rupture of membranes (SRM): In this, labor process was allowed till there was spontaneous rupture of membrane (assessed on speculum examination) in active phase of labor without any intervention. Duration of active phase of labor was measured in hours from duration of enrolment till there was complete cervical dilation i.e. 10 cm (as assessed on vaginal examination). All the data was entered and analyzed by using SPSS version 20.0.

Results

Our study comprised of a total of 120 primigravida females in active phase of labor. Mean age of our study cases was 25.13 ± 2.61 years, ranging; 22 – 31 years. Mean age of our study cases in group A was 25.27 ± 2.71 years while that of in group B was noted to be 25.00 ± 2.52 years (p= 0.579) and 80 (66.7 %) belonged to age groups ranging from 21 – 25 years. Mean gestational age of our study cases was 38.41± 1.18 weeks, ranging 37-41 weeks. Mean gestational age in group A was 38.27 ± 1.03 weeks while that of group B was 38.55 ± 1.30 weeks (p=0.191) while 66 (55%) had gestational age ranging from 37 – 38 weeks.

Mean body mass index (BMI) of our study cases was noted to be 23.89 ± 1.66 kg/m^2 ranging from 21.5 kg/m^2 to 27.7 kg/m^2. Mean BMI in group A was noted to be 23.90 ± 1.66 kg/m^2 while in group B was 23.88 ± 1.68 kg/m^2 (p= 0.957) while 102 (85%) had normal weight. Mean duration of active phase of labor in our study was noted to be 5.14 ± 0.83 hours (with minimum duration of active phase of labor was 3.50 hours and maximum duration of active phase of labor was 6.50 hours). Mean duration of active phase of labor in group A was 4.61 ± 0.59 hours while that of in group B was 5.67 ± 0.70 hours (p= 0. 000)

Table No. 1

Distribution of mean duration of labor among study cases.

(n=120)

Groups	Duration of labor (In hours)		P – value
	Mean	Standard deviation	
Group A n= 60	4.61	0.59	**0.000**
Group B n= 60	5.67	0.70	

Table No. 2
Stratification of Mean duration of labor with regards to age in both groups.
(n=120)

Age groups	Groups	Duration of labor (In hours)		P – value
		Mean	Standard deviation	
21 – 25 years (n=80)	Group A n=38	4.76	0.45	0.005
	Group B n=42	5.57	0.71	
More than 25 years (n=40)	Group A n= 22	4.36	0.71	0.000
	Group B n= 18	5.90	0.62	

Table No. 3
Stratification of Mean duration of labor with regards to gestational age in both groups.
(n=120)

Gestational age	Groups	Duration of labor (In hours)		P – value
		Mean	Standard deviation	
37 – 38 weeks (n= 66)	Group A n= 36	4.59	0.52	0.000
	Group B n= 30	5.73	0.70	
More than 38 weeks (n=54)	Group A n= 24	4.65	0.69	0.000
	Group B n=30	5.60	0.70	

Table No. 4
Stratification of Mean duration of labor with regards to BMI in both groups.
(n=120)

BMI	Groups	Duration of labor (In hours)		P – value
		Mean	Standard deviation	
Normal weight (n=102)	Group A n=50	4.51	0.57	0.000
	Group B n= 52	5.66	0.71	
Overweight (n=18)	Group A n= 10	5.12	0.39	0.033
	Group B n= 08	5.68	0.63	

Discussion

Labor is "the presence of uterine contractions of sufficient frequency, duration, and intensity to cause demonstrable effacement and dilation of the cervix" whose evaluation of progress is restricted to episodes of rudimentary examination of cervix while prospectively pointing the onset of labor still remains a challenge [11-15]. This randomized trial was done to ascertain the short duration of labor in primigravida in active phase labor. Our study comprised of a total of 120 primigravida females in active phase of labor. Mean age of our study cases was 25.13 ± 2.61 years ranging; 22-31 years. Mean age of our study cases in group A was 25.27 ± 2.71 years while that of in group B was noted to be 25.00 ± 2.52 years (p= 0.579) while 80 (66.7 %) belonged to age groups ranging from 21 – 25 years. A study conducted by Abdullah et al [7] reported 24.69 ± 3.03 years mean age. Another study conducted by Chuma et al [16] reported 25.42 ± 5.25 years mean age of these patients, these findings are close to that of our study results. A study from Iraq conducted by Rasheed et al [17] reported mean age 21.89 ± 4.86 years in primigravida undergoing late amniotomy. Another study from Bangladesh by Ghani et al [18] reported 25.3 years mean age.

Mean gestational age of our study cases was 38.41± 1.18 weeks, ranging; 37 – 41 weeks. Mean gestational age in group A was 38.27 ± 1.03 weeks while that of group B was 38.55 ± 1.30 weeks (p=0.191) while 66 (55%) had gestational age ranging from 37 – 38 weeks. Rasheed et al [17] from Iraq reported 38.01 ± 2.88 weeks mean gestational age in primigravida undergoing amniotomy. Abdullah et al [7] reported 38.41 ± 1.03 weeks mean age of the primigravida in active phase of labor. In our study, 81 (67.5%) women belonged to poor socio-demographic background and were less educated. A study conducted by Ghani et al [18] from Bangladesh reported 80 % women from poor socioeconomic background.

Mean body mass index (BMI) of our study cases was noted to be 23.89 ± 1.66 kg/m^2 ranging; 21.5 kg/m^2 to 27.7 kg/m^2. Mean BMI in group A was noted to be 23.90 ± 1.66 kg/m^2 while in group B was 23.88 ± 1.68 kg/m^2 (p= 0.957) while 102 (85%) had normal weight. Similar results have been reported by Rasheed et al from Iraq [17].

Amniotomy has been related with significant shortened duration of labor as been reported in different studies [7, 9, 17, 18]. Mean duration of active phase of labor in our study was noted to be 5.14 ± 0.83 hours (ranging from 3.50 hours to 6.50 hours). Mean duration of active phase of labor in group A was 4.61 ± 0.59 hours while that of in group B was 5.67 ± 0.70 hours. (p=0.000). Similar results have been reported by Ghani et al [18] from Bangladesh. Bellad MB et al[9] has shown a significant difference in mean duration of labor between amniotomy [artificial rupture of membranes (ARM)] and spontaneous rupture of membranes (SRM) i.e. 4.76 ± 1.64 hours versus 5.66 ± 1.85 hours respectively. A study by Abdullah et al [7] from Karachi also reported that there was significant reduction in mean duration of active phase of labor i.e. p=0.001. Rasheed et al [17] from Iraq reported quite high duration of labor to be 6.33 ± 1.65 hours which are different from our study results.

Conclusion

Artificial rupture of membrane is safe, reliable and cost effective modality when employed in primigravida. Our study results indicate that artificial rupture of membrane in active phase of labor in primigravida is associated with significant reduction in duration of labor which reduces fetomaternal morbidity and mortality. Artificial rupture of membrane can be effectively employed to decrease hospital costs which is not only beneficial to the

suffering families but also a relief for hospital authorities as well as healthcare professionals.

References

1. Martin JA, Hamilton BE, Ventura SJ. Births: final data for 2009. Natl Vital Stat Rep. 2011;60:1.
2. Cromi A, Ghezzi F, Agosti M, Uccella S, Piazza N, Serati M, et al. Use of an antispasmodic (Rociverine) to shorten the length of labor: a randomized, placebo-controlled trial. Acta Obstet Gynecol Scand. 2011;90(12):1371–8.
3. Dencker A, Berg M, Bergvist L, Ladfors L, Thorsen LS, Lilja H. Early versus delayed oxytocin augmentation in nulliparous women with prolonged labour - a randomized controlled trial. Br J Obstet Gynecol. 2009;116:530–6.
4. Parveen T, Hussain H, Khattak NN. Effects of phloroglucinol on augmentation of labour in primigravida. J Med Sci. 2013;21(3):131-33.
5. Nachum Z, Garmi G, Kadan Y, Zafran N, Shalev E, Salim R. Comparison between amniotomy, oxytocin or both for augmentation of labor in prolonged latent phase: a randomized controlled trial. *Reprod Biol Endocrinol*. 2010;8:136.
6. Smyth RMD, Markham C, Dowswell T. Amniotomy for shortening spontaneous labour. *Cochrane Database Sys Rev.* 2013;6:CD006167.
7. Abdullah A, Saboohi S, Hashami U. Effects of amniotomy versus spontaneous rupture of membrane on progress of labour and foetal outcome in primigravidae. J Liaq Uni Med Health Sci. 2010;9(1):33-6.
8. Cooley SM, Geary MP, O'Connell MP, McQuillan K, McParland P, Keane D. How effective is amniotomy as a means of induction of labour?. *Ir J Med Sci*. 2010;179(3):381-3.
9. Bellad MB, Kamal P, Rajeshwari P. Does artificial rupture of membrane (ARM) reduce duration of labor in primigravidae: a randomized controlled trial. South Asian Fed Obstet Gynecol. 2010;2(1):37-9.
10. Andersson O, Hellstrom-Westas L, Andersson D, Domellof M. Effect of delayed versus early umbilical cord clamping on neonatal outcomes and iron status at 4 months: a randomised controlled trial. *BMJ*. 2011 Nov 15;343:d7157.
11. Arzola C[1], Perlas A, Siddiqui NT, Carvalho JC. Bedside Gastric Ultrasonography in Term Pregnant Women Before Elective Cesarean Delivery: A Prospective Cohort Study.AnesthAnalg. 2015 Sep;121(3):752-8.
12. Bataille A[1], Rousset J, Marret E, Bonnet F. Ultrasonographic evaluation of gastric content during labour under epidural analgesia: a prospective cohort study. Br J Anaesth. 2014 Apr;112(4):703-7.
13. Le Ray C, Deneux-Tharaux C, Khireddine I, Dreyfus M, Vardon D, Goffinet F. Manual Rotation to Decrease Operative Delivery in Posterior or Transverse Positions. Obstet Gynecol.2013 Sep;122(3):634-40.
14. Wei S, Wo BL, Qi HP, Xu H, Luo ZC, Roy C, Fraser WD. Early amniotomy and early oxytocin for prevention of, or therapy for, delay in first stage spontaneous labor compared with routine care. Cochrane Database Syst Rev. 2013 Aug;7(8):CD006794
15. Saadia Z. Rates and indicators for amniotomy during labor - a descriptive cross sectional study between primigravidas and gravida 2 and above. Med Arch. 2014 Apr;68(2):110–2.
16. Chuma C, Kihunrwa A, Matovelo D, Mahendeka M. Labour management and Obstetric outcomes among pregnant women admitted in latent phase compared to active phase of labour at Bugando Medical Centre in Tanzania. BMC Pregnancy Childbirth. 2014; 14: 68. doi: 10.1186/1471-2393-14-68
17. Rasheed FA, Ahmed AA, Hussain SA. The impact of early versus late amniotomy on duration of labor, maternal and neonatal outcomes in Iraqi primigravida with spontaneous labor. Med Sci. 2014;3(3):1343-51.
18. Ghani T, Rahim A, Begum F, Mahmuda B. Amniotomy shortens the induction delivery interval. CBMJ. 2013;2(2):67-70.