



Early Amniotomy Versus Expectant Management Of Membrane Rupture In Term Primigravida: A Comparative Study Of Labor Progression And Maternal - Neonatal Outcome.

Hina Khan¹, Anila Mumtaz^{2*}, Heema³, Faiza Rehman⁴

¹Assistant Professor, Khalifa Gul Nawaz (KGN) Hospital, Bannu, Pakistan

²Assistant Professor, Women & Children Hospital (WNC), Bannu, Pakistan

³Assistant Professor, Liaquat Memorial Hospital, Kohat, Pakistan

⁴Assistant Professor, Rehman Medical Institute (RMI), Peshawar, Pakistan.



Correspondence:
Dr. Anila Mumtaz.

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Abstract

Background: obstetric diagnosis, the end of which is to accelerate labour, improve foetal tracking together with only one disease monitor, and in some rare diseases — increase contractions. However, amniotomy efficiency in expectancy management particularly spontaneous rupture of membranes (SRM) among term primigravida patients has not been extensively studied in our local setting. This study aim is to compare the effect of amniotomy or SRM on labor progress, labor duration and maternal and neonatal outcome in primigravida women. **Objectives:** The primary objective of the present study was to compare the duration of labor for both the amniotomy and SRM in term primigravida women. Secondary outcomes were mode of delivery, maternal and neonatal complications, and Apgar scores. **Methods:** This was a randomized controlled trial conducted at the Department of Obstetrics and Gynecology, Lady Reading Hospital MTI BANNU, Pakistan between 1 February, 2021, and 1 August-2021. Excerpt 1: Primigravida women (320) with singleton pregnancies and gestational age[?] 36 weeks. Study Groups: Group A was an amniotomy group and Group B a spontaneous or spontaneously ruptured membranes group. The data were collected in the form of duration of labor, delivery mode, maternal complications as well as neonatal complication and Apgar. Data for the statistical analysis were analyzed by using the SPSS version 22 where continuous data was analyzed using independent samples t-tests and categorical variables were examined with chi-square tests. **Results:** Amniotomy was associated with a significantly shorter labor duration when compared with spontaneous rupture of membranes (SRM), according to the study. The mean of the labor time was 5,725 ± 0.59 hours for Group A (Amniotomy) and in Group B(SRM), it was 7,150 ± 0.48hours (p=0.000). This happened through out all the age, gestational age and weight sub groups. Probiotics compared to placebo: For both 18–30 years of age and >30 years of age, as well as weight groups ([?] Preterm and risk groups (subgroup 1: ≤70 kg; subgroup 2: >70 kg) in Group A had more labors lasting ≤2 weeks than those in Group B. Both groups did not differ with respect to their method of delivery and Apgar outcomes. Since the matching of these two groups for age, gestational age and weight was adequate, the results were valid. **Conclusion:** Amniotomy significantly shortens labor compared with spontaneous rupture of membranes (SRM) in term nulliparous women. There was no significant difference in maternal and neonatal outcomes (mode of delivery and Apgar scores), but the study findings do support amniotomy as a part of management to augment labor. More work is required to conduct studies assessing long-term neonatal outcomes and help determine the safety profile of amniotomy in various at-risk populations.

Keywords: Amniotomy, Spontaneous rupture of the membranes, primigravida, labor duration, obstetrics, maternal outcomes and neonatal outcomes.



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INTRODUCTION

Amniotomy (also abbreviated as AROM, or more frequently called, breaking the water) is the intentional rupture of amniotic sac by an obstetrical care provider¹. This is the most straightforward and commonly performed procedure for managing a labor, also used by obstetrical providers since many years². Amniotic cavity is a sac enclosed in the uterus, where the fetus grows and is protected during the antepartum period³. This is a cavity of a two-layer membrane, the innermost amnion and the outermost chorion⁴. The potential cavity is present early in gestation and is filled with serous fluid⁵ during the first few weeks. As the fetus start to produce urine, the volume of body fluid increases in one way or another as a result of growth of urinary tract⁶. In reality, the amniotic fluid consists primarily of fetal urine⁷. The amniotic

membranes are usually intact until towards the end of most pregnancies but break spontaneously in the hours leading up to impending spontaneous labor, or sometimes after labor has actually begun⁸. The reasons why using artificial interruption of membranes from obstetricianside can be to (1) stimulate or trying to fasten the delivery process, or (2) in favour with internal fetal monitoring installation that will direct to check the state of the fetus⁹.

The fetal heart rate and uterine activity are recordable with external systems, but in some cases, a more direct monitoring during labor is required¹⁰. In such evaluations, this is a barrier of the amniotic membrane and in this scenario; the amniotic membrane must be perforated to install a fetal scalp electrode or intrauterine pressure catheter to perform adequate measurements¹¹. A study by Abdullah A. et al. in 2023 The study had also reported that the mean of the labour duration in amniotomy group was 6.66 & plusmn; 1.4 hours and for spontaneous rupture of membranes it was 7.66 & plusmn; 1.75 among primigravida patients¹² Currently, almost no data exist in the modern obstetric literature on effect of amniotomy and spontaneous effects of ruptured membranes (ROM), especially tailored to local context.

The study about a decade old being the only one carried out in Karachi is more or less an insight but not enough to help with current decision making¹³. In order to fill this gap as well as gather local evidence, I plan to perform a study comparing the outcomes of amniotomy versus spontaneous rupture of membranes of early labor between term primigravida patients. This study not only provides valuable population-level data, but also will help inform the selection of the best-suited intervention for our population¹⁴.

MATERIALS AND METHODS

These were the reasons behind conducting this experiment to find out what contributes in the amniotomy and spontaneous Membrane Rupture (SROM) and duration of labour in case of first time mothers. This clinical trial has conducted in Department of Obstetrics and Gynecology, Lady Reading Hospital MTI BANNU during six months (1 st Feb 2021 to 1 st August 2021). It was approved by the Institutional Ethical Review Committee (ERC) of the Bannu Medical College approval reference No. 20 /DiR&MJ/BMC/2025, dated 05/11/2025. A total of 160 participants were recruited and randomly allocated them into two groups of group A Amniotomy group (80 participants) and group B Spontaneous Rupture of Membranes (80 participants).

The outcome measures were labor hours which were estimated at 6.66 +- 1.4 hours in the Group A and 7.66 +- 1.75 hours in the Group B based on a study by Regular et al.,²³ from which our sample size was set to be 95 percent confidence level, 80 percent power and position of error 5 percent & exclusion criteria included Pregnant women-that are not at risk e.g. Group A- Amniotomy was done under aseptic condition, Coverage with prophylaxis antibiotics and constant monitoring for impending complications like cord prolapse and placental abruption. Group B: Subjects were retained as intact membranes till spontaneous rupture and fetal distress where an action was done.

The primary endpoint was the duration of labor; secondary endpoints included mode of delivery, maternal complications, neonatal complications and Apgar scores. Data were conducted in SPSS version 22, and the continuous ones compared using unpaired sample t-tests for continuous variables and chi-square tests for categorical variables. Analyses were also conducted post stratification to demonstrate the difference of the above groups on the basis of age, gestational age and weight. The p significance level was set as follows: 0.05 corresponding to the number.

RESULTS

Methods: This was a single centered, prospective randomised control trial study conducted on 320 participants which were randomly divided into Group A (Amniotomy)- 160 participants & Group B (Spontaneous Rupture of Membranes)- 160 participants. Also in group A (Amniotomy) has 90% (144 out of 160) were between 18 to 30 years while only 10 % (16 out of 160) among above the age of 30 years. Likewise, in Group B (Spontaneous Rupture of Membranes), 92.5% (148 out of 160) were aged between 18 and 30 years while the remaining were above 30 years (7.5%, n = 12 out of 160).

Therefore, the vast majority of each sample were young people: 90% of Group A and 92.5% of Group B were aged between 18 and 30 years old. In relation with the labor time, it was also observed that Group A (Amniotomy) is much less in total mean of time compared to group B where in the mean of labor time for group a was 5.725 +- 0.59 hours and Mean of Labor Time for group b was 7.150 +- 0.48 hour, respectively; $P=0.00026$. In the grouping of 18-30 years, group A mean was 5.750 +- 0.60 hours of labour whereas in seat B it was 7.162 +- 0.50 hours of labour notes (Table 2). In the cohort with age >30 years, Group A had a shorter mean labor duration of 5.500 ± 0.57 hours compared to Group B (7.000 ± 0.00 hours). When analyzed on demographic variables, the labor duration at 37-39 weeks was found to be lower for Group A with mean of 5.794 ± 0.59 hours as compared to Group B (7.151 ± 0.50 hours) but the difference was not significant ($P = \text{Group p}[27]$). Group A mean weight was 67.025 ± 3.58 kg and group B mean weight was 67.900 ± 3.01 kg with no significant difference between them.

Table: Comparison of Age, Labor Duration, and Demographic Variables Between Group A (Amniotomy) and Group B (Spontaneous Rupture of Membranes)

Category	Group A (Amniotomy)	Group B (Spontaneous Rupture of Membranes)	Total
Sample Size (n)	160	160	320
Age Distribution (years)			
18-30	144 (90%)	148 (92.5%)	292 (91.25%)
>30	16 (10%)	12 (7.5%)	28 (8.75%)
Labor Duration (hours)			
Overall Duration	5.725 ± 0.59	7.150 ± 0.48	-
Age Group 18-30	5.750 ± 0.60	7.162 ± 0.50	-
Age Group >30	5.500 ± 0.57	7.000 ± 0.00	-
Gestational Age 37-39 weeks	5.794 ± 0.59	7.151 ± 0.50	-
Gestational Age >39 weeks	5.333 ± 0.51	7.142 ± 0.37	-
Weight ≤70 kg	5.771 ± 0.59	7.162 ± 0.50	-
Weight >70 kg	5.400 ± 0.54	7.000 ± 0.00	-
Demographic Variables			
Age (years)	27.175 ± 2.39	26.275 ± 2.57	-
Gestational Age (weeks)	38.500 ± 1.08	38.400 ± 1.15	-
Weight (kg)	67.025 ± 3.58	67.900 ± 3.01	-

DISCUSSION

The findings of this paper will help in improving the understanding about the effect of amniotomy on timing of labor in primigravida women, compared with spontaneous rupture of membranes (SROM). I = We have demonstrated that amniotomy has an important labour shortening effect and this finding is in line with extensive literature supporting such an intervention. The mean labor time in group A (Amniotomy) was only 5.725 ± 0.59 hours as compared to the average labor time in Group B (SROM) i.e., 7.150 ± 0.48 hours with statistically significant difference ($p = 0.000$) [1]. This supports the hypothesis that amniotomy accelerates labor due to a better performance of uterine contractions, as demonstrated by the research conducted by Fraser et al. (1999) and Smyth et al. (2006) 2,3. There was no significant effect of age on labor period for either group.

In Group A, as Abdullah A. et al reported, younger age groups like both 18–30 years and over 30 years also had significant shorter labor periods [5] (2010), with the same results in all age groups⁴. This indicates that it is safe to use amniotomy on a wide age range, but caution needed in older women or those with additional risk factors such as being obese. These results were further reaffirmed by the comparison of two gestational age groups (37–39 weeks and 39 weeks[>]). Regardless of whether the gestational age at the start of labor was lower or higher, Group A mean labor periods were always shorter than Group B. Surveys by Goh et al. Amniotomy: Systematic reviews (Matzneller et al. Our result was also consistent with the effect of maternal weight on the length of labor.

In Group A [?] In Group A, for 70 kg the duration of labor was shorter (5.771 ± 0.59 hours) than in Group B (7.162 ± 0.50 hours), but this difference was also present in women having weight greater than 70 kg too. This result is in line with Pasko et al. (2019), who concluded that while maternal obesity may have a significant effect on labor progress, amniotomy seems to lessen this effect⁷. In both groups, gestational age, demographic (age, weight), and gestational age were in equal measure with the differences of labor duration may be valid. The mean age and the gestation age were comparable in all groups, and the slight difference in weight between first and last day after birth did not seem to have any significant effect on outcome. This further strengthens the case that the discrepancy in duration of labor seen is due more to the procedure (an amniotomy) itself than any confounding demographics.

CONCLUSION

In conclusion, amniotomy shortens the duration of labor more than SROM among women in their first pregnancy as shown by this paper. These results are corroborated in literature and contribute to the goal of controlling labor progression using

one of the good intervention amniotomy. Although useful in the labor duration, amniotomy did not differ in fetus mode of delivery and fetal Apgar outcomes, as per Cochrane reviews and Fraser et al. (2000) 8.

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