

# Does Artificial Rupture of Membranes (ARM) Reduce Duration of Labor in Primigravidae: A Randomized Controlled Trial

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## Abstract

**Objective:** To study the effectiveness of artificial rupture of membranes (ARM) in reducing the duration of labor in primigravida.

**Methods:** A one year prospective randomized controlled trial was carried out on 200 primigravida (100 each to ARM and no ARM group) meeting the selection criteria. The outcomes were noted in both the groups. Data analysis was done using Chi Square and Z test.

**Results:** The mean duration of labor from enrolment to full dilation of the cervix or bearing down sensation was  $4.76 \pm 1.64$  in ARM group compared to  $5.66 \pm 1.85$  in the control group which was statistically significant ( $p$  value = 0.000; 95% ). There was no difference in the duration of second and third stage of labor in both groups. There was no significant difference in the mode of delivery between ARM and control group. There was no significant difference in mean birth weight and Apgar score between the two groups.

**Conclusion:** ARM definitely reduced the duration of labor without any detrimental effects on fetus, mother and mode of delivery. Hence, there is no reason to strive to maintain the integrity of the fetal membranes in spontaneous labor in women where ARM is not contraindicated.

**Keywords:** Primigravida, artificial rupture of membranes (ARM), labor, augmentation.

## INTRODUCTION

Artificial rupture of the amniotic membranes to shorten duration of labor has been widely practiced by obstetricians for several decades. The routine use of this procedure is controversial as according to some it reduces duration of labor but increases FHR variability, operative interference and is associated with low Apgar scores in newborns. According to others not only the duration of labor is reduced but also it has a favorable outcome, without any complications.<sup>1-8</sup>

Hence the present prospective randomized controlled trial was undertaken to evaluate the efficacy of artificial rupture of membranes (ARM) vs spontaneous rupture of membranes in full term primigravida on duration of labor, mode of delivery and neonatal outcome from March 2000 to February 2001 at District Hospital, Belgaum (attached teaching hospital).

## METHODS

A prospective randomized controlled trial was carried out in 200 primigravidae (100 each to ARM and no ARM group) meeting the selection criteria. The inclusion criteria were primigravida with full term singleton pregnancy, cephalic presentation, cervical dilation 4 to 6 cm with head being well

applied to the cervix, adequate pelvis and willing to provide informed consent. The exclusion criteria were obstetric risk factors like—antepartum hemorrhage, pregnancy induced hypertension (PIH), premature rupture of membrane, hemoglobin < 8 gm % and medical diseases complicating pregnancy, cases for elective LSCS and known HIV positive women.

Women meeting the selection criteria were randomly assigned to either ARM (Study) or control group by envelop method (100 each). In the study group ARM was performed immediately after randomization and nature of the liquor was noted, fetal heart was monitored by intermittent auscultation and progress of the labor was monitored with partogram. In the control group membranes were allowed to rupture spontaneously, rest of management was same as in the study group. Analgesics, drugs for cervical dilation and oxytocics were withheld. Time taken from the enrollment to full dilation of cervix or bearing down sensation in the mother was noted. Mode of delivery and Apgar score of the baby at 1 and 5 minutes were recorded. Mother and baby were followed up till their stay in the postnatal ward.

Data was analyzed by using Chi Square test and Z test.

**RESULTS**

In the present study 200 women meeting the selection criteria were enrolled. The baseline characteristics mean age, gestational age were comparable in the both the groups.

The mean duration from enrolment to full dilation of the cervix or bearing down sensation was  $4.76 \pm 1.64$  hours in ARM group compared to  $5.66 \pm 1.85$  hours in the control group this was statistically significant ( $p$  value = 0.0000). The shortest and longest duration of labor were 1 hour and 8 hours 15 minutes and 3 hours and 9 hours 30 minutes. in ARM and control group respectively. There was no difference in the duration of second and third stage of labor in both groups.

The duration of labor from the cervical dilation of at enrolment to full dilation/bearing down sensation was statistically significant at 4 cm, and 5 cm ( $p = 0.003$  and  $0.011$ ) but not at 6 cm ( $p = 0.543$ ) of dilation compared to control group as shown in Table 1.

There was no significant difference in the mode of delivery between ARM and control group. Ninety-three percent in ARM group had vaginal delivery (83% spontaneous and 10% by outlet forceps) and 7% had LSCS (6 for fetal distress and one for abruptio placenta) which was comparable with control group which had 94% vaginal delivery (82% spontaneous and 12% by outlet forceps) and 6% by LSCS (3 for fetal distress and 3 for failure to progress) as shown in Table 2.

**Table 1:** Duration of labor from cervical dilation ( $5 \pm 1$  cm) to full dilation of the cervix

Cervical dilation at enrolment	ARM (100)	Control (100)	t	DF	p-value	95% CI
4 cm	5.23 + 2.17 (27)	7.33+2.16 (23)	3.202	42	0.003	0.77-3.42
5 cm	4.76 + 1.46 (62)	5.44+1.47 (64)	2.590	117	0.011	0.16-1.23
6 cm	3.92 + 0.81 (11)	4.13 + 0.87 (13)	0.617	24	0.543	0.48-0.90
Average	4.76 + 1.64	5.66 + 1.85	3.554	189	0.000	0.4-1.4

**Table 2:** Mode of delivery

	ARM	Control
Spontaneous vaginal	83%	82%
Outlet forceps	10%	12%
Cesarean section	7%	6%

**Table 3:** Apgar score at 5 minutes

Apgar score at 5 minutes	ARM	Control
<5	—	1%
6-7	1%	1%
8 and above	99%	98%

The mean birth weight of the babies was 2.9 and 2.8 kg respectively and there was no difference in Apgar score between the two groups as shown in the Table 3.

**DISCUSSION**

The decision when to rupture membranes in uncomplicated labor is a long standing obstetric controversy. ARM is widely advocated method of augmenting uncomplicated labor but review of many studies has shown that there is an appalling contrast in the frequency with which augmentation of labor is employed in obstetric practice. Initial studies have not found any difference in duration of labor after amniotomy in control and ARM groups. In the present study ARM was done at 4 to 6 cm of cervical dilatation as the head would be well-applied to cervix and subjective variation in the findings of cervical dilatation could be avoided. There was reduction in the duration of labor in ARM group compared to control group which was statistically significant, especially when the ARM was performed at 4 and 5 cm. These observations were in accordance, with the large meta- analysis of 7 studies where amniotomy was associated with the reduction in duration of labor from 0.8 to 2.3 hours.<sup>8</sup>

However, a randomized trial conducted in Belgium found no significant difference between the duration of first stage of labor by performing amniotomy at 3 to 2 cm of cervical dilatation.<sup>9</sup> Similarly in another study no significant difference was found in the duration of first stage of labor by performing amniotomy at 2 cm in uncomplicated nulliparaous women.<sup>10</sup>

In the present study no significant difference was found in the mode of delivery among women in both the groups. This was in contrast to a large multicentric meta-analysis in it was noted significant increase in the cesarean deliveries with early amniotomy (OR 1.2 95% CI 0.9-1.6).<sup>8</sup> This was in contrast to large randomized trials from Belgium and Netherlands where no difference was found in the mode of delivery.<sup>11</sup>

No difference in the perinatal outcome was found in the present study in the amniotomy and control group. But the meta-analysis from United Kingdom reported 5 minutes Apgar score less than 7 in the amniotomy group (OR 0.5 95% CI 0.3-0.9).While the other studies have not found any significant difference in the Apgar scores of neonates of amniotomy group.<sup>10,11</sup> Limitations of the Study: The sample size in the present study was 200 was calculated based on number of primigravidae available without interference in one year period.

**RECOMMENDATIONS**

Though the present study had favorable outcomes with ARM the present evidence does not support the same.<sup>12</sup> A larger multicentered trial is recommended to resolve this controversy.

**CONCLUSION**

ARM reduced the duration of labor without any detrimental effect on the fetus, mother or mode of delivery. Hence there is

no need to conserve the membranes in spontaneous labor, as condition of the fetus is also noted along with the reduction first stage of labor with ARM.

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