Comparison of Artificial Rupture of Membranes with Intact Membrane in Labouring Multigravidae

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Abstract
Background: To study the effect of amniotomy on the duration of labour and Apgar Score of babies in laboring multigravidae

Methods: In this interventional study, 100 women with uncomplicated term pregnancy and spontaneous onset of labour were divided into two groups. Patients were in active labour with Bishop score 5-6 and intact membranes. Fifty women underwent amniotomy (group A) while fifty women did not have amniotomy (group B). Duration of labour was noted in hours and categorized as more than 6hrs and less than 6hrs in both groups. Apgar scores of babies were noted at 5 minutes of delivery and categorized as up to 6/10 or more than 6/10 in both groups.

Results: Forty patients in group A were delivered with in 6hrs and only 10 patients took more than 6 hrs to deliver. Where as in group B, 11 patients were delivered with in 6hrs and 39 patients delivered after 6hrs. Forty three babies in group A and 45 babies in group B had more than 6/10 Apgar score. Seven newborns in group A and 5 newborns in group B had Apgar Scores up to 6/10.

Conclusion: Amniotomy in established onset of labour reduces the duration of labour with no significant effect on neonatal outcome.

Key Words: Amniotomy, Labour, Apgar score.

Introduction
Artificial rupture of membranes (ARM) with or without oxytocin, during an established labour is believed to result in shorten labour with no adverse effects on fetus. It reduces the need of augmentation and thus hyperstimulation and uterine rupture especially in the multigravidae. The risks of amniotomy are changes in fetal heart rate pattern and rarely cord prolapse. The decision whether or when to rupture the membranes in uncomplicated labour is a long standing controversy. ARM is artificial rupture of amniotic sac with special amniotomy forceps or a pair of kocker forceps or with an instrument called amnionhook or by an amniocot. Kocker forceps are a pair of forceps with toothed jaws at the end. Amniohook is a long crochet type hook with a pricked end. Amniocot is a glove with a small pricked end on one finger. (not available in our setting). Early amniotomy has been advocated as a component of active management of labour. It is often the easiest way to start or augment labour.

Traditionally amniotomy has been either hind water or forewater. Forewater procedure is safer than hind water approach. It is used for inducing unstable lie when the fetal head is wandering out of pelvis and needs to be stabilized.

Before doing ARM an abdominal palpation to confirm fetal lie and presentation, auscultation of fetal heart sounds and vaginal examination to assess Bishop score and integrity of forewaters must be performed. With aseptic technique the tip of index and middle fingers of one hand should be placed through the cervix onto membranes, with other hand a pair of kocker forceps is slided between two fingers until cervix is reached. The point is turned upwards to break the membranes. Amniotic fluid is usually released in the form of gush so cord prolapse is excluded before removing the fingers and fetal heart is rechecked after the end of the procedure. The success of amniotomy is dependant upon the state of cervix (dilatation and effacement), the parity of woman and station of presenting part at the time of intervention.

Amniotomy reduces length of labour. It is particularly useful in the grand multigravidae with a favourable cervix. Amniotomy also detects meconium staining of amniotic fluid. It allows placement of internal fetal monitor on baby’s scalp and occasionally to take fetal blood samples. It is helpful in reducing the dose of oxytocin and risk of hyperstimulation especially in multipes. Amniotomy is used as a sole method of induction of labour if the membranes can be reached. Controlled artificial rupture of membranes is useful in massive polyhydramnios to reduce the risk of abruption and cord prolapse due to sudden spontaneous rupture of membranes. It is useful in reducing pressure in cases of abruptio placenta preventing extravasation of blood into the myometrium and entry of thromboplastin substances.
into the circulation. The problems with amniotomy are risks of cord prolapse and intrauterine infection. Amniotomy is also associated with variable decelerations of fetal heart rate due to umbilical cord compression. Amniotic fluid embolism, a rare obstetric emergency is associated with ARM but the risk appears to be more associated with spontaneous rupture of membranes with an explosive force rather than controlled artificial rupture of membranes. Theoretically ARM should prevent this. Labour induction results in increased risk of operative delivery and longer hospital stay. Amniotomy is associated with a reduction in labour duration of between 60 and 120 minutes. It is not possible to conclude that early amniotomy has a clear advantage over expectant management, or amniotomy is to speed up contractions and shorten the reverse.

The primary aim of amniotomy is to speed up contraction and shorten the length of labour. It allows the presenting part to descend and press more effectively on the cervix. The pharmacologic effects of amniotomy are important than its physical effects. Rupture of the membranes cause prostaglandin release from the decidua which increase uterine activity and ripen cervix. Prostaglandin (PGF2) alpha appears to be the main prostaglandin generating myometrial contractility while PGE2 is more important in the process of cervical ripening. Main sources of these prostanooids within the uterus are the decidua and amnion. Amniotic fluid levels of PGF2 alpha at ARM and the ratio of PGF2alpha/PGE2 at ARM are prognostic for the subsequent progression of labour.

Patients and Methods

The descriptive study was conducted at Holy Family Hospital during the period June 2006 to Nov 2006. A total of 100 cases, selected on the base of inclusion and exclusion criteria were divided into two groups with 50 cases assigned to each, group A (ARM group) and group B (intact membranes).

The inclusion criteria consisted of multigravidae having two to four children at term (37 completed - 42 weeks) in active labour with Bishop score more than 5, having low risk singleton pregnancy with longitudinal lie and cephalic presentation with intact membranes. All cases of fetal distress (which occurred before and any time during the study), post term and high risk pregnancies in which ARM was indicated were excluded.

ARM of group A patients was done with full aseptic measures at BS 5-6. Fetal heart rate was auscultated just after ARM to detect fetal distress and vaginal examination was done to exclude cord prolapse. In group B patients, no attempt was made to rupture the amniotic sac with the intention to keep the membranes intact till second stage of labour.

If spontaneous rupture of membranes (SRM) occurred before 8 cm cervical dilatation, the case was excluded from the study but if SRM occurred at or after 8 cm dilatation, the case was still included in the study as SRM at this stage cannot alter the results.

Patients of both the groups were given analgesics when needed, as well as oxytocin infusion if the pains were not strong enough. Fetal heart rate was strictly monitored every 15 minutes in the 1st stage and every 5 minutes in 2nd stage of labour in both the groups. If there was any sign of fetal distress or cord prolapse, appropriate measures were taken by the attending obstetrician and case was excluded from the study.

Duration of labour of patients in both groups A and B was noted from time of start of management till the completion of 2nd stage of labour in hours and categorized in two groups, up to 6 hours or more than 6 hours. Apgar scores of babies of both groups A and B were noted down at delivery at 5 minute interval and categorized in to two groups, up to 6/10 or more than 6/10.

Chi-square test was used to compare the frequencies of patients in the two categories of duration of labour (up to 6 hours and >6 hours) between the two groups and to compare frequencies of patients in the two categories of Apgar scores (up to 6/10 and >6/10) between the two groups. A p-value of less than 0.05 was considered significant.

Results

Total subjects in the study were 100 low risk parous women at term in spontaneous labour. eleven patients dropped out of the study. Five patients had suspected fetal distress. Two patients had instrumental delivery, one from group A and one from group B. These 11 patients were replaced to complete the sample size of 100 patients. (These 100 patients were divided into two groups of 50 patients each and were assigned to have or not to have amniotomy after informed consent).

The mean age of the patients was 25.62 yrs. The maximum age was 27 years and minimum was 25 yrs. Among the total patients included in the study, Para 1 were 49%, para 2, 31% and para 3, 20%. Duration of labour of the two groups was comparable. Forty patients (80%) in artificial rupture of membrane group (A) undergoing amniotomy were delivered in up to 6 hours and only 10 patients (20%) in this group took...
>than 6 hours. While 11 patients (22%) delivered in up to 6 hours in control group (B) and 39 patients (78%) had labour lasting > than 6 hours. Patients undergoing amniotomy delivered much earlier than patients not undergoing amniotomy. The difference was statistically significant with P value = 0.00 (using Chi-square test). (Table 1). There was no statistically significant difference in 5 minute apgar score between the two groups with P value = 0.538.

Table 1: Duration of labour in artificial rupture of membrane group and control group
(n=50 in each group)

<table>
<thead>
<tr>
<th>Groups of patients</th>
<th>Up to 6 hours</th>
<th>&gt;than 6 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artificial rupture of membranes</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>Control Group</td>
<td>11</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>49</td>
</tr>
</tbody>
</table>

(Table 1: Duration of labour in artificial rupture of membrane group and control group (n=50 in each group)

Table 2: Apgar scores of newborns in artificial rupture of membrane group and control group (n=50 in each group)

<table>
<thead>
<tr>
<th>Groups of patients</th>
<th>Up to 6/10</th>
<th>&gt;than 6/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artificial rupture of membranes</td>
<td>7</td>
<td>43</td>
</tr>
<tr>
<td>Control group</td>
<td>5</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>88</td>
</tr>
</tbody>
</table>

Seven newborns (14%) with artificial rupture of membrane group had Apgar score up to 6/10 and this was similar to the 5 newborns (10%) that had Apgar score up to 6/10 in the control group. Though there was a slightly increased incidence of poor Apgar score in the artificial rupture of membrane group the difference was not significant (Table 2). All newborns with poor Apgar score were shifted to Neonatal Intensive Care Unit (NICU) but only 3 of them were admitted for more than 24 hours for observation, one from group A (ARM group) and two from the control group. Most of the babies in both groups had satisfactory (more than 6/10) apgar score, 43 newborns in group A and 45 in the group B.

Discussion

The management of labour determines to a great extent the outcome both for the mother and baby. In the process of labour, the fetal and maternal conditions are closely monitored to prevent or promptly identify any problem and threat. However, many practices in the modern labour have come under question recently. Amniotomy is believed to result in a shorter duration of labour by enhancing uterine contraction and also to reduce the incidence of dystocia. Results of our study showed that there is a statistically significant reduction in the duration of labour in the amniotomy group compared with the control group. Majority (80%) of patients delivered with in 6 hours in amniotomy group. Thus patients in amniotomy group delivered earlier than the non amniotomy group. Many studies concluded that amniotomy significantly reduced the duration of labour especially in the first stage of labour without affecting oxytocin requirements. Garite et al, reported the reduction in duration of labour in addition with no difference in mode of delivery between the two groups. On the other hand, a study by Mechthild M et al concluded that “The rupture of membranes shortened 1st stage of labour. This effect was larger than that of any other factor and more pronounced in multiparas.” Mikkin et al conducted a study on amniotomy in 533 multiparous women and 157 nulliparous women and randomized them to either amniotomy or intent to conserve membranes.

Duration of labour was reduced in both nulliparous and multiparous patients in amniotomy group and oxytocin was used less in the intervention arm. In our study, it has been observed also that the oxytocin requirement for labour augmentation in the amniotomy group is slightly lower than for the control. This difference is likely to be due to the increased contractility of the uterus, which is said to result from better application of fetal head to the cervix following amniotomy in labour.

Sega et al reported an increased incidence of fetal heart rate abnormality or fetal distress and thus cesarean section following amniotomy. Though our study excluded cases of fetal distress, we came across only 5 cases of fetal distress, 2 from the amniotomy group and 3 from the control group in 100 patients. This might be because we included 100 low risk multiparous women at term in our study. The observation might have been affected on taking large study population like 400-500 patients. Secondly, this low incidence may be due to the fact that fetal heart rate monitoring in this study was by intermittent auscultation using Pinnard’s stethoscope, thus resulting in an inability to detect subtle fetal heart rate abnormality. A higher incidence of caesarean section could result from the use of continuous electronic fetal
heart rate monitoring without facilities for fetal scalp blood sampling. Incidence of poor Apgar scores at 5 minutes were similar in both amniotomy and control group. A slightly low incidence of poor Apgar score at 5 min interval in the control group compared with the amniotomy group in this study, though not enough to reach a statistical level (p value = 0.0538). Results of present study are similar to the study by Ajadi et al., which reported that newborn outcome measured by Apgar score at 1 and 5 min showed no significant difference between amniotomy and control group.

Conclusion

1. Amniotomy significantly reduces the duration of labour when compared with the practice of leaving the membranes intact until second stage.
2. Amniotomy does not increase the risk of any adverse outcome in the newborn.
3. It reduces the incidence of prolonged labour, and risks of obstructed labour, uterine rupture and septicaemia can be avoided, which all contribute significantly to maternal mortality and morbidity.

References