

Amniotomy shortens the induction delivery interval

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Abstract

Amniotomy or Artificial rupture of membrane is commonly performed procedure in obstetrics. It induces and or accelerates the progress of labour. It is done by artificial rupture of forebag of amniotic membrane. It causes local increase of prostaglandin which interact with collagenous framework and matrix of cervix, converting it from a rigid structure to a soft distensible organ. Release of amniotic fluid shortens muscle bundles of myometrium, strength and duration of contractions are thereby increased and more rapid contraction sequence follows. For this purpose amniotomy as a method of induction of labour may benefit in the way of reducing time interval and operative intervention. This study was conducted with the aim and objectives to evaluate cases in terms of indication, determine amniotomy delivery interval, analyze outcome of amniotomy in labour, find out cases needed for intervention during the process and detect any maternal and fetal complication that may arise as a result of amniotomy. This cross-sectional study was undertaken among 110 cases in Sir Sallimullah Medical College and Mitford Hospital over a period of one year from December 1999 to December 2000. Out of 110 patients 58 patients were multigravida and 52 were primigravida and their mean age was 25.3 years. Amniotomy was done in these patient with mean cervical dilatation of 3.9 cm. Amniotomy alone was done in 88 cases. Mean amniotomy-delivery interval was 4 hours 54 minutes and 90(81.8%) patients delivered normally; 89.1% babies were healthy. Amniotomy can not be used in remote areas of our country. Though it may shorten labour by augmentation and may contribute in reducing maternal morbidity and mortality but there is potential risk of cord prolapse, abruption placenta, risk of infection, so it can be done in institution with proper supervision.

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Introduction

Amniotomy is an effective way to induce or augment labour.¹ First effective artificial rupture of membranes (ARM) was described in 1756 by Thomas Denman of Middlesex hospital & came to be known as "English method". Next important discovery was oxytocin. Turnbull and Anderson advocated a policy of amniotomy followed by immediate intravenous titration of oxytocin. In Later half of 20th century; the role of prostaglandin E₂(PGE₂) lies in its ability to bring about cervical ripening. The art of successful labour induction lies in using all of these elements in the most effective combinations². Tissue of fetal membrane is attached to uterine decidua. On opening of the cervix, lower most part of amniotic sac is exposed. As the presenting part engaged, forebag become isolated from upper compartment.³ After rupture of membrane, inflammatory traumatic response occurs which releases prostaglandin(PG) it enters into maternal circulation & Timchard and Gibbens revealed that there is also spurt release of oxytocin, these are uterotonic.⁴ Once labour has begun oxytocin levels do rise, especially during 2nd stage.

Prostaglandin are essential mediators of oxytocin's effect on uterus. Vaginal examination & amniotomy cause rise in maternal plasma oxytocin level (Ferguson reflex).

Prostaglandin may be the key factor in the initiation of labour. PGF₂α appears to be principal prostaglandin, generating contractility of the myometrium and PGE₂ helps in cervical ripening, it interacts with collagenous framework & matrix of cervix that helps in cervical ripening.

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Main source of prostaglandins are deciduas & amnion. Between amnion & deciduas lies chorion, a rich source of PG degrading enzyme, 5-hydroxyprostaglandin dehydrogenase (PGDH). Activation of uterine prostaglandin in labour vested in inducible isoform of cyclooxygenase, COX-2 and high capacity of chorion to metabolize PG represents a defence mechanism against early & inappropriate production of PG before scheduled time. The influences include trauma, haemorrhage & infection causes precocious production of PG initiating premature deliveries. Amnion is the major site of increased production at the time of labour specially after amniotomy. A ripe cervix associated with shorter latent phase and shortened duration of labour.⁵ Patients with favourable cervix for amniotomy, there was sudden and progressive descent of fetal head to cervix and increased level of prostaglandin in them. These seem to support the idea that amniotomy should be performed at an appropriate time and the investigations speculated that the increase in prostaglandin level due to increased force of the head upon the cervix. When membrane remain intact, the expulsive force does not work efficiently against the cervix because of hindrance due to inherent tension of fetal membrane. When this tension is removed by spontaneous or artificial rupture of membrane, the presenting part directly press the cervix and force of distension of the cervix increased after rupture of membrane. On the otherhand when head is still floating over the cervix and membranes intact, efficiency of the effect of rupture of membrane and acceleration of labour is poor.⁶ For this purpose amniotomy may be beneficial in the way of reducing time interval and operative intervention. Considering potential risk of increased in frequency like cord prolapse, abnormal fetal heart rate pattern and infection, none of these events were increased in frequency. It also make obstetrician to have a chance to get knowledge about fetal condition by direct examination of liquor where modern facilities of fetal monitoring is not easily available. This study was conducted to evaluate effect of amniotomy on labour in shortening duration of labour and it's effectiveness, complications and maternal and fetal outcome.

Methods

A cross sectional study was conducted on 110 cases between December'1999 to December' 2000. After admission a detailed history and careful general and obstetrical examination were performed. The study population was selected on the basis of induction or augmentation of labour and who fulfilled inclusion and exclusion criteria. Singleton pregnancy with cephalic presentation with intact membrane were selected for study and major degree of CPD or contracted pelvis, malpresentation, cord presentation, major degree

of placenta previa, previous two caesarean section, invasive carcinoma of cervix, cardiac disease, preexisting fetal distress & previous successful repair of VVF were excluded. Necessary information were taken and filed in protocol proforma and partograph⁷ was maintained. The cases were selected randomly (every alternate cases). Color and amount of liquor was noted and FHR monitored carefully. Uterine contraction and progress of labour was monitored. if progress is not satisfactory other measures of induction such as oxytocin was tried. Maternal and fetal condition were assessed properly. Second and third stages of labour was managed conventionally.

Results

Of total 110 patients in this study, 52(47.2%) were primigravida and 58(52.8%) were multigravida (range 15-35 years). Mean age was 25.3 years. Most of the patients were from lower socioeconomic group (80%). Out of total, 76(69.1%) patients height was between 151-154cm; 20(18.2%) patients were 155 cm or more and only 14(12.7%) were 155 cm or less. Among multigravida 38(34.5%) patients had previous history of normal vaginal delivery, history of forceps delivery in 2(1.8%) cases, 4(3.6%) had history of prior one caesarean section and 14(12.7%) patients had history of MR, abortion or preterm delivery. Ninety (81.8%) patients were normotensive and 20(18.2%) were hypertensive. Forty-one (37.3%) patients with gestational age of 41-42 wk; 38(34.5%) were in 39-40 wks; 28(25.5%) were in 37-38 wks and only 3(2.7%) were 43 wk or above. Majority of cases had some indications of amniotomy. Amniotomy was done in 44(40%) cases in prolonged pregnancy, 12 (10.9%) cases with preeclamsia, 8(7.2%) cases with gestational hypertensive disorder, 42(38.1%) cases with term pregnancy with early labour for augmentation and 4(3.6%) patient with Rh incompatibility (Table-I). Sixty eight (61.8%) patients had engaged head and 42(38.2%) cases had non-engaged head. Fifty-two (47.2%) patients had Bishop's score more than 6, 42(38.2%) patients were between 5-6 and only 16(15.5%) cases had Bishop's less 5 with the mean of 6.2. In majority of cases 58(52.8%) amniotomy was done with cervical dilatation of 2-3cm, in 44(40%) cases it was done in more than 3 cm where patient came with early labour and only 8(7.2%) cases it was done in less than 2 cm. Mean cervical dilatation was 3.9 cm. Oxytocin needed only 22(20%) cases; 88(80%) cases no oxytocin required.

Table-I : Indications of amniotomy

Groups	Number	Percentage
Prolonged pregnancy	44	40%
Preeclampsia	12	10.9%
Gestational hypertension	8	7.2%
Rh incompatibility	4	3.6%
Term pregnancy with labour(A	42	38.1%

Amniotomy delivery interval in both primi and multi gravid patients were shown in **Table - II**

Table - II : Amniotomy delivery interval

Hours	Primigravida, N=40	Multigravida, N=58	Total=98
.25-1.5	Nil	4	4
1.51-2.5	2	8	10
2.51-3.5	5	9	14
3.51-4.5	8	12	20
4.51-5.5	10	10	20
5.51-6.5	6	8	14
6.51-7.5	5	5	10
7.51-8.5	2	2	4
>8.5	2	Nil	2

After amniotomy mean duration of different stages of labour are shown in Fig 1 and amniotomy delivery intervals of all cases are shown in Fig 2.

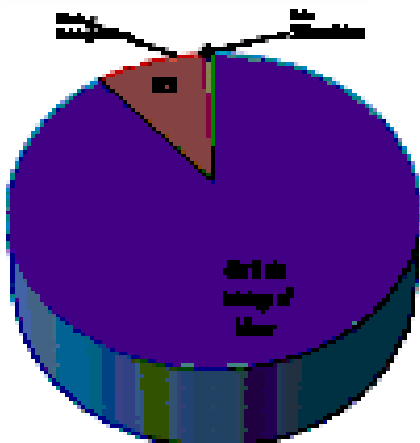


Fig 1: Duration of Different Stages of labour

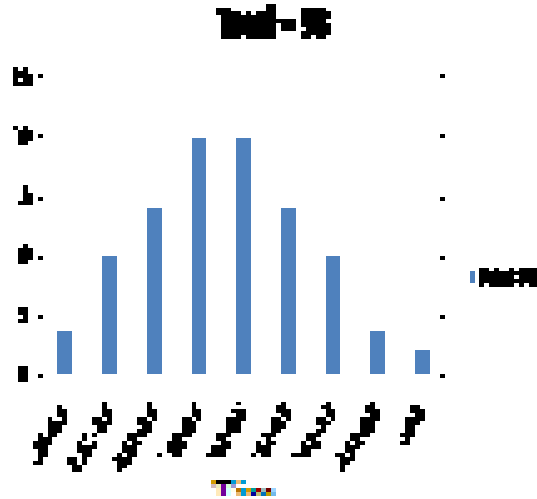


Fig 2: Amniotomy delivery intervals

Mean amniotomy delivery interval of total 98 patients was 4 hours 54 minutes. Ninety (81.8%) patients delivered normally; instrumental delivery were in 8(7.2%) cases due to prolong 2nd stage of labour and to cut short the 2nd stage of labour. LSCS was done in 12(10.9%) cases; 8(7.2%) cases due to fetal distress, 3(2.7%) cases due to cervical dystocia, 1(0.9%) case due to uterine inertia.

Ninety eight (89.1%) babies were healthy, 12(10.9%) babies had asphyxiated due to preexisting maternal condition like preeclampsia and prolonged pregnancy required resuscitation. Apgar score in 5 minutes was 7-10 in 98(89.1%) babies; apgar score was 5-6 in 12(10.9%) babies. Majority of the baby 100(90.9%) had birth weight within normal range 2.5-4 kg, 8(7.2%) babies had less than 2.5 kg and only 2(1.9%) had more than 4 kg although non-diabetic.

Duration of 3rd stage of labour were in primigravida was 5-20 minutes with a mean of 7 minutes and in multigravida 1-9 min with a mean of 4 minutes. Maternal complications during and after labour were minimum; 4(3.6%) cases had cervical dystocia, 5(4.5%) cases had uterine inertia needed oxytocin infusion, prolonged 2nd stage in 4(5.4%) cases, postpartum haemorrhage in 7(6.3%) cases and manual removal of placenta done in 3 cases. Blood transfusion needed in 9(8.1%) cases.

Discussion

In this study amniotomy was done at mean cervical dilatation of 3.9 cm with Bishop's score was 6.2 and most of them 68(61.8%) had engaged fetal head. It was found that when amniotomy was done at less favourable Bishop's score there was tendency to delay in labour, which is similar to the study done by Orhue AA.⁸

This study also correlated with another study done by Mahmood. TA et al.⁹ He showed that after introduction of single dose of prostaglandin amniotomy was done for induction of labour in 260 patients, there was significantly reduced the need for oxytocin augmentation and also reduced the intervention delivery interval. Another study done by Ashrafunnessa et al.¹⁰ concluded that when amniotomy done in less favourable Bishop's score (≤ 5) rate of emergency caesarean section increased. Mean duration of labour was less in multigravida than primigravida. In this study mean amniotomy delivery interval 5hr.7min in primigravida and 4 hrs 42 min in multigravida which indicates that routine amniotomy may shorten the labour. It correlates with study done by Johnson N et al.¹¹ He showed that routine amniotomy shortend in primigravida by 1 hr and parous women by 4 minutes. Another study done by Dermot Mac Donald,¹² divided amniotomy delivery interval into two groups with amniotomy done alone and who did not go into labour within 12 hours, then oxytocin given. He found that less than 12 hours interval in 46% patients and more than 12 hours interval in 54% patients. This study differ with our study as in most cases oxytocin given if uterine contraction was inadequate in earlier time. However mode of delivery were coincide with this study except caesarean section that 87% went into normal vaginal delivery, 10% instrumental delivery and 3% went into caesarean section. Caesarean section rate was more in our study, but it was correlated with other study done by Dean V et al¹³ where increased risk of caesarean delivery was found in nulliparous subjects with labour induction, which was also supported by the study done by Segal et al.¹⁴ As per indication the study was conducted by Yudin et al,¹⁵ showed that the commonest indication was prolonged pregnancy and which was correlate with our study. Amniotomy done in less favourable score with < 3 cm dilatation had more chance of delay in labour which is same to our study and similar to the study done by WD Fraser et al.¹⁶ He showed that if amniotomy was done with < 3 cm dilatation there is more chance of delay in labour. In our country study done by Z.Hasan¹⁷ and Mahbuba¹⁸ showed that with amniotomy and oxytocin the duration of labour can be reduced significantly.

Conclusion

This less expensive intervention procedure in selected cases may help in reducing the duration of labour especially in cases where induction of labour is needed and may reduce the incidence of caesarean section and thereby reducing the maternal morbidity and mortality in our country.

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