

AMNIOTOMY IN LABOUR

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Although traditional teaching has always laid stress on the unfavourable results of ruptured membranes, a number of recent publications (Embrey, 1953; Nixon et al, 1958; Calkins, 1958) have shown that labour was shortened when membranes ruptured just before or with early onset of labour. They went on to postulate that artificial rupture of membranes early in labour should shorten labour and that it carried no added risk to the mother or foetus. Our impression, from clinical observations at the Kandang Kerbau Hospital, Singapore, was that artificial rupture of the membranes in labour tended to speed up the course of labour. In the absence of a specific contraindication, the procedure appeared to be safe and had been adopted as a routine labour ward procedure largely with the object of expediting the rapid turnover of women occupying labour beds, this being an important consideration in a hospital with about 100 deliveries every 24 hours.

Whether our clinical impressions and practice had a sound and scientific basis, however, had never been put to the test. It was, therefore, decided to conduct a study on a series of patients admitted to the Normal Labour Ward and examine the soundness of our clinical impressions in the light of the results obtained. A prospective study was thus started.

Method of Study

A total of 580 cases were studied. All mothers admitted to the Normal Labour Ward between the hours of 9:00 a.m. and 4:00 p.m. from Monday to Friday and between 9:00 a.m. and 1:00 p.m. on Saturday were used for this study. All these mothers, as far as could be ascertained at the time of examination, had no abnormality and were expected to have a normal vaginal delivery. Those who subsequently developed any complication not resulting from artificial rupture of membranes and neces-

sitating transfer to the Abnormal Labour Ward or ending in Caesarean section were excluded from the study. Those not in labour and cases where delivery was imminent, for obvious reasons, were also excluded.

Each patient was interviewed and examined by a final year medical student. Each student set out with these objectives:

1. To ascertain the time of onset of labour, i.e. from the time of the first painful uterine contraction.
2. To confirm that the patient was in labour, i.e. having painful rhythmic uterine contractions at intervals of not more than ten minutes.
3. To ascertain the state of the membranes. Those with intact membranes were subdivided into two groups:
 - (a) Those with odd admission numbers had the membranes artificially ruptured on examination at admission.
 - (b) Those with even admission numbers had the membranes intact until spontaneous rupture occurred at a later stage in labour. These served as controls.

Those in whom spontaneous rupture of the membranes had occurred prior to vaginal examination formed a third group.

RESULTS

Of the 580 cases, only 569 cases were finally included in the analysis. Eleven cases were not included due to reasons shown in Table I. There were 174 patients in the control group, 240 in the study group and 155 in the spontaneous rupture group. Since the duration of labour is influenced by parity, the three groups were further analysed according to parity so as to allow fair comparison of the duration of labour in each sub-group. The distribution is shown in Table I.

TABLE I

PARITY DISTRIBUTION

Total number of cases = 580

	No. of Cases	Primip	Para 2-4	Para 5+
Control Group	174	43	82	49
Artificial Rupture Group	240	77	88	75
Spontaneous Rupture Group	155	36	77	42

- 11 cases not included.
- 2 undiagnosed twin.
- 2 Caesarean sections for cephalopelvic disproportion.
- 7 insufficient data entered.

Duration of Labour

The average duration of labour in the three groups were 8 hours 55 minutes, 9 hours 37 minutes and 7 hours 21 minutes respectively, labour being shortest when spontaneous rupture of membranes occurred early in labour and longest when the membranes were artificially ruptured after labour was established.

The duration of labour in relation to parity in the three groups is shown in Figure 1. The duration of labour in Group 3 (Spontaneous Rupture) was considerably shorter than in Group 1 (Controls) and Group 2 (A.R.M.). This shortening effect was seen in all parities. The difference in duration of labour in Groups 1 and 2 was less marked although it was longer in Group 2 with all parities, showing that artificial rupture of membranes did not shorten the course of labour.

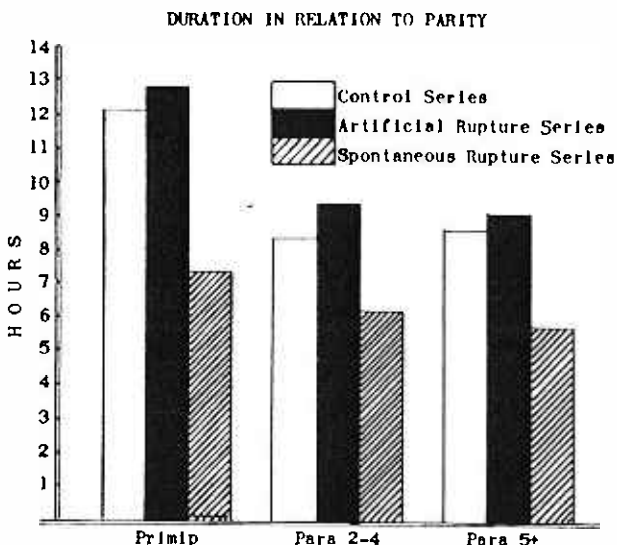


Fig. 1.

Duration of Labour in Relation to Cervical Dilatation and Parity

To determine whether artificial rupture of membranes at any particular stage of cervical dilatation could influence the duration of labour, each parity group was analysed in relation to the dilatation of the cervical os at the time of examination. The results are shown in Figures 2 to 4, from which it may be observed that amniotomy in labour at any stage of cervical dilatation had no visible effect in shortening the overall duration of labour.

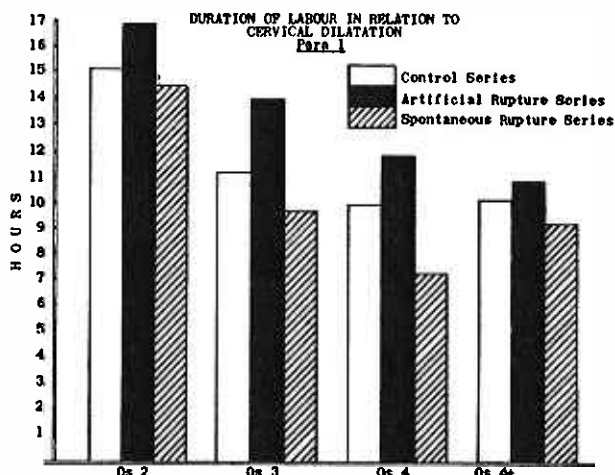


Fig. 2.

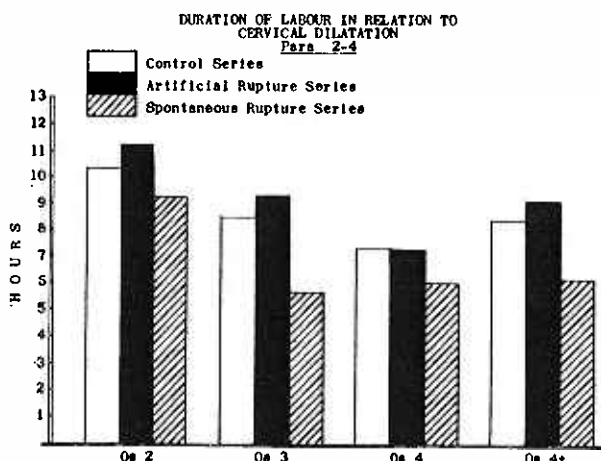


Fig. 3.

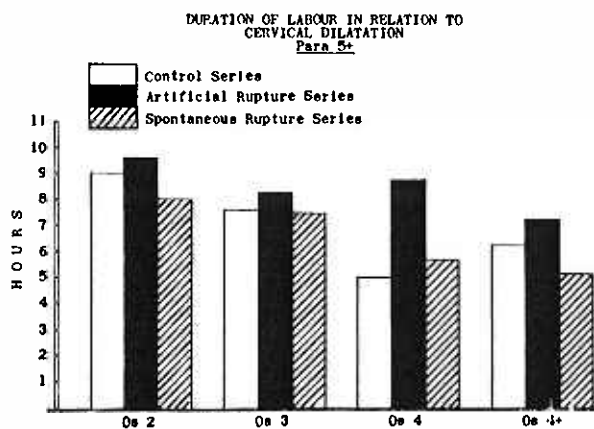


Fig. 4.

Duration of Labour Following Examination/ A.R.M. Related to Parity

Since the timing of onset of labour is liable to some uncertainty and subjectivity, it was decided to study the effect of vaginal examination with and without artificial rupture of membranes on the subsequent duration of labour. The results are shown in Table II. From it, one may conclude that in primiparas the subsequent course was lengthened by artificial rupture of membranes, while in multiparas there was no effect.

TABLE II

V.E./A.R.M. Interval in Hours

	Control V.E. Del	A.R.M. A.R.M. Del.
All Parity	1-18	1-53
Primip	2-40	3-15
Para 2-4	1-36	1-24
Para 5+	1-47	1-18

Maternal and Foetal Complications

Since 80 per cent of mothers and babies in this hospital are discharged within 48 hours of delivery, it was not possible to make a valid study of the incidence of maternal and foetal morbidity.

The foetal complications, such as prolapse of the cord, conversion of an unstable lie or oblique lie into a case of obstructed transverse lie with possible prolapse of the arm and intrauterine foetal infections which may result from artificial rupture of membranes were not observed. However, in the A.R.M. group, there were two cases of foetal distress, one needing a Caesarean section and the other a high mid-cavity forceps delivery. Whether this was due to loss of liquor amnii resulting in premature partial separation of placenta or in dry labour leading to foetal distress it is difficult to say. The numbers studied are insufficient to form conclusions. Prolapse of the cord was seen only once, in a case of spontaneous rupture of the membranes.

Maternal complications, such as trauma to the cervix, lower uterine segment or vagina, resulting from misuse of the amniotomy instrument (e.g. Kocher's forceps) and maternal infections and morbidity in the early puerperium were not encountered.

DISCUSSION

It is commonly taught that the normal time for membranes to rupture is when labour has

been well established, usually in the latter part of the first stage, and sometimes in the second stage. Rupture before the onset of labour is regarded as an abnormal event with an unfavourable omen. It is commonly referred to as premature rupture of the membranes. This attitude toward spontaneous premature rupture of the membranes is more traditional than rational and represents a "hangover" from the days of protracted trials of labour attended by high foetal and maternal casualty, before antibiotics and safe obstetric surgery were readily available.

The old observers were correct, of course, in their observations that prolonged rupture of the membranes was a highly undesirable event. But what was not fully appreciated is the fact that prolonged labour following early rupture of membranes will naturally result in the liquor drained dry and unfavourable foetal and maternal results. The question which had not been answered was: "Does premature rupture of the membranes in fact predispose to prolonged labour, with its attendant ill effects on mother and child?"

In recent years, attempts have been made to answer this question. Various papers have appeared in the literature to refute the view that premature rupture of membranes caused prolonged labour with its associated ill-effects. King (1940) surveyed approximately 15,000 cases from 34 papers and concluded that the duration of labour was the same or shorter than an unstated average in cases where the membranes ruptured early. This conclusion was not based on any controlled study nor was there any differentiation between spontaneous and artificial rupture of the membranes. Embrey (1953) in a study of 1,052 cases found that labour which followed within 24 hours of spontaneous premature rupture of the membranes was shortened, but if it failed to do so until after 24 hours then it tended to be prolonged. Other observers, notably Calkins (1952), Nixon et al (1958) and Friedman and Sachtleben (1963) have also found that spontaneous premature rupture of the membranes is associated with a marked shortening of labour. Calkins thought that this might be the "result of natural selection, either on the basis of a greater uterine motility or a more favourable cervix or both" but proceeded to demonstrate that this was probably not the case. Friedman and Sachtleben (1962, 1963) have demonstrated that the shortening of the first stage of labour with spontaneous premature rupture of membranes is due to

pre-labour cervical dilatation which may be the cause of the early rupture in these patients. They start off with a 'handicap' and therefore end sooner.

The next question to be answered is: "Does artificial rupture of the membranes in labour materially shorten its subsequent course?" Using tokographic techniques, Murphy (1947), Zimmer (1951), Reynolds (1954), and Friedman and Sachtleben (1963) could demonstrate no significant effect. Somewhat contradictory evidence was found by Caldeyro-Barcia and Alvarez (1961) studying oxytocin induced labours. In these, labour was definitely shortened by artificial rupture of the membranes. At the same conference on oxytocins, Theobald (1961) stated categorically that intact membranes are the greatest single hindrance to normal labour.

The present investigation, involving a small series of 240 cases of artificial rupture of the membranes in labour with a control series of 174 cases with membranes left intact, has brought to light certain useful information. Where membranes are found to be intact in labour, artificial rupture had no demonstrable effect in shortening its subsequent course. The effect of artificial rupture of membranes was not influenced by the state of cervical dilatation. In a parallel series of 155 cases with spontaneous premature rupture, labour was markedly shortened, probably as a result of natural selection resulting from either a greater uterine motility as postulated by Calkins (1952) or a pre-cervical dilation of cervix as shown by Friedman and Sachtleben (1963) or both.

From these observations it may be concluded that if the aim is to shorten labour then artificial rupture of the membranes in established labour fails to fulfil that aim. Its routine use for this purpose is therefore not based on scientific evidence. However, in cases of prolonged first stage due to uterine inertia, timely amniotomy, followed, if necessary, by oxytocin is likely to result in acceleration of labour. Amniotomy also permits examination of the quantity and quality of the liquor amnii, especially in cases of suspected placental insufficiency and foetal distress. These latter advantages have practical values which are known to every obstetrician and requires no large-scale controlled studies to verify. Thus amniotomy as a routine procedure in labour does not shorten labour but the procedure is relatively safe and should be carried out when there is an indication such as uterine inertia, suspected placental insufficiency or foetal distress.

The risks of amniotomy can be minimized by careful selection, excluding those not in labour and those with unengaged head.

SUMMARY

1. In a series of labours studied at the Kandang Kerbau Hospital it was found that those cases with spontaneous premature rupture of the membranes had the shortest duration of labour, while those with intact membranes did not have their labour shortened by artificial rupture of the membranes. On the contrary, the procedure appeared to lengthen slightly the duration of labour among primiparas.
2. Although amniotomy in labour does not reduce its overall duration, nevertheless it may be useful in expediting delivery in some cases of inefficient uterine action.
3. Amniotomy allows the examination of the liquor amnii and is of great practical value in the management of cases of suspected placental insufficiency and foetal distress.
4. No serious maternal or foetal complications resulted from amniotomy done in 240 cases. This shows that the procedure can be performed with safety under supervision.

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