

Prolonged First Stage of Labour

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FOR the purpose of this article, 360 cases of labour were analysed in which the first stage lasted 30 hours or longer. From this analysis it will be seen that these cases may be divided into two main groups:

1. Those cases in which the membranes remained unruptured up to, or nearly up to, full dilatation of the os; 185 cases fell into this group.

2. Those cases in which the membranes ruptured early in labour; 127 cases fell into this group.

Forty-eight cases did not fall into either group.

In all cases of prolongation of the first stage, with the membranes intact, it can be taken as certain that the head of the foetus is not extended and can pass the brim. In cases of obstructed labour the membranes will always rupture before full dilatation of the os. Whereas the presence of unruptured membranes indicates a well-flexed head and the absence of disproportion between the pelvis of the mother and the head of the foetus, the reverse does not hold true, since early rupture of the membranes may suggest, but does not always imply, obstruction.

One hundred and eighty-five cases of labour in which the first stage lasted 30 hours or more and in which the membranes did not rupture until full dilatation of the os, have been investigated. The average length of the first stage in these cases was 44 hours.

In 184 cases, the vertex presented. The remaining case was that of a breech presentation with extended legs in which delivery of a small foetus was spontaneous.

One hundred and sixty-eight cases of labour ended in spontaneous delivery; 17 patients were delivered with the forceps on account of prolongation of the second stage. In 166 cases the foetus presented with the occiput anteriorly and in 18 cases with the occiput posteriorly.

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In 15 of the latter the occiput rotated to the front—13 of which were delivered spontaneously, and two required delivery with the forceps.

In two patients, the occiput rotated into the hollow of the sacrum, one being delivered spontaneously of a live child, weighing seven pounds eight ounces, and the other was delivered with the forceps after a second stage of five hours 45 minutes, of a live child weighing seven pounds one ounce.

In one case the rotation of the head was arrested and delivery was effected by manual rotation and with the aid of the forceps.

There were six stillbirths, and the following table will show that in not one of these cases can the result be attributed to the type of labour :

Macerated foetus	4 cases.
Anencephalic foetus	1 ,,
Labour complicated by accidental haemorrhage		1	,,

There were no maternal deaths and in only 10 cases was the puerperium morbid, but none of the patients was seriously ill.

From an analysis of the above it will be seen that in cases in which the first stage is prolonged, while the membranes remain unruptured, a vertex presentation without disproportion may be anticipated and the result to the mother and child will be good.

With early rupture of the membranes, however, the prognosis, both to the mother and the child is not so good, nor is a vertex presentation so certain, and even when the vertex presents, labour is more likely to be difficult.

Early rupture of the membranes in vertex presentations appears to occur under three conditions :

1. *In cases otherwise normal.*
2. *In cases of disproportion.*
3. *In cases of abnormal uterine action.*

In the majority of cases of early rupture of the membranes labour is unaffected, and ends spontaneously without prolongation of the first stage. Such cases do not come into the scope of this article, which is meant to deal only with cases of prolongation of the first stage, but it is interesting to note that in a series of 330 cases recently analysed, in which the membranes ruptured either at the onset of labour or at least 12 hours before full dilatation of the os, but in which no account was taken of the duration of the first stage, there were 225 cases in which labour ended spontaneously and without difficulty.

Of these 225 cases, the foetus presented with the occiput anteriorly in 200 and with the occiput posteriorly in 17. In all the latter cases, the occiput rotated spontaneously to the front. In six cases the foetus presented by the breech and in the two other cases the foetus presented with the occiput posteriorly and were delivered with the face towards the symphysis pubis.

The average length of labour in these cases was 16 hours, the longest labour being 28 hours and the shortest being two hours, 25 minutes.

In such cases, disproportion is absent and after rupture of the membranes, the head descends and completely fills the lower uterine segment and itself acts as a dilator. Uncomplicated rupture of the membranes is thus of no clinical importance.

The type of case now to be described, however, is that type in which the membranes rupture early and the first stage of labour is unduly prolonged. This type is frequently due to disproportion between the head on the one hand and the cervix and pelvis on the other hand. Consequently in every case of early rupture of the membranes, disproportion must be excluded.

In this analysis, patients in whom gross disproportion necessitated Caesarean section have been purposely excluded as these cases are neither so difficult to diagnose nor to treat. Only those cases in which disproportion, if present, was minor in degree have been considered. In such cases the disproportion is frequently relative, due to the posterior position of the occiput and extension of the head. The head is prevented from descending into the lower uterine segment and so the valve action is absent. In this way the unsupported membranes have to withstand the full force of uterine contractions, with their consequent rupture. After rupture of the membranes, the cervix lacks a dilator and liquor escapes. In this way, as labour pains are, in part, reflex from distension of the cervix, a vicious circle is established; the uterus does not contract so vigorously, nor are the contractions so useful, since the os does not dilate and the sheet of cervical tissues lying below the head becomes nipped between the head and the brim. The cervix is not drawn up and obstruction to the descent of the head is increased. This sheet being nipped between the head and the brim, becomes oedematous particularly in the anterior lip, and increases obstruction still further.

In some cases, if left alone after prolonged and difficult labour, the uterus succeeds in drawing up the cervical tissues above the head in much the same way, as pointed out by Gibbon Fitzgibbons, as a jersey is drawn up from a child's body.

These cases may be readily recognized clinically by the fact

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that, on vaginal examination, a partially dilated cervix is found hanging loosely in the vagina, unfilled by the head which remains high, and does not descend during a contraction. The unsupported area of the head also develops a caput succedaneum but does not exhibit moulding. On abdominal examination, the uterus may present a retraction level and, as Bethel Solomons² points out, the height of this will be out of proportion to the size of the os. The bladder may be unduly prominent owing to its elevation as the lower segment stretches.

As already stated, the cases referred to, are not those in which there is disproportion between the head and the pelvis after the cervix has been withdrawn, but only those cases in which there is minor disproportion between the head on the one hand and the cervix and pelvis on the other hand thus leading to obstruction from nipping of the cervical sheet of tissues owing to failure on the part of the uterus to draw up the cervix. Many of these cases end with high application of the forceps or craniotomy, while puerperal morbidity and stillbirth-rate are high.

The foetus appears to suffer in three different ways:

1. Owing to the escape of liquor, the placental circulation may become compressed between the uterine wall and the foetus.
2. With preservation of the membranes, the foetal head is compressed against the lower uterine segment only during a contraction, pressure being released with its cessation; but with early rupture of the membranes, the foetal head is continuously compressed against the lower segment and the pelvic brim.
3. There is the risk of an upward spread of infection through the liquor, giving rise to a transplacental septicaemia, and as a result the foetus may be either born dead, or die within a day or so after delivery.

The majority of these cases occur in primiparae of average growth and average measurements.

If one could anticipate such a case, perhaps Caesarean section would be the treatment of preference but the majority are not diagnosed until many vaginal examinations have been made and the first stage of labour has been prolonged for 24 hours or more. There is one other objection to Caesarean section, namely that, in these cases, disproportion is hardly sufficient to warrant Caesarean section on subsequent occasions since it is frequently found that, in a second labour with a child of equal size but presenting with the occiput anteriorly, the termination is normal.

In these cases if the os can be made to dilate and the cervix draw up, then good results can be obtained. Frequently this can be effected by substituting a rubber bag in place of the

ruptured membranes. The bag not only supplies an artificial dilator but also reflexly stimulates contractions, and in many cases the cervix is taken up within a few hours. As soon as the os is dilated and the cervix is withdrawn, the bag descends into the vagina, when second stage pains appear. On removing the bag from the vagina, pains cease for a short time until the head descends, when they recur, thus the character of second-stage pains would appear to be reflex in origin from distension of the vagina.

If the bag is removed when the os is fully dilated, a vaginal examination should be made to make sure that the head is fitting the brim and to exclude prolapse of the umbilical cord.

As already pointed out, there are considerable risks to the foetus in cases of early rupture of the membranes and particularly in that type of case in which the first stage is prolonged and obstruction results from the cervical sheet of tissues, the greatest of these being compression of the foetal circulation resulting from escape of liquor and the exertion of continuous pressure by the foetal head against the pelvic brim.

Very frequently, on the introduction of the bag, an immediate improvement of the foetal heart can be heard as the head is lifted into the uterus and relieved from pressure (see Cases 3, 6, and B1).

In those cases in which the liquor has almost completely drained away, such a lifting of the foetus might serve only to compress the placental circulation more and might further endanger the life of the foetus.

A balloon has been devised which will obviate their danger and which will permit of the introduction of a pint or more of normal saline into the uterus and thus diminish the pressure around the foetus.

This balloon is introduced in the ordinary fashion and distended with saline injected through tube A,—see diagram. When this is completed and the os is once more plugged with an artificial bag of membranes, about a pint of normal saline is injected through tube B into the uterine cavity, supplying the foetus with an artificial liquor and so relieving it from compression. The injection of saline into the uterus should be effected slowly and a careful watch kept of the mother's pulse rate although in the few cases in which I have used the balloon I have never seen any ill effect.

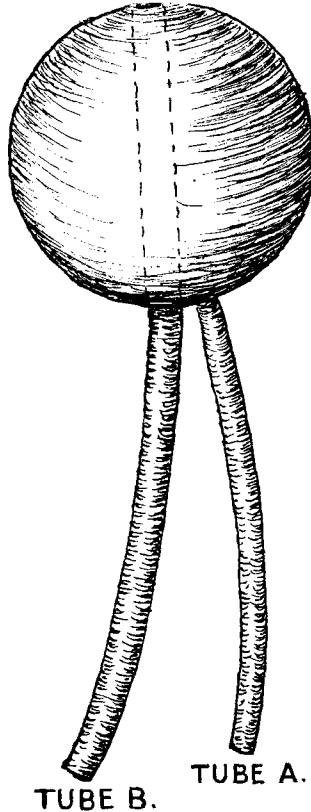
One hundred and twenty-six cases in which the first stage lasted over 30 hours, or more, and in which the membranes rup-

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tured early in labour have been analysed. The average length of the first stage was 52 hours.

Of these 126 cases the foetus presented with the occiput anteriorly in 80 cases and with the occiput posteriorly in 42 cases and by the breech in four cases.

Of the 80 cases in which the foetus presented with the occiput anteriorly, 45 were delivered spontaneously, 32 required delivery with the forceps and three of the labours ended in craniotomy.



THE AUTHOR'S BALLOON.

In 16 of these cases the puerperium was morbid and in six cases the foetus was stillborn due to the method of delivery.

Of the 42 cases in which the foetus presented with the occiput posteriorly, nine resulted in spontaneous rotation and delivery. In one case the foetus was delivered spontaneously with the face towards the symphysis pubis. In 29 of these cases rotation was arrested, and it was necessary to rotate manually and deliver with the forceps. In two cases the foetus was delivered with the

face towards the symphysis pubis with aid of the forceps and one case was delivered by craniotomy. In 14 of these cases the puerperium was morbid and five resulted in fresh stillbirths.

Of the four cases in which the foetus presented by the breech, three resulted in fresh stillbirths, one after perforation of the after-coming head. In one case the puerperium was morbid.

These cases were taken consecutively from the reports of the City of London Maternity Hospital. It is not intended to imply that all of them, or even the majority, fell into the group of cases of minor disproportion. When it has been possible to get data, in the majority of cases the head was able to descend into the pelvis and fill the lower segment, but the majority of the cases in which the foetus was stillborn, was of this type of minor disproportion.

Below is found a table comparing the results of cases of prolonged first stage, with and without early rupture of the membranes. From this table it will be seen that the results to both the mother and the foetus are very much worse in those cases in which the first stage of labour has been prolonged with early rupture of the membranes.

	Without rupture of the membranes	With rupture of the membranes
Total number of cases	185	126
Spontaneous delivery	168 (91 per cent)	55 (43 per cent)
Instrumental delivery	17 (9 ,,)	71 (57 ,,)
Stillbirths due to method of delivery	0 (0 ,,)	14 (11 ,,)
Morbid	10 (5 ,,)	14 (11 ,,)
Anterior presentation of vertex	166 (90 ,,)	86 (63 ,,)
Posterior presentation of vertex	18 (10 ,,)	42 (33 ,,)

It is to be clearly understood that the use of the balloon is limited to those cases in which, when the membranes rupture, the foetal head is unable to descend and apply itself to the lower segment. In the majority of cases of early rupture of the membranes, even in those in which the first stage is unduly prolonged, there is not any disproportion. The head descends and distends the lower segment and itself acts as an efficient dilator, so that a useful purpose could not be served by the introduction of the balloon. Delay in these cases appears to be due to some abnormal uterine action. The patient either has feeble pains, or suffers more or less continuous pain without good con-

tractions. The membranes rupture early and, after a prolonged first stage it is frequently necessary to complete dilatation manually and apply the forceps on account of signs of foetal distress. The majority of these cases occur in elderly primiparae and I am under the impression that I have seen more cases among Jewesses than Gentiles.

The intra-uterine balloon appears to act only as a dilator of the os and does not directly influence the withdrawal of the cervix. In those cases in which uterine contractions are normal, but when withdrawal of the cervix is hindered because it is nipped between the head and the brim, the introduction of the balloon will not only aid the dilatation of the os but will also allow the cervix to be withdrawn. In cases of abnormal uterine action, however, if the balloon be introduced it acts merely as a mechanical dilator, and after several hours it may pass into the vagina through a fully dilated os, but with the cervix still hanging loosely in the vagina. In such cases there is danger of the head failing to follow the balloon and fit in this cervical sleeve, increasing the risk of prolapse of the umbilical cord. (See Case B 1).

From a study of those cases in which I have used the balloon, it would appear that withdrawal of the cervix is part of the normal uterine action, and the use of the balloon, no matter how efficient it may be as a dilator of the os, is of no use as an aid to withdrawal of the cervix unless employed in cases in which uterine action is normal.

Even in cases of abnormal uterine action the use of a balloon will increase the speed of dilatation of the os, but in these cases there is always an increased danger of prolapse of the umbilical cord from failure of the head to follow the descent of the balloon (See Case B 1.)

A case of abnormal uterine action which I have seen recently is of interest. It is not included in the series already analysed.

The patient, a primipara, aged 31, a Jewess, was seen 12 hours after the onset of labour. The membranes had ruptured at the commencement. The contractions were very severe and almost continuous. Examination showed the os to be dilated to the size of a florin with the head well down and filling the cervix. Hyoscine was given. Ten hours later the head presented at the vulva with the cervix which had been amputated circularly at the cervico-vaginal junction in front of it. Delivery with the forceps resulted in the extraction of a live child weighing six pounds four ounces.

There is yet a third type of case which is occasionally met with and it appears to be a combination of the two types previously mentioned. In this type there is minor disproportion as well as abnormal uterine action. Delivery of a live child by the

vagina is almost impossible and there appears little doubt that a lower uterine segment Caesarean section is the best treatment.

Below are appended the brief details of nine cases not included in those already mentioned, which were treated by the introduction of the balloon.

A. *When the delay was due to disproportion between the head, on the one hand, and the cervix, and the pelvis on the other hand.*

CASE I. A primipara, aged 30. Prolonged first stage (40 hours), with ruptured membranes. Balloon was inserted when the os was dilated to the size of half a crown. Spontaneous delivery seven hours later of a live child.

CASE II. A primipara, aged 28. Prolonged first stage (48 hours) with ruptured membranes. The balloon was inserted for foetal distress when the os was dilated to the size of a five-shilling piece. Vertex delivery eight hours later of a live child.

CASE III. Primipara, aged 26. Prolonged first stage (70 hours) with ruptured membranes. Os dilated to the size of a half-crown. Foetal distress. Foetal heart detected only with difficulty. Immediately after insertion of the balloon the foetal heart improved. Six hours later the balloon was expelled through a fully dilated os. After a second stage of four hours, foetal distress was again noted. The forceps was applied. Foetus stillborn.

CASE IV. Primipara, aged 42. Prolonged first stage (28 hours). Ruptured membranes. Os dilated to the size of a florin when the balloon was introduced. Ten hours later the balloon was expelled through nearly a fully dilated os. Eight hours later delivery of a live child.

CASE V. Primipara, aged 25, prolonged first stage (41 hours). Early rupture of membranes, os dilated to the size of a florin. Small balloon introduced. Spontaneous delivery of a live child 14 hours later.

CASE VI. Primipara, aged 28. Prolonged first stage (42 hours). Early rupture of the membranes. Os dilated to the size of a florin. Foetal distress. Discharge of thin meconium and feeble pulse. The balloon was introduced. Twelve hours later spontaneous delivery of a live child.

CASE VII. Primipara, aged 26. Membranes ruptured after 24 hours labour. Os dilated to the size of a florin. Head not filling the cervix but contractions normal. The balloon was inserted and was expelled five hours later. Spontaneous delivery of a live child weighing seven pounds two ounces, three hours after, expulsion of the balloon.

B. *When the head can pass the brim and fills the lower segment and delay is due to abnormal uterine action.*

CASE I. The patient, a primipara aged 41, was seen after three days labour with the membranes being ruptured from the commencement. Examination under an anaesthetic showed the os to be dilated to the size of a florin; the head could pass the brim and distend the lower segment.

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The foetal heart was heard only with difficulty, and, as there had been a continuous drain of liquor for three days, it was decided to introduce the balloon and some saline into the uterus. Fifteen ounces of saline were introduced into the amniotic cavity, and, within 10 minutes, the foetal heart was heard beating at a rate of 140 per minute. Fifteen hours later the balloon was expelled into the vagina through a fully dilated os, but the cervix, which was not withdrawn, still hung as a sleeve in the vagina. The umbilical cord prolapsed, but was immediately pushed back, and the forceps was applied to the head which remained high. A live child, weighing six pounds was delivered. There was not any moulding of the foetal head, and the perineum was not torn. These facts are mentioned to show that there was not any disproportion, and that the delay in the first stage was the result of an abnormal action of the uterus.

CASE II. Primipara, aged 34. After 38 hours labour in which the contractions were painful but ineffective, with the membranes being ruptured from the commencement of labour, the os dilated to the size of a florin, and the head filled the lower uterine segment; the balloon was inserted and was expelled six hours later through a fully dilated os, but the cervix was not withdrawn. Three hours later it was necessary to deliver the head, which was in the pelvic cavity, with the forceps, because of foetal distress. Delivery of a live child weighing six pounds five ounces resulted.

CONCLUSIONS.

1. Cases in which the first stage is prolonged may be divided into two clinical groups:

- (a) Without rupture of the membranes.
- (b) With rupture of the membranes.

2. When the membranes remain unruptured a normal vertex delivery may be anticipated without injury to the mother or the foetus.

3. When the membranes rupture early, the prognosis to mother and foetus is not good.

4. When the membranes rupture early one of three causes may be anticipated:

- (a) Disproportion.
- (b) Abnormal action of the uterus.
- (c) A combination of (a) and (b).

5. When disproportion results from the nipping of the cervix between the head and the pelvis good results can be obtained by introducing an india-rubber balloon.

6. The introduction of the balloon in cases of abnormal uterine action will serve only to dilate the os and will not influence the withdrawal of the cervix.

7. When there is abnormal uterine action, e.g. inertia and disproportion, lower segment Caesarean section offers the best hope of obtaining a live child.

8. A balloon has been described which will allow the introduction of normal saline into the amniotic cavity in cases in which the liquor has drained away and the foetus is showing signs of pressure.

9. An attempt has not been made to define abnormal uterine action, which has been used as a general term.

10. Only the treatment of patients, first seen after labour has been unduly prolonged, has been dealt with and an attempt has not been made to discuss the prophylactic treatment when prolongation of the first stage may be anticipated.

REFERENCE.

1. Gibbon Fitzgibbon. *The Journ. of Obstet. and Gynaecol. of the Brit. Emp.*, 1929, xxxvi, 756.
2. Solomons, Bethel and Wentworth Taylor. *Journ. of Obstet. and Gynaecol. Brit. Emp.*, 1929, xxxvi, 293.