

OCCULT PROLAPSE OF THE CORD*

A REVIEW BASED ON A PERSONAL SERIES OF 14 CASES

E. A. STRASHEIM, M.Sc., M.B., Ch.B., M.D., Pretoria

Every obstetrician has had the bewildering and frustrating experience of sudden, unaccountable foetal death before or during labour in a woman whose pregnancy had been normal in every respect up to that time.

Whenever no real or apparent cause can be found, compression of the cord must be considered a likely aetiological factor. However, it will usually remain undiscovered unless the embarrassment of the foetal circulation makes Caesarean section necessary.

What does the term 'occult prolapse of the cord' signify? It can be interpreted either as a condition where the cord is at, or near, the lower uterine segment, but not within reach of the fingers during ordinary vaginal examination, or as a condition where the umbilical cord can undergo compression without being palpable or visible through the cervix. In this condition of 'occult prolapse' the cord, technically speaking, has not prolapsed, since it remains above the presenting part. For this reason some authorities object to the term 'occult prolapse of the cord'. Maxwell² is of the opinion that the term does not adequately describe the actual problem and that it is therefore superfluous and confusing. He also prefers the longer but more descriptive term 'foetal distress due to compression of the funis'.

We are not concerned here with true prolapse or presentation of the cord or with the fore-lying cord, since in these conditions the cord is either visible or palpable through the cervix.

Various authors admit to the practical impossibility of determining the true incidence of occult prolapse, but all maintain that it must be much higher than the figures usually given. I fully agree with this view, since the condition is still far too often completely ignored or forgotten in the differential diagnosis. Various authors give the range of incidence as from 0.2% to 0.9%. In my series of 14 cases the incidence was 1.5%.

Although the condition is therefore not very common, it is still sufficiently frequent and the foetal end-results are generally so poor, that it should always be an important subject for consideration. Diddle and O'Connor found that 4.8% of 663 consecutive foetal deaths were due to compression or injury of the cord.

There were 2 foetal deaths in the present series of 14 cases; a mortality of 14.3% which compares very favourably with the usual figures ranging from 24% to 45.8%.

AETIOLOGY

Most authors maintain that, in contradistinction to cases of true prolapse, the presentation in occult prolapse is usually a well-engaged vertex. This was not my experience, since this was so in only 3 of the 14 cases in this series.

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In a further 8 cases the vertex was also the presenting part, but its level was anywhere above the ischial spines. Possible aetiological factors include: a very long cord, low implantation of the placenta, repeated external versions and abnormal presentation (3 of the present series of cases). In the large majority, however, no real cause can be found and the condition is probably due to an unfortunate but fortuitous set of circumstances which bring the cord into a position where it can undergo compression.

Parity is usually of no consequence and the state of the membranes or the cervical dilatation is not a factor. This is again in marked contrast to the condition of true prolapse or presentation of the cord. The only real relation between true and occult prolapse is that the cord may be compressed in both, although the circumstances surrounding the compression are different and, generally speaking, compression will occur at a later stage in cases of true prolapse.

Since there are no findings which are diagnostic of a compressed cord, except at Caesarean section where the relationship of the cord to the presenting part and the pelvis can be seen, occult prolapse can only be deduced as the cause of foetal distress after obvious causes such as pathological labours, maternal anoxia or placental conditions have been excluded. However, any case of foetal distress for which no demonstrable cause can be found, should lead to the suspicion of a cord undergoing compression.

DIAGNOSIS

This raises the problem of foetal distress and the question whether such a state exists and/or whether it can be diagnosed. Although some authorities query such a state, there is no doubt whatever in my own mind that real foetal distress *in utero* does occur and also that it can undoubtedly be diagnosed. Diagnosis should, however, not depend solely on one single sign or feature.

Marked slowing of the foetal heart, especially if there is also an associated irregularity, is one of the most reliable signs of foetal distress (a foetal heart rate consistently above 160 per minute should also never be ignored). If foetal bradycardia is associated with meconium-stained liquor amnii, it may not perhaps be pathognomonic of funic compression, but it must be regarded with very grave suspicion. Where foetal-heart irregularities are associated with a clear liquor amnii, compression of the cord is unlikely, but I still feel that these irregularities should alert one to watch for pending foetal distress. A similar state holds where meconium-stained liquor without an abnormal foetal heart rate is present. Under such circumstances there should be frequent auscultation of the foetal heart. Where the presentation is still high, Cope³ has pointed out that special attention should be paid to the foetal heart rate. He maintains that marked slowing of the

foetal heart during a contraction or when the presenting part is pushed into the brim, should always call for a careful vaginal examination, if necessary under an anaesthetic. He states that the index finger should be inserted along the side of the head and neck; this may facilitate the diagnosis of either a tight loop of cord round the neck, or a cord draped over the shoulders or lying alongside the head. Inability to feel the cord does not, however, exclude the condition.

I should like to emphasize two features which I feel are so characteristic that the presence of both can be construed as an indication of occult prolapse with the cord undergoing compression. This means imminent danger of foetal death unless immediate delivery is arranged.

Bradycardia

The first sign is the occurrence of foetal bradycardia when firm fundal pressure is applied. The firmer the pressure, the lower the heart rate will fall. On discontinuing fundal pressure the foetal heart will return to its normal rate fairly rapidly. I have found this sign especially significant when the presenting part is high and loose. The longer the heart rate takes to return to normal, the more imminent is the danger of foetal death. Hon³ has recently evaluated a special manoeuvre in which foetal electrocardiography is used. This appears to hold great diagnostic promise. Further studies with the foetal electrocardiograph may eventually enable us to remove the diagnosis of a compressed cord from the realm of speculation. Hon³ does admit, however, and it is also my candid opinion, that the characteristic foetal bradycardia can be recognized clinically when fundal pressure is employed. This sign was consistently found in all 14 cases in this series and in all occult prolapse was confirmed (11 by Caesarean section, 3 by vaginal delivery) with the cord either lying in loops alongside the presenting part, or draped round the shoulders and/or neck.

I should not like to leave the impression from what I have just stated that I consider every case with the cord round the neck should be treated for occult prolapse. After all, Shui and Eastman⁴ have recently proved quite conclusively that there was no greater foetal mortality in 23% of infants born with the cord coiled around the neck than in the remaining 77%.

With reference to the 'draped' cord, it has been postulated by Maxwell¹ that the cord may first engage with the presenting part and be compressed by the occiput against the pelvic wall. As the occiput descends further and also flexes, it may slide past the loop of cord which then becomes draped over the shoulders as the foetus descends. Under such circumstances foetal distress in the form of foetal bradycardia will be noted during the compression and may only be transitory if labour is rapid or the compression only partial. Should labour be prolonged, or the compression complete, foetal death may eventually occur.

Meconium-stained Liquor

The second characteristic feature is the presence of thick meconium-stained liquor amnii. If such a 'pea-soup' variety of meconium-stained liquor is associated with

foetal bradycardia, I have no hesitation in doing a Caesarean section and I consider that delay will undoubtedly seriously endanger the foetus. To wait until there is more marked and permanent foetal bradycardia will usually be too late. This occurred in both cases of foetal death in this series. The nursing staff was grossly negligent in not informing me earlier of the change in foetal heart rate, since they neglected to listen frequently enough to the foetal heart.

A point of practical significance in the foetal prognosis should be mentioned. Prognosis for foetal survival will be good if, on relieving fundal pressure, or on partial disengagement of the presenting part, together with the administration of oxygen, there is a fairly rapid improvement in the foetal heart rate.

MANAGEMENT

It is well known in cases of true prolapse that the foetus need not be dead even though the pulsations are absent between contractions. Experimental evidence indicates that the foetus can survive *in utero* for 15-20 minutes after the cord has been clamped. It is, however, not known how long a foetus can survive *in utero* after all cord pulsations have ceased.

Therefore when fundal pressure produces foetal bradycardia and the membranes are still intact, I always rupture them. Should the typical 'pea-soup' variety of liquor (or something very similar) escape, I proceed with immediate delivery. It should be remembered that the finding of meconium-stained liquor at the time of rupture is not in itself unusual, and that in the average case with this somewhat disturbing symptom nothing further of a serious nature will develop. It probably indicates a transitory anoxic effect on the foetus from any one of many causes. But, as stated, it should put one on the alert.

Management of the case with foetal bradycardia and thick meconium-stained liquor must be one of prompt delivery. The method will of course depend on the parity, stage of labour, dilatation of the cervix, and level of the presenting part. The difficult decision will often have to be an individual one but, in spite of the newer trend toward more frequent Caesarean section, there is still a place for conservatism here. Generally speaking, vaginal delivery should be carried out if, after all factors have been carefully evaluated, it appears that such delivery can be accomplished quickly and without trauma to mother and child. It is important, however, to elevate the presenting part first; this will allow the foetus to recover from the anoxia before actual delivery is attempted. In the present series 3 patients were delivered vaginally, 1 by forceps and 2 with internal version and extraction. One foetal death occurred in these 2 patients.

The more frequent use of appropriate Caesarean section represents a recent change in attitude and has also been largely responsible for the marked improvement in foetal mortality in recent years.

The presence of the above two characteristic signs, with the presenting part anywhere above the ischial spines, constitutes in my experience an absolute indication for immediate Caesarean section. Delay, in the hope of getting the presenting part lower, will only lead to an unneces-

sarily high foetal mortality. Be wary, however, of doing a Caesarean section unless a favourable response in the foetal heart rate can be obtained with the administration of oxygen and disengagement of the presenting part (should it be low in the pelvic cavity). The second foetal death in my series occurred when there was no such response.

When Caesarean section is done in such cases, I should like to appeal to obstetricians always to attempt a careful determination of the relations of the cord to the presenting part, since it is only in this way that we shall ultimately be able to arrive at a more accurate assessment of the incidence of foetal distress due to compression of the cord which has undergone occult prolapse.

The routine performance of fundal pressure manoeuvres during the last few weeks of pregnancy, or more especially early in labour, particularly when the presenting part is still high, is therefore recommended. I am convinced that such a procedure will help obstetricians to make a diagnosis of occult prolapse early, with consequently closer attention and observation and thus earlier interference, which will undoubtedly result in a decrease in the number of cases where inexplicable sudden foetal death occurs.

CONCLUSION

Occult prolapse of the cord can therefore be fatal to the foetus but, on the other hand, it may be completely innocuous, depending upon the duration of interference with the foetal circulation. There seems little doubt that partial foetal anoxia, occurring over a long period before diagnosis is established, produces pathological changes in the cerebral cortex that may cause varying degrees of permanent foetal damage. This can only be avoided if the condition is diligently looked for in the routine manner described. By the time that the foetal heart fails there is every indication that the condition has lasted long enough to cause foetal death.

It will be obvious that an occasional case will arise where unwarranted Caesarean section may be performed and which would also raise the Caesarean section rate of the individual obstetrician or the particular hospital. However, it must not be forgotten that a woman comes to us with the sole desire for her confinement to end with a live healthy baby that will not be mentally deficient, spastic or otherwise deformed. She is totally uninterested in statistics which are still so frequently stressed to the point where the human element is often completely ignored. It behoves us, as far as possible, not to fail her. In this context, a quotation from Prof. N. J. Eastman is appropriate: 'Looking back over 35 years and more of obstetrics, I can recall only one or two instances in which I regretted having performed a Caesarean section. Contrariwise, I remember all too vividly a large group of cases in which I bitterly regretted that a section had not been done. In addition, I recall to my sorrow still other instances in which Caesarean section was performed too late'.

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