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THE AMNIOTIC FLUID

GLYN REES, O.B.E., M.R.C.S., D.OBST.R.C.O.G.

Senior Obstetrician and Gynaecologist, University of Cape Town and Cape Provincial Administration

'Premature rupture of the membranes causes delay in the first stage of labour'. True or false? Most doctors, when asked this question would answer without hesitation: 'True'. When challenged, they would quote with some indignation (and every justification) such eminent authorities as Comyns Berkeley, Victor Bonney, Whitridge Williams,[1] Munro Kerr,[2] and Dugald Baird,[3] who, for half a century, have taught that 'the bag of forewaters acts as a fluid wedge which dilates the cervix during labour', and 'the absence of this wedge, as in early rupture of the membranes, causes delay in the first stage'.

Any doctor who practises obstetrics knows that if there is delay in the first stage, and he wishes to accelerate delivery, he ruptures the membranes thereby destroying the very wedge which is said to be so valuable. No further argument is needed to show that the importance of this dilating wedge is a myth. The myth owes its origin, no doubt, to the fact that premature rupture of the membranes is often associated with some abnormality such as disproportion or malpresensation which, in itself, gives rise to delay.

Medicine has suffered too much from myths of this sort, which, once born, are nourished by constant repetition until they acquire the status of fact. Another example of this process comes immediately to mind. 'Oligohydramnios does not give rise to any maternal symptoms'.[4] This statement is widely accepted as being correct. In fact, it would be true to say that variations in the volume of the amniotic fluid are generally regarded as being of no consequence unless there is gross polyhydramnios.

DECREASED LIQUOR AMNII

A decrease in the volume of liquor amnii at the end of pregnancy is probably a normal phenomenon. Indeed, it has been suggested that the consequent reduction in the size of the uterus is the factor which initiates labour[5] and that insensitivity to this change is one of the causes of postmaturity. In these cases, the liquor continues to be absorbed and, by the time the patient finally goes into labour, has become greatly diminished in amount (oligohydramnios) or is completely absent (anhydramnios). The first case of anhydramnios described[5] occurred in Cape Town and is worth recording again, since it illustrates clearly the syndrome which is typical of the condition.

Case Report

Mrs. N.K., aged 24, had been well throughout pregnancy (her first). There appeared to be no obstetric abnormality whatsoever. Labour began spontaneously 14 days after her estimated date of confinement. The contractions were mild at first and the patient did not enter the nursing home until 12 hours after their onset. The foetus was in the LOA position, with the head fixed and the heart sounds audible. The cervix was one-fifth dilated. During the next 6 hours labour seemed normal though not strong, and the head descended slowly. However, 4 hours later (22 hours after the onset of labour) the contractions became strong and irregular, the intervals between them varying from 1 to 7 minutes. The foetal heart rate was normal. The cervix was two-fifths dilated and well applied to the presenting part. It was noted at this time that there was no bag of forewaters, though the membranes had not ruptured. Pethidine, 100 mg., was administered and repeated after 3 hours.

Twenty-seven hours after the onset of labour the attendants were distressed to find that the foetal heart sounds could no longer be heard. The contractions were still irregular and vaginal examination showed little further progress. The patient's general condition, however, was good. She was given ¼ gr. of morphine and was then able to sleep between contractions. Four hours later it became necessary to repeat the morphine in order to control the contractions which had again become very strong.

When labour had been in progress for 35 hours and had been well established for 18 hours, vaginal examination showed that no further progress had been made. The patient's general condition was still good, her morale was excellent, and it was still hoped that vaginal delivery would be possible. Delivery by Caesarean section was naturally viewed with the greatest reluctance since the foetus was dead.

However, after another 4 hours uterine action had again become tonic and incoordinate, the lower segment was ballooning and there was a marked Bandl's ring. There was no further cervical dilatation. Rupture of the uterus was now imminent. It was decided that, notwithstanding the absence of foetal heart sounds, Caesarean section was necessary in the interests of the mother.

When, at operation, a distended thin-walled lower segment was incised, a small amount of glutinous green material was all that escaped. The foetus, weighing 6 lb., was delivered easily. The thick upper segment, which was sharply demarcated from the lower segment and about half its size, contained no fluid whatsoever. The membranes had not ruptured during labour and at no time had any leaking of liquor been detected.

The cardinal features of this case are: (1) Postmaturity, (2) anhydramnios, (3) incoordinate uterine action, and (4) intrauterine death of the foetus.

Comment

Since anhydramnios was first described in 1954 it has been the practice in Cape Town maternity hospitals to observe and record any deficiency in the volume of liquor amnii, and there is now no doubt that anhydramnios, or marked oligohydramnios, is dangerous both to baby and mother. In a case of postmaturity the possibility of anhydram-

nios should always be borne in mind. Frequently cases of postmaturity are induced surgically, and the opportunity exists for gauging the volume of liquor. The observation is made more accurately and more easily with the aid of the Drew-Smythe catheter which taps the amniotic sac above the foetal head. If anhydramnios is diagnosed, the patient must be watched with the greatest care, for from the moment that labour begins, the baby's life will be in danger. In the absence of liquor amnii, the foetus is not cushioned from the direct pressure of the contracting uterine walls. Moreover, the uterus itself is liable at any time to go into spasm. From the onset of labour, therefore, the foetal heart should be auscultated at half-hourly intervals, while oxytocics should be withheld for fear of precipitating incoordinate uterine action. If labour proceeds smoothly and is expected to be short, no interference is necessary as a rule. However, the foetal heart is liable to stop without warning, and if the baby is to be saved facilities for immediate Caesarean section must be available throughout labour.

There appears to be an individual predisposition to anhydramnios. Mrs. N.K. has since been delivered of 2 live babies by Caesarean section. At the first operation (at term) the uterus contained only 2 oz. of liquor. The baby had a right talipes equinovarus. The second operation was performed at 38 weeks; the amount of liquor was normal and there was no foetal abnormality.

POLYHYDRAMNIOS

An excess of liquor amnii is commonly referred to as hydramnios. This is inaccurate, for the word hydramnios is merely a literal translation into Greek of the Latin words liquor amnii. An abnormal deficiency of amniotic fluid is universally known as oligohydramnios. Its natural and logical antithesis is polyhydramnios. The aetiology of polyhydramnios is obscure. Its importance lies in its frequent association with certain morbid conditions of the mother and foetus. These conditions fall into 3 groups:

1. Uniovular twin pregnancy, where the polyhydramnios affects only the sac of the larger twin.

2. Foetal deformities, such as anencephalus (but not hydrocephalus), spina bifida, and talipes.

3. Less frequently, maternal diseases such as diabetes, pre-eclamptic toxaemia, and cardiac or renal disease causing oedema of the placenta.

Polyhydramnios is usually a chronic condition which does not become clinically recognizable until the 4th or 5th month of pregnancy. As a rule no treatment is called for, although during labour the possibility of malpresentation and prolapse of the cord must be kept in mind. Occasionally the onset is acute and the symptoms caused by the sudden distension of the uterus are correspondingly severe. In the acute condition it is necessary to remove sufficient liquor to relieve the embarrassment of cardiac and respiratory action. This is best done by means of the Drew-Smythe intra-amniotic catheter so that the rate of withdrawal is well controlled. The operation may have to be repeated from time to time.

Diagnosis is usually easy, though occasionally polyhydramnios may be confused with an ovarian cyst. It is helpful to remember that the cervix is pulled upwards by a distended uterus, while a large ovarian cyst pushes it downwards. X-rays and the presence or absence of a uterine souffle will also help. Where an ovarian cyst co-exists with pregnancy the diagnosis may be more difficult. A distended bladder associated with an incarcerated retroverted gravid uterus sometimes causes difficulty in diagnosis, but is soon recognized when the catheter is used.

ABORTION

There is reason to believe that abortion is sometimes caused by failure of the mechanism which controls the volume of the amniotic fluid.[6] If the liquid is absorbed or ceases to be secreted in normal amounts, the uterus, deprived of its cushioning effect, becomes irritable and expels the embryo. Unfortunately this knowledge is of little practical value, since no means is known of maintaining or restoring the normal fluid volume.

A variant of this condition is, however, amenable to treatment. It sometimes happens that the internal os lacks the tone necessary to support the uterine contents. The amniotic sac then bulges through the os and eventually ruptures. Liquor amnii escapes, the uterus becomes irritable and the foetus is expelled. This condition, first described by Shirodkar,[7] is commonly known as 'the incompetent os'. There is usually a history suggesting trauma to the sphincter, such as previous precipitate labour. Subsequent pregnancies run a normal course until the 4th month, but at any time between then and the 7th month liquor amnii begins to escape. Examination will reveal a toneless patulous cervix, with membranes (if they have not already ruptured) bulging through the os. Occasionally, if the patient is put to bed at once and remains there, it is possible to prolong pregnancy until the child is viable. Usually, however, liquor continues to escape and before long the uterus expels the foetus. Subsequent pregnancies will follow a similar course unless the condition is cured. Fortunately operative treatment gives good results. Operative treatment is usually undertaken shortly before the 4th month of pregnancy. The bladder is stripped off the anterior surface of the cervix as in colporrhaphy. A purse-string suture is now passed round the cervix deep to the mucosa in the region of the internal os. The material used varies with individual preference. Fascia lata, heavily stranded chromic catgut, and nylon sutures have all been used. The use of nylon sutures is probably the most satisfactory, though this method has the disadvantage that the sutures must be removed to allow delivery per vagina. Delivery by Caesarean section is considered by some to be the method of choice in these cases.

The Shirodkar operation gives excellent results when performed for the condition for which it was designed. Unfortunately there are already signs that it is becoming 'fashionable', and perhaps it is as well to mention that it will cure no other type of habitual abortion.

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