ON NON-INSTRUMENTAL AIDS TO LABOUR.*

By WILLIAM STEPHENSON, M.D., F.R.C.S. EDIN.,
Professor of Midwifery, University of Aberdeen.

I.—WHEN MAY WE, WITH ADVANTAGE, RUPTURE THE MEMBRANES BEFORE FULL DILATATION OF THE OS?

MANY a shrewd practitioner, with but little knowledge of the *science*, has acquired from experience very considerable skill in the art of obstetrics, more especially in many little details whereby a normal but a tardy labour can be facilitated. Such experience, however, is blind and liable to error, until the scientific basis on which it rests is understood. Before even the science of midwifery existed, it was found that a change in the position of the patient was often very effectual in accelerating a lingering labour. Under such circumstances, it was a common resource to get the patient out of bed, make her kneel on the floor, or sit between a couple of chairs. This is often of great service, and a scientific explanation can be given why it should be so. But there is one condition, where the labour is certain to be tedious, and where an ignorant midwife or medical attendant is very likely to try the above plan, with the result of only aggravating the evil. In this case, the cause of delay is a pendulous abdomen; and a knowledge of the normal axis of the uterus directs the attendant to lay the patient on her back and apply a binder. This illustration is a good example of a non-instrumental aid to labour, and also of the precision which is given to treatment, by scientific knowledge, as compared with the blind and oftentimes bungling actions of empiricism.

There are many ways by which an enlightened and experienced obstetrician can thus materially help on labour. Some, as the one referred to, are described in books; of others no mention is made, but they are left to be acquired by experience; and more, the result of such experience is at times found to be entirely at variance with the principles laid down by the authors of our text-books. Such is the case in the question, which I propose to discuss on the present occasion: When may we, with advantage, rupture the membranes before the full dilatation of the os? I may mention that this question has reference only to normal labour, where the head presents, and there exists no contraction of the pelvis, but where the progress of the first stage is retarded.

As a part of the history of our art, it is interesting to observe how exaggerated were men's ideas regarding the importance of retaining intact "Nature's wedge", and how patiently and reluctantly former practitioners would wait, under the dread of being meddlesome, for Nature to do what they could readily have done, even when convinced that the non-rupture of the membranes was the cause of delay.

There is still remaining, at the present day, much of the dread of having too early recourse to this simple operation. In the face of the fact that much, and often long-continued, ineffectual exertion is often due to the integrity of the membranes, even before full dilatation of the os, and the other fact that such ineffectual work is often productive of serious after-complications, there is certainly a want of discussion on this point in our recent works. Leishman speaks of it where there is unusual thickness and resistance of the membranes: "But before we decide on rupturing them, we should be sure that the proper function of the membranes has been effected in producing dilatation of the os." Playfair recommends puncture before completion of the first stage only when the liquor amnii is excessive in amount; and renews the oft-repeated and considerably exaggerated caution: "If we evacuated the liquor amnii prematurely, the pressure of the head on the cervix might produce irritation and seriously prolong the labour." This latter point is a question upon which the members of this Society might with profit express the results of their experience: in how far they have observed that irritation is produced, and the labour delayed, in cases where the membranes have ruptured or been punctured before, or early in the first stage. The term irritation is vague in the extreme, and conveys no definite idea to the mind.

Before entering on the discussion of our question, it is well to define what is the exact meaning in which various terms are to be employed. By *full dilatation* of the os is meant, not obliteration, but only that degree which we know will permit the ready passage of the head; whilst the state in which the uterus and vagina are one continuous canal should be designated as *complete obliteration* of the os. The term *os* itself should be confined to the lumen of the *cervix*, and the latter term be always employed when speaking of the state of the tissues which compose it. *Dilatation* also should be limited to speaking of the size of the os, while we speak of *expansion* of the cervix.

In reference to the puncture of the membranes, I have stated practice is at variance with teaching. Whilst our books say that this should not be done, except in rare cases, until the full dilatation of the os, many practitioners have found that by experience they can recognise certain favourable conditions, especially in multiparæ, where it is of great advantage to evacuate the waters when the os is not more than half dilated. We have seen that formerly there existed a very exaggerated idea of the function of the amniotic bag; that its purpose was supposed to be the dilatation of the whole length of the parturient canal; and that it should only be punctured when protruding at the external orifice. Modern opinion now regards the integrity of the membranes as no longer of any value after the full dilatation of the os; and it remains to be seen whether their true function should not be further curtailed, and that what at present is still empirical in practice does not rest on pure scientific grounds. The question must be answered by direct observation, and not by any imaginary views regarding the action of "Nature's wedge", the foetal head being quite as much a wedge of nature as the bag of waters.

In discussing obstetric problems involving the first stage, it has been too exclusively the custom to take the degree of dilatation of the os, and the softness or dilatability of the tissues, as the criterion of the amount of progress made in the process of labour. This, it is easy to show, is an error; and in forming an opinion, we must take cognisance of something more. It is a matter of common experience to find that the membranes rupture spontaneously while yet the os is but slightly dilated, and that the head at once descends and comes into contact with the whole lower segment, the parturient ring being in close relation to the head. Again, it is likewise a matter of common experience that the membranes give way when the os is of the same size as in the first case, and yet the head does not come into close relationship with the parturient ring; the cervix of the lower uterine segment in this case has not in its upper part been expanded to the full diameter of the head. If the finger be introduced well through the os, it is possible to feel the head resting on a ring of firm tissue. Sir James Simpson describes this as an adventitious band of fibres which delays the first stage. It is nothing more than the unexpanded structure of the lower uterine segment. It is evident that, although the os was of the same size in both cases, yet that the mechanism of the first stage was, in the first instance, in advance of the second; and that the difference lay in the degree of expansion of the lower segment, not in the dilatation of the os.

Next, take, what is also a matter of common experience, the condition of parts after delivery. The cervix is found hanging in the vagina, open, loosely relaxed, and elongated; while above, the walls of the uterus are firm and contracted, barely admitting the finger. From this observation (see also Matthews Duncan on *Mechanism of Natural and Morbid Parturition*), together with an examination of Braune's section of the frozen body of a female in the second stage of labour, it is evident that what occurs in the process of the first stage is not the mere opening up of a canal or tube which has been simply constricted in its middle; but, in addition to a constriction, there also exists a diaphragm, obstructing the lumen of the passage, and this obstruction is overcome by longitudinal as well as lateral stretching of this diaphragm. In easy labour, the constriction and diaphragm disappear simultaneously; but it frequently occurs that the disappearance of the first is in advance of the second, and the canal is dilated to its full, whilst the diaphragm has only been strained. No increase in the size of the os has taken place.

By studying the mechanism of the first stage, we can readily understand the production of these two effects of expansion and longitudinal stretching. By muscular contraction, the contents of the uterus are exposed to a uniform pressure. This force, Schulz has called the "internal uterine pressure". It is exerted on the waters, and must, therefore, be equal in all directions; and as the lower portion of the uterus is the weaker, it must yield. This, then, is the expansive force. But, as the uterus also tends to shorten itself in its longitudinal diameter, there is also a longitudinal direction given to the force, whereby it becomes expulsive. This, from the tendency of the uterus to assume its original form, Schulz terms the "form restitution power"; but, as its direction is in the axis of the uterus, I would speak of it as the *axial* force: a term more congenial to our language.

When the membranes are yet entire, this axial force can act only through the ovum as a whole, waters and foetus; and, therefore, at a disadvantage in proportion to the quantity of the liquor amnii. When this is large, as in hydramnios, the disadvantage is at its greatest; the force, in fact, being entirely converted into the uniform internal pressure. When the relative proportion between the quantity of waters and the size of the foetus is less, as we find it normally, then the axial force is brought to bear on the foetus; the fundus, acting on the breech,

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presses the child downwards, and the head is brought to bear on the lower uterine segment. When the internal uterine pressure is greater than the axial, the waters are forced downwards past the presenting part, which recedes. When, however, the axial force is the greater, and can act through the foetus, the contrary effect results; the water is forced upwards, and the head is brought into close proximity with the lower portion of the uterine walls. When the child is thus forced down during a pain, the uterine walls closely surround the head, and the membranes being still entire, the liquor amnii is divided into two portions; that in front of the head is called the forewaters. If the division be complete, then the entirety of the membranes is really a disadvantage; for now the forewaters but impede the more powerful action of the axial force. If the separation be incomplete, then the expansive action is only obtained, the internal pressure being still in excess of the axial. If the reverse be the case, the forewaters are but forced back above the head. By the mode of action, the internal uterine pressure is the force which tends to expand the lower uterine walls. Acting, in fact, like a glove-stretcher, its expulsive power can only act on the entire ovum, and is, therefore, at a disadvantage. The axial force is exerted mainly through the foetus, and can exert its full strength only after the membranes are ruptured.

It seems, therefore, evident that *the function proper of the bag of waters should be limited to that of expansion only*. But the full dilatation of the os is effected, not by expansion alone, but also by longitudinal stretching. When, therefore, we find dilatation tardy from defect in degree or direction of the power alone, and not from any inherent character of the tissues, when once it is evident that the lower segment of the uterus is well expanded, the rupture of the membranes is the most effectual means of favouring the dilatation, by bringing the axial force into full action, and this irrespective of the degree of the size of the os.

By the researches of Dr. Matthews Duncan on the Power of Natural Labour, a beginning has been made to place this subject on a more purely scientific and accurate basis; but we are not yet in a position, and it requires qualifications which few possess, to follow up the subject as he has done. He has, however, shown mathematically, what has been long practically known, that partial evacuation of the liquor amnii is an efficient way of improving the power of the uterus, even when defective in amount. "It is a common belief," he says, "that the uterine pains increase in strength after the evacuation of the liquor amnii. Whether this be true or not, as commonly believed, I do not here consider. But it is certain that, if the uterine contractions remain of the same force after as before the partial evacuation of the liquor amnii, the power of the labour or the extruding force will be increased, as the curvature of the contracting organ is increased." (*Researches in Obstetrics*, page 315).

Having laid down the basis of our knowledge, it remains only to discuss the diagnosis of the conditions which warrant us in having recourse to rupture of the membranes before the full dilatation of the os. The first point is the determination of the degree of expansion of the lower uterine segment. We have seen that the size of the external os is no criterion of expansion. The os, in fact, may be very small, and yet expansion may be complete. It is by the internal os that we can best judge, but this is hard to reach, and difficult to determine its exact site. There is one means, however, of ready access, whereby we can form a proximate opinion: it is the degree of dilatation or updrawing of the vaginal *culs-de-sac*. This is a point which has been entirely left out in the consideration of the progress of the first stage. It is a matter of common experience to find, in the class of cases where we feel something is required to promote a labour with tardy dilatation of the os, that the upper part of the vagina is well expanded and drawn up, greatly increasing the perceptible diaphragm of the cervix, which alone obstructs the continuity of the developed canal. Now, we know that the longitudinal muscular fibres of the vagina run upwards, and are continuous with those of the body of the uterus, and that the attachments of the uterus in their upper portion correspond with the internal os. This portion, then, cannot undergo expansion without carrying with it the tissues which are in connection therewith. Consequently, we find that, as the first stage of labour advances, the upper part of the vagina is dilated until it seems to coincide pretty closely with the upper part of the bony canal. When, therefore, a considerable portion of the lower segment of the uterus can be felt in the vagina, and not merely through its walls, expansion is certain to be complete, whatever may be the size of the parturient ring; and the tissues composing it are those of the cervix proper, and not the uterus. Under such circumstances, I believe the membranes may be ruptured with advantage. It is, however, unnecessary in many cases to wait for the full development of the condition above described. I have taken the extreme state as being most readily under-

stood, and indicating the direction in which our observations should be made.

Another class of cases, or it may be only an additional character to those of the first, are where the action of the uterus seems to be effecting, not steady dilatation, but extreme thinning of the tissue of the cervix; and also where the head is felt to be in close contact with the parturient ring, there being little or no bag of waters.

The next point to be considered is the quantity of liquor amnii; not the actual quantity, as is generally referred to when speaking of it being present in excess, but the proportion its amount bears to the size of the child, and also to the capacity of the amniotic sac. This latter is rarely quite filled; otherwise, it would remain much more tense than it usually does in the intervals between the pains. If it be nearly or entirely distended, it will interfere with the power of restitution of form, by preventing alteration in the form of the uterus, and consequent action on the foetus, even though the actual quantity of waters is not greater than ordinary. In this circumstance, it must be regarded as really in excess, quite as much as where there is excess in actual quantity. Undue tension, therefore, of the membranes during a relaxed state of the uterus must be regarded as unfavourable to the mechanism of labour, and as warranting an earlier rupture of the membranes than under other circumstances.

The liquor amnii must also be considered in excess, irrespectively of actual quantity, if it be unduly great in proportion to the size of the child. Here, again, it interferes with the action of the force which restores form, or the axial force. If, therefore, the parts of the child be not recognisable externally with ordinary facility during a relaxed state of the uterus; if *ballotement* be unusually facile, and especially can be felt during a pain, the probability is that there is a true excess of liquor amnii; and this condition would fully warrant the rupture of the membranes before the full dilatation of the os; the other conditions being favourable to the operation.

I have discussed the subject apart from the state of rigidity or dilatation of the cervix, conditions which undoubtedly must be taken into consideration in determining any line of treatment in the first stage; but the subject of rigidity is one which requires discussion by itself, and would only tend to complicate and obscure the question.

ON THE TREATMENT OF ACUTE RHEUMATISM.*

By E. MARKHAM SKERRITT,

B.A., B.S., M.D.Lond., M.R.C.P.;

Fellow of University College, London; Lecturer on Medicine and on Pathological Anatomy at the Bristol Medical School; Physician to the Bristol General Hospital.

NEXT, what evidence have we that salicin and salicylic acid have any specific action in acute rheumatism? I take it that a specific remedy should—1. Cut short the disease; 2. Prevent relapses while under its influence; 3. Ward off complications.

1. *Influence in Cutting Short the Disease.*—We have already seen that, in a certain number of cases, these remedies have failed—salicin in 19.4 per cent., salicylic acid in 20 per cent.—and this without respect to dose.

2. *Prevention of Relapse.*—Under salicylic acid, relapse is mentioned in four cases; but these are not conclusive, as the acid had been previously stopped. My friend Dr. Shingleton Smith, however, tells me that a patient of his had a relapse while taking the soda-salt. A case of my own gives very definite evidence of the occurrence of relapse under salicin. A young man was admitted into the Bristol General Hospital, suffering from a well marked first attack of rheumatic fever. Under twenty-grain doses of salicin every hour, the temperature was normal in two days; the dose was then gradually reduced to twenty grains every three hours. The temperature remained normal for six days; but then, while the patient was still taking twenty grains every three hours (the largest dose that Dr. MacLagan gave in any of his first series of cases), there was a relapse. This lasted five days, though the dose was increased to twenty grains every two hours, and, for one day, to twenty grains every hour. For nine days, the temperature was normal, and the patient went out, still taking fifteen grains three times a day; he then was readmitted in another relapse.

3. *Prevention of Complications.*—The following have occurred:—*a.* Heart-complications:—Under salicin, endocarditis came on in three cases, pericarditis in four; under salicylic acid, endocarditis developed in one case. *b.* Lung-complications:—Under salicin, bronchitis and oedema, pneumonia, pleurisy; under salicylic acid, bronchitis, collapse, pneumonia. *c.* Hyperpyrexia:—These remedies have already con-

* Concluded from page 106 of last number.