

III. UMBILICAL CORD ROUND THE CHILD'S NECK AS A CAUSE OF DELAYED LABOUR, AND SOMETIMES OF INFANTILE DEATH.

By A. D. LEITH NAPIER, M.D., Dunbar.

DELAYED labour may be due to many factors ; therefore it is not surprising that different opinions are held as to whether circumvolution of the neck by the funis is ever really a retarding agent to the completion of parturition or not. So far as I know, most writers on obstetrics assign little importance to the condition. They tell us that the normal length of the cord is so and so, that with the cord circumvoluting the neck there is usually increased length, and that even if this is not so, there is generally a free cord of ten or twelve inches, which is sufficient to permit a natural termination.

Theoretically we are confronted with these opinions ; practically we find that most practitioners have experienced considerable and vexatious delays in many cases in which the aforementioned condition of parts was afterwards discovered to exist.

The umbilical cord may be from two to seventy inches long. The average length is about eighteen or twenty inches. The usual placental insertion is approximately central ; in some it is close to the margin of the placenta, and in rare cases the insertion is membranous (velamentosa). The frequency of circumvolved funis is from one in seven to one in ten. This, however, includes different degrees of the condition. I know of no statistics bearing on the varieties of cord twistings. The causes are said to be (1) an elongated cord, (2) a small child of active habits, (3) a large quantity of liquor amnii and small child. To some extent these explanations are unsatisfactory. Considering that the activity

of the child is really uterine and not foetal, that in many cases the theoretical elongation of the funis does not exist, and that the third cause is as frequently absent as present, we must look for further solution. Whether the changes of uterine position in the latter months of pregnancy, and the final descent causing alteration of foetal position, are to be esteemed of much consequence is also doubtful, seeing that coiling has been observed as early as the fourth and fifth months. Certain combinations of these alleged causes are probably necessary for its production.

The diagnosis is at times very easy, at others somewhat obscure. The signs as given in books are possibly correct; yet I question if the depression of the fundus with each pain, and the defined spot of tenderness (said to be due to a stretching of the peritoneum), the marked recession of the head after each pain, and the irregular hæmorrhages, are often conjunctively met with. In my experience placental adherence is more properly associated with the first two. The head retraction is most often due to resiliency of the vaginal walls, or perineal rigidity, or to general pelvic contraction. The irregular hæmorrhages cannot well depend on circumvolved cord, unless this should occasion partial placental detachment; and that such is oftentimes less easy of practical demonstration, than of theoretical suggestion, during the progress of a case, most will allow.

Head retraction, however, deserves more notice. That it really occurs practical obstetricians will admit; it is quite as reasonable to believe that the funis twisted round the neck may have something to do with it, as to assert that insufficient dilatation of soft parts, etc., are the only attributable causes of delay.

It is stated by some that retraction occurs most frequently in primipara. From the aforesaid causes it is highly probable that it should: yet I doubt if corded neck is as common in primiparæ as in multiparæ; and very often in the latter, with ample room, and, during the earlier periods of the cases, with seemingly perfectly powerful pains, this head retraction is noted. But the conditions in both classes of patients which seem to me to point most clearly to corded neck are—(1.) Head retraction, with fairly sufficient pains and pelvic accommodation. (2.) Gradual cessation or prolonged abeyance of the pains. (3.) Insufficient head flexion, followed by the mechanism described as super-rotation (*Ueberdrehung*), in which, say in a first presentation, at the outlet, the small fontanelle is found under the right (*not left*) pubic arch, and the face is turned towards the left thigh and backwards as in the second.

Head retraction with fairly good pains in a sufficiently-sized pelvis cannot always be explained as due to the causes mentioned as most common, viz., vaginal and perineal rigidity, as undue retraction is often observed without such rigidity; and the very usual assertion that the cord round the neck can interfere with the progress

of labour only at or about the termination of the second stage is thus contradicted by ordinary experience.

Gradual cessation, or prolonged intervals of rest, with very weak second stage pains—in other words, uterine inertia—requires more consideration than has been generally given it.

In the majority of examples, in the absence of constitutional depravity, inertia depends on—(a.) Impairment of uterine musculo-nervous power, as from mental emotion, uterine, vesical, or rectal distention or compression, exemplified by excess of liquor amnii, retained urine or faecal matter, intramural uterine, cystic, and rectal tumours, etc. (b.) Uterine thinning from disease or over-distention, as also from malignant cervical disease, etc. (c.) Cord circumvolution.

Leaving aside mechanical or "*a fronte*" hindrances, and regarding the simple, true form, which is a want of expulsive uterine power, there are but two great classes of inertia, with grades of each,—the first, in which there is prolonged abeyance of pains, exaggerated periods of quietude, of from twenty minutes to two hours; the second, in which, after more or less strong pains, there is a total stoppage of uterine action, or for many hours a torpidity or such slight pains that no appreciable expulsive influence is exerted.

In primiparæ in which this foetal corded neck is found, a case is usually characterized either by a lazy first stage, and a second stage marked by good pains, but with intervals of considerable duration, so that the patients may fall asleep between each; or a lazy first stage, and for a time (*i.e.*, till the second stage has been well established) fairly satisfactory progress; afterwards a gradual falling off of any efficient pains. Although these may be frequent and cause much suffering, they seem to cease before reaching their acme, and result in nothing.

In multiparæ the inertia is commonly simply an interruption of the second stage for some hours; the membranes often rupture spontaneously too soon. Eventually one or a few strong pains come on and complete delivery, or there is a uterine lassitude without any resuscitation of parturient power. We may find the primiparous characteristics in multiparæ, and *vice versa*.

I am much more inclined to regard this inertia as an important diagnostic sign than the retraction with strong pains. The head retraction is a later symptom; and although it does retard labour earlier than just at the outlet, as we are taught to believe by different authors, it is from many considerations too unreliable a sign to attach great weight to *per se*.

Without discussing the other causes, which I have indicated roughly, but confining myself to the one under immediate concern, uterine inertia is known to depend on irregular contraction of the muscular fibres. These irregular contractions may be compared to the so-called "hour-glass contractions" of the third stage. The

most common cause of the "hour-glass" condition is the now happily almost exploded practice of pulling away the placenta by traction on the cord, *i.e.*, exciting irregular action by irritation of uterine fibres opposite the site of placental insertion.

Uterine inertia in the second, and possibly in the later part of the first stage, may depend on irritation of this particular region by a somewhat similar pulling consequent on the neck being encircled by the cord. I admit that unless there is actual shortening of the cord the analogy cannot be well understood. But that there is really irregular, markedly irregular, contraction in such cases is without doubt. The precise explanation of its production is difficult. When we have a cord of 30 inches or more and but one entanglement, the irregularity may be met with; on the other hand, a cord of 18 inches long with two or three coils round the foetus occasions an actual shortening, but the uterine action may not be more markedly irregular than in the case with the longer cord.

The theoretical objections to the traction irritation theory, that the condition rarely happens without an elongated cord, cannot be seriously entertained. Intra-uterine deaths occur from the cord being drawn tightly round the foetal neck. It is admitted that most probably strangulation did not cause these deaths. Even apart from traction during labour, if such interruptions to the circulation are sufficient in some instances to occasion foetal death, they might justly be deemed accountable for abnormal uterine irritation and impairment of function. It is right to remember, on the contrary, that excellent authority can be adduced to show that the pressure of a tightened cord during intra-uterine life is sometimes innocuous. From the structure of the cord we are debarred from highly estimating the nervous influences exerted. Still it is most probable that, either from traction irritation or from some interruption to the circulation, resulting in placental engorgement and thus causing a direct focus, we arrive at sympathetic uterine nerve irritation as the true explanation of this inertia accompanying the condition.

Insufficient head flexion is oftentimes associated with corded neck. Whether it depends on the above-mentioned insufficient expulsive power, or whether the axis of cephalic exit is also altered, is uncertain. From the fact that flexion may be less marked in roomy pelves than in those of small primiparae, the want of expelling force would seem the more satisfactory explanation; but as cord twisting is combined with other presentations in a proportionately larger number of cases than with first cephalics, the question cannot be easily determined. I regret I have nothing beyond my personal observation to corroborate this last-made statement. It may be thought that the super-rotation movement has caused me to think so, but not so. My earlier cases may have been misleading, but latterly I have closely observed all with reference to this mechanism.

The diagnosis of circumvolved cord may be made in the lower third by digital examination. I have frequently done so in well-sized pelves. At the outlet clear evidence of corded neck is often seen before the actual birth of the head. While in many cases the birth of the head establishes the accuracy of our former ideas, I confess that more than once I have been mistaken.

The treatment naturally depends on the stage at which the diagnosis is established. If we knew that such existed previous to the advent of the second stage, we would, as a matter of course, employ sedative and tonic measures calculated to prepare the uterus for its extra work. But as the discovery is by no means infrequently made, at soonest, after the rupture of the membranes and partial dilatation of the os, we must marshal our resources differently. In a very large percentage of cases it is well to rupture the membranes artificially. If we have a suspicion of corded neck, the questions of act or delay arise. Action gives us more certain pains, and even with a partially dilated os the head advances more rapidly. If we act soon enough, a threatened tedious labour, especially in a multipara, will be rendered short and natural. To delay until the os is fully dilated, and then rupture, may give us, in some cases, still more satisfactory results, as, if no pains of sufficient degree supervene, the way is clearly opened for forceps. On the whole, with a soft dilatable os, artificial rupture will be found most expeditious. As a general rule, nearly 20 per cent. of primiparæ demand the employment of instruments; and allowing time for the parts to be sufficiently relaxed and distended is all that is needful. Further delay is at the expense of the maternal strength, if not injurious both to mother and child. With manual compression and forceps we incur far less risk to the child, should there be any probability of interference with the circulation.

I have found it necessary to free the head, after its birth, by cutting the funis before the shoulders were born. I have also, in a few cases, divided the cord in vagina, and thereafter delivered instrumentally with happy results. In these cases I could feel the cord coiled round the neck.

In head-arm, head-hand, and foot presentations, "cross births," and uterine tumours with head presenting, I have met with these entanglements. It is impossible to lay down definite rules for treating these, as each case must be considered according to its peculiar requirements. One of shoulder-and-hand I attended last October was delayed after version by the right leg, which was left in utero, being firmly encircled by the cord; the fœtus not only rode on the funis, but had it looped round the thigh. It was necessary to manœuvre the leg partially free before I could get it down. The length of the cord was about 20 inches. Although this case does not come under the heading of my paper, I mention it as illustrative of actual delay occasioned by the cord coiling.

No advance of moment was made, which rendered it advisable to bring down the second leg when the hindrance was evident. Yet, as such cases do not apply generally to the matter under discussion, with this passing reference we leave them.

The concomitants, sequelæ, or results of cord entanglements may be placed under two classes,—those properly belonging to the circumvolution, and those due to the inertia or irregular uterine contraction induced by it.

The most important of the former is infantile death. Although many writers have denied that the unborn fœtus can be directly strangled by compression from the cord, Caspar, Hecker, Scanzoni, and others believe differently. Most affirm that death is from suffocation, and that, though admittedly uncommon, death may happen during parturition from the cord compressing the neck. Intra-uterine fœtal death from constriction of the neck is also recognised. Smellie records a case (*N. Syd. Soc.*, p. 114, vol. ii.), as also does his editor, M'Clintock (*ibid.*). Dr M'Clintock found the neck at its circumference reduced to nearly one-half. I fancy that these cases are less rare than is believed, and that most of us have had somewhat analogous experience.

It is a very common occurrence to have a child seemingly still-born after cord coiling. Artificial respiration, the loss of a little blood, etc., usually obviates death; but if no aid was at hand, doubtless many children would die.

I do not now consider the effects of twistings or knots of the umbilical cord itself, as most are at one regarding the pathology of such. As in examples of knotted cords, so in circumvolved cords, infantile death may be caused by blood deterioration from excess of carbonic oxide due to imperfect aeration. Placental adhesion of a slight degree is a somewhat rare concomitant of circumvolution. Irregular or modified "hour-glass" contraction may be also experienced. Presumably both are due to some uterine irritation from cord straining.

The uterine flaccidity or inertia accompanying or resulting from corded neck may be continued in the third stage and permit post-partum hæmorrhages. To be more precise; the continued inertia tends to bleeding. I have never seen much blood lost as a result of it, but have often seen indications of hæmorrhage.

Exaggerated after-pains are common sequelæ. These may be due to the irregular partial contractions, and the consequent formation of clots; or to slight metritic attacks, possibly caused by the undue expulsive force finally exerted, or from some small zones of inflammation left as the consequence of placental adhesions.

Neither my time nor opportunities for studying the medico-legal aspects of the subject permit me to dwell on these; but from one or two cases I have been connected with I have been much interested in them, and hope that some of the Fellows present may favour us with their views on these points.

The President said that the Fellows were specially indebted when a member came from the country to read a paper. In his experience, coiling of the cord round the neck of the child was not a frequent cause of delayed labour, and he doubted whether it could produce uterine inertia. It proved sometimes a cause of delay at the end of the second stage, so that he had to cut the cord to allow of the child's being born.

Dr James Young had found the cord coiled thrice round the child's neck, but never found it a cause of delay.

Dr Napier, in reply, said that he had divided the cord in the vagina with blunt scissors. The points which he wished to bring out in his paper were that cord-coiling was more frequent, and exercised more influence, than was generally supposed.