HYDROCEPHALIC FETUS DELIVERED BY SPINAL TAPPING.

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THE delivery of the after-coming head is often a matter requiring skilful manipulation, and the employment of the forceps is sometimes necessary. If, however, the head happen to be hydrocephalic as well as after-coming, the most careful manipulation will often fail to deliver it, and the use of forceps becomes a danger. The value of the method suggested by Van Huevel and carried out by Tarnier will under these circumstances be easily appreciated. As that method does not appear to be widely known or often practised in this country, it has seemed to me that the report of the following case may serve a useful purpose in bringing it prominently before the profession.¹

On the night of August 15th I was hurriedly summoned to the Royal Maternity Hospital, Dr. Hy. H. Robarts, one of the resident surgeons, informing me by telephone that a woman was being sent in with her baby born as far as the shoulders, but with the head still above the pelvic brim. On my arrival at the hospital I was put in possession of the following facts regarding the case: The patient was a married woman, 28 years of age, who had had three previous confinements and no miscarriages; her first child, a girl, was now 6 years old, healthy, born in a normal labour; her second, also a girl, was born dead four years ago, head presentation, no further details; her third child, a boy, was born two and a half years ago, normal labour, now alive and healthy. During the present pregnancy—the fourth—the patient had complained greatly of pain in the left side of the abdomen, which had prevented her sleeping at night; she had also noticed that the abdomen was bigger than in her previous pregnancies. She was under the care of a medical man in one of the suburbs of Edinburgh; he was called to her on August 15th, labour pains having commenced on the evening of the 14th. In the afternoon the os was fully dilated, and a transverse presentation was diagnosed, position left acromio-anterior. On account of the large size of the abdomen the presence of twins was suspected. At 7 p.m. the medical attendant ruptured the membranes, performed version, and brought down the feet without much difficulty; the body was also brought down and the arms with considerable exertion, but no efforts could extract the head. Another doctor was summoned, but even with his help the head remained firmly fixed above the pelvic brim. Attempts were twice made to apply the forceps, but with no success. The patient was then sent into the Maternity Hospital, where she arrived at 9.50 p.m.

On her arrival at the hospital the patient was in a very collapsed state; her pulse was 140 and thready; her lips and face were pale, the nose was pinched and the eyes hollow. She complained of no pains. On abdominal palpation I felt the uterus fairly well contracted, and as large as if it had a full-time fetus in it, but protruding from the vulva were the body and limbs of a male infant. In the upper part of the uterine tumour was a soft area, which I regarded as blood clot, above the head; in the lower part I thought I detected a crackling sensation such as one gets on palpating a hydrocephalic head. The body of the child was lying transversely in the pelvic cavity, the back being to the right; the cord was not pulsating. I passed my fingers up behind the fetal back and felt a well-ossified portion of the occipital bone; I thought I could feel a membranous part beyond it.

By this time I had diagnosed obstruction in labour due to large size of the head, and I naturally thought first of hydrocephalus. I could not, however, absolutely exclude some rarer conditions, such as meningocele, encephalocele, cranial or facial teratoma, or dicephalus, with single body. I said, therefore, to the house-surgeons and to the resident pupils from Milne Murray Lodge, that I intended to treat the case as if it were one of hydrocephalus, keeping in mind the comparative frequency of that state and the great rarity of the others.

The nature of the treatment then engaged my attention. It was obvious that further traction upon the trunk of the child was inadvisable; it had already been practised for two hours, the attachment of the head to the trunk had been weakened, so that there was fear of separating the former and leaving it in the uterus, and there was the rapidly-increasing risk of uterine rupture. To tap the head suggested itself as the best

plan to pursue; but it seemed to me, at the same time, that the further intravaginal and intrauterine manipulation that it would involve, the probability that the occipital bone would require to be pierced with a perforator, and the collapsed state of the patient all combined to make a very grave prognosis. It was then that the illustration in Tarnier and Budin's *Traité de l'Art des Accouchements*,² representing tapping of the spine in a case of retained hydrocephalic head, came into my mind. That illustration, as some of my readers will remember, shows an infant born as far as the shoulders; the spine has been opened into in the dorsal region, and a stream of fluid is issuing through a cannula which has been pushed into the spinal canal. The figure is entitled, "Procédé de Van Huevel-Tarnier." It seemed to me at once that if I could by this method draw off the fluid from the cranial cavity by paracentesis of the spinal canal, I should be giving the patient a much better chance than by further interference through the vagina. The infant was already dead, so I had only the mother to consider.

By gentle manipulation I brought the infant's body round so that the occiput lay above the symphysis pubis and the back was in the middle line anteriorly. Urine had been drawn off by the catheter, and the patient was under chloroform, but not deeply. I took an ordinary scalpel and made a transverse incision over the interspace between the sixth and seventh dorsal vertebrae in the interscapular region. I then cut down into the spinal canal, but no fluid appeared. I next took a long silver catheter with one large and several small openings in its distal end and insinuated it into the spinal canal, bending the back of the infant at the time so as to make the spinal curves and those of the catheter to coincide. I calculated that the tip of the instrument was inside the cranium, but still no fluid issued. I then turned the catheter so as to make the point pass forwards in the cranial cavity; I felt some resistance, which was overcome, and then clear fluid with a slightly yellowish tinge began to run freely from the catheter. Dr. Robarts aided the emptying of the head by suprapubic pressure. When 36 oz. of fluid had thus been drawn off I seized the lower limbs and carried them forward over the symphysis pubis, and with very slight traction delivered the infant literally with one hand, aided by the suprapubic pressure which Dr. Robarts was exercising. A large quantity of blood clot came away with the head, and the placenta was born almost immediately. The uterus contracted fairly well. A large intrauterine lysol douche was given, the fluid returning freely. The child was born at 10.20 p.m., or half an hour after the mother's admission to the hospital. Four grains of ergotine were injected hypodermically, and repeated in about an hour. Strychnine, $\frac{1}{10}$ gr., was also given. The uterus softened several times, but the bleeding was not great. The pulse, however, was 150, and the facies not at all good, so I ordered a saline by the bowel, which was given. The patient was then put to bed and some brandy given, and afterwards some hot milk; with the help of bromide of potash and chloral she slept well.

The infant (Fig. 1), a male, was, save for the hydrocephalus, well formed; there was no spina bifida or other external deformity. The length was 22 in., and the weight, including 36 oz. of fluid drawn off, was 12 lb. The head was collapsed, but quite intact, owing to the nature of the operation which had been performed (Fig. 2). The two halves of the frontal bone were widely separated; the parietals, which measured 5 in. square, were separated from all the neighbouring bones by sutures $1\frac{1}{2}$ in. wide. The supraocciput was loose, being separated from the basiocciput. All the cranial bones were well ossified. Some of the measurements of the head may be mentioned: the circumference was $21\frac{1}{2}$ in.; from the root of the neck to the glabella measured over the vertex was $16\frac{1}{2}$ in.; the O.M. diameter was $6\frac{1}{2}$ in.; the biparietal diameter was $6\frac{1}{2}$ in. No eyeballs were visible in the orbits; the orbital fissures were short, measuring only $\frac{3}{4}$ in. The placenta weighed 2 lb. 4 oz., and the cord was 28 in. in length.

The mother's recovery may be briefly summarized: On August 16th, the first day of the puerperium, the temperature was 100° , and the pulse varied from 110 to 104; the patient suffered no pain; she was given brandy (half an ounce) every four hours. On the second day of the puerperium the temperature fell to 97° , rising in the evening to 100.6° ; the pulse varied from 81 to 100; Henry's solution was given in the evening, and an enema next morning. On the third day (August 18th) the temperature varied from 98.4° to 99.8° ; the bowels were moved, but not very freely, so a second dose of Henry's solution was given; the pulse varied from 86 to 92;

there had been no difficulty with micturition. On the fourth day there was slight fetor of the lochia, so vaginal douching twice daily (carbolic, 1 to 40) was begun and continued for twelve days; with the help of an enema, the bowels were well moved; the temperature showed an evening rise to 100° , and the pulse varied from 80 to 88. During the following three days (August 20th, 21st, 22nd) the morning temperature was normal, and the evening 100° ; thereafter it was practically normal; the lochial discharge gradually lost its fetor, and ceased; there was never any uterine tenderness, and after the first few days the involution proceeded well. The patient left the hospital on the fifteenth day with a pulse of 72 and a normal temperature. It may be added that she had ergot and iron during most of the puerperium, and on one occasion—the seventh day—had to have the catheter.

Fig. 1.—Hydrocephalic fetus, weighing 12 lb., delivered by traction after spinal tapping.

According to Tarnier and Budin,³ the procedure which was adopted with such complete success in this case, was proposed by J. Van Huevel in 1848,⁴ and actually carried out by Tarnier in 1868. Hubert,⁵ however, claims for Lacoux the honour of establishing it as a useful obstetric operation. At any rate, it would appear to have been adopted by Tarnier's pupils, and employed by them when occasion arose. N. Charles⁶ used the method successfully in 1881; and in the same year J. Dougall,⁷ in the account which he gives of a hydrocephalic fetus with spina bifida delivered as a breech, seems to have thought, after the labour was over, that he might have facilitated the extraction of the infant by draining off the cranial fluid through an opening in the sac of the spinal hernia. I may quote Dougall's words: "In this case, had the labour not finished when it did, I would have used the perforator. It occurred to me after, that I had neglected an opportunity of making one of the complications obviate the other. This could have been done after the child was dead, by opening the tumour at the bifid spine, and so tapping the cranium through the cerebro-spinal canal. This operation might probably be performed in lieu of craniotomy in fetal hydrocephalus, even where the spine is not bifid. An incision could be made into the cerebro spinal canal about the dorsal region, after turning, or in a breech presentation, and the cranium emptied of its superfluous fluid thereby."

A recent case in which spinal tapping was employed for the delivery of the hydrocephalic after-coming head, was that

reported by Dr. Ira G. Stone in 1897⁸; Stone had only a soft rubber catheter with him, so he stiffened it by placing a uterine sound inside it, and was thus able to pass it up the spinal canal into the cranial interior. Another case seems to have been reported by B. Pozzoli.⁹ In one instance, that recorded by Oul,¹⁰ the manœuvre failed; the reason was found to be a fracture of the spine in the cervical region with separation of the two parts, which made it practically impossible for the sound to follow the canal, and so reach the cranium. This case affords a good argument for early use of this method, and for the avoidance of indiscriminate traction upon the fetal trunk.

The advantages of spinal tapping for the delivery of the after-coming head in hydrocephalus are so obvious that I need scarcely enumerate them. There is, first, the advantage

Fig. 2.—Hydrocephalic fetus, delivered by traction after spinal tapping. The transverse incision over the dorsal spine is shown.

of operating upon parts which are external and visible; there is, secondly, the accessibility of the armamentarium required—a knife and a catheter; there is, thirdly, the rapidity and completeness of the evacuation of the cranium thus obtained; and there is, fourthly, the avoidance of any further internal interference with hands or instruments when all such interference is of necessity fraught with danger. It is by no means an easy or a safe procedure to perforate a hydrocephalic head behind the ear or through the occiput when prolonged traction has already been made upon the trunk, when the forceps has perhaps been thrust once or twice into the uterus, and when the operator has the dread of uterine rupture prominent in his mind; tapping the spinal canal at once easily and safely removes the whole difficulty and greatly reduces the after-risks. What cleidotomy has done for the delivery of the shoulders after craniotomy or basilysis, spinal paracentesis promises to do for the extraction of the after-coming hydrocephalic head; both are scientific and elegant methods of overcoming difficulties which are often attacked by force, ill-regulated and misapplied and excessive.

REFERENCES.

- ¹ The operation is sometimes mentioned in textbooks—for example, in my *Essentials of Obstetrics* (p. 138), but the writer has seldom had personal acquaintance with it. ² Vol. iv, p. 32, 1901. ³ Op. cit. ⁴ *Presse Méd. Belge*, i, 279, 343, 1848-9. ⁵ *Cours d'Accouchements*, ii, 254, 268, 1878. ⁶ *Jour. d'Accouch.*, Liège, ii, 41, 1881. ⁷ *Glasgow Medical Journal*, xvi, 25, 1881. ⁸ *Medical News*, New York, lxx, 302, 1897. ⁹ *Lucina*, Bologna, iv, 167, 1899. ¹⁰ *Arch. de Toccl.*, xviii, 617, 1891.