

ACCOUNT OF A
CASE OF
EXTERNAL AND INTERNAL
CEPHALHÆMATOMA,
COMPLICATED WITH FRACTURE OF THE RIGHT PARIETAL
BONE, IN A NEW-BORN INFANT.
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I HAVE the honour to lay before this Society, the particulars of a case which is interesting, from the comparative rarity of its occurrence, as well as from the illustration it affords of the manner in which nature brings about the cure of similar affections.

On February 8th, 1845, Eliza Wilcox, aged 16 days, was brought to me by her aunt, from whom I learned that the mother of the infant had thrice previously given birth to living children after easy labours, and that Eliza was born after a perfectly natural labour of five hours' duration; that she cried as soon as she was born, sucked well on the following day, and had continued to suck well ever since. It was not till the third day after birth, that a small

swelling, the size of a walnut, was noticed a little to the right of the vertex, extending downwards and forwards over the parietal bone. This tumour had since increased in size every day, notwithstanding which, the child's health was undisturbed, save that she was rather uneasy at night ; and, with one exception, her bowels had acted daily since she was born.

The child was well formed, well nourished, perfectly healthy in her appearance, the pupils of her eyes acted readily under the stimulus of light, she cried loudly, and sucked vigorously. Her head was well formed, and neither was the anterior fontanelle nor were the sutures remarkable either for precocious or for tardy ossification. A soft, elastic, non-pulsating, semi-fluctuating tumour, of irregularly oval outline, occupied nearly the whole of the right parietal bone. The greatest prominence of this tumour was just over the parietal protuberance, a little above which, was a slight depression, or furrow ; and again, a second prominence, the base of which reached almost to the sagittal suture. The tumour was thus imperfectly divided into two ; that nearer the vertex being softer, and more manifestly fluctuating, than the other. A line, circumscribing the base of both tumours, measured twelve inches. They did not anywhere extend beyond the sutures bounding the parietal bone, but the raised edge or ring which ordinarily surrounds the sanguineous tumour of the scalp more or less completely, was nowhere perceptible.

During the examination of its head, the child seemed uneasy, but did not cry, and pressure on the tumour produced no effect on its nervous system.

I directed the application of slips of adhesive plaster round the head, and the employment of a cold lotion.

On February 12th, the child continued well, with the exception of slight diarrhœa, and the tumour had ceased to enlarge since the application of the plaster.

On February 15th the purging had been checked by some powders which I had prescribed. The child seemed well and happy, did not cry or appear fretful. There was no very obvious diminution of the tumours, but that over the parietal protuberance was rather firmer.

On the evening of the same day, the child became very drowsy, had convulsive twitchings of the muscles of the face, and the skin of the surface assumed a yellowish hue. The child sucked heartily, but vomited soon after sucking, and passed an unquiet night. On the afternoon of the 16th, she was taken to church to be christened; while there she yawned deeply two or three times, and when brought home, had an attack of general convulsions, which lasted for about three minutes. During the night she continued very ill, became convulsed at four o'clock in the morning of the 17th, and died in convulsions at six A. M.

At the *post mortem* examination, thirty-three hours after death, I was not permitted to examine any part except the head.

The external appearances were not remarkable. The face was tranquil, the eyes were closed, and there was no discoloration of the scalp.

On dissecting off the scalp from the subjacent cellular tissue, it was found rather closely adherent to it at some points over the right parietal bone, and at those situations presented considerable vascularity, but was elsewhere remarkably bloodless. Successive layers of exceedingly dense cellular tissue, between which yellow serum was infiltrated, were then removed, and the pericranium was exposed. It was of a reddish colour, and very dense texture, but did not present any other remarkable appearance. On opening that tumour which was seated over the parietal protuberance, it was found to be filled with coagulated blood. The red particles had subsided for a depth of about three lines ; the dark clot beneath was more than half an inch in thickness, firm in texture, and adhering closely to the bone ; especially near that situation where the depression had existed between the two tumours. The other, more distinctly fluctuating tumour, contained semi-coagulated blood, of the appearance and consistence of gooseberry jelly, and somewhat less firmly adherent to the bone than was the clot in the other situation. After this blood had been removed, a semi-circular layer of dense, reddish, fibrinous exudation, about three lines broad, wedge-shaped, with its narrow edge directed inwards, was seen extending along the inner and anterior border of the tumour. It was situated

immediately beneath the pericranium, adhered very closely to the subjacent bone, and formed, so far as it extended, a raised margin around the effused blood. The sensation it conveyed to the finger was very similar to that which is communicated by the osseous ring that usually surrounds these effusions, though its edge wanted something of the sharpness which that presents. The subjacent surface of the parietal bone was rough and uneven; a condition which, moreover, was not confined to that situation, but existed over a large extent of the bone. This roughness seemed to be owing to the deposit of new osseous matter, which apparently had formed the medium of the firm connection that existed between the clot and the surface of the skull.*

The frontal and left parietal bone were much more vascular than usual, though otherwise healthy; the membranous sutures were in a perfectly natural condition.

The sutures were now cut up, and the right parietal bone was removed. Before this was done, however, a fissure was noticed in the bone, running from the coronal suture, about an inch from the anterior fontanelle, obliquely backwards and upwards. The edges of this fissure, at the time of making the examination, were quite clean, not stained with blood as they afterwards appeared.

On the inner surface of the bone was an effusion of blood between the cranium and the dura mater, more than half an inch in thickness, and occupying

* See Pl. IV. fig. 1.

the whole of the fossa of the parietal bone. The tumour thus formed was of an oval shape, and its surface was slightly irregular. Between the two layers of the dura mater, by which it was covered, were numerous bony deposits, and a ring of newly-formed bone surrounded its base. This ring had not attained the same development in its whole circumference; osseous matter having been abundantly poured out along the frontal margin of the tumour, more sparingly elsewhere, and being entirely absent along its inner border. It appeared to have been formed partly by ossification of the dura mater, partly by heaping up of new bone on the inner surface of the skull. It would have been impossible to ascertain whether the inner table of the skull had contributed, like the outer table, to the process of reparation, by the deposit of new bone, except by the complete removal of the clot, and consequent destruction of the preparation. The clot, therefore, was raised at one edge only, but in that situation the bone was perfectly smooth and unaltered. The blood appeared to have been poured out in successive layers, none of which, however, seemed of very recent date, since all were firmly coagulated, though the red particles had not subsided, but remained equally diffused throughout the clot.*

The rest of the interior of the skull and the dura mater presented no unnatural appearance. There was a depression of the right hemisphere of the

* See Pl. IV. fig. 2.

brain, in a situation corresponding to the tumour. With this exception, the convolutions of the brain presented a perfectly natural appearance, and there was no fluid beneath the arachnoid, nor any injection of its vessels. The whole right hemisphere was pale, bloodless, and very soft; the left was of natural consistence, but its section presented an unusually large number of bloody points. There was no fluid in the ventricles, but little blood in the sinuses, and no other appearance of importance was observed in the brain.

The two features which impart to this case its chief interest are, the fissure of the parietal bone, and the effusion of blood upon the dura mater, both of which have been but rarely noticed. In the absence of any proof of injury having been inflicted on the child, either before, during, or after birth, it is not very easy to account for the fissure of the skull. The fact that the edges of the fissure were quite clean, and presented no signs of any attempt at the formation of callus, may incline some to suppose that it resulted from violence inflicted on the head after birth, and shortly before the child's death. It will be found, however, on reference to other similar cases, that in none were there any indications of a reparative process about the edges of the fissure; a circumstance, by the bye, on which M. Rokitsansky insists* as common to fissures of the skull, however produced. The absence, moreover, of all abrasion of the skin, or injury of the scalp, militates against

* Handbuch der Pathol. Anatomie, p. 248.

the supposition that the cranium was fractured after birth, by external violence. It seems most probable that the effusions of blood, and the fissure of the bone, took place about the same time, while the process of ossification going on around the effusion, on the interior of the skull, indicates sufficiently that many days must have elapsed since that occurrence. The annals of legal medicine * contain many instances of injury of the child before birth, and of fracture of its skull by a blow, or some other act of violence inflicted on the mother. In the present case, however, the mother had received no injury for nine weeks before her confinement; and though she was at that time thrown from a cart, yet as she fell on her back, it is unlikely that the foetus should have suffered from her fall. The probabilities appear to be in favour of the occurrence of the fissure during labour, of which accident there are several cases on record. In many instances of fracture of the skull in natural labour, some contraction of the antero-posterior diameter of the pelvis has existed, while, at the same time, the foetal skull has been more firmly ossified, and, consequently, less yielding than usual.† In this case, indeed, none of these

* As instances of this occurrence may be mentioned, the cases recorded by Mende, in *Henke's Zeitschrift für die Staatsarzneikunde*, Bd. iii., s. 277; Adelman, *ibid.*, Bd. v., s. 295; Becher, *ibid.*, Bd. xxvi., s. 245. Many other cases may be found, by collating the French and German journals.

† Such are the cases related by Jörg, *Schriften zur Kenntniss des Weibes*, Bd. ii., s. 123; Schmidt, quoted by Jörg, *lib. cit.*,

circumstances existed, but fissures of the skull have been known to take place during easy labours, and wholly independent of contraction of the pelvis, and of any preternatural degree of ossification of the skull.* In such cases, the fractured bone is usually that which was in contact with the sacrum, and the fracture is produced by the uterine action driving the head forcibly against the promontory of that bone. Sometimes, however, the bone in contact with the sacrum escapes uninjured, while a fissure occurs in the presenting bone. To explain this occurrence, it has been suggested by Professor Jörg,† that the head entering the pelvis very obliquely (possibly, as in the case recorded by himself, from too great inclination of the pelvis), is detained against the promontory of the sacrum, while the presenting bone is forced by the violent uterine action so much lower than the other, as to place the membranous connections of the cranium greatly on the stretch, to bend, and finally to break the presenting bone. In the present instance, it is not possible to determine by which of these two processes the injury was inflicted, though probability seems to be in favour of the former.

It may be suggested that the effusion of blood on

s. 130; and E. von Siebold, in his *Journal für Geburtshülfe, &c.*, Bd. xiii., s. 404.

* Such cases are described by V. d'Outrepoint, in V. Siebold's *Journal*, Bd. xiii., s. 400; by Carns, *ibid.*; by Hoere, *ibid.*, Bd. v., s. 224; and by Danyau, *Journal de Chirurgie*, Janvier 1843.

† *Loc. cit.*

the surface of the dura mater was merely the result of hæmorrhage from the vessels wounded by the fracture of the bone. Feist* indeed, and some other writers, have refused to recognise as instances of cephalhæmatoma, those cases in which the effusion of blood was complicated with fracture of the cranial bones. It should, however, be borne in mind, that cephalhæmatomatous swellings, either external or internal, do not by any means invariably co-exist with fissure of the cranial bones; and in the present case, none but a very subordinate share in the production of the effusion can be attributed to the fissure of the parietal bone. Had the extravasation of blood resulted from the escape of that fluid from vessels wounded by the fissure of the bone, the centre of each extravasation might be expected to correspond to the situation of the fissure. This, however, was very far from being the case either with the external or internal effusion, and that tumour which was near to the sagittal suture was quite remote from the fissure, and unconnected with it. Both the fissure and the effusion probably occurred at the same time, and from a similar cause, but the latter cannot be considered as the result of the former. In M. Valleix's valuable work on the diseases of children, is an engraving that illustrates the ease wherewith the blood may be made to transude through the imperfectly ossified foetal skull. The direction in which the pressure acts during la-

* Die Kopfblutgeschwulst der Neugeborenen. Mainz, 1839, 4to, s. 7.

bour, and the greater porousness of the outer, than of the inner surface of the skull, account for the greater frequency of external, than of internal cephalhæmatoma ; but the same cause that ordinarily produces the former is quite adequate, if more energetic than usual, to give rise to the latter.

If it be allowable to judge from the number of instances of internal cephalhæmatoma on record, it must be of very rare occurrence. M. Rokitansky indeed, and M. Baron, both speak of it as being by no means unusual. I have seen, however, an account of only eight cases,* besides which I have

* The particulars of these cases are briefly as follows :—

1. V. Siebold's Journal, Bd. ix., s. 43. The patient was delivered by the forceps, but the foetal head was uninjured. There existed both external and internal cephalhæmatoma. The child died with symptoms of exhaustion on the fifth day.

2. Held, Hecker's Annalen, 1831, Bd. xx., s. 34. Labour natural, except that the funis prolapsed. Child still-born, with sub-aponeurotic and internal cephalhæmatoma. Bone uninjured.

3. Dubois, Article Cephalhæmatoma, in Nouveau Dict. de Med., t. vii., relates a case which occurred to M. Moreau. The skull received no injury, and there was no external cephalhæmatoma. The tumour was situated on the inner surface of the os frontis. Death was preceded by head symptoms.

4. Padieu, in Valleix, Clinique des Enfants Nouveau-nés, p. 541. Child still-born. Fracture of the parietal bone two inches long, external and internal cephalhæmatoma, which communicated readily with each other through the fissure.

5. Hoere, in V. Siebold's Journal, Bd. v., s. 257. Quick labour, fracture of right parietal bone ; internal and very slight external cephalhæmatoma. Head symptoms from birth, death on the fourth day.

6. Burchard, de tumore cranii recens-natorum sanguineo. Vra-

found mention of one other case, of which I have been unable to learn the particulars,* and in one instance, in addition to that related in this paper, it came under my notice, associated with slight hæ-morrhage into the cavity of the arachnoid.

The case just related, is the only instance with which I am acquainted, in which the process of cure of internal cephalhæmatoma has been witnessed. It presents, however, the closest resemblance to the method which nature follows in the cure of external cephalhæmatoma, which has been seen and described by many observers. An osseous ring surrounded the effusion, the analogue to that which in external cephalhæmatoma encircles the swelling on the outside of the skull, and which conveys to the finger the impression of the bone within its circumference being absent. It is this new formation in an early stage, which has been already described as forming a partial boundary to the upper of the two external tumours. Perhaps the absence of any such ring around the other external effusion may be accounted for by the separation of the dura mater, as well as of the

tislaviæ, 1837, 4to. Case V. is one of fissure of the parietal bone in a premature fœtus, external and internal cephalhæmatoma, death from marasmus in twenty-one days.

7. Case VI. An aperture existed in the bone, of the size of a fourpenny piece; external and internal cephalhæmatoma; death from trismus on the twenty-first day.

8. Case III. An oblong aperture in the bone, external and internal cephalhæmatoma; death in convulsions on the ninth day.

* Betschler, *Annalen*, Bd. ii., s. 50.

pericranium in that situation, and the consequent impairment of the nutrition of the bone. The bony plates deposited in the dura mater correspond to those which, in other cases, have been found in the pericranium, and at length by their coalescence having completed the transformation of the membrane into bone, have led some observers into the erroneous supposition that the effusion had taken place between the two tables of the skull.

It is fair to infer, from the perfect correspondence of the curative process in this case of internal cephalhæmatoma, with that which is known to take place when the blood is effused on the exterior of the skull, that the remaining steps of the process would have presented the same similarity, if the child's life had been prolonged. The effused blood would doubtless have become absorbed, new bone would have been deposited on the interior of the cranium, adhesion would have taken place between it and the ossified dura mater, and slight thickening of the skull would in process of time have been the only remaining trace of this extensive mischief.

While speaking of the cure of cephalhæmatoma, I may perhaps be pardoned for suggesting a doubt as to whether ossification of the pericranium covering the effusion be, as Prof. Chelius* conceives it to be, of invariable occurrence. I have twice watched the spontaneous cure of cephalhæmatoma most carefully, and found the tumour gradually diminish in

* *Medicinische Annalen*, Bd. vi., Heft 3; quoted in *Canstatt's Jahresbericht für 1842*, Bd. i., s. 452.

size, without ever presenting that sensation to the finger, like tinsel crackling under pressure, on which Chelius insists as pathognomonic of ossification of the pericranium. May not this ossification of the pericranium be an exception to the general rule, and the cure be ordinarily effected by the gradual absorption of the blood, and the return of the pericranium to its natural relations, without any alteration of its texture?

The duration of life, and the cause of the death of children who have presented effusions of this kind beneath the cranium, have been very various. Twice the child was still-born; in one instance it died on the fourth, in one on the fifth, in two on the ninth, and in two on the twenty-first day, and in one the date of death is not mentioned. In one of the two cases which have come under my notice, convulsions occurred fifteen hours after birth, and the affection terminated fatally in forty-one hours, a large quantity of blood being found after death beneath each parietal bone. In the other case, which has just been detailed to the Society, no symptom of affection of the brain appeared till the twenty-third day after birth, and death took place on the twenty-fifth.

The yielding structure of the infantile skull, with its membranous fontanelle and unossified sutures, is probably the reason why the effusion of blood upon the surface of the brain does not at first, nor invariably, cause cerebral symptoms. In the present case, the nature of the reparative processes plainly

indicates that the effusion beneath the dura mater must have existed for many days before the symptoms became apparent. It may not be easy to assign a reason for their development at the time when they did eventually come on, but the absence of symptoms in some cases of hæmorrhage into the cavity of the arachnoid in infants, or their tardy supervention long after the blood has been poured out, proves satisfactorily that this feature in the present case, though not explicable, is at least accordant with analogy.

