CASE OF ANEURISMAL DILATATION OF THE OCCIPITAL ARTERY, TREATED BY LIGATURE OF THE COMMON CAROTID.

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THE following case affords an example of arterial lesion in a very unusual situation, and presents features of interest both from an anatomical and a surgical point of view, which render it, in my opinion, worthy of a somewhat detailed record.

G. H., aged 37, carpenter, was brought to me by Dr. Felce in September, 1873. He was then suffering from a very loud pulsating *bruit* in the region of the mastoid process of the temporal bone of the left side, of the origin of which he gave the following account. Four months previously, while getting off an omnibus, he fell and struck his head against the conductor's footboard, thus causing a small scalp-wound in the parietal region, about four inches above the mastoid process. He was stunned by the blow, but soon recovered himself, had his wound dressed at a druggist's shop, and went home. On the morning after the fall, he began to notice a pulsating buzzing noise in the left ear. This was at first slight, but gradually and steadily increased in intensity, until, at the time when I saw him (four months afterwards), the sound heard through a stethoscope applied over the mastoid process resembled that made by the forcible blowing of a large pair of bellows, varying occasionally into a kind of musical whistle. It was, in fact, the loudest arterial or aneurismal *bruit* to which it has ever been my lot to listen. The noise could be heard with scarcely diminished intensity at any part of the cranium. It prevented him from sleeping at night, the sensation being aggravated when he laid his head on his pillow, and it caused him so much anxiety and annoyance as seriously to injure his health and to prevent him from following his occupation. There was no external swelling, but a faint pulsation was perceptible by the finger applied just behind the mastoid process, and it was found that pressure on this spot completely arrested the sound. It was also controlled by pressure on the common carotid artery in the neck.

The sudden appearance of these symptoms made it pretty certain that the lesion, whatever it was, had its origin in the blow which he received when he fell from the omnibus; and it seemed also clear that the occipital artery must be the vessel affected, close to the point where it emerges from the groove under the mastoid process, and where it is covered by the sterno-cleido-mastoid, splenius, and trachelo-mastoid muscles. The vessel here lying deeply against the bone, to which it is firmly bound down, might be supposed not unlikely to suffer injury from the concussion and vibration caused by a blow on the cranium three or four inches above. The diffusion of the sound over the head was doubtless due to the good conducting power of the cranial bones, and did not depend upon any injury to the vessels within; for he had never had any headache, giddiness, or other symptom of intracranial mischief.

The question of the exact condition of the diseased vessel at the time the patient came under my notice was more difficult to determine. Was it a sacculated aneurism of small size, not projecting externally on account of the resistance of the thick muscular layers by which it was covered, but, perhaps, making its way more readily inwards by causing absorption of the bone in the direction of the mastoid cells? This appeared to me to afford the most probable explanation of the symptoms. Mr. Holmes, who was kind enough to examine the patient at my request, thought the exact nature of the lesion doubtful, whether an aneurism in the strict sense of the term, or a partial laceration of the internal coats, causing some dilatation of the vessel, and the lacerated parts projecting into the stream and producing the peculiar *bruit*. He thought, however, that in any case it was an aneurism of the occipital, either formed or forming, and that the dilatation, if unchecked, would result in the formation of a sacculated aneurism.

My own view, now, judging by the light of subsequent events, is that the coats of the artery were injured by the blow, to what extent, or in what precise way, I will not undertake to specify; that the vessel became dilated in consequence; and that the loss of resiliency in its coats and the resisting character of all the surrounding structures gave rise to the very loud and remarkable *bruit*. I think, with Mr. Holmes, that, though probably not as yet actually an aneurism, it would have resulted in that condition had it not been interfered with.

The patient was admitted into St. Mary's Hospital on September 30th, 1873; and, in consequence of the complete manner in which the symptoms could be arrested by compression behind the mastoid process, the effect of direct and continuous pressure at that spot was first tried by means of an instrument contrived by Mr. Blaise, which completely

arrested the *bruit*, and which the patient was able to wear continuously without much inconvenience. This instrument was worn for six weeks, being removed occasionally to test the progress which had been made. Whenever it was removed, a faint noise began to be audible after a short time, and speedily increased in force. The result at the end of six weeks was that, when the pressure was discontinued for a day, no perceptible advantage had been gained.

I decided, therefore, with the approbation of my colleagues, to ligature the common carotid artery, and performed that operation on November 12th, 1873, in the usual way, the ligature being applied above the omohyoid muscle, and about an inch below the bifurcation. Carbolicised catgut was used for the ligature, both ends of which were cut off short. There was complete cessation of pulsation and *bruit* as soon as the ligature was tied. Some suppuration took place in the wound, which retarded his recovery, and the wound itself was afterwards very slow in healing; but with these exceptions no untoward circumstances occurred as the result of the operation.

The effect of the ligature of the main artery on the disease appeared at first all that could be desired; the symptoms being entirely arrested for three days. At the end of that time, however, he thought he noticed some return of the sound, which was also found to be faintly audible through a stethoscope. Compression behind the mastoid process was, therefore, again resorted to; and this was carefully regulated by the patient himself, whose sensations at once informed him if the instrument slipped or the pressure was insufficient. But, whenever it was discontinued, the sound was distinctly heard, though greatly modified from its original intensity. The question, therefore, arose as to how the diseased vessel was supplied with a sufficient current of blood to produce this effect—the complete obstruction of the main trunk being evidenced by the absence of all pulsation in the temporal and facial arteries of that side. Careful examination seemed to point to the ascending branch from the subclavian, the profunda cervicis, as its source. This vessel arises from the subclavian, passes backwards between the sixth and seventh cervical transverse processes, and then ascends at the back of the neck, resting on the semispinalis colli and covered by the complexus, giving off muscular branches as it goes. When it reaches the upper border of the complexus, it forms a distinct and constant anastomosis of considerable size, with a descending branch from the occipital called princeps cervicis. This branch arises very regularly from the occipital shortly after that vessel emerges from the groove beneath the mastoid process. The term “princeps cervicis” shows the importance attached by the older anatomists to this channel of communication, which probably, as this case tends to show, takes a considerable share in the establishment of the collateral circulation after ligature of the common carotid artery.

I could feel below the mastoid process the pulsation of a vessel taking this direction, and evidently communicating with the spot where the sound could be heard, for pressure upon it completely arrested the *bruit*: I concluded, therefore, that blood was conveyed through this communication into the diseased part of the occipital, and thence into the branches of that vessel on the scalp. It seemed clear that the blood must be flowing in this direction, because pressure on the occipital further on had then no effect on the sound. It was evidently important, therefore, to intercept this ascending current; and with this view, on December 17th, five weeks after the ligature of the carotid, I passed a needle transversely beneath this branch about three quarters of an inch below the seat of disease, hoping thus to obliterate it on the principle of acupuncture. The pressure of the needle, however, proved insufficient, for the patient could still hear and feel the pulsation. I, therefore, applied a twisted suture round the ends of the needle, so as to compress the vessel firmly between the needle and the skin. This seemed at first to be effectual, for there was complete cessation of the *bruit*, but in a few hours afterwards it was again slightly perceptible. I left the needle and suture *in situ*, hoping that the inflammation and swelling that would ensue might help to obliterate the vessel. On the third day, however, as there was rather free suppuration along the track of the needle, and it was causing much pain with swelling of the surrounding parts, I thought it better to remove it.

The result of this procedure was, on the whole, satisfactory, for there was a marked diminution in the pulsation; and, though the *bruit* continued to be audible through a stethoscope, it was not heard by the patient himself, and caused him no inconvenience. Under these circumstances, further interference seemed unadvisable, and treatment was discontinued, in the hope that the symptoms would remain stationary, or perhaps ultimately disappear altogether, which hope has since been fully realised.

He left the hospital on December 23rd, and a month afterwards was able to resume his ordinary work as a carpenter, which he has continued without interruption to the present time. The pulsation and

bruit slowly but steadily diminished, till, in October 1874, they ceased altogether. Since that time he has been perfectly well; and, when I last saw him (in April 1875), I could discover no trace of his disease remaining.

There is a point worthy of remark which I noticed soon after he left the hospital. I have already stated that, before I applied acupressure to the ascending branch of communication, pressure on the occipital beyond had no effect on the *bruit*. Afterwards, however, I found that the sound ceased equally when pressure was applied below, and when it was applied to the occipital beyond; thus showing, I think, that the force of the ascending current of blood through the diseased vessel had been so far diminished by the acupressure that, when free circulation through it was interrupted by pressure beyond, the sound was arrested, whereas previously the impulse of the ascending current was sufficient to produce its effect, notwithstanding the same interference with the onward flow.

It may be asked why I did not, in the first instance, tie the occipital artery in the neck, as was in fact suggested to me, instead of resorting to the apparently severer measure of ligaturing the common carotid. In the first place, I believe that ligature of the occipital would have been insufficient to cure the disease, in consequence of the free communication which that vessel has in the scalp with the temporal and posterior auricular of its own side, in addition to its anastomoses across the median line, which latter, of course, remain open in either case. Secondly, the dissection required to expose the occipital artery in the neck is one of great difficulty; it is no easy matter to find the vessel in the dead body, and in the living I believe the procedure would probably involve greater danger than the ligature of the main trunk. The occipital artery lies far from the surface, ascending along the posterior belly of the digastric muscle, and somewhat overlapped by it, covered also by the sterno-mastoid muscle and the parotid gland. It is a very difficult thing to find a vessel of that limited size in a deep dissection in the neck, especially as there are no very definite landmarks, and the artery is not very constant in its course, or in the level at which it takes its origin from the main trunk. I believe, therefore, I did right to tie the common carotid, and this conclusion appears to have been borne out by the result.

The only other alternative would have been to expose the vessel at the seat of the disease, and ligature it there. This idea I rejected, because it would have involved a division of the sterno-mastoid, splenius, and trachelo-mastoid muscles, and a search for the vessel against the under surface of the temporal and occipital bones, besides the disadvantage of applying the ligature to an unhealthy vessel. Had it been possible to expose it and secure it on both sides of the disease, this might perhaps have been the best course to pursue, but it was impracticable, because the dilated part almost certainly extended along the groove under the mastoid process, and was therefore quite out of reach.

ON CHOREAL MOVEMENTS AND CEREBELLAR RIGIDITY IN A CASE OF TUBERCULAR MENINGITIS.

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THE following case is clinically interesting, whatever the explanation may be of the rare symptoms presented. The movements this child had were exactly like those of a case of acute chorea. By merely watching the patient, no one could, I think, have supposed it was anything else. It was, indeed, for a while a case of chorea; but its pathology was unusual. I took careful notice of the movements; they were not mere tremors, nor vague starts, but movements quite indistinguishable from those of scores of patients I have seen with choreal movements. My friend Mr. G. E. Herman, who has along with me taken notes of about eighty cases of chorea, quite agreed with me in my opinion. Dr. Ferrier saw the patient with me, and he was so good as to examine the brain for me. It will be noted that no plugs were found in the vessels.

The diagnosis of tubercular meningitis in this case was made by the history. The existence of swelling of the optic disc would, I think, have shown that it was not an ordinary case of chorea.

I must say what I mean by the expression "cerebellar position", used by me in the following notes. In some cases of disease of the middle lobe of the cerebellum, the patient lies on his back, with his legs and feet extended, the latter a little turned in; the arm is acutely flexed at the elbow; the wrist is flexed, and the palm is turned

towards the front of the upper arm. The head may be thrown back. The spasm is tonic. In some cases of tumour of the middle lobe of the cerebellum, besides this permanent set of the limbs and body, there occur paroxysms of spasm very like those of ordinary traumatic tetanus.

The reader will find interesting remarks on the pathology of tubercular meningitis in Rindfleisch's work (New Sydenham Society's translation, vol. ii, p. 312). Speaking of "the tubercular degenerations of the vasa propria of the brain", he says: "These extend to the very edge of the centrum of Vieussens, causing mechanical impairments and lesions of the cortical substance, not only by obstructing the vessels, but mainly by the numerous extravasations to which they give rise." He says also: "I have a case on record in which the cortical substance around the fissure of Sylvius was in a state of 'red softening'; and this change could be readily traced to countless punctiform hemorrhages from the tuberculous blood-vessels of the brain-tissue." Rokitansky also alludes to extravasations caused by the growth of tubercle." I suppose these extravasations are the result of plugging of vessels—a now well recognised cause of the hyperæmia and extravasations of ordinary red softening.

I regret that I have not the name of the clinical clerk to whom I am indebted for the following notes. I only saw the patient twice.

W. E. B., aged 4½, was admitted February 27th, 1873. The child was supposed to be well until the morning of Christmas-day, when he had no appetite for breakfast or dinner. In the afternoon, he was put to bed. When he got up in the evening, he complained of pain in the abdomen and chest. For two or three days, he lay on his back, with his legs drawn up; or, if put on his feet to walk, "he walked about doubled up". He took very little food; the bowels were open about once in two days; his stools hard, and small in quantity. He never had any diarrhoea, and never passed any blood or slimy fæces. He was very hot, and perspired a great deal while asleep. This continued for about three weeks; then the child improved for a few days, but relapsed into the former state. He had continued ill, "on and off", ever since.

On admission, the child appeared very emaciated; abdomen flaccid and sunken. He complained of pain in the abdomen. He had not had his bowels open for eight or nine days, and had been sick for nearly a week. He was very irritable in manner.

March 5th. His mother said he had not known her since five o'clock this morning. She thought he could not see, and could not speak. His temperature this morning was 100. Chorea movements appeared during the night. Dr. Hughlings Jackson saw him in the afternoon and made the following note. "He appears to be quite insensible. The movements are now very decided; affect both sides, but left side rather more than right. Arms, face, and legs are all working, and in degree according to the order given. The most frequent movement in the face is one like a sneer on the left side." The movements were too rapid for certain computation. The left arm moved about forty-seven times in one minute, and sixty-seven times the next. In the evening, the temperature was 100.4.

March 6th. He went to sleep at 2 A.M., and had been still since. His temperature in the morning was 100.1. There is no note as to his general condition, except what is to be inferred from the statement that he ate an egg. At tea-time, the right optic disc was decidedly swollen; the veins were very dark. The left disc was almost normal, but the veins were very dark. Evening temperature, 100.15.

March 7th. Morning temperature, 100.15. He now lay quiet, and did not move. His mother reported that, except a twitter of the arms, he had not moved all day. His face was placid. Dr. Hughlings Jackson made the following note. "His two arms are now in the 'cerebellar position'; and so, I am told, they have been all day and night, except that once he moved the left downwards. The arms are tremulous; the tremor is occasional, and as if on attempt at slight movements. There is no frown on his face. His masseters are very rigid. His legs are kept straight out; feet extended (he was lying on his back). His belly is much retracted, but the abdominal wall is not stiff. He occasionally puts the left arm down slowly and vaguely, but it soon goes up again. The right arm is rigid. The elbows are kept to the side." There was no discharge from either ear. On account of movements of his eyes, ophthalmoscopic examination was impossible. The nurse said he never moved again. He died on the 9th, at ten o'clock in the morning.

Necropsy.—The child was very much emaciated. There was seen, on removing the dura mater, a large quantity of serum. At the base, there were the usual signs of tubercular meningitis. The optic nerves were imbedded in lymph. The pons, medulla, and the upper and under surfaces of the cerebellum were much affected. The lungs were crammed with very fine miliary tubercles. No tubercle was found in the liver, spleen, nor kidneys. The intestines were not opened. No cheesy