ACCOUNT OF A CASE IN WHICH
A LARGE CYST CONTAINING HYDATIDS

WAS DEVELOPED AT

THE ROOT OF THE NECK,

DEATH ENSUING FROM RUPTURE OF THE LEFT SUBCLAVIAN ARTERY.

BY

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THE following case presents so many points for consideration, in respect of the origin of the disease, its course, and unexpected result, as to render it, I believe, worthy of being brought under the notice of practical surgeons.

Henry Moore, a waterman, æt. 24, of healthy appearance, and free from any signs of scrofula, was admitted into St. Thomas's Hospital, January 14, 1851.

Nine years ago he first noticed a small, fixed lump, about the size of a pigeon's egg, rising just above the level of the left clavicle, at the outer side of the sterno-mastoid muscle. It felt firm to the touch, was painless when pressed upon, and the skin covering it was of natural appearance. It grew very slowly; and the only inconvenience the patient felt was an occasional numbness and tingling in the left arm and hand.

About a year ago he noticed that his left hand, which, in consequence of his employment, was often in the water, became more readily chilled than the right, and then remained numb for a considerable time. This led him frequently to examine the hand; and in doing so, he discovered that there was sometimes no pulse to be felt at the left wrist; and

about six months since pulsation ceased there entirely. About this period he gave up his employment as bargeman, as the exertion of using the pole brought on pain and numbness throughout the left arm.

When he came to the hospital, the tumour presented the following appearances:—Its bulk, as far as it could be defined, was about that of a hen's egg; it seemed to rise up from about the situation of the first rib, behind the left sterno-mastoid muscle and carotid sheath, having pushed these parts forwards and towards the right side, and the external jugular vein slightly backwards. Above the middle part of the clavicle the swelling was but slightly prominent, being bound down by the cervical fascia: the omo-hyoideus muscle could here be felt running obliquely across it. The most prominent part was on the median plane, about an inch above the top of the sternum: at this spot the displaced left common carotid artery could be seen pulsating, and it communicated a harsh thrilling impulse to the finger. Parallel to the artery, and between it and the inner edge of the sterno-mastoid muscle, lay a large vein, which might be made to swell up considerably by pressing just above the top of the sternum. The *pomum Adami* lay rather higher than natural, and the notch in the thyroid cartilage was more than half an inch to the right of the median plane. In no part of the tumour itself was any aneurismal pulsation, or bellows-sound, discoverable; the thrill felt above the sternum being due to the carotid artery, thrust forwards by the growth behind it; and the impulse communicated to the mass became more and more feeble as the finger was removed from the neighbourhood of this vessel. The only spot where anything like the elasticity of fluid could be detected was an inch above the left sterno-clavicular articulation, where the sterno-mastoid muscle and large anterior jugular vein, diverging from each other, seemed to leave the tumour covered only by skin and fascia.

The patient's voice was hoarse and weak, and had been so for about three months before his admission. He had no difficulty in swallowing, and the effort caused no movement

in the tumour. Not the slightest pulsation could be traced in the left arm, not even in the axillary artery; but the return of blood through the vein seemed free, as there was no œdema of the limb.

The position of the tumour, then, as far as it could be explored, was evidently behind the left carotid sheath; and it seemed probable that it had closed the subclavian artery by compressing that vessel against the first rib. With respect to the nature of the tumour, the diagnosis appeared to lie between encephaloid deposit, and a cyst containing fluid; its slow progress making the latter supposition the more probable one.

After much careful examination, it was decided that an exploratory opening should be made, and on the 25th of January a fine trochar was passed directly backwards, an inch above the left sterno-clavicular articulation, between the inner edge of the sterno-mastoid muscle and the large vein running beside it. About one drachm of clear, colourless fluid escaped, and pressure over the swelling failed to bring out any larger quantity. For several days after this puncture had been made, the harsh thrill in the left common carotid artery almost ceased; and it was thought by some who carefully examined the patient, that a very feeble pulsation could be detected in the left radial artery.

In consequence of the prevalence of erysipelas in the ward, no further operation was attempted until the 8th of March. The patient's general health meantime continued good, and he felt no inconvenience, except occasionally some obscure pain in the neck, and slight numbness in the left upper extremity. The operation was necessarily slow, in consequence of the important parts in the immediate neighbourhood of the incision, and the uncertainty existing as to the position in which some of them might be found. The incision was commenced about an inch above the left sterno-clavicular articulation, and carried upwards along the inner edge of the sterno-mastoid muscle to the extent of an inch and a half. The large vein, which afterwards proved to be an unusually developed anterior jugular, bulged into the wound so much

that, to avoid it, it was thought best to shift the position of the wound by drawing the skin a little outwards, so as to bring the incision nearly over the interval between the sternal and the clavicular portion of the sterno-mastoid muscle. The fibres of the latter having been carefully divided, part of the sterno-thyroid muscle was seen, having been brought a little out of its natural position by the pressure of the tumour. As soon as the fibres of this muscle had been separated to the same extent as those of the preceding one, a fascia-like structure was exposed, which felt elastic to the finger, as if containing fluid. A fine trochar was passed in, and a few drops of clear, colourless fluid escaped, similar in character to that which had been previously found. The knife was carried along the canula, and the fascia-like structure divided to the extent of more than half an inch. Immediately a thin membrane presented, which, on being drawn out, proved to be an empty hydatid, about the size of a marble. Another hydatid bulged into the opening, and (the nature of the swelling being thus ascertained) I passed in my finger, and found a large sac so filled with hydatids of various sizes that I could not ascertain its precise extent. I brought several of the largest cysts, some of them as large as a hen's egg, against the edge of the first rib, and broke them one after another; afterwards withdrawing the empty skins as they presented themselves at the wound. Carrying the knife upon my finger into the opening I had made into the sac, I enlarged it, directly upwards, to the extent of two or three lines, and was then able to pass my forefinger behind the sternum and along the edge of the first rib, but could not reach the bottom of the sac, where several hydatids could be felt crowded together.

In making this last incision some slight arterial bleeding occurred, apparently from some muscular branch of the sterno-mastoid in the upper angle of the wound. Pressure with the finger and thumb arrested this, and a compress and bandage were applied over the spot, to prevent its recurrence.

The patient complained much of pain during the operation, and became faint and exhausted; but as his circulation resumed its activity, the pulsation of his left radial artery became almost as distinct as that of the right.

He passed a pretty good night, and felt easy the next morning.

March 9th.—The sac still containing a large quantity of broken and entire hydatids, and blood having also escaped into its cavity, presented almost as large a swelling as before the operation. The pulse at the left wrist was rather less than it had been overnight.

On the 10th the compress was removed from the wound, and, as no farther bleeding had occurred, a poultice was applied.

11th.—Two whole hydatids, the size of pigeons' eggs, and several smaller ones, passed out of the wound to-day, together with many fragments of larger ones which had been broken at the time of the operation. An offensive sanies begins to drain away from the wound.

13th.—Two more entire hydatids, similar to those passed on the 11th, several others the size of peas, and fragments of broken ones, came away. The patient feels easy. The discharge from the wound is more copious, and, although very fetid, has more of the appearance of healthy pus.

15th.—I passed my finger this morning through the wound, so as just to enter the opening in the sac. The patient was directed to lie as much as possible in such a position as to favour the escape of the discharge.

17th.—The pus from the wound is very fetid. My little finger, passed into the sac, does not come in contact with any hydatid, but enters an empty space. No hydatids have passed out for the last four days. The patient's appetite begins to flag, and he feels low, but does not complain of much pain. He was ordered to take *Liq. Cinchonæ*, $\mathfrak{mxx}$, twice a day, and a pint of porter with his dinner.

19th.—One entire hydatid, as large as a hen's egg, passed this morning, and three burst ones about half that size. The patient feels better again, and his appetite has improved.

20th.—Two large hydatids passed to-day. The opening in the sac begins to contract, so that it only admits the tip of the little finger. Fetid sanies continues to drain away.

Nothing worthy of note in the patient's condition occurred till the—

27th (the nineteenth day after the operation), when I was sent for, at 10 a.m., in consequence of bleeding having occurred from the wound. One of the dressers happened to be near at hand when word was brought him that the patient was bleeding. A large clot had slowly forced its way out of the wound, followed by a jet of blood. Pressure was applied over the wound, and when I arrived all hæmorrhage had ceased, and only a little colourless fluid, like that from a hydatid, welled up now and then from the opening. The patient was much blanched; the sac was distended, evidently with clot; pulsation could be felt at the left wrist, but feebler than at the right. A little strip of whitish tissue, like dead cellular membrane, hung in the wound. I ordered the patient to be constantly watched, and a bladder of ice to be laid on the part.

1 p.m.—An empty hydatid (when full, the size of a hen's egg,) came away an hour ago, and no blood passed then or since; the patient described a peculiar sense of oppression—"a burden" he termed it—about the left side of the sternum, as having preceded this morning's burst of hæmorrhage. He was ordered to omit the porter, and to allay his thirst by sucking, now and then, a bit of ice.

28th.—I was sent for again at 4 a.m. A fresh burst of bleeding had taken place, and had been checked by pressure, as before. At the same time a strip of fibrous tissue, about five inches long by two in width, like sloughy fascia, passed out of the wound. This made it appear probable that the whole sac was in a state of slough, and was loosening from the surrounding textures, and that the bleeding was taking place from the various vessels destroyed in the process.

When I arrived at the bedside all bleeding had ceased. The patient was so faint that I gave him two ounces of wine. The dresser continued to watch beside him, ready to apply pressure on the first sign of clot in the wound.

9 a.m.—No more hæmorrhage. At 5 p.m. I was again summoned. A fresh jet had occurred, instantly stopped by the dresser in attendance. With but slender prospect of success, I now determined to explore just so far as to ascertain whether the blood came from any partially divided vessel at the mouth of the sac, and consequently within reach. I extended the skin-wound two inches upwards, along the sterno-mastoid muscle, and made a cut an inch long outwards from the lower end of the wound, and then cut carefully through all the clavicular portion of the sterno-mastoid muscle. The central tendon of the omo-hyoideus was thus exposed and divided, and a clear view obtained of the mouth of the wound in the sac; and along its outer edge lay a very large vein (the internal jugular). It was quite collapsed, and it was only by running the finger over it that a little blood could be made to pass along it, and its being a vein demonstrated. No aperture could be found in its wall, nor could any cut vessel be discovered.

From time to time, during this exploration, masses of broken-down and putrid clot were jerked out from the sac with great force, together with much bloody sanies, but no fresh blood flowed. Any attempt to enlarge the opening in the sac seemed out of the question; a compress was therefore laid over the wound, and a bladder of ice applied.

The patient died the following day, at 10 a.m.

29th.—Body examined four hours after death. The chest alone could be inspected. The first bone of the sternum, the left clavicle, together with the five lower cervical and three upper dorsal vertebræ, and the first two ribs on both sides, the larynx, œsophagus, aorta, and upper half of the left lung, were removed for subsequent examination. A few ounces of serum were in the cavity of the left pleura, stained by the transudation of colouring matter from the clot in the sac. There was a patch of quite recent fibrin on the outer side of the middle lobe of the left lung, and three or four slender bands of this deposit were attached to the costal pleura adjoining. There were no signs of old pleuritis anywhere, and the lung was crepitant throughout.

The larynx, trachea, and bronchi having been removed from the preparation, it required great care to dissect away the œsophagus without opening the inner wall of the hydatid sac, so closely were the two structures united. The portion of the vertebral column removed from the body, consisting of the five lower cervical and three upper dorsal vertebræ, presented a considerable curvature, the concavity being toward the left side. The sac, formed of condensed cellular tissue, was attached above to the left side of the third cervical vertebra, and thence along the median plane of the vertebral column, as far down as the lower part of the body of the second dorsal vertebra; from the latter point it passed on to the convexity of the aortic arch.

On dividing the vertebral attachment of the sac, so as to obtain a view of its interior, the fifth, sixth, and seventh cervical vertebræ were found to have undergone absorption to the extent of almost the left half of their bodies; and the corresponding portions of the second dorsal vertebra had suffered in nearly the same degree. The head and neck of the first and second ribs had likewise disappeared. The vertebral vessels were exposed at one or two points of their course through the foramina in the transverse cervical processes, and the cancellated texture of these processes laid bare, like that of the bodies of the vertebræ.

From the left side of the second dorsal vertebra the sac was traced, as above noticed, on to the convexity of the arch of the aorta; but, by careful dissection, it might be separated from the coat of this vessel as far as the outer side of the origin of the left subclavian artery. At this point, however, the sac and aorta became united by delicate vessels, and this union extended for a distance of nearly two inches onward along the arch.

The sac next came in contact with the apex of the left lung, to which it was intimately united, by fibrinous adhesion, to the extent of the palm of one's hand; no intervening layer of pleura being distinguishable. Loosely attached to the inner surface of the second rib and border of the first, the sac passed on to the internal surface of the scaleni

muscles, and so back to the transverse processes of the four lowermost cervical vertebræ, from which situation we began to trace it.

Superficial to the anterior surface of the sac ran the left common carotid artery, accompanied, when above the level of the sternum, by a very large *anterior* jugular vein, which, from its great size and relative position to the artery, had, during the patient's lifetime, been supposed to be the internal jugular. The last-mentioned vein, however, had been widely separated from the carotid artery by the pressure of the swelling, and lay to the outer side of the incision made into the sac; the carotid artery and vagus nerve skirting the inner edge of the same opening.

The scaleni muscles were found in their natural position, and the subclavian artery emerged from between them in the usual way; it seemed, however, rather smaller than natural, and, on drawing it out a little from between the muscles, it had evidently undergone constriction in that situation.

The dissection having been pursued to the extent above described, without interfering with the wound, to prevent the possibility of injuring any vessel in the neighbourhood, the interior of the sac was examined from behind, by drawing forward that portion which had been detached from the vertebræ. When cleared of the broken-down and putrid clots which filled it,¹ it presented a surface of sloughy shreds of membrane, except at the back part, where the bony structure of the vertebræ was laid bare. It was probably from this situation that the long strip of fibrous tissue had been detached, which passed out of the wound on the occasion of the burst of hæmorrhage.

The source of this hæmorrhage was now discovered. At the bottom of the sac the left subclavian artery lay exposed to the extent of nearly an inch, and exhibited a slit, about half an inch long, through which a probe passed directly into the aorta. The latter having been laid open along the concavity of its arch, the probe was seen lying in the entrance of the subclavian artery. This vessel was next

A solitary, collapsed, hydatid was found within the sac.

slit up along its outer side, from its origin almost to the point where it passed between the scaleni. Its cellular coat was so thickened, and so identified with the condensed pleura, that it was impossible to trace the bounds of each. The inner coat of the artery was everywhere entire, except at one spot, distant about three quarters of an inch from its aortic origin, where its inner wall presented a shallow oval depression, half an inch in width, the long axis parallel to the course of the artery. Along half of the circumference of this oval depression the coats of the artery had given way, so as to establish the communication above described between its cavity and that of the sac.

Although externally to the scaleni the calibre of the artery was free, and its size scarcely, if at all, less than natural, a probe could not be passed downwards to the seat of rupture; and the cause of this was now apparent. The long-continued compression of the artery between the sac of hydatids and the edge of the first rib had terminated in total obliteration of the vessel at the latter point, so that for a distance of more than half an inch it was merely a rounded cord. The vertebral and internal mammary arteries took their usual course (the latter being, perhaps, larger than natural); the thyroid axis was given off in the usual way; and about three-quarters of an inch farther on, the subclavian, having narrowed to a tube less than half a line in diameter, became entirely closed. As this closure must have been of old standing, the circulation in the left arm had probably been carried on by the anastomosis existing between the supra-scapular and subscapular arteries; but, considering the *total* absence of pulsation at the wrist for so long a time previous to the sac being opened, it is difficult to account for so distinct a pulsation having been restored immediately after the operation.

With regard to the manner in which the rupture of the subclavian artery occurred, one would rather have expected to find evidence of ulceration of its outer coat, at the point where it was laid bare by the separation of the sloughy portion of the sac, than at the corresponding spot within the

cavity of the vessel. Indeed, my first impression, on viewing the rent in its wall, was, that it had been wounded during the operation, more especially as some arterial bleeding had taken place towards its conclusion. A little examination, however, proved that this accident could not have happened. When my finger was first introduced into the opening I had made in the sac, its cavity was entirely choked up with hydatids; and it was not until several of these had been broken, in the manner above described, that the point of my finger could be brought fairly in contact with the edge of the first rib. The only enlargement of the original wound in the sac was made, as I have stated, directly upwards, in a line with the angle of the jaw, and by means of a small scalpel introduced on my finger. If we notice, on the preparation,¹ the distance between the opening in the sac and the rent in the subclavian artery, the possibility of a wound of the latter appears altogether out of the question; nor should I have alluded to it at all, but for the circumstance of arterial bleeding taking place when the opening in the sac was enlarged.

That the artery was not injured subsequently to the operation is certain; for no probe or similar instrument was ever passed into the wound, its patency being, as I thought, best ensured by passing the point of my finger into it from time to time.

The bleeding, too, which followed the last small incision was arrested by pressure, maintained for about an hour with the finger and thumb, at the mouth of the wound, and for some hours afterwards with a pad of lint. During eighteen days, broken or entire hydatids were passing out; and it was not until the nineteenth day after the operation that the fatal hæmorrhage commenced.

With the knowledge we now possess of the extent to which the disease had proceeded, there can, I think, be no doubt that the operation hastened the patient's death, by the free admission of air into the sac, and the consequent

¹ The preparation was exhibited to the Society; it is preserved in the Museum of St. Thomas's Hospital.

sloughing of its walls; but with the uncertainty which necessarily existed as to the real nature of the case, it would have been wrong to have abandoned it without an operation of some kind being attempted. Here was a cyst, containing fluid, steadily increasing in bulk, which had entirely stopped the current of blood through the subclavian artery, and was gradually impeding that through the common carotid, as well as the return of blood through the veins of the neck. The pressure on the nerves supplying the left arm had already obliged the patient to abandon his employment, and the alteration in his voice seemed to indicate an amount of pressure on the trachea, which might ultimately end in suffocation.

It seems impossible to determine with certainty the structure in which the hydatids were first developed; but if we regard the rounded pits seen here and there on the eroded surface of the vertebræ, it seems not unlikely that they may have been the original seat of the parasites, which, as they grew, would of course press on the nerves passing down to form the brachial plexus, and thus cause the tingling and numbness of the left arm and hand, which were the earliest symptoms noticed by the patient. The sheath of the left longus colli muscle, and the anterior ligaments of the cervical vertebræ, probably formed the sac at an earlier stage of the disease; condensed cellular tissue, and, ultimately, the pleura covering the apex of the left lung, together with fibrinous deposit, completed it at a later period. The pressure which had latterly been exercised upon the superior and inferior laryngeal nerves on the affected side, had, doubtless, caused the peculiar weak and hoarse tone of the patient's voice.

Microscopical examination of most of the hydatids was made as soon as they were voided. In several, of the size of pigeons' eggs, clusters of echinococcus were found, in various stages of development; but neither in the largest cyst, which was equal in bulk to a hen's egg, nor in those about the size of a pea, could any of these bodies be detected.