CASE
OF
ACUTE CARIES OF THE WALLS OF THE
TYMPANIC CAVITY,
PRODUCING
ULCERATION OF THE INTERNAL CAROTID ARTERY.

BY
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THE cavity of the tympanum is remarkable for its intimate relations with important organs. Thus, above it, lie the dura mater and the middle lobe of the cerebrum; below it is the jugular vein; in front is the internal carotid artery; and behind it are the lateral sinus and cerebellum. Internally are the portio dura nerve and the labyrinth; while through the tympanic cavity itself passes the chorda tympani nerve.

When it is borne in mind that this cavity communicates with the outer air, through the Eustachian tube, and that it is protected externally only by the delicate membrana tympani, it will not be a source of surprise that diseases of the mucous membrane of the tympanum are very prevalent, nor that, when they communicate with neighbouring structures, they frequently terminate fatally.

It is known full well that disease often extends from the tympanic walls upwards to the dura mater and cerebrum, and backwards to the lateral sinus and cerebellum; it sometimes advances downwards to the jugular vein, but it is extremely rare for the internal carotid artery to be seriously implicated. Indeed, with the exception of the case to which I shall subsequently refer, and which was cited by Professor Hewett, in his lectures at the Royal College of Surgeons, in the year 1859, I am not aware that any instance has been reported of hæmorrhage from the internal carotid artery, originating in caries of the petrous bone.

If we inquire into the cause of the rarity of ulceration of the internal carotid artery, a satisfactory answer may probably be found in the fact, that caries of the osseous walls of the tympanum is usually a chronic disease; that it commonly results from secretion being pent up in the tympanic cavity, and that this secretion accumulates in largest quantities in the middle part of the tympanum (remote from the position of the Eustachian tube and carotid canal) and presses upon the delicate upper wall of the tympanum, which easily yields. On the contrary, the case of caries of the *canalis caroticus*, already on record, and the one I am about to relate, appear to have been instances of acute disease occurring in the mucous membrane and in the bone, and wholly independent of any accumulation of secretion.

CASE.—W. C—, æt. 46, a jobbing builder, was admitted under my care at St. Mary's Hospital as an out-patient, on the 18th of August, 1859. He was sallow and thin; he had a careworn aspect; his pulse was quick and weak. He had long complained of pain in the left side of the chest, and was reported to have undergone much domestic trouble, which had undermined his health. Two years before I saw him he received a violent blow on the head, above the left ear, producing a wound which bled profusely at the time, but soon healed. Three months previous to his admission at the hospital, during a violent fit of coughing, he was

seized with intense pain in the left ear, which continued, with scarcely any intermission, to the time of my seeing him. At the expiration of a few days from the attack of pain, a copious discharge took place from the ear, which has never ceased. At the time of my seeing the patient, the discharge was of a muco-purulent character, and it had a peculiarly sickly and fetid odour, characteristic of diseased bone.

On making a careful examination, the dermis lining the meatus externus was observed to be much tumefied, and no portion of the membrana tympani could be detected. The pain which the patient most complained of was described as being situated very deep in the ear; it was constant and lancinating: he also complained of tenderness below the ear and down the neck, in the course of the large blood-vessels, where there was some degree of tumefaction.

The treatment consisted in the application of leeches below and of blisters behind the ear and at the nape of the neck, in opiate injections, and fomentations. Morphia, aconite, quinine, steel, and iodide of potassium were administered in succession, but neither local nor general treatment appeared to have the slightest effect upon the progress of the disease; the only relief that the patient obtained was when under the influence of large doses of morphia. The symptoms continued without change till the 10th of January, 1860, when the incus came away in the discharge. It did not show any signs of disease, except that the inferior extremity of its long process was rough, and the os orbiculare had disappeared. When I saw the patient on the 16th of January, he stated that during the previous two days, he had twice in the twenty-four hours observed blood of a bright-red colour to pass out of the ear for four or five minutes; in the intervals of the hæmorrhage the pain had been excessive, and the discharge copious and fetid. Upon examination, there was no appearance of blood in the tympanic cavity, the mucous membrane having a pulpy appearance. From the fact of the blood being of a bright-red colour, and from the rapidity with which it flowed from the

ear, it was evident that the internal carotid artery had become involved in the disease of the tympanum, that the blood escaped from its cavity, and, most probably, through an ulcerated opening. A consultation was accordingly held with my colleague, Mr. Ure, who proposed, should the bleeding recur, to tie the carotid artery. The patient, however, resolutely declined to become an inmate of the hospital. It was consequently decided that, if the bleeding recurred, pressure on the carotid artery, and plugging the external meatus, should be resorted to, and five-grain doses of gallic acid were administered thrice daily. The hæmorrhage returned on the following day; the plugging of the external meatus arrested it for a time, but subsequently it took place from the nose. The neck of the patient was so extremely tender, that he could not bear any pressure on the carotid.

As the patient now sent for my friend, Mr. Charles Aikin, who resided near to him, and who had attended him previous to his admission as a patient of the hospital, and as he still refused to become an in-patient, he gave up his letter, and I promised to continue my attendance as before, in conjunction with Mr. Aikin.

On the 18th of January, the hæmorrhage having recurred in considerable quantity, Mr. Lane, who was in attendance at the hospital, was called into consultation. The patient's strength was now greatly reduced by the effects of the disease, the intense and prolonged pain he had undergone, and by the loss of blood; and, it being evident that active and destructive disease was making rapid progress in the ear, all hope of benefit from the operation of tying the carotid artery was abandoned, and attention was directed to the alleviation of the pain. To this end, large doses of morphia were administered at frequent intervals, which afforded relief; slight hæmorrhage came on every eight or ten hours, and the patient gradually sank, and died on the 27th of January.

Autopsy.—Large tuberculous cavities were found in each lung.

No disease was detected in the cerebrum, cerebellum, pia mater, or dura mater.

A considerable quantity of dark-coloured purulent matter was found in the upper and anterior part of the neck ; this was continuous with an orifice in the external meatus, through which pus escaped and percolated downwards. This opening in the external meatus was situated within half an inch of the orifice : it was at the lower part, and admitted an ordinary-sized probe. The dermoid meatus was much thickened, but not ulcerated at any other part. The membrana tympani had wholly disappeared, as well as the malleus and incus ; the stapes was detached from the fenestra ovalis and from the tendon of the stapedius muscle, and was free in the tympanic cavity. The mucous membrane had been removed by ulceration from the whole of the surface of the promontory, which was bare ; and at the posterior and inner part of the tympanic cavity were small, rounded, polypoid growths, covering carious bone. The upper osseous wall of the tympanum was destroyed, and there was an orifice communicating with the middle cerebral fossa, sufficiently large to admit a small horse-bean. The upper wall of the horizontal portion of the mastoid cells was also carious, and presented numerous minute orifices. The posterior wall of the mastoid cells formed by the sulcus lateralis was also carious, and exhibited several small apertures. The lateral sinus contained a clot of fibrine, but no pus. The dura mater covering the orifices in the tympanum and mastoid cells was somewhat thicker than natural, and lymph was effused on its surface looking towards the bone. The inferior part of the anterior wall of the tympanum was almost wholly destroyed by caries, so that it and the cavity of the canalis caroticus were directly continuous by means of several large apertures ; the inner wall of the canalis caroticus was also carious. Where the internal carotid artery was in contact with the carious wall of the tympanum, it presented an aperture about two lines in diameter, through which the blood had escaped during life into the cavity of the tympanum. The borders of this aperture were soft and tumefied. The lower

wall of the tympanum, separating it from the fossa jugularis, presented several small carious orifices. The cellular structure of the petrous bone between the meatus auditorius internus and the carotid canal was soft and carious.

The question which presents itself to the mind of the Surgeon who hears the particulars of this case is—could no other steps have been taken to save the life of the patient?

Every effort that was made with the object of arresting the progress of the caries was of no avail; and there is, I think, but little doubt that, if the carotid artery had been tied with the view of arresting the hæmorrhage, the disease would have advanced, and probably with greater rapidity. Although the loss of blood doubtless hastened the death of the patient, its principal cause was the exhaustion produced by the intense pain, and by the rapid extension of the disease; and, supposing no hæmorrhage had occurred, life could scarcely have been prolonged more than a few days.

The case cited by Mr. Hewett is reported in the second volume (third series) of the '*Archives générales de Médecine*,' 1837, by M. A. Boinet, then *Interne* of the Hôtel Dieu of Paris: it is in some respects singularly analogous to the one just related. I may perhaps be permitted to give some of the leading facts. In the year 1834, a man, æt. 42, applied at the Hôtel Dieu on account of a purulent discharge from the left ear. In 1826, while tipsy, he was brought to the same hospital, having fallen from a fourth story. There was a wound at the upper and back part of the head, with a depression of the cranium. Small portions of bone were extracted, and he left the hospital after a sojourn of two months. About six years afterwards, without any known cause, noises came on in the left ear, accompanied by acute pain which extended over the head; a discharge speedily followed. Received into the Hôtel Dieu again, he was bled locally and generally, and blistered, and a seton was applied at the nape of the neck. Under this treatment the discharge diminished, and he left the hospital after a sojourn

of five months. He continued his occupations for about a year, when he again returned to the hospital, with an increase of pain and discharge. About a month after his stay in the hospital, he was seized with paralysis of the left side of the face; the other symptoms abated, and he again left the hospital, but returned at the end of two years and a half. He complained of a copious discharge from the left ear, but not of pain in the head. Two months after he had been in the hospital there was a sudden rush of red blood from the mouth, nose, and left ear; the hæmorrhage lasted for ten minutes. On the following morning the hæmorrhage recurred, and again arrested itself, without quite so much loss as on the previous day. In the evening violent hæmorrhage occurred, which it was found impossible to arrest, and the patient died from loss of blood.

Autopsy.—The substance of the brain was firm, and rather pale than otherwise. The cerebellum was healthy. The dura mater presented a slightly blackish tint at the posterior part of the petrous bone, and also at its base in front; on removing this membrane a roundish aperture, three lines in diameter, was observed in the upper surface of the petrous bone. There was also a large aperture at the lower part of the petrous bone, the whole of the jugular fossa having been destroyed. The styloid process was detached from the rest of the bone. The cochlea and the semicircular canals were laid open in parts; the orifice of the Eustachian tube and the carotid canal had completely disappeared. The mastoid cells and the mastoid process were in a natural state. The portio dura nerve, from its entrance into the aqueduct of Fallopius to its passage behind the mastoid process, was destroyed. The left sinus lateralis was almost obliterated at its lower part, while at its upper part there was a clot adhering to its surface, but without any traces of pus. The internal carotid artery, of which the coats were very thin and slightly soft, presented an ulcerated opening, about a line in diameter, at its anterior part and about the middle of its course in the temporal bone. It did not contain any clots.

A preparation from my Museum, which I lay before the Society, reveals a state of parts very analogous to that described by M. Boinet, with the exception that the disease had extended to the lateral sinus, and not upwards. The preparation was presented to me, and I regret that I am unable to give any particulars of the case, as it is very rare that so extensive disease is met with. The whole of the meatus externus and mastoid process have been removed, the styloid process detached, the entire osseous sulcus lateralis in the temporal bone absorbed, the lower wall of the tympanum destroyed, as well as the fossa jugularis, and the posterior part of the canalis caroticus.

Carious temporal bone and ulcerated internal carotid artery.