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A CASE OF PAROTIDEAN AND INTRA-TYMPANIC MALIGNANT TUMOR.

By H. KNAPP.

With notes from Drs. H. B. SANDS and A. H. BUCK of New York, and Drs. S. H. PECK and S. J. PARKER of Ithaca, N. Y.

THE rarity and importance of tumors originating in the tympanic cavity or extending to it from adjacent structures may justify the following communication of a case which, though lacking the post mortem autopsy, seems to offer no small clinical and pathological interest. The patient was under the care of several physicians besides myself, viz., Drs. H. B. Sands and A. H. Buck of New York, and Drs. S. H. Peck and S. J. Parker of Ithaca, N. Y., to whom I am indebted for the privilege of embodying in this paper the substance of more or less extensive notes which they kindly placed at my disposal.

Mr. J. H. W., æt. 37, consulted me May 7, 1877, on account of sudden deafness in his right ear. Below and in front of his right ear there was a tumor the size of a hen's egg, which he had first noticed six or seven years previously. It had increased very slowly at first, but quite perceptibly during the last six months. His left ear was affected with chronic otorrhœa, without pain or any symptoms of irritation. His right ear never discharged, and he could always hear well with it until three days before he came to me. At that time he went to bed feeling and hearing as well as ever, but on awaking the next morning, he found that he was deaf.

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682

Condition at first visit.—When the left ear was closed, he could understand ordinary speech at the distance of five feet, and hear the watch tick when in contact with the right ear, the right mastoid process or the forehead. There was no diminution of sensibility or mobility in the face or any part of the body, and his mental faculties were undisturbed.

The right membrana tympani was uniformly bluish-red, slightly convex and greatly dislocated forward. The cone of light was absent, but there was a dull roundish reflex on the posterior lower part. The malleus was seen in its ordinary direction from above-forward to below-downward, but its tip lay less deep in the canal than the short process. Neither the drumhead nor the adjacent parts of the ear-canal showed increased sensibility to the touch, and the drumhead yielded to the probe as if a soft substance, harder than liquid, were behind it.

The slow development of the pre-aural and infra-aural tumor, the pushing forward and appreciable resistance of the drumhead, together with the absence of inflammatory symptoms seemed to me evidence enough of the existence of a tumor within the tympanic cavity. The sudden occurrence of the deafness, I thought, was analagous to the sudden deafness caused by plugs of cerumen, which do not impair hearing, so long as there is the slightest chink between them and the wall of the meatus. As soon as this chink disappears, the deafness is manifest, and this is frequently observed to occur suddenly. In the same way, I imagined, the tumor in the drum cavity had grown imperceptibly, and only interfered with the hearing when it had occluded the whole cavity, or at least occupied the oval window and the niche of the round window. This event must of necessity have happened at some period in the progressive growth of the pseudo-plasm; but the sudden deafness might have been caused also by the occurrence of a serous or hemorrhagic effusion into the drum, an accessory symptom which is not infrequent in the progress of tumors occupying other parts of the body, for instance the skull or the eye.

When, the next day, I found the condition of the patient unchanged, I made an incision with a paracentesis needle into the

drum-membrane in front of and below the handle. The edges of the wound at once retracted, and through the gaping opening I saw a reddish, fleshy growth, filling the whole space behind the displaced membrana tympani. The cut-surface showed that the membrana tympani was not thickened. The incision caused no particular pain, liberated no pus, serum or blood, but gave rise to considerable hemorrhage, and did not improve the hearing. When touched with a probe the tumor gave the sensation as of a somewhat soft, fleshy mass.

Clinical diagnosis. The existence of a non-inflammatory, fleshy and vascular tumor in the tympanic cavity having been demonstrated, and for six years the development of another tumor in the parotid region having been observed, two questions presented themselves: Had these tumors any connection one with the other, and what was their nature?

As primary intra-tympanic tumors are exceedingly rare, and tumors in the parotid region are known to extend to the middle ear; furthermore, as the pre- and infra-auricular tumor had been steadily growing for at least six years, and evidences of any ear affection having been noticed only five days, I inferred that most probably I had to deal with a *primary parotidean growth, which had entered the tympanic cavity through the Glaserian fissure or its vicinity.* I further assumed that the two tumors were of the same nature, probably *adeno-chondro-sarcomatous.* This diagnosis was based upon the fact that the parotidean tumors are commonly of a complex nature: adenomatous, sarcomatous, cartilaginous, myxomatous and carcinomatous portions being frequently found together in the same specimen. The presence of myxoma appeared unlikely, as the parotidean tumor felt uniformly firm; and for carcinoma the patient was scarcely old enough.

Under this supposition I advised the patient to have the parotidean tumor removed by a skilled surgeon, and recommended Dr. H. B. Sands, whom I had seen successfully operate in similar cases. I imagined that if the supposed connection between the tumors were more than microscopical, both tumors

might be removed in the same sitting. He followed my advice, but delayed the operation. The incision which I had made in the drumhead was followed for a few days by a scanty sero-purulent discharge. On May 23d he came to me again, having had great pain in the ear the previous day and night. I found the inner half of the auditory meatus occupied by the tumor, and the walls of the outer half red, swollen and tender to the touch. I ordered warm instillations of a weak solution of carbonate of soda. During the next few days the inflammatory swelling in the outer part of the ear-canal and its surroundings was more pronounced. On May 29th the pain was relieved. An abscess had formed, and pus escaped upon pressure on the tragus. Both Dr. Sands and myself thought it advisable to delay the operation until the inflammatory symptoms had subsided. When in a few weeks this had occurred, on examination (June 20th) I found that the aural tumor filled the entire meatus, whereas there was no noticeable change in the parotidian tumor. My departure for Europe being at hand (June 23d) I advised him to let another aural surgeon in my stead take charge of his case, and proposed Dr. A. H. Buck, whom he also consulted at once.

As to the operation, Dr. Sands kindly gave me the following note :

“*June 26, 1877.* I excised the parotid tumor at the New York Hospital. A vertical incision, extending from the level of the meatus down to the lower end of the growth, measuring from three and a half to four inches in length, was made over the middle of the most prominent part of the tumor. It included only the superficial tissue. The remaining tissues were cut on a grooved director, and carefully dissected out with the fingers. The large mass was first removed, and beneath it was found a sort of a pedicle, which was also removed by careful and delicate dissection. The growth proved to be an enchondroma, covered by parotid glandular tissue externally, and firmly adherent to the digastric and other deep-seated muscles. The operation was difficult and tedious, but no large vessels or nerves were divided. After the operation no paralysis of the facial nerve could be detected, although the tumor was apparently situated beneath the parotid gland, the tissue of which was freely divided. No connection existed between the parotid and aural tumors; and with Dr. Buck's assistance I removed as much as I could of the latter by means of a

dressing forceps, having previously snapped two pieces of wire in attempting to affect removal with the "snare."

July 24, 1877. Patient remained in the hospital until a fortnight since, when he went to Ithaca. To-day he returned nearly well.

Dr. Satterthwaite, who has examined the specimen, reports that the parotid tumor is cartilaginous, the aural tumor cancerous; but Dr. Buck thinks, from an examination he has made, that the latter is also enchondromatous. (See below.)"

For the following important informations I am indebted to Dr. A. H. Buck:

"The external tumor, removed by Dr. Sands, proved to be a mixed growth (fibrous, chiefly, but in part cartilaginous and in still others, cellular). The parotid gland was found spread out over the mass in the form of a capsule, but was not involved in its growth. Very careful search was made, but at no point could any offshoot be discovered which might be looked upon as the connecting link between the outer tumor and that within the ear. One portion of the growth seemed to terminate at the tip of the stylo-mastoid process. This suggested the idea that the extension of the growth to the middle ear had perhaps taken place by way of the stylo-mastoid foramen. This could hardly have been the case, however, as there was complete absence of facial paralysis.

July 25, 1877. The external wound in the neck has almost entirely healed, and the patient is now exceedingly anxious to have an effort made to remove the aural growth. The pain in the region of the ear continues, and the tumor has increased quite perceptibly in size. By means of a curved blunt-pointed knife, made expressly for this case, I was able to cut off quite a large portion of the growth. The bleeding was active, but not profuse. The patient was entirely unconscious of pain (etherized) during the cutting operation. As soon as the bleeding had ceased, I attempted to further diminish the size of the mass by gnawing away small portions with a miniature "rongeur." After one or two seizures I was obliged to desist, as the blood poured from the ear in a continuous stream, and the bleeding showed no tendency to stop of itself. The hemorrhage was readily arrested by stuffing the ear with cotton, and applying pressure by means of a bandage passed over the head and under the jaw.

The slippery character of the masses removed (like boiled sago) was a very noticeable feature ; and when broken down, the fragments did not show the slightest trace of possessing any fibrous tissue in their composition.

The *microscopic condition* of one of these masses from thin sections made by Dr. W. H. Porter of New York, stained with carmine, and mounted in Damar varnish, was as follows : With low powers it appears that the tumor is composed in part of *round, oblong, and branching alveoli* * filled with *medium-sized cells* which have imbibed the staining material quite uniformly and abundantly. Only here and there among these cells can the outlines of a still more deeply stained nucleus be distinguished. The *interalveolar tissue* occupies fully one half of the entire specimen. It has apparently not imbibed any of the staining material, though the round and oat-shaped nucleus-like bodies, scattered quite uniformly throughout its substance, are as deeply stained as the *epithelioid* elements in the alveoli. At many spots the stained nuclei seem to be surrounded by a perfectly colorless hyaline substance, sharply limited against the contiguous inter-alveolar tissue : in other words, *cartilage cells seem to enter largely into the composition of the matrix of the tumor*. All the blood-vessels encountered are of comparatively large size, and filled with blood corpuscles. At no point can I find distinctly fibrillated connective tissue.

Later on the day of the operation a second and very unsatisfactory effort was made to diminish the size of the growth. The copiousness of the bleeding, however, again obliged me to desist.

July 26, 1877. I introduced four red-hot needles in succession into the mass, with a view of diminishing the bleeding. As soon as the rongeur was used, however, the bleeding became as active as on previous occasions. Before I had reached the middle ear in my mining operations, I thought it advisable to abstain from further interference.

Soon afterwards a large abscess developed on the side of the neck, just below the mastoid process, and the patient was again transferred to Dr. Sands."

* *Statics* by Dr. H. K.

He soon returned to Ithaca and was treated by Dr. S. H. Peck, whom he had consulted in June, 1877. Dr. Peck writes: "In my opinion there existed a connection between the tumor of the neck and the growth in the ear, and I advised non-interference. Patient seen again August 14, 1877, considerably exhausted by his journey and the operation. He complained of paroxysmal recurrence of pain and inability to rest at night, which was relieved by morphia 0.01 gr. An indurated circumscribed tumor developed beneath the auricle and increasing slowly, carried the ear outward."

Oct. 25, 1877. I saw the patient again myself in consultation with Drs. Peck, Sands, and Buck. The auricle was considerably raised by a tumor underneath and around it, the size of a man's fist. The tumor was hard, uneven, filled the meatus, and showed several fistulous openings, discharging thin pus. Facial paralysis had existed for five days. As it was evident that the temporal bone in all its parts was invaded by the pseudoplasm, and as a radical removal was impossible, we consoled the patient as well as we could, stating that another operation would be too dangerous, but that tumors are sometimes seen to exfoliate by a kind of sloughing process, and a natural cure thus be effected.

He returned to Ithaca. The remainder of his sad history may be briefly told from notes of Dr. Peck and Dr. Parker. The tumor continued to grow in every direction. When its base was six inches in diameter, the cutis began to crack, causing excoriated, secreting surfaces partaking of the character of indolent ulcers which increased with the growth of the tumor. Nine months before his death, capillary hemorrhages began to occur from the denuded surfaces, and he lost about four grams of blood at every dressing. Repeatedly, however, "profuse hemorrhages from large vessels and by jets took place, usually in the forenoon, which Dr. Parker checked in a few moments without the least difficulty by dry pulverised alum, or persulphate of iron and other dry powders on cotton lint applied to the bleeding part." The local treatment consisted of disinfectant and astringent applications; the general treatment of anodynes at night and at intervals vegetable and mineral tonics. The patient's general condition during the growth of the tumor was good, his appetite was fair and he suffered but little pain. There was no enfoliation by sloughing in the circum-aural part of the tumor, but those portions of the intra-aural growth which protruded beyond the

external meatus always decayed in a short time. Progressive emaciation accompanied the growth of the tumor, death taking place from exhaustion, September 15, 1878, fifteen months after the first operation. Post mortem refused.

Dr. Peck describes the last stage of the tumor as follows :

"At the time of death the tumor measured in circumference at the base twenty-two inches, in the antero-posterior diameter eight inches, in the vertical seven inches. Its elevation over the surface of the skull was five inches. It extended anteriorly to within half an inch from the orbit, posteriorly nearly to the occipital protuberance, superiorly to the parietal eminence, inferiorly to the angle of the lower jaw. The ear, normal in size and appearance rested upon the external surface of the tumor, being carried outward by the tumor. In general appearance the tumor presented a lobulated form, viz : a superior, middle and inferior lobe, the superior being above the ear, the middle behind, and the inferior below the ear. Mastication was slightly interfered with, simply by the weight of the tumor. No protrusion of the growth into the bucco-pharyngeal cavity was noticeable. No mental disturbance."

Remarks.—The importance of the case may justify the foregoing somewhat lengthy description. It appears that we had to deal with an extra-aural and an intra-aural tumor. A connection between the two may be assumed, but, in the primary stage at least, was not proven. The aural portion, when first come to notice, was truly intratympanic, as demonstrated by the presence and incision of the unbroken membrana tympani. The microscopic examination proved both tumors essentially of the same nature ; a chondro-sarcoma (alveolar) or a chondro-adenoma, or chondro-carcinoma. The description of Dr. Buck corresponds most nearly to that of a chondro-adenoma* Since these tumors are common in the parotid region, and the external tumor had existed six years before the internal made itself noticeable to the patient, I, for my part, consider it most probable that the external tumor was primary, and extended to the middle ear. From the description it is evident that it occupied the locality of the base of the parotid gland, and I believe

* See Paget, *Lectures Surg. Pathology*, ii. p. 201.

that it probably started from the deep-seated portions of the gland, whereas the unaffected external portions lay over it like a capsule. Yet it has to be considered that Dr. Sands mentions that the tumor apparently lay beneath the gland, and Dr. Buck explicitly states that the parotis was not involved by the growth. The deep-seated portion of the gland occupies the posterior part of the glenoid fossa which is separated from the tympanic cavity only by a thin and somewhat porous plate of bone, and connected with it even by two canals, the canal of Huguier through which the chorda tympani, and the Glaserian fissure through which the ligamentum mallei anterior and the tympanic branch of the internal maxillary artery enter the tympanic cavity. I advised the removal of the external tumor, on the supposition that in this way the pseudoplasm also had made its way into the ear, and thought as stated above, that possibly the connection was more than microscopic, in which case the aural tumor might have been removed together with the parotidean from the posterior part of the glenoid fossa. At the operation no such connection could be traced, yet the whole history of the disease makes me still adhere to the opinion that there was a connection. Let me mention in support of this supposition that for a long time the simultaneous occurrence of intra-ocular and extra-ocular tumors was referred to separate and independent centres of formation, because no connection was detected between the tumors. Yet more careful microscopic investigation discovered in almost all cases the strings of elements of the pseudoplasm through the sclerotic, sometimes, it is true, in very slender and crooked tracks; yet the communicating links were there—though they had long escaped observation—despite the fact that the melanotic sarcomas, in consequence of the natural tinting of their elements, were an unusually favorable subject for such investigations. The same condition has been frequently demonstrated in other tumors. After describing an exquisite case of enchondroma of the scapula, Virchow * says: "The propogation took place through the connective tissue, as has

* Morbid Tumors, vol. i. p. 490.

later been observed in a similar manner in other cases, and *as it is invariably and very distinctly seen in enchondromas of the soft parts.*"

The radical removal of malignant or conditionally malignant growths of the tympanic cavity either from the glenoid fossa or from the external meatus or mastoid region may be an unusually difficult surgical performance, from which, however, in appropriate cases, we ought not to shrink. By chiseling the bony walls of the meatus and the outer plate of the mastoid process away, which can be, and has at least partially been, done with safety, we gain sufficient space for manipulations in the middle ear.

The literature on malignant intra-aural tumors is scanty. It is compiled by Schwartze at the end of his paper on "A case of primary epithelial cancer of the middle ear," in the ninth volume of the *Archiv. für Ohrenheilkunde*, p. 208, etc. 1875, and in his "Pathological Anatomy of the Ear;" translated into English by G. O. Greene, p. 29, etc. 1879. It comprises nineteen cases, to which is to be added a case of primary epithelial cancer of the petrous bone by Lucaë (*Arch. für Ohrenh.*, xiv, p. 127) 1878, and the case of Delstanche (*Arch. für Ohrenh.*, xv. p. 21) 1879, though it originated in the external auditory canal. Since Schwartze gives only the bibliography of the cases with notes on some of them, it would be a thankful task critically to review them as to their origin, course, termination, nature, and treatment. Such a review, apart from its scientific value and usefulness, could scarcely fail to lead to some practical suggestions as to the operative removal or destruction by caustics and heat of these otherwise invariably fatal affections.

The parotid tumors are briefly, but very instructively described by Paget (*Lectures Surg. Path.*, i. p. 201), etc.; exhaustively, however, and with a very extensive bibliography they are treated by Virchow in his large work on tumors, in the chapter Chondromata (vol. i. p. 435, etc). In this place the old controversy as to the origin of the tumors in the region of the parotid is clearly discussed on the basis of many observations and researches, and I beg leave to quote

from it a passage bearing upon the case under consideration. On page 512, Virchow writes: "Bruns who maintains the extra-glandular origin of a part of the so-called parotid enchondromas, states that just the sub-auricular enchondromata originate in the gland. Possibly these contradictions will be solved by the demonstration that some of the enchondromas in this region are of extra-glandular, others of intra-glandular origin. This supposition is supported not only by decided statements of authors, but also by the fact that the same region is the favorite seat of subcutaneous myxomas, fibromas and kystomas. At any rate my own investigations prove beyond a doubt that the intra-glandular origin of enchondroma occurs in its most perfect type just in the salivary glands."

