

Turnbull (L.)

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OF THE

MEMBRANA TYMPANI.



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OF DISEASES OF THE EYE AND EAR OF THE HOWARD HOSPITAL, VICE PRESIDENT
OF THE MEDICAL SOCIETY OF THE STATE OF PENNSYLVANIA, ETC.

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The subject of the safe removal of foreign substances or fluids from within the cavity of the tympanum or middle ear, in cases of deafness, is one which has always attracted the attention and exercised the ingenuity of many careful observers.

These intra-tympanal substances may be, for convenience, divided, according to their nature, into three classes or groups, viz—

First. Serum, mucus, muco-pus, pus, and blood.

Second. Fibrin (semi organized), polypoid granulations and growths, and phosphatic deposits.

Third. Connective tissue, and fibrin (organized).

It is almost unnecessary to dwell upon or to state the amount of danger that the above conditions may cause, but, as we pass from the first to the third, we observe that the ratio of risk to the organ of hearing proportionately increases.

The question as to the source of these products then arises. Why are such substances found in the tympanum? Simply as the retained products of inflammation. Retained, because of their being rapidly poured out while the surrounding parts are swollen, or the Eustachian tube may be occluded, either permanently, as in stricture, or temporarily, from congestion or oedema of its mucous investment.

If we consider, for a moment, the small size

and peculiar construction of the middle ear, as well as its highly important function, we can measurably estimate the injurious influences of even a stasis of the natural secretion of the parts.

In acute "otitis media," we have, as is well-known, the pouring out of the fluid portion of the blood. It is not necessarily accompanied by aching pain, but always associated with unusual sensation and swelling.

If it should be, as is frequently the case, catarrhal, then we have what aurists generally call "otitis media plastica," or "exudativa." In the course of a few hours the intra-tympanal, as well as the tubal mucous membrane becomes swollen, the blood vessels pour out serum, which, with the extra amount of the natural secretions of the parts, completely fills up the middle ear, and sudden deafness is the result. While the patient feels a fullness in the ear or ears, unconsciously he attempts inflation by the Valsalvian method, or accidentally he forces some air into the tympanic cavity, and the fluid or semi-fluid substance therein contained becomes filled with air-bubbles, whose successive escape subsequently causes a continuous crackling sound, which is very distressing to the patient. Pain, as has been already indicated, is not always present, and was wanting in at least one-half the number of cases coming under my observation.

Such acute cases call for immediate treatment, by operative interference, and, moreover,

are also among the most successful, and yield the most brilliant results. The cure follows quickly, on the favorable prognosis, and re-ounds greatly to the skill of the aurist.

If the inflammation is of a higher grade, and the secretion assumes a purulent character, "otitis media suppurativa," mere local applications are of little avail; it becomes our duty, when the tympanum is full of pus, to provide it a means of escape. Such cases are accompanied by more swelling than those just considered, and are always accompanied by pain. If not evacuated by the surgeon, the pus may find its way through the membrana tympani, by ulcerative process.

Time is an important element, as regards the prognosis and result of such cases. Should the exudation become partly or wholly organized, there is but little hope of success from any line of treatment.

Should a small cavity like the tympanum be filled with a jelly-like mass, it can be readily imagined that the functions of the parts will be seriously interfered with, and it will become self-evident that it is of primary importance in the treatment to remove the foreign substance.

Where possible, the air-douche of Politzer may be used to dissipate fluid collections within the tympanum, the force of the sudden rush of the incoming air acting mechanically in displacing the morbid material. The Eustachian catheter may also be employed, but I have found it, in such cases, of comparatively little service, as sufficient force cannot be given to the stream of air injected, while in about two-thirds of the whole number of cases treated by the first method I have found that a few (two or three) blasts of air, from a good Politzer's bag, were sufficient at each daily sitting.

When, however, from the density, or inspissated character of the contained fluid, we find that Politzer's douche is ineffectual, we must resort to the operation of incision of the membrana tympani, and the subsequent use of the intra-tympanic catheter, by which means I have been successful in several most important cases.

At this place I will report the clinical notes of three of the most interesting and instructive cases, each treated by a somewhat different method. They were not operated upon by the myringotome, however, but with a long-handled, delicate knife, designed to make a round opening; by this expedient we are

also enabled to enlarge the incision in the membrane. This cannot be done so well by the ordinary cataract needle, especially in cases of plastic inflammation with tenacious exudation, as in "otitis media hypertrophica,"* but the needle may be conveniently used where the secretion is liquid.

The three cases which are reported will illustrate three classes, and are given in detail, not for the specialist, but for the benefit of the intelligent and well educated general practitioner, to prove that this is a legitimate and justifiable operation, which should not be neglected when the proper cases present themselves. In the second case the fact is shown that by long and careful treatment good, and even successful results may follow without using the knife or needle. It must, however, be born in mind that if the proper cases are not selected, any operation will only increase the patient's risk, without any commensurate benefit. In certain other cases, by an operative procedure the patient will have "acute otitis media" set up, which may extend to the brain and cause death. Two cases were communicated to me recently by a distinguished young surgeon. The first was a young lady with catarrhal deafness, who, by the use of "Poltzer's" air-douche and local treatment, had her hearing increased from four inches to twenty; to hasten this improvement a perforation was made, which has never healed, and the hearing not only went back to the four inches, but has become worse, in spite of all his care and treatment. The second was a young German, who was going west, and was brought for treatment; so desirous was the surgeon to hasten this case that he punctured his membrana tympani at once, with the hope of a sudden cure, but instead of cure he unfortunately lost the little hearing remaining in that ear, and had to go west, after ten days' treatment, with the wound open, and liable to take cold in it, from exposure in traveling.

Case 1.—Plastic Inflammation of the Mucous Membrane of the Middle Ear, Involving Eustachian Tubes. Removal of a Small Portion of Material by Incision of the Membrane, with Decided and Continued Improvement.

M. D., aged 22, a professional male cook in a

* For full details concerning the symptoms and general treatment of this form of ear disease, please see "Clinical Manual of Diseases of the Ear." Philada., J. B. Lippincott & Co. pp. 176-183.

large hotel, where he was exposed at all times to a heated and moist atmosphere. In March, 1875, soon after having his hair cut short, he was suddenly seized with deafness and with a filling up of his right ear and nose, as he expressed it, which gradually increased. He did not at that time apply for treatment, but in July, 1876, the humming sound became so intense that he could not sleep, and he had to give up his occupation. He was so deaf that he was unable to hear, except when spoken to in the loudest tones. He then visited the University of Pennsylvania, and was informed that he had catarrhal deafness; but finding no relief, he soon discontinued his attendance. The man employed some domestic and also quack remedies, with but little or no relief. He then applied at the Howard Hospital, March 7th, 1877, when the physician employed Politzer's air douche, and also some local remedies to his throat, etc. This treatment was continued for some time, but not much benefit resulted. From his statement, and the annoying subjective symptoms, the white or grayish spotted appearance of the membrane, and the want of the moist sounds of catarrh, I made up my mind that there was some foreign matter there that wanted removal. There was no bulging of the membrana tympani. I therefore, on March 7th, assisted by Dr. Gilmer, penetrated the membrane with a small delicate round-pointed knife, near to the foreign matter, which was in the vicinity of the handle of the malleus, and enlarged the opening downward, so as to give a free exit. There were but a few drops of very tenacious mucus forced out by the Eustachian catheter. I did not use Politzer's air douche, for fear of forcing the secretion from the orifice of the tube into the middle ear and through the perforation; nor did I syringe by filling the meatus with warm water and soap, but employed a weak solution of potash, one grain to an ounce of water, from which I found much benefit. He had considerable pain at the time, which was almost immediately relieved. He began to improve, as he stated, immediately after the operation, getting rid of that suffering and distressed feeling, and experiencing great diminution of the noises. On the 8th and 9th of March he was treated by my son, Dr. C. S. Turnbull, who found him much improved, and reintroduced the catheter, etc. On the 10th he had a return of his distress, accompanied with dizziness, which was soon relieved by the

introduction, by means of the catheter, of the vapor of chloroform. March 13th, doing very well; hearing distance, right ear, $\frac{1}{30}$ in. watch, left ear, $\frac{1}{10}$; feels so well that he wants to go to work; his hearing, for the human voice, was very much improved, but still had some irritation and swelling of his tonsils and uvula. Compound tincture of iodine and glycerine was applied to the tonsils, and a gargle for his uvula and throat. Schwartze uses alkaline (one grain of potash to an ounce of water) injections, to insure absorption of any remaining mucus, and if the tube is not freely pervious, he uses weak injections of zinc sulph., to render it so.

Case 2.—Case of Mucus in the Middle Ear, with Deafness, Removed in Part by Politzer's Air Douche, and with the Intra-tympanic Catheter.

Elizabeth L., aged twenty-four, a bright, intelligent young lady; a seamstress; residence Chester county, Pa.; single; general health good; both ears affected, but the left ear the most. The presumed cause of the deafness was cold. Has had all the diseases of childhood, but no severe disease of late. Has pain, with dryness and itching in the ears, with noises, of a crackling or snapping character. Her physician had given her medicines to drop into the ear, for the relief of the pain and noises. The meatus was found normal, no excess of cerumen, membrana tympani opaque, like a ground window glass. Left ear more opaque than the right. This opacity changed its position by the movement of her head. Eustachian tubes plugged with mucus and collapsed. This tenacious mucus extended into the middle ear, as determined by the otoscope. Hearing distance, right ear; $\frac{1}{25}$ in. watch. Left ear, $\frac{9}{25}$ in. Has chronic pharyngitis, and back of pharynx the glands were enlarged, and her voice was nasal. There are also small ulcerated spots near the orifice of the Eustachian tubes.

Treatment, November 16th, 1875, to December 6th. Astringent gargle and cleansing douche, using warm water and common salt, followed by glycerine and water. Internal, pills of sulphate of cinchonidia, three grains each, on account of pain in her head, with half drachm doses of bromide of potassium. Also elixir of valerianate of ammonia, for nervous symptoms. Local applications to the throat, excising the glands, painting them with iodine and glycerine, and sulphate of copper.

December 6. The discharge from the ulcer-

ated surface of the throat collected in the Eustachian tubes was more tenacious, and we were less able to use Politzer's air douche, which, nevertheless, increased the hearing to $\frac{3.6 \text{ in.}}{2.5 \text{ ft.}}$ in right ear, and left to $\frac{3.0 \text{ in.}}{2.5 \text{ ft.}}$. The patient then left for the country, and wrote as follows:—

December 13. "I fear I have taken cold since returning to my home, as my throat is sore, but it does not have any effect on my hearing yet, and I hope it will not, as it still continues to be better; the noises do not change much, though I think they are not quite so persistent, and not so far in the head, but more in the ear, the left ear, especially (persons cannot help admitting that I am benefited by your treatment). There is not any of that confused feeling in my head now that was there when I first came to you."

December 27. "When I wrote you last I was suffering from a cold, which increased, and remains with me yet. If I was only as well as when I left you, I should be thankful. I think my hearing still better than when I came to you. The noises are somewhat louder, but they do not annoy me so much. I am still using the medicines. There is a very unpleasant feeling of dryness in both ears; the ulcers in my throat I have been watching and trying to keep away by using what you gave me (a solution of cupri sulph.). They were in my throat first, where the Eustachian tube connects with the throat, and I could see them, by means of a mirror; allowing the sun to shine in my mouth and holding my tongue down with a spoon, I touched them with a piece of cotton moistened with the preparation you gave me. By this means I keep pretty clear of them."

I received no communication from my patient until February 14th, 1876. "I am still following your directions, having omitted but one day. Shall I continue the use of them until I return to the city? My hearing is about the same as when I wrote you last; the noises are pretty loud in the left ear." I directed her not to return until mild weather. She came on in July. After a week's treatment I noted the Eustachian tube on right side was swollen at its orifice, and was plugged with mucus. Inflation with the catheter and balloon improved the hearing distance on that side to $\frac{3 \text{ in.}}{2.5 \text{ ft.}}$. The hearing continued to improve by inflation, with now and then application of electricity to the tubes. Both membrana tympani are sunken, and the tinnitus in right was diminished by

drawing, with Siegle's pneumatic otoscope, the membrane outward.

After continuing the treatment for some time, the result did not satisfy me, so I resorted to the intra-tympanic catheter, and with a closely-fitting brass syringe, withdrew a plug of mucus, much to the patient's relief and my own satisfaction. She states that the noises are so much less that they no longer annoy her. The hearing distance is now up to $\frac{5}{2.5} \text{ ft.}$ right; left $\frac{5.5}{2.5} \text{ ft.}$. There is also more moisture in the ear and it feels more comfortable. Both membrana tympani look better, both in position and color. She was directed to take tonics, good diet, and cod-liver oil, which she states have acted like a charm; was also directed to avoid cold feet or exposure to draughts of air.

Case 3.—Case of Perforation of Membrana Tympani Following an Acute Attack of "Otitis Media Catarrhalis," the Perforation Remaining Open Six Months After.

F. M. T., aged twenty-two years, student. Resides in Connecticut; single; both father and mother living, but has lost two brothers with phthisis, and the mother's family more than one member by the same disease. General health good; robust. The patient is well developed, yet subject to cold, followed by a bronchial cough. The ear most affected is the right; presumed cause, influenza. This was followed by intense pain, fever, bulging of the membrane, and blowing noises. Treatment, acute stage; pain relieved by hypodermic of morphine; leeching, hot water application, with Politzer's air-douche, to inflate the middle ear, and ultimately puncture of membrana tympani, with discharge of muco-purulent secretion for some weeks; by the use of mild astringents, and cleanliness, the discharge diminished, so as not to be at all offensive, but is sometimes troublesome, and if neglected the hearing becomes diminished on that side. Six months after, membrana tympani opaque, cicatricial tissue, with small, irregular perforation along the handle of the malleus. By force, air passes through the perforation, with a whistling noise. The right Eustachian tube is obstructed, so that the patient cannot inflate it, on account of mucous plugs, etc. Right ear hearing distance, $\frac{5 \text{ in.}}{2.5 \text{ ft. watch}}$. Left ear, $\frac{2.5 \text{ in.}}{2.5 \text{ ft.}}$. By careful treatment, cleansing the ear with a solution of bicarbonate of soda in warm water, and inflating the ear by means

of Politzer's air-douche, the hearing was increased to double the distance; also, by the use of an artificial membrane and a solution of zinc sulphate, the ear has assumed a much improved character, but, owing to the tuberculous tendency of the patient, it is difficult to heal the perforation.

It should be remembered that a thickened condition of the membrana tympani, which prevents its vibration to sound, may also involve the whole mucous membrane of the middle ear, or may extend still deeper, and include the membranes of the fenestræ.

Perfect closure of the Eustachian tubes would be a true indication for this operation, but, unfortunately, this condition is very rare. I have met with only a few such cases in many years of practice, these being generally produced by syphilis or small-pox.*

One of the most difficult conditions, after an operation, is to keep the opening patent, if the opening be in a healthy membrana tympani.

In the last edition of the work of Von Trölsch,† he gives the report of the following modification of the operation.

"In one case I have tried the following method, with a view of securing a permanent opening in the drumhead: I cut out a triangular flap with my paracentesis needle, the base of the flap being above. This flap I folded back, and

* A case of this kind is reported in the author's work, pp. 224, 337. Philada., 1875. There is also one, by Lindenbaum, in *Archiv für Ohrenheilkunde*, pp. 295, *et seq.*

† Von Trölsch, "Lehrbuch der Ohrenheilkunde." Leipzig, 1877. pp. 413.

pressed against the drumhead, which I had scarified. The flap united to the membrane in healing. The opening had not decreased at the end of two weeks, when I lost sight of the patient. I think this method worthy of a fair trial. Repeated puncturing of the flap, and of that part of the membrana tympani to which it is fastened, would, perhaps, ensure the result aimed at."

The pain of the operation of perforation is, for the time, sharp, but is usually of very short duration. In a few cases the operation has been followed by severe inflammatory symptoms. It must not be hastily concluded that the patient is permanently relieved after the operation. As relapses are apt to occur, the patient should be kept under observation for some time; many clinical histories are incomplete on this account.

Conclusions.—Since publishing my views, on p. 242, in my manual, in which I state that "the author has resorted to the operation of puncturing, incising, or making a flap in the membrana tympani, in chronic cases of catarrh of the tympanum, I find so far my success has not been what I could have wished." By a happy combination of operative procedure with the use of Politzer's air-douche, solutions of various strengths of caustic potash, to soften the secretion, the careful use of the intra-tympanic catheter, and above all in importance, the proper selection of cases, and the use of the spray of carbolic acid, to prevent suppuration and entrance of septic matter into the middle ear, my success has been much more satisfactory.

