Novel Methods of Treating Diseases of the Middle Ear.

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NOVEL METHODS OF TREATING DISEASES OF THE MIDDLE EAR.

In diseases of the middle ear, attended with increased and perverted secretions, the surgeon often feels the need of methods more effectual than the old ones for evacuating this cavity. Serum and mucus may be absorbed if they are not too abundant, but in frequently recurring attacks of sub-acute inflammation, such as occur in persons subject to naso-pharyngeal catarrh, nervous coryza, etc., the secretions are so profuse, and attacks follow each other in such rapid succession, at certain seasons, that the middle ears contain mucus for periods of considerable length. Absorption may not occur after one attack before another supervenes. Unless these secretions can be removed, progress toward recovery is impeded, and the hearing is seriously impaired.

Instead of relying solely on the old methods of evacuation by injections into the middle ear, paracentesis of the membrana tympani and inflation, I have employed a treatment so simple that patients may practice it unaided. I have never seen such a method published, but I believe that its beneficial effects in a large class of cases entitle it to a place in aural therapeutics. This method is the reverse of the Valsalvian experiment. The patient closes the mouth and nostrils and exhausts the air in the naso-pharynx by a strong inspiratory act. This causes the ejection of the column of air and the secretions from the Eustachian tube and tympanum into the pharynx. The success of this practice becomes apparent in several ways. On evacuating the middle ear one experiences at first the subjective sound of rushing air, followed by the sensation of a movement

inward of the drum head and ossicula. These sensations are accompanied with crackling sounds, comparable to fine mucous râles. After the discharge has entered the throat it may be seen on inspection with the rhinoscopic mirror, and sometimes without it, covering that portion of the wall of the pharynx corresponding to the side with the affected ear, if but one ear is diseased. When the patient clears the throat the evacuated secretions are forced into view upon the column of the fauces. Sometimes after expectorating the discharge a peculiar, disagreeable taste is left on the tongue. It has been compared to a metallic taste, when I have found a mixture of mucus and pus escaping from the tube. After removing the discharge the patient is directed to swallow, or practice the Valsalvian experiment, whereupon the air re-enters the middle ear and restores the equilibrium of atmospheric pressure on both sides of the drum head. A sense of relief from pressure, and increased hearing distance, follow. One should not inflate the middle ear too soon after practicing this method, else the tube and tympanum may not be emptied completely, and the entrance of air through the tube may force some remaining fluids back into the tympanic cavity, where they will be retained until the next treatment. That the discharge does not emanate from the nasal cavities is apparent from the rhinoscopic examination, and from the fact that it occurs when there is no concomitant naso-pharyngeal catarrh, and the peculiar taste is experienced only after each evacuation of the ear. When the contents of the tympanum are of too great consistence, or too tenacious, to pass readily through the tube, we may liquefy them by injections of warm water solutions of salt or soda, so as to render their expulsion possible.

There are cases in which this method is impracticable owing to resistance in the tube. Its walls may participate in the tympanic inflammation and be-

come so swelled as to close the passage into the middle ear, or the walls of the tube may be agglutinated together by adhesive secretions. Yet after ineffectual attempts, success has often rewarded repeated efforts, and a threatened rupture of the membrana tympani has been averted. A short, spasmodic effort may not suffice, when an inspiratory act, prolonged for the space of five or ten seconds, may succeed. If it does not, the surgeon may diminish the resistance to the passage of air through the tube by the use of astringent Eustachian bougies, or washes, when the occlusion is due to swelling of the walls. When the stoppage is attributable to the presence of secretions, the following method may be resorted to: A vulcanite syringe may be introduced into the Eustachian catheter *in situ*. Gentle traction may be exerted with the piston rod so as to suck the contents of the tube into the catheter. By this means the tympanic cavity, as well as the tube, may be emptied. The curve of the distal extremity of the catheter should be so adjusted that the axis of the beak shall correspond to that of the tube. Otherwise the part of the tube impinged upon might be drawn into the opening of the catheter, which would prevent the escape of fluids and occasion some irritation. The syringe should be easily manageable with the thumb and fingers of one hand, and the piston should fit the cylinder perfectly, to insure success. A Politzer air balloon, without a valve, may be substituted for the syringe. The air bag, exhausted by compression, may be applied to the catheter and allowed to expand, thus causing a vacuum in the catheter, to fill which the secretions vacate the tube. After resistance in the tube has been overcome by this means the more simple method will probably succeed.

When the inflammatory process extends to the mastoid antrum and cells, and they are filling with secretions, it will be readily seen how much more rational these methods are than that of inflation.

The latter practice forces the discharges in the direction of the mastoid cells, while the methods which I propose withdraw them from that locality. Indeed, when there is no concurrent mastoid disease, it need not be emphasized that the act of forcing the unhealthy secretions from the tympanum into the healthy mastoid cells is performed at the risk of inducing a grave complication. Either of the methods I propose is easily practiced, the one by the patient himself, the other by any surgeon who has had some experience in manipulating the Eustachian catheter.

The first method is also applicable to a different class of cases from those previously mentioned. It is serviceable in chronic catarrhal inflammation of the middle ear with proliferation of the mucous tissue, bands of adhesion between the tympanic walls and the ossicles, partial anchylosis in the chain of bones and retraction of the membrane. By repeatedly alternating this method with the Valsalvian or the Politzer method of inflation, the air is alternately rarefied and condensed in the middle ear. The effect of this practice is to cause, by rarefaction a movement inward of the drum head and motion in the articulations of the ossicles with each other, and of the foot-plate of the stapes in the fenestra ovalis; and, by condensation, the reverse movement. It is evident that by this means the bands of adhesion are stretched, and perhaps divided, and stiffness of the joints is prevented or modified. I employ this treatment on the principle that motion prevents or overcomes anchylosis, as one sees demonstrated frequently in general surgery. It has an advantage over other methods in that patients are able to practice it unaided by a surgeon, and catheterism can be omitted. These are important considerations in the treatment of sensitive and fastidious or indigent patients. If they are unable to inflate the middle ear by the Valsalvian method, they can be instructed in the use of the air baloon. I have observed the hear-

ing distance rapidly increase when no other treatment than this passive motion was employed. It is apparent that as the freedom of motion is restored in the sound-conducting apparatus it becomes possible for it to respond to sound waves, to the vibrations of which it was not before susceptible.

When this method is not successful, on account of an impermeable tube, I have resorted to another device which does not depend for its success on the condition of the Eustachian tube. I use a rubber tube of suitable calibre and length to fit into the patient's external auditory canal and extend to the mouth. By alternately rarefying and condensing the air in the external meatus he obtains the same movements in the conducting apparatus as were performed in the former experiment. To accomplish the same object I use Siegle's pneumatic otoscope. The advantage of this instrument is that the surgeon inspects the drum head during the treatment, and ascertains the degree of its mobility.

In closing, I will briefly describe one other method of treatment, which I have never known any other surgeon to use. I employ it for the purpose of applying various medicinal solutions to the walls of the external auditory meatus, tympanic cavity and Eustachian tube, without the aid of the Eustachian catheter. If the middle ear is discharging pus through the perforated membrana tympani into the external meatus, these cavities are thoroughly cleansed. Then, the patient's head being inclined to the opposite shoulder, the meatus is filled with the warm solution. The patient is then directed to exhaust the air of the middle ear by practicing the experiment I have already described. This effects the evacuation of the fluid in the external meatus through the middle ear and Eustachian tube into the nose or throat. In those cases where the Eustachian tube is patulous this is accomplished with little effort by the patient,

and the tympanum and tube are thoroughly treated. In this manner I have used solutions of boracic acid, zinc sulphate, carbolic acid, mercuric bichloride, etc., with the happiest results.

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