

[This case is certainly remarkable. Were it not for the eminence and acknowledged skill of the reporter, one might be inclined to suspect that a neurotic element may have been present and that hysteria and suggestion entered into the symptoms and the cure.—Ed.]

OTOLOGY.

UNDER THE CHARGE OF

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Regional Anæsthesia of the External Auditory Canal.—P. LAVAL (*Archiv f. Ohrenheilkunde*, Band lxiv., Heft 2 and 3), on the recently published experiments of von Eiken on local anæsthesia of the external auditory canal, with secondary anæsthetic effect upon the middle ear permitting removal of the ossicles, has led the writer to publish his own experiments, made by a similar method, independent of those of von Eiken's in the past summer in this field of work and since successively repeated.

Since the previously proposed methods of local anæsthesia had proved inadequate for special reasons, the Schleich infiltration anæsthesia limiting the space anæsthetized by wheal formation, the ethyl chloride anæsthesia being hardly applicable on account of the severe after-pains, and the higher per cent. solutions of cocaine having proved ineffectual, the writer adopted the method of regional anæsthesia by injections along the course of the nerves supplying the external auditory canal, the procedure being, therefore, an application of Oherst's original method for anæsthetizing fingers and toes, developed in later years by Braun.

The field of operation in the external canal and middle ear is supplied by three nerve trunks with sensory fibres, whose anatomical relationships were determined by successive comparative dissections in three cadavers.

Anteriorly the nervous meatus acustici externi enters a branch of the auriculotemporalis with two or three fibres to the external auditory canal, then it breaks through the fibrocartilaginous part close to the lateral part of the osseous canal, in order to ramify inward and outward in the fibrocartilaginous canal. Its outer limits of ramification lie close behind the crest of the tragus, inward it takes part in the innervation of the drum membrane. Similarly situated is the ramus auricularis vagi, which passes through the canaliculus mastoideus laterally from the os tympanicum to the fibromembranous canal and divides into two branches. It supplies the posterior wall, the greater part of the drum membrane, and a zone about 0.5 cm. broad and applies itself half-moon shaped in the cavum conchæ to the entrance of the external auditory canal. The

third nerve is a branch of the nervous auricularis magnus, which ascends with greater regularity from below to the sternocleidomastoid muscle, running subcutaneously in the axis of the antitragus to the posterior surface of the concha, and there dividing into several branches, distributing itself in the region of the cauda helix to the lateral surface of the auricle. It supplies a part of the concha, lying below a line drawn horizontally through the tragus, as well as the lobulus, with sensory fibres, but on the posterior surface the line lies about 1 cm. lower.

In the greater number of operations, in the region of the external auditory canal, only the first two named nerves come into consideration, though there were cases in which a painless operation could be assured only by anesthetizing the third nerve also.

In seeking the anterior branches it is possible to injure the temporal artery, the auriculotemporalis nerve, the capsule of the maxillary joint, and the parotid gland. However, if the mouth of the patient is opened as widely as possible the first two named organs sink deeper inward, together with their surrounding fatty tissue, as is easily demonstrable on the cadaver, and as can be tacitly appreciated by pressure in the groove in front of the tragus in the living subject, the folds of the capsule of the joint being tightly stretched and the parotid gland with the ascending maxillary branch being thrown forward. The facial nerve need not be considered, since it runs at the lower end of the external auditory canal, and the canal itself is avoided in the anterior as well as in the posterior injection by pulling the auricle upward and backward.

After disinfection and anesthetizing the outer skin with a spray of ethyl chloride, the needle of a Pravaz syringe is inserted about 0.5 cm. in front of the tragus at the height of and in the direction of the floor of the external auditory canal perpendicularly to a depth of 1.5 cm., the injection fluid being made to flow during this process by constant pressure, the whole amount injected being 0.5 cm. The mouth should be widely opened and the auricle fixed by a gentle pull on the lobule. Where it is possible to open the mouth only partial rotation of the jaw toward the opposite articulation in the vertical axis will produce a compensating effect. The branch of the vagus is reached at the height of the canal by gently pulling the concha outward and forward and going in about 1 cm. in depth perpendicularly, close behind the fold of the auricle, between the cartilage and the bone of the mastoid process. From the same puncture opening, when necessary, the branch of the auricularis magnus can easily be reached, the needle, which is not completely removed from the puncture channel after injection, being pushed close under the skin about 1.5 cm. parallel to the posterior auricular fold forward and downward, and the final injection made into the subcutaneous adipose tissue close behind the lobule.

For all three injections 0.5 cm. of the solution is sufficient. Laval found that this quantity of fluid saturated the loose adipose and connective tissue through an area equivalent in extent to the size of a large cherry, and by bilateral injection of two cadavers with a weak watery solution of methylene blue, demonstrated that the nerve trunk was washed by the fluid to a great extent. In very fat individuals, in order to make sure, the dose should be increased to 0.75 cm.

The fluid used for injection in the clinical experiments was a solution of Braun's cocaine suprarenal tablets dissolved in 1 cm. of distilled

water. Each tablet contained cocaine muriate, 0.01; suprarenal borate, 0.00013, and sodium chlorate, 0.009, the result being a 1 per cent. solution of cocaine, the addition of 1 cm. of salt solution affording the equivalent of 0.5 per cent. solution of cocaine in physiological salt solution. In the first experiments a weaker solution only was used, but in the case of a strong thirty-five-year-old man, it did not diminish the sensibility, and the writer has since then favored the 1 per cent. solution for men, and for women and children the weaker 0.5 per cent. solution. The anesthesia begins in about five minutes and lasts usually fifteen to twenty minutes; in one case, a girl, aged eighteen years, it lasted over three-quarters of an hour. In all cases the injection, as well as the operation of puncture, was painless and no evidences of cocaine intoxication were observed. As to after-pain, aside from slight sensitiveness of the place of injection for some time after the operation, there was no reported complaint on the part of any of the patients.

In the summer of 1902, 10 or 11 cases were operated upon under anesthesia and 4 more in the following winter. The majority of the operations consisted in incision and curetting of furuncles in the canal. Of these, 1 is worthy of notice, a case in which a furuncle became an extensive abscess, completely closing the entrance to the canal and extending about 1 cm. downward in the *cavum conchæ*. By the third injection at the posterior point of puncture, the writer succeeded in anesthetizing the lower half of the auricle, made a long incision, and curetted without causing pain. In 2 cases there were polypoid granulations about the size of peas, one from the edge of a deep ulcer, the other, with total defect of the drum membrane, resting on the posterior inferior part of the carious annulus tympanicus. A case of carcinoma of the canal in a man, aged about forty years, was of especial interest. The suspicious tumor, half the size of a pea, rested posteriorly and inferiorly on the lateral border of the middle third of the external auditory canal. The tumor was completely removed by an oval incision, including a strip of normal skin, then elevated from the bone and removed with forceps without causing pain. The result of the histological examination gave indications for radical operation. Close to the tumor there was total defect of the drum membrane, the malleus lying free, and cholesteatoma of the mastoid process, the middle ear being epidermatized. The tactile examination of the usually sensitive medial wall and attic of the middle ear by means of a probe, and even a relatively strong pull on the malleus, were unaccompanied by pain. It is to be assumed that, during the ten years' suppuration in this latter case, the nerves of the plexus tympanicus had degenerated and had been vicariously replaced by fibres of the nerves of the canal.

The result attained in these cases has led the writer to use local anesthesia of the external auditory canal in incising the drum and in extraction of the malleus and incus. In the latter operation the anesthesia failed of full effect, but a diminution of sensibility was observed in incising the drumhead, and once, according to the statement of the patient, it was completely painless. The mucous membrane layer of the drumhead obtains its sensory fibres from the plexus tympanicus, and these are not reached by the injection.

The results show the usefulness of local anesthesia in the important field of the surgery of the external auditory canal. Furunculosis, which well demands the use of the method in the paramount number of cases,

can be painlessly treated, and, on that account, more thoroughly than without local anæsthesia. Small tumors, even of malignant nature, as one case showed, can be easily and completely removed.

If the inflammatory and painful area extends, as in one case, into the lower part of the cavum conchæ, the author recommends, in addition to the typical injection before and behind the canal, the one below the concha. This latter injection alone being sufficient to permit operations upon the lobule without sensation of pain.

PATHOLOGY AND BACTERIOLOGY.

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Racial Differences in Strains of Typhoid Bacillus, and the Inhibiting Substances in Serum and Their Importance for the Gruber-Widal Reaction.—FALTA and NOEGGERATH (*Deut. Arch. f. klin. Med.*, 1905, Band lxxdiii. p. 150), in their work upon the agglutination of typhoid bacilli, bring out certain important points bearing upon the practical application of the Gruber-Widal reaction. From their investigations they conclude that the delayed agglutination or complete failure of agglutinations of the serum of certain cases of typhoid fever is to be explained in the first place by the fact that the strains of typhoid bacilli used for the reaction are only slightly agglutinable for that particular serum. This error may be rectified by using many types of typhoid bacilli. Substances which inhibit agglutination are frequently found in fresh human and animal typhoid serum. Often they may be demonstrable for the first time toward the end of an attack, though sometimes they are entirely absent. These substances are not identical with the proagglutinoids of Eisenberg and Volk, but are more nearly allied to some of the by-products of the thermolabile agglutinins of Joos. When they are present in large amounts they may give the false impression of a negative reaction.

Contribution to Our Knowledge of the Anticoagulating Substances of the Blood and Tissues.—CONRADI has demonstrated that the juice expressed from the organs and tissues of animals accelerates in an extraordinary way the coagulation of blood, while autolysis of the organs gives rise to substances which retard or suspend coagulation.