injection in nervous patients the site of the initial puncture may be deadened by projecting an ethyl chloride spray upon it.

At the conclusion of the operation a mixture of boracic acid and anæsthesin in equal parts is dusted over the area. This effectually obviates the pain which was found to ensue about an hour afterwards, and moreover, by absorbing exuded blood, tends to prevent the establishment of discharge in dry cases.

As regards the dangers of the method, none need be anticipated. Slight headache and palpitation have been complained of by some patients, but these seem to be the only discomforts incidental to the method, and are probably due to the effect of the suprarenal solution.

LOCAL ANÆSTHESIA FOR AURAL OPERATIONS, WITH SPECIAL REFERENCE TO DR. NEUMANN'S METHOD.[1]

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Mr. Seymour Jones has described in detail the method of carrying out the local anæsthesia according to Dr. Neumann. I only intend to give here my own personal experience of this method, to draw attention to some of the difficulties which I have met with; and, lastly, to make a few observations based on experiments undertaken on fresh temporal bones for the purpose of demonstrating where the fluid goes to after being injected under the periosteum of the auditory meatus.

As regards my experience of the method, owing to my return to Scotland being so recent, I am not able to bring forward a large series of cases on which this method has been tried. But I think the number will be sufficient, along with those mentioned by Mr. Jones, to prove that the claims of Dr. Neumann, namely, that complete anæsthesia is produced on the walls of the external meatus on the tympanic membrane and other walls of the tympanum, are justified.

For purposes of producing anæsthesia in the ear I have used Dr. Neumann's method twelve times; three times for ossiculectomy and removal of the external attic wall, three times for removal of aural polypi, once to allow of dissecting a skin web out of the external auditory meatus, and five times for paracentesis of the tympanic

[1] Communicated to the Otological Society of the United Kingdom, June 3, 1905.

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membrane and other small intra-tympanic operations. With only one exception the result was most satisfactory. In no case was more than one syringeful, *i. e.*, 10 minims, injected, and in several cases 6 to 8 minims sufficed. In one case where ossiculectomy with chiselling away of the external attic wall was performed, the injection at the postero-superior angle of the meatus of 10 minims gave half an hour's anæsthesia. In every case where I succeeded in carrying out the method, the sensation of pain was completely absent. Patients, however, complained somewhat of crunching noises, or the vibrations of chiselling. In one case, in which a radical mastoid had been performed, I injected 10 minims of the cocaine and adrenalin solution in order to try and produce anæsthesia, so as to allow of scraping of the inner wall of the cavity. The anæsthesia produced was not so complete as in the other cases, because the injection of the fluid could not be carried out so effectively, owing to the changed conditions. An advantage is, of course, the absence of excessive bleeding, so that the parts are freely visible during operation.

I would like to mention that I have tried this method very successfully in operations on the nasal septum and the inferior turbinals, and I am sure that anæsthesia so obtained is much better than after the application of cocaine and adrenalin to the mucous membrane.

Dealing with the difficulties met with in performing the injection, I confess to having found the technique rather difficult in some cases. The great difficulty is in keeping the point of the needle under the periosteum. One is very apt to push the needle through the cutaneous periosteal layer into the lumen of the canal. This difficulty is increased by certain peculiarities in the external auditory meatus, to which I attribute the cause of my one failure to inject the fluid. In this case the cartilaginous meatus was very narrow, whilst the osseous meatus was very wide. The superior osseous wall arched sharply upwards and inwards. For this reason, after piercing the skin over the cartilaginous meatus, it was difficult to avoid repiercing the skin over the osseous meatus, so that the point of the needle projected into the lumen of the canal. In addition to this difficulty the cutaneous periosteal layer in this case was extremely thin and friable, so that it tore away readily on inserting the needle underneath it.

Wishing to find out, if possible, where the fluid injected in this manner made its way to, I have injected one or two temporal bones in the fresh state with a solution of methylene blue. The

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injection was made, in a similar manner as described, at the junction of cartilaginous and osseous parts of the meatus. Here are three temporal bones so treated. In the first only a few drops were injected. In the second and third at least 20 minims were used, but a considerable quantity was lost owing to its escape outwards along the path made by the needle, the tissues in the dead state having lost a great deal of their elasticity and so failing to grasp the needle tightly enough. As far as I could make out by a study of these specimens immediately after injection, the fluid on coming to the Rivinian segment is split up into two streams. One is directed downwards in the meshes of the middle layer of the tympanic membrane and flows under the muco-periosteal layer lining the floor of the tympanum. The other stream is directed upwards under the muco-periosteal layer of the external wall of the attic, over the roof of the attic, and diffuses itself over the inner wall of the the tympanum, there to meet the stream which has passed along the floor of the tympanum. In addition, as you will see, the fluid diffuses itself along the aditus into the antrum and mastoid cells. The question is, does the fluid flow under the muco-periosteum, or does it simply burst through this not very resistant layer, say at the membrana flaccida, and spread over the cavities I have mentioned? These specimens, I am afraid, prove definitely neither one nor the other, but a careful examination and section of the bones immediately after injection proved to my own satisfaction that the fluid burrows its way underneath the muco-periosteum and floats it off the bony surface. The results of these experiments gave me the idea that perhaps the injection of various medicaments in adhesive catarrhal or sclerotic conditions of the middle ear might have a more beneficial effect than when injected through the Eustachian tube. The fluid would be absorbed directly by the vessels of the parts, and the local action would probably be more efficient. The action of potassium iodide or iodine in specific disease of the labyrinth might, if applied in this manner, lead to more encouraging results. In order to test the utility of this, I have injected, in a case of otosclerosis of a very pronounced character, 10 minims of a half per cent. solution of nitrate of pilocarpin. As to the result I cannot at present say much, only that it is encouraging enough to lead me to pursue my experiments.

Mr. Jones and I are indebted to Dr. Neumann, of Vienna, for opportunities of trying this method of producing local anæsthesia in Professor Politzer's clinique.

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