

SURGERY IN OTOSCLEROSIS WITH A REFERENCE TO SUCCESSFUL FENESTRATION OF THE STAPES FOOTPLATE

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The earliest operations for otosclerosis since the introduction of aseptic surgery have been credited to a German otologist, Kessel, who in 1876 removed the tympanic membrane, incus and malleus; the results were not encouraging. Boucheron (1888) and Miot (1890) were the first to perform stapes mobilization, but the operation was abandoned because it was thought to be both useless and harmful. The principles and technique of the fenestration operation were mainly developed by Hölmgren (1916), Barany (1924) and Sourdille (1932), from whose work Lempert devised the present-day one-stage operation for fenestration of the lateral semi-circular canal. The results of this operation have been good, and it was the basis of the accepted method of surgical treatment of otosclerotic deafness until 1952, when Rosen¹ published a report which revived interest in stapes mobilization. The results of Rosen's operation and subsequent modifications, including fenestration of the stapes, have been very encouraging.

It is with reference to this operation of fenestration of the footplate of the stapes that the following case is reported:

CASE REPORT

H.R., Coloured male aged 30 years, attended the out-patient department of the Livingstone Hospital on 4 August 1958. Ever since commencing work as a garage attendant 8 years previously, he had noticed a gradual deterioration in his hearing. More recently he had developed noises in the ears. His previous history and family history were negative.

He was found to be an intelligent man, speaking in a soft voice. On general examination no abnormality was detected. Both tympanic membranes were normal and mobile. Weber's sign equivocal. Rinnie's sign negative in both ears. Air conduction

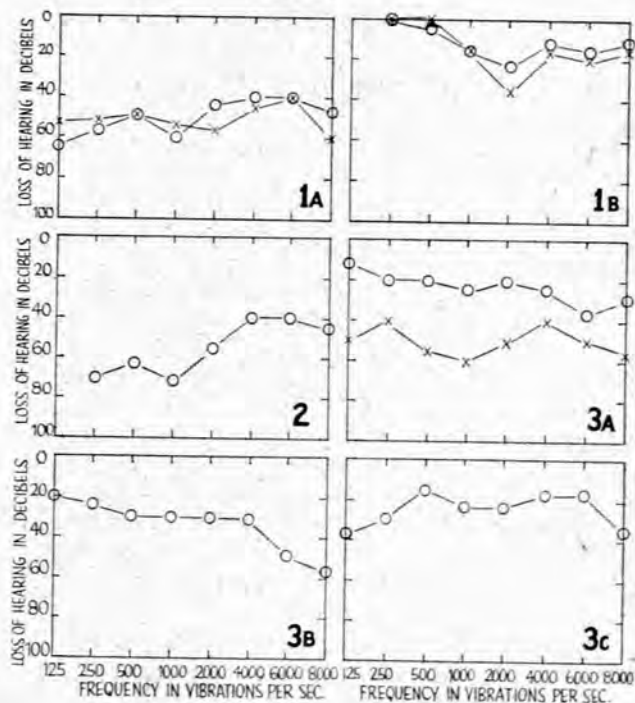


Fig. 1. Audiogram, August 1958. A = air conduction. B = bone conduction. Crosses = left, circles = right.

Fig. 2. After mobilization. Audiogram (right ear), air conduction. November 1958.

Fig. 3. After footplate fenestration. Audiogram, air conduction. A = on 13 January 1959. B = on 19 January 1959. C = on 16 March 1959. Crosses = left, circles = right.

diminished in both ears. The audiogram is shown in Fig. 1 (A and B) for air conduction and bone conduction in each ear.

Bilateral otosclerosis was diagnosed, and on 18 September 1958 a stapes mobilization was attempted on the right ear under a local anaesthetic. The stapes was approached by raising a post-tympano-meatal flap and exposing the middle ear. After manipulations at the stapes neck and incudo-stapedial joint, the flap was replaced and the ear packed with vaseline gauze. The surgeon did not feel convinced that he had successfully mobilized the stapes. The patient was discharged from the hospital on 21 September.

He was seen in the out-patient department again on 25 September. On this occasion he presented with an acutely inflamed auditory canal and a small posterior perforation of the right tympanic membrane with a pulsating discharge visible in the perforation. He was treated with achromycin (250 mg. *q.i.d.*) for 4 days and local decongestant and cleaning methods were instituted. On this treatment his ear cleared up completely and he was discharged.

He returned to the out-patient department again in November. The right tympanic membrane had healed and the auditory canal appeared quite normal. His hearing showed no improvement. The audiogram (air conduction) on the right ear is shown in Fig. 2.

The alternative lines of treatment were either to do a formal Lempert fenestration of the lateral canal or, assuming the previous surgeon had failed to mobilize the stapes, to make a second attempt at mobilizing.

On 5 January 1959 the middle ear was again exposed by raising a post-tympano-meatal flap. The middle-ear structures were easily identified and it was seen that both crura of the stapes had been fractured. Apart from abandoning the operation there appeared to be no alternative to fenestration of the stapes footplate. Accordingly this was undertaken, and an opening of about 1 mm. square was made in the footplate of the stapes near the posterior crus. All blood clot was removed and a few drops of hydrocortisone introduced into the tympanic cavity. Throughout the operation magnification of $\times 6-16$ was used. The tympano-meatal flap was replaced and the canal packed with tulle gras strips.

The immediate post-operative period was quite uneventful except for mild giddiness during the first 48 hours.

Removal of the ear plug a week later presented a dramatic scene with the patient exclaiming that he could not stand the noise.

An audiogram done on 13 January showed a marked improvement in the hearing (air conduction) of the right ear (Fig. 3). There was some depression of hearing a week later, as can be seen from Fig. 3B.

The patient was discharged on 21 January. On 16 March 1959 an audiogram examination showed that the improvement first noted 2 months previously had remained unaltered (Fig. 3C).

DISCUSSION

It is apparent that clinical otosclerosis presented a great problem to the early otologists, whose failures were probably due not only to a lack of knowledge of the physiology of hearing, but also to the poor surgical technique applied and the absence of aseptic measures. Nevertheless the results of the efforts of early operators and experimenters served to form a basis for those who followed.

It was not until Hölmgren published the results of his work that the surgical treatment of otosclerosis began to advance rapidly. To Lempert goes the honour of the present-day operation of fenestrating the lateral semicircular canal. This appeared to be the only method of surgical treatment until 1952, when Rosen revived the operation of mobilizing the stapes, an operation previously attempted by Miot and others but abandoned because of the poor results produced.

This seemed to be the logical way of treating deafness due to an ankylosis of the stapes, and the Lempert operation to a great extent became the line of treatment only in those cases where the stapes mobilization had failed. The procedure of fenestration of the footplate of the stapes has been mentioned as being a method of treatment in cases where mobilization of the stapes had failed. In the case reported in this article, failure was due to fracture of the crura, and the result of subsequent footplate fenestration was gratifying. A second case of failed stapes mobilization has since been treated by fenestration of the stapes footplate, and again the result has been satisfactory. If further experience shows this operation to be workable and to produce reasonable results in cases of stapes ankylosis where mobilization is impossible, one feels that it would be the logical procedure to adopt in preference to the Lempert operation.

Not only does it appear to be the best site for creating a fenester, but it will also eliminate so many of the difficulties that arise after a formal Lempert operation, when the cavity constantly requires attention in order to keep it dry and clear of wax. In addition the Lempert operation is a far more formidable procedure and certainly more bloody.

In the case described the patient was detained in hospital for an unnecessary length of time because he was an up-country resident. In this case, as well as the one done subsequently, the patient could have returned to duty within a week or 10 days after the operation. This is naturally an important factor at any hospital where people cannot afford to be detained for any great length of time. The patient who has been subjected to the Lempert operation is expected to pay frequent visits to the clinic for several weeks afterwards. Where distances between home and clinic are great, this may be very costly.

One feels that the case of clinical otosclerosis which warrants surgery should be treated by mobilization of the stapes which, if it fails, could be supplemented by a fenestration of the stapes footplate at the same operation. This approach is surely more logical than to abandon the operation and subject the patient to another anaesthetic at a later date in order to perform a fenestration of the lateral semicircular canal.

SUMMARY

A case of failed stapes mobilization is reported which was successfully treated by fenestration of the stapes footplate, and the instillation of hydrocortisone drops into the middle ear. A brief discussion on the advantages of this procedure is given.

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