SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY

President: J. P. MONKHOUSE, F.R.C.S.

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Discussion on the present position of stapes footplate surgery

P. H. BEALES said that for nearly two years now he had been performing removal of the stapes footplate and vein grafting of the oval window in otosclerosis.

He could not claim much experience of the Shea operation as he had only carried it out on six occasions, five of these did well and the sixth case showed no hearing improvement.

In about 70 other cases he had used a modified form of the Portmann operation.

This operation differs from the one described by Portmann in that the stapedius tendon is always cut as unless this is done one cannot see the posterior end of the footplate completely.

After removal of the mucous membrane from around the footplate and from the footplate itself, the anterior crus is cut some little distance away from the footplate and the posterior crus is cut close to its junction with the footplate. The crura are now turned inferiorly on to the promontory and if the oval window is very deeply placed bone is removed with a drill from the promontory before this is done.

An excellent exposure of the whole footplate is obtained and it is removed. The vein graft is applied to lie across the oval window but it is not tucked down into it to any extent. If the incus is raised slightly with a hook the posterior crus can be moved into position to lie in the centre of the oval window covered by the vein graft. This area is the one which will be least affected should there be further growth of otosclerotic bone. In the Portmann operation with preservation of the stapedius the crurae do not lie in the centre of the oval window but at its anterior and posterior ends and refixation may occur here. In most cases it is possible to preserve the inco-stapedial joint and good contact is nearly always obtained with the posterior crus and the vein. If the posterior crus is too short a small piece of vein or fat is used to bridge the gap. If the joint is damaged it is replaced into position and a tiny piece of fat or vein is wrapped round it. The early results of this procedure are shown in the table.

The results appear to be approximately the same as those obtained with the Shea operation, and this operation appears to be a sound one as no abnormal material has been put into the middle ear. Although it appears that plastic

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material is quite inert, Shea in a recent article has stated that fibrosis and thickening of the vein graft has occurred in certain cases where the facial nerve is close to the promontory—and because of this the polythene strut has been in too great an area of contact with the vein graft.

This fact shows that polythene tubing does in fact produce some reaction with the tissues.

There are several unknown factors which operate in this procedure, and so he thought that if it is possible to remove one of the unknown factors, i.e. the foreign body, and still get good results, the surgeon has gone a step forward.

Ref.: Shea J. J., Jr. (1960) *J. Amer. med. Ass.*, **174**, 2181.

Results of 54 Oval Window Fenestrations in Otosclerosis
September 1959 to March 1961

using the technique of:

Platinectomy and Vein Grafting of oval window with preservation of stapes crurae and inco-stapedial joint.

Marked hearing improvement with post-op. hearing level of less than 30 db. in frequencies of 500, 1,000 and 2,000 c.p.s.	43 cases or 80 per cent
Hearing improvement with post-op. hearing level of 35 to 45 db. in frequencies of 500, 1,000 and 2,000 c.p.s.	5 cases or 9 per cent.
No change in hearing after operation	5 cases or 9 per cent.
Hearing worse after operation post-op. labyrinthitis 2 mos. post-op.	1 case or 2 per cent.
Gain of over 10 db. in Bone conduction after operation	7 cases or 13 per cent.

Mr. David Bawtree asked Dr. House two questions:

Firstly:—What is the average length of the polythene strut used in these cases as in my experience 3·5 or 4 mm. is usually suitable but is sometimes difficult to cut each tube for each individual case?

Secondly:—What is the post-operative optimum time for obtaining the maximum improvement in hearing as in my experience with the original Rosen's mobilization operation the improvement showed itself immediately whilst I have found that in most cases of stapedectomy and vein graft the improvement is much more gradual.

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WILLIAM MCKENZIE asked Mr. House if he advised stapedectomy in all cases of otosclerosis, and if he considered that simple mobilization at the stapes neck or footplate was no longer recommended.

He shared with the other speakers the disappointment with the results of mobilization when the deafness was equal in both ears, but when only one ear was affected and the other ear heard normally, the results of mobilization had been good, in his experience, and compared with the results obtained by stapedectomy.

The reason for this lay perhaps in the early stage of the disease in cases of unilateral otosclerosis.

MR. GAVIN LIVINGSTONE asked: (1) In the event of a portion of the footplate dropping inwards, how much importance should be attached to recovering it by delving into the vestibule?

(2) Is it necessary to thin the vein graft meticulously when adequate results are obtained by using a plug of vein or fibrous tissue attached to steel wire?

KENNETH MCLAY asked Dr. House and Mr. Cawthorne what was their management of the case of otosclerosis where the focus was very soft and vascular.

Dr. House replied that the vascularity of the focus did not influence the choice of therapy as had been outlined in his paper.

R. R. WOODS said the question was raised of the sensitivity to noise after operation when hearing has been restored to a normal, or near normal, level. If such people are engaged in industry or noisy occupations, are they more liable to traumatic deafness of the boilermakers' type in view of the fact that the protective action of the stapedius muscle has been lost? Should such people wear protective ear-pads? The views of the speakers on this point would be appreciated.

A. BROWNLIE SMITH stated that he had no doubt at all that operation on the stapes can produce a remarkable improvement in the hearing but he uttered a note of caution about the future. He hoped to show later that the incus is nourished from two sources: (1) from the incudal artery which enters the body of the ossicle and sends a branch down the long process and (2) from vessels which come from below. These latter vessels may come from the mucosa of the tympanum or may accompany the tendon of the stapedius muscle and reach the lenticular process by passing around the head of the stapes and around the capsule of the joint. Should this blood supply be disturbed by dislocation of the inco-stapedial joint or by removal of the stapes, then it is possible for avascular necrosis of the lenticular process, and the tip of the long process to occur. Should this necrosis develop after the stapes operation, it would be unfortunate if, at a later date, the polythene prop and the piece of fine wire were found to be no longer in contact with a functioning incus.

ALAN G. GIBB asked the opening speakers what they considered to be the present position of Fowler's anterior crurotomy in the treatment of stapes

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fixation. He himself had found the results of simple mobilization by the indirect and direct methods uncertain but felt that anterior crurotomy was based on sound principles. As regards the vein grafting operation he followed the method of Beales, with slight modifications and had resorted to polythene struts only in cases where he had damaged the stapes. The preservation of the stapes made the operation more difficult as Mr. Cawthorne had pointed out, but he felt that a good end result justified the extra trouble.

STUART R. MAWSON said he had been doing Stapedectomy by the Shea technique since January 1959 and that until recently had been adhering closely to the original indications given by Shea, that is where mobilization failed due to fracture of the crura or gross fixation of the footplate. He wondered whether there was not still a place for mobilization but found the present figures of the preceding speakers very impressive.

I. B. THORBURN stated that he regarded himself as an occasional stapedectomist having had experience of some 50 cases during the past year. This was a difficult operation technically and he found it an advantage to gain a little extra room for instrumentation by using an endaural incision and elevating the skin of the posterior meatal wall together with the posterior part of the drum. He found that the posterior crus of the stapes could occasionally be preserved and utilized but if it was in any way shortened or detached from the incudostapedial joint he preferred a polythene strut. While he agreed that a vein graft was usually the most suitable material to use for sealing the oval window, he always kept available a small piece of fibrous tissue and this could be used as an alternative to close the oval window if any bleeding should develop. He found that a convenient method to apply the vein graft to the open oval window was to wrap it round a tiny moist piece of gelatine sponge which when it was withdrawn left the graft in good position.

W. LEACH reported excessive leakage of perilymph had happened in at least two of the cases at St. Thomas's Hospital. In one of those perilymph welled up into the middle ear as soon as the stapes footplate was removed, and continued to escape throughout the operation. Post-operatively leakage continued into the dressing for about forty-eight hours, necessitating several changes of the outer dressing. He did not recall that there were any untoward effects otherwise, apart from the usual giddiness post-operatively, and both patients subsequently obtained a useful hearing gain.

He asked if Dr. House has come across this phenomenon while operating on the stapes footplate and if he has any explanation for it.

H. ZALIN said he felt there is something of a warning note to be heard in the work of Belluci and Wolff on Tissue Reaction Following Reconstruction of the Oval Window in Experimental Animals. They have shown that an intense fibrotic obliterative process involves the cochlea after the footplate has been removed and such substances as gelfoam, vein graft and fat are placed in the open window. Minimal reaction occurs when only part of the footplate is removed and replaced by a vein graft in which the intima lies

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towards the vestibule. This placing of the vein graft is contrary to present surgical practice and we have heard from Mr. Cawthorne that the graft is so placed because the adventitia adheres well to the bony margins of the oval window. He suggested that the peripheral zone of the intimal surface of the vein graft could be made to adhere by scarification with equal facility and that an intimal surface in contact with perilymph is to be preferred to an adventitial surface.

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