ONE HUNDRED CASES
OF
PARACENTESIS OF THE TYMPANIC
MEMBRANE,
WITH THE RESULTS OBTAINED THEREFROM, AND
REMARKS ON THE METHODS OF OPERATION.

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THE methods employed have been the knife, the trephine, acids, oils and ointments, Pagenstecher's and other mercurial preparations, the glycerine extract of pancreatine, and the galvano-cautery.

Of these, the knife, Sir Astley Cooper's method, is the most ready and expeditious, but unless combined with some other method, it has been in my hands useless, if a permanent opening is desired. For the purpose of giving exit to fluid, or for making a preliminary perforation, it is to be preferred above all others. A broad needle with cutting edges is a convenient form of instrument for this purpose.

The trephine—Fabrizzi's method—is troublesome in use, and painful to the patient, two objections which are not counterbalanced by any advantages it possesses over other methods.

The same may be said of the use of acids—Simrock's method—but their use has the advantage of not alarming the patient so much as the knife or trephine. The size of the opening can be regulated more exactly by these than by the cautery, but in other respects the cautery is to be preferred. This method also requires, as a rule, more than one application before a perforation is obtained.

By the frequent application of ointments a cataractous drum may be thinned and at last perforated. If the patient can be taught to apply the ointment properly for himself, the combination of this with other methods offers fair prospects of success.

Glycerine, and the glycerine extract of pancreatine, have not been successful by themselves; but this method of digestion, suggested to me by Dr. Lauder Brunton's chapter on digestion, in the 'Handbook for the Physiological Laboratory,' is, I think, worthy of further trial. Other digestive secretions, such as pepsine, might be used, either alone or in combination with the cautery or knife.

The galvano-cautery—Voltolini's method—I prefer to all others. The following is the procedure which I have found best:—Having ascertained by perosseal audition that the acoustic is fairly healthy, the hearing power is determined by the watch. A preliminary puncture is then made by means of a broad needle, and while the opening gapes, and is still unaffected by the congestion arising from the irritation, the hearing power is again ascertained. If it has improved, the galvano cautery, if ready, may be at once applied to the spot, and the opening made as desired. If the operation is not to be completed at that sitting, cotton wadding is placed in the meatus, and the patient is directed to return after the lapse of a week or a fortnight. Should the hearing not be improved by the preliminary puncture, wool is placed in the ear, and nothing further is done.

The opening having been made by the cautery, a pad of wadding smeared with mercurial or simple ointment, or the glycerine extract of pancreatine, is passed into the opening and pressed against the drum, so as to expand it as much as

possible, and left there for two days. This causes the wound to gape, and at the same time acts, I believe, prejudicially on the nutrition of the drum. The wadding is removed every second day, the parts washed with warm water and carbolic acid solution, the drum drawn outwards by means of the vacuum speculum, for the purpose of preventing any adhesions forming, and the wadding again applied. This has been hitherto the most successful method which I have tried, but this success is not sufficiently satisfactory.

If a method of causing the drum to bulge externally can be arranged, the danger of adhesions which the above method entails would be avoided.

When a large cicatrix of an old perforation is present, I choose that spot in preference, hoping, as proposed by Weber, Liel and myself (*vide* 'Guy's Hospital Reports,' 1875), that the nutritive processes caused by the irritation will be less exalted in that spot, and I have found that in cases having such cicatrices the success has been greatest. Frequent repetition of the perforation in the same spot has a similar effect, and I have seen benefit in some cases by the thinning of the drum, which is gradually established at the spot, though no perforation remain.

The cautery employed may be modified in shape according to the action desired. If a permanent aperture is required, a thin wire, with an expansion at the active end, is convenient. If it is employed merely as a tightener in a relaxed drum, a thicker wire, or several points, will be found useful.

The cases in which I have tried the operation have been : (1) thickening of the drum, (2) relaxation of the membrane, (3) tinnitus, (4) accumulations in the cavity, (5) adhesions in the cavity, and (6) in chronic cases in which other remedies had failed as a *dernier resort*. It is also used in cases of impassable stricture of the Eustachian tube, and I would certainly employ it in such, if a case occurred in my own practice.

Of 83 individuals operated upon, 46 were improved temporarily or permanently. If the causes, however, which induced operation are considered, the benefit received by certain

classes of cases was much greater than appears when looking at the general success. Of 8 cases in which paracentesis was performed on account of tinnitus, only 2 received benefit from the operation, 5 were not improved, and in 1 the result is not given. Of 6 cases of nervous affection, in which the operation was exploratory, or as a dernier resort, not one was improved. In 2 cases, the operation was merely a preliminary step to further action on adhesions in the cavity, in one of which the operation was successful. Of 39 cases of cataractous drums, 23 were benefited, 12 were not, 3 were doubtfully improved, and in 1 the result is not given. In 7 cases of relaxed membranes, paracentesis improved 5, the remaining 2 were not improved. In 21 cases in which the perforation was made for the removal of fluids or solids from the cavity, 15 were benefited, 5 were not, and in 1 the result is not given.

The operation was performed 104 times. In some cases the benefit was so great that it was repeated several times at the request of the patient. This occurred especially among those with cataractous drums. In no case have I seen any alarming results follow the operation.

In one case, Case 19, all the methods mentioned, except that of digestion, were tried. This patient has been deaf since childhood, and had two dense immovable drums. The hearing power on the left side was $\frac{0}{LX}$ and on the right $\frac{1}{LX}$. Choosing the worse ear, the slit made by the knife improved the hearing at once, and on making a large perforation by means of sulphuric acid, it improved to $\frac{18}{LX}$, and while lying in bed the patient could hear the tick of a clock hanging on the wall, which he said he had not been able to hear before. In ten weeks he returned with the opening closed, and asked me to repeat the operation. The opening was again made with acid, and he was advised to paint the edges of the perforation with glycerine and carbolic acid by means of a small camel-hair brush. Eight months afterwards he returned to have the opening again made. This was done by the cautery, which was used at the same spot in hopes that the cicatricial tissue would be less likely to have such a renovating power

as the untouched membrane. This opening, however, closed, and the cautery was again applied at the same spot, and the perforation was present when I last heard of the patient some two weeks after the operation.

In case 15, the improvement received by the first operation was sufficient to cause the patient to come to town to have it repeated. Choosing the cicatrix of the old opening, acid was used, and after making a large perforation, wadding smeared with simple ointment was pressed against the membrane. This he renewed for himself daily. The perforation was present when the patient was last heard of, seven weeks after the operation.

Case 23 had been operated upon by Mr. Hinton, 10 years before, and the patient had received so much benefit from that paracentesis, that he was desirous that it should be repeated. The perforation was made this time by the cautery, and the improvement was again considerable.

The choice of the part of the membrane for operation is, I think, somewhat important. If the perforation is made for the purpose of removal of fluids from the cavity, it ought to be made in the portion which bulges most. If a relaxed membrane is the cause of the operation, the portion showing the greatest want of tension is chosen, and one or more slits made according to the degree of relaxation. If a permanent opening is desired, I prefer a point posterior to the manubrium, and midway between it and the periphery, because this point is furthest from the blood supply, and it allows the passage of waves of sound in a moderately direct line to the secondary membrane.

No.	Initials.	Age.	Sex.	Reasons for operating.	Method.	Position of perforation.	Result to hearing power at time of operation.	Time the perforation remained open.	Remarks.
1	H. L.	...	R.	<i>Thickened membrana tympani</i>	Knife	Post. inf. quadrant	Improved		
2	A. B.	22 R.	"	"	Trephine and knife	"	O $\frac{5}{LX}$ to $\frac{5}{LX}$		
3	J. W.	60 R.	"	"	Trephine	"	C $\frac{1}{LX}$ to $\frac{1}{XL}$	...	Patient returned in 6 weeks saying that as long as he kept cotton-wadding in the ear the perforation kept open, but now closed. Again perforated, and this closed in thirty hours.
4	J. W.	60 L.	"	"	"	"	C $\frac{1}{LX}$ to $\frac{1}{XL}$		
5	W. M.	23 R.	"	"	"	"	Improved	3 months	
6	W. M.	23 L.	"	"	"	"	"	6 months	
7	J. F.	45 R.	"	"	"	"	"	30 hours	Made a second paracentesis on same spot.
8	T. H.	64 L.	"	"	"	"	Improved to conversation, not to watch		
9	S. K.	67 R.	"	"	"	"	Much improved.	8 days	Again paracentesed at patient's desire.
10	W. E.	51 L.	"	"	"	"	Improved	...	Repeated in 7 days.
11	M. W.	56 L.	"	"	Knife	"	No improvement		
12	L. R.	50 R.	"	"	"	"	Improved	2 days	
13	H. G.	32 R.	"	"	Trephine	"	No improvement		
14	E. W.	25 L.	"	"	"	"	"	...	Perosseal audition imperfect.
15	J. C.	38 L.	"	"	Knife and sulphuric acid	"	Improved	...	This case was left alone till the cicatrix of the preliminary incision had formed, and then sulphuric acid was employed, and after the opening had been made, a plug of oiled wadding was pressed upon the

No.	Initials.	Age	Reasons for operating.	Method.	Position of perforation.	Result to hearing power at time of operation.	Time the perforation remained open.	Remarks.
23	A. H.	30 R.	<i>Thickened membrana tympani</i>	Knife and cautery and wadding	Post. inf. quadrant	$\frac{C}{LX}$ to $\frac{4}{LX}$	Open when last seen	This patient had been operated on in the same ear by Mr. Hinton 8 years before, and then heard better after operation. The old cicatrix was still to be seen.
24	S. K.	28 L.	"	Knife	"	No improvement	...	The membrana tympani was very concave externally, and a case for tenotomy.
25	W. S.	40 R.	"	" and cautery	"	$\frac{1}{LX}$ to $\frac{3}{LX}$	Open when last seen	
26	E. G.	... L.	"	"	"	Improved	"	
27	W. Y.	18 L.	"	Knife	"	No improvement	3 weeks after operation	+ 2 concave membrana tympani.
28	G. B.	52 R.	"	"	"	"	...	Affection of acoustic.
29	W. B.	29 R.	"	"	"	"	...	
30	R. M. F.	19 L.	"	" and cautery	"	Improved	Open 12 days after; not seen since	Tinnitus not improved.
31	G. T.	27 R.	"	Knife	"	No improvement	...	Affection of acoustic.
32	A. H.	33 L.	"	"	"	"	...	" (specific).
33	A. H.	33 R.	"	"	"	Doubtful improvement	3 days	Again perforated, and again closed in 72 hours. The improvement being slight it was not repeated.
34	E. B.	37 R.	"	"	"	Result not given	...	Wadding saturated with glycerine pressed into opening.
35	E. B.	36 L.	"	" and cautery	"	Improved	...	
36	M. S.	23 L.	"	"	"	"	...	
37	R. P.	54 R.	"	"	"	"	...	
38	M. A. H.	38 L.	"	Knife	"	Not improved	...	
39	J. G.	28 L.	"	Trephine	"	Improved.	...	

40	E. H.	18 R.	Relaxed <i>tympani</i>	Knife and sul- phuric acid	"	"	at time. and after clo- sure still great- er improvement ensued	...	Several points were touched with sul- phuric acid for the purpose of heightening the effect of the para- centesis.
41	F. M.	18 R.	Relaxed cicatrix, the Knife rest of membrana	"	"	No improvement			
42	R. F.	35 ...	tympani being dense Relaxed membrana tympani at old cic- atrix, which flapped extensively	"	"	Improved		6 months	
43	A. S. R.	28 ...	Relaxed membrana tympani	"	"	No improvement			
44	A. P.	16 R.	Relaxed membrana tympani, the greater part of the membrane having been lost at one time	Cautery	"	C $\frac{5}{1X}$ to $\frac{6}{1X}$, and improving when last seen		...	The whole membrana tympani seemed to be formed of two large cicatrices.
44A	A. P.	16 L.	Ditto ditto	"	"	O $\frac{1}{1X}$ to $\frac{2}{1X}$		...	Healed by a very thin goldbeater- skin cicatrix, which was easily broken down by probe a month afterwards.
45	E. P.	18 L.	Membrana tympani drawn in and atro- phied	Knife	"	Improvement on closure of open- ing, not before.			
46	A. G. B.	37 R.	<i>Tinnitus</i>	"	"	No improvement		36 hours.	
47	A. G. B.	37 L.	"	"	"	"		36 hours.	
48	A. C.	59 ...	"	"	"	"			
49	E. L.	31 ...	"	"	"	"			
50	C. I.	45 ...	"	Knife and cau- tery	"	Improved, tinni- tus nearly gone While open tin- nitus less, but again returned to former strength when cicatrix formed			
51	L. C.	36 L.	"	Knife	"	No improvement			
52	W. B.	47 R.	"	"	"	"			

No.	Initials.	Case No.	Reasons for operating.	Method.	Position of perforation.	Result to hearing power at time of operation.	Time the perforation remained open.	Remarks.
52A	E. L.	24 L.	<i>Tinnitus</i>	Knife	Post. inf. quadrant	No improvement	...	Patient had a brother who died of "tumour of the head." This patient came on account of the deafness and fits, which occurred daily before the operation. The mass of the tumour was removed at two sittings. He had no fits after the operation. Seen a week after. Affection of the acoustic.
53	B. B.	20 L.	Removal of substances from cavity. Sebaceous looking matter (molluscous tumour)	Knife, suction by piston	Both sides of manubrium, large incisions	Improved	...	
54	B. P.	33 ...	Fluid which came after sudden sickness	Knife and vacuum speculum	Lower part	Hearing not improved but feels lighter & easier	...	
55	W. W.	... ..	Mucus	Knife and suction	"	Improved		
56	B. P.	38 ...	Serous-like fluid	"	"	"		
57	M. B.	50 ...	Mucus	"	"	" $\frac{1}{2}$		
58	C. E.	52 L.	Thick jelly-like pinkish mass	"	"	0 $\frac{2}{LX}$ to $\frac{1}{LX}$	...	The patient said this ear had been deaf all his life. In coming out through the slit the mass, though under pressure, was not broken, and when the whole mass fell on to the floor of the meatus it formed a mass of nummular shape.
59	C. E.	52 R.	Serous-like fluid	"	"	0 $\frac{2}{LX}$ to $\frac{1}{LX}$	...	This was a much thinner fluid, seemingly the result of acute inflammation.
60	F. F.	13 L.	Mucus	"	"	Not given.		
61	C. G.	63 R.	"	"	"	Heard at once as well as he had ever heard		
62	E. L.	24 R.	" and tinnitus	"	"	$\frac{6}{LX}$	...	Tinnitus removed almost immediately.

63	C. B.	32 R.	Exploratory to examination of whitish-yellow bulging in front of malleus—Exostosis	"	"	No improvement	
64	C. H.	46 ...	Dried mucus	"	"	"	Membrana tympani cut like putty. Injections of alkaline solutions caused no improvement. Symptoms improved. Caries of temporal bone.
65	J. B.	26 R.	Pus	"	"	Improved	...
66	A. P.	18 R.	"	"	"	"	Complete cessation of cerebral symptoms, which present before operation.
67	F. C.	58 ...	Mucus in cavity, with exudation between layers of membrana tympani	"	"	"	Relieved tinnitus, fulness, and all discomfort.
68	J. G.	44 L.	<i>Accumulations</i> . Bladder-like projection through a thick membrana tympani	Knife and vacuum speculum	Post. sup. quadrant	"	The acute symptoms were at once relieved. Thin fluid exuded after the perforation.
69	S. C.	51 R.	Pus in cavity from blow a short time before	"	Anteriorly	²⁰ to $\overline{\text{IX}}$	In 10 days the membrana tympani was dry and cicatrised, and made normal excursions.
70	E. E.	23 L.	Dried mucus, which was not removed	"	Posteriorly	No improvement	To use steam and injections for softening; result not obtained.
71	R. H.	15 R.	Mucus	"	Low vertical	⁸ to $\overline{\text{IX}}$	After using steam at home his hearing improved.
72	H. M.	20 R.	"	"	Post. inf.	Improved	After making the slit in the membrana tympani the end of a small catheter was passed through into the cavity, and air was driven between the membrana and the promontory, which separated them considerably.
73	J. B.	40 L.	"	"	"	No improvement	...
74	A. K.	... R.	<i>To remove adhesions</i>	Knife and vacuum speculum and Politzer	Posteriorly	Improved	...

No.	Initials.	Side.	Reasons for operating.	Method.	Position of perforation.	Result to hearing power at time of operation.	Time the perforation remained open.	Remarks.
75	A. S.	23 R.	<i>To remove adhesions</i>	Knife and vacuum speculum and Politzer	Throughhold cleatrix	No improvement		
76	J. S.	60 L.	<i>Menière's disease</i>	Knife	Post. inf. quadrant	"		
77	G. C.	27 R.	<i>Acoustic affection</i>	"	"	"		
78	C. P.	20 R.	"	"	"	"		
79	E. J.	24 R.	"	"	"	"		
80	L. P.	49 R.	"	"	"	"		
81	J. W.	45.	"	"	"	"		