TREATMENT OF CHRONIC MIDDLE-EAR SUPPURATION.

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The frequency of this disease and its intractable nature are well known. With regard to its intractability, neglect is at the bottom of it in nearly all cases, and the absurd popular prejudices on the subject often lead to this.

As besides polypi, mastoid disease, necrosis of the ossicles, and a host of other troubles, dangerous intracranial complications are likely to be set up, every effort must be made to put an end to the disease.

Uncomplicated chronic suppuration in the tympanum can be cured, and will be cured, if systematically treated, and the principles which should guide us are precisely the same as those that direct our line of action in suppuration of any other part of the body; thus, rigid asepsis must be observed, pent-up matter liberated, and the parts rendered as surgically clean as possible; regeneration of the tissues must be brought about by the local application of astringents, and impairment or loss of function of the part consequent on the inflammation must be combated (in the case of the ear this part of the treatment is rather apt to be overlooked in our desire to put an end to the suppuration). Attention should also be paid to the general health. Many of our cases will be difficult to cure, and will tax to the utmost the patience of the surgeon, attendants, and patient himself.

To render the tympanum clean and aseptic, it must be flushed out with some such solution as corrosive sublimate 1 in 5,000, carbolic acid 1 per cent., formalin $\frac{1}{2}$ per cent., hydrogen peroxide 10 volumes strength, &c. (To prevent repetition, it should be noticed that all solutions used for the ear must be warm, with the exception of rectified spirit.) Syringing out the ear in the ordinary way, however, only washes out the meatus, except when a very large perforation exists in the drum; so it will be readily seen that suppuration will continue if the tympanum is not thoroughly cleansed. It must not be supposed from these remarks that the syringe is not to be used, for in many cases with profuse discharge it is the quickest and simplest means of washing out the meatus.
The tympanum can be satisfactorily cleansed by ear-baths. The patient is directed to sit with his head on one side so that the diseased ear points upwards, the auricle is now drawn upwards and backwards, and the solution poured in out of a teaspoon until it appears at the mouth of the external meatus (if a heated spoon is used it will not be necessary to warm the solution, as contact with the hot metal will do this). The tragus is now pressed upon, so as to drive the fluid into the tympanum, where it should be retained for ten or fifteen minutes. In the case of a small perforation its entrance can be facilitated by making the patient hold his nose and swallow.

The efficacy of the bath can be still further increased by the simultaneous use of Valsalva's experiment, or Politzerisation, and to assist in forcing the air into the diseased ear and prevent it from entering the sound one, the resistance in the latter should be increased by holding it shut. For those cases in which cakes of inspissated pus and epithelium adhere to the tympanic walls there is an excellent remedy in hydrogen peroxide.

Although I had often heard of this drug, and seen its brilliant results on the hair, it was not until the early part of this year, when acting as clinical assistant at the London Throat Hospital, that I saw its equally brilliant results in aural surgery, and I have not been without a supply of it since. Under normal conditions, the reaction of this drug to skin and mucous membrane is very feeble, but when brought into contact with pus, it bubbles up with the formation of ozone, inspissated matter is liquefied and driven out of its hiding place, and the cavity in which the drug has been put is thoroughly disinfected. Flushing can also be carried out by syringing through the Eustachian tube or through a tube introduced through a perforation or fistulous opening; but as a more prolonged action of the drug can be obtained by an aural bath, these methods possess no advantages over it, except perhaps in those cases in which the tympanum is caked with inspissated pus and hydrogen peroxide is not available. Having rendered the ear as aseptic as possible, the fluid remaining in the tympanum is expelled by some form of air douche, the meatus is then dried with sterile cotton-wool and plugged with some antiseptic gauze or wool. It may be noted that it is sometimes necessary when a perforation is small or badly placed to enlarge it to allow of free drainage (as artificial perforations tend to close very rapidly, this must be prevented by frequently separating the edges with a probe).

This cleansing process will have to be repeated two, three or four
times a day, according to the amount of discharge. When it is
inconvenient to dress so often, an antiseptic gauze dressing can be
put over the ear after it has been plugged with gauze; this should
not be allowed to remain without change for over twenty-four hours,
however.

If the perforation is large and the drainage free, an antiseptic
powder, such as boracic acid, aristol, dermatol, &c., may be
insufflated into the deeper part of the meatus before plugging. In
some cases when discharge has become scanty, fluids seem to pro-
duce irritation and keep up the discharge; under these circum-
stances the dry antiseptic treatment should be adopted. The ear is
simply mopped out with sterile cotton-wool and packed with dry
antiseptic gauze, or a little boracic powder insufflated before
plugging with sterile cotton-wool. Many cases will get well with
the antiseptic treatment alone; on the other hand, some will require
the application of astringents or antiseptics with an astringent
action, before regeneration of the mucous membrane can be brought
about, and for this purpose ear-baths of boracic acid and rectified
spirits, grs. xx. to the oz. (momentary smarting is of no conse-
quence, but if really painful it must be diluted with water and
gradually strengthened as tolerated), carbolic acid and zinc sulphate,
grs. v. of each to the oz., nitrate of silver, grs. v. to the oz., gradu-
ally increased to xx., acetate of lead, sulphate of copper, chloride
of zinc, alum, and tinct. ferri. perchlor., in similar strengths have
all been used with success. In obstinate cases these various
astringent remedies must be tried in succession, and it is needless
to say that those solutions which in themselves are not antiseptic
must be sterilised before being used. When a large perforation
exists, if thought necessary to directly stimulate the tympanic
mucous membrane, this can be done by means of a fine probe, upon
the point of which caustic has been fused.

A few words are now necessary regarding those after-effects of
inflammation, viz., tympanic adhesions and permanent dry perfora-
tions. So far as adhesions are concerned, presuming our case has
made progress towards cure with respect to discharge, or even from
the first, it is necessary to employ some form of air douche to break
down or stretch them. Later, suction by Siegle's pneumatic
speculum or intermittent pressure on the malleus may have to be
tried. In the earlier stages the form of air douche used is not of
much consequence; later, however, when cicatrization is progress-
ing rapidly, the stronger blast through a Eustachian catheter
should be employed. In spite of every care, however, a certain amount of
deafness may ensue, and when it is great, the use of the knife has been advised, but the results have been so uncertain that its employment as a routine measure should never be thought of except in extensive bilateral deafness, and even then it is only fair to inform the patient that it is merely an experiment.

With respect to a permanent dry perforation its effect upon the hearing varies, and depends upon its position more than upon its size, for quite a number of persons have a very extensive perforation, yet their sound-perceiving powers are fair, or even good. That the membrana tympani and larger ossicles are not essential to good hearing is proved by the results of ossiculectomy and the radical mastoid operation, in both of which the whole of the drum, malleus, and incus are removed. In any case an artificial drum will often bring about a marked improvement in hearing. A roll of cotton-wool moistened with glycerine is the safest and best of these contrivances, and the patient himself is usually better able to adjust it than the surgeon.

The appliance should not be used until discharge has ceased for at least a month. At first it should not be worn for more than two hours at a time; as tolerance is established the time may be gradually increased. It should always, however, be removed at night; but as the tympanum is exposed, and the entrance of fluid is very likely to bring about a recurrence of suppuration, an attempt should be made to heal the perforation. This should be done by touching up the edges with chromic acid, the galvanic cautery, or repeated applications of trichloracetic acid.

Should our efforts fail, and they are not unlikely to do so, in very large perforations the dangers of allowing fluid to enter the ear should be pointed out, and the advisability of keeping the ear constantly plugged with cotton-wool insisted on.

The great secret of successful treatment for cure of the discharge is constant attention and cleanliness on the part of all concerned, with the almost daily supervision of the surgeon himself; and for this reason it is necessary to entrust the carrying out of orders to someone who has been instructed as to the importance of details.

Happily the soldier is in a position to receive the requisite attention, but in the case of his family and in civil life much of the treatment has to be left to relatives or friends, who do not realise the importance of surgical cleanliness. In this case written instructions are necessary, and they are best remembered and more likely to be carried out when given under the heading of "Don'ts."
Treatment of Chronic Middle-Ear Suppuration

The following, which I have had printed for distribution, cover the essential points:—

DON'TS

to be remembered in discharge from the ear:—

(1) DON'T forget to carefully clean your hands before syringing.
(2) DON'T forget to boil the syringe or keep it in 1 in 20 carbolic lotion.
(3) DON'T forget to employ boiled water whatever solution is used.
(4) DON'T forget, when giving an ear-bath, to see that the teaspoon has been sterilised before using by boiling or passing it through the flame of a spirit lamp.
(5) DON'T forget to only use sterilised cotton-wool taken out of an air-tight tin box with forceps that have been sterilised. (If two pair of forceps are used the wool can be rolled up for drying or plugging without being touched by the fingers.)
(6) DON'T on any account give the patient a supply of cotton-wool for self use.

In some very chronic cases, especially those that have been neglected for months or years, do what we will discharge continues. Presuming treatment has been systematically carried out carefully for six months, and we can exclude some complication that requires attention, or some septic condition of the mouth, nose, or nasopharynx that is infecting the tympanum through the Eustachian tube, it is obvious that the tympanic mucous membrane is past redemption, and our only hope of bringing about a cure (for stop the discharge we must) lies in performing the radical mastoid operation, which, as is well known, consists in throwing open the tympanum and mastoid antrum into one large cavity, curetting it out, and allowing it to become lined with epithelium. The results of this procedure are extremely good; it is rare for any existing deafness to be increased, on the contrary, it is more frequently improved, whilst the effect on the general health due to the cessation of discharge is obvious to the most casual observer, and there should be no hesitation in doing it even on both sides if necessary. This operation is not a special one confined to otologists, it is described in every text-book on general surgery, as it is the recognised step prior to the carrying out of more extensive operations for the relief of intra-cranial affections consequent on suppurative middle-ear disease, and is therefore one that any army surgeon may be called upon to perform at a moment's notice.

When the disease is confined to that part of the tympanum above the drum known as the attic, treatment on ordinary lines is practically never sufficient. Owing to the presence of the ossicles and various
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folds of mucous membrane, this region is divided up into numerous cavities which are hard to clean and drain, so the tympanic syringe must be used; even then, however, in a very large number of cases, it will be necessary to remove the drum, malleus, and incus, with a portion of the outer attic wall. And the advisability of taking this step without too much delay will be apparent when it is remembered how closely the attic is connected with the cerebral cavity and mastoid antrum. Prolonged suppuration here is almost certain to lead to serious intra-cranial complications.

The treatment of the complications to be met with in chronic middle-ear suppuration is too vast a one to be discussed within the limits of a short paper. Suffice it to say that practically the majority of them will require attention before suppuration can be cured; thus, if polypi are present, they must be removed; if there is caries or necrosis, the necrotic tissue must be got rid of. Finally, quite a number of the complications are only curable by the radical mastoid operation.

From a service point of view the advisability of keeping a man under treatment for so long a period as six months might be questioned. Personally I can see no reason why a soldier, with simple chronic middle-ear suppuration, should be admitted to hospital. For months past I have treated all such cases in barracks, the men are marked "Attending and Duty," and as long as they come to the hospital during the day at stated times for treatment, are available for duty. It may be difficult at some stations owing to distance, &c., to carry out this system. In those cases I would suggest that means be taken to get the men attached to the hospital for duty, or to units quartered within easy reach of the hospital.

As the treatment outlined can be more efficiently carried out with some special organisation, especially so when numbers have to be attended to, I have created a nose, ear, and throat department in my hospital, and find the work is minimised and better carried out by this arrangement.

A room for examination has been set apart for this class of diseases, and in it are kept all the appliances, solutions, &c., required for their diagnosis and treatment.

An orderly, specially instructed, is told off to look after the room and its belongings, and he carries out all treatment ordered. I find the men take a greater interest in their work if it is explained, and occasionally they are allowed to examine a nose, ear, or throat. All these things, though little in themselves, help to keep an orderly interested in his work, and all orders for treatment are consequently carried out with more zeal and intelligence.