REFRESHER COURSE FOR GENERAL PRACTITIONERS

CHRONIC SUPPURATION IN THE MIDDLE EAR

BY

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The term "chronic suppuration in the middle ear" may be applied to any inflammation of the middle ear which has given rise to a perforation of the drumhead, shows no tendency to heal, and is associated (with some important exceptions) with a more or less continuous discharge of pus. No fixed period of time can be laid down, but any discharge which shows no signs of clearing in five to eight weeks is usually regarded as chronic by most otologists.

Probably all such cases date from one or more attacks of acute inflammation, and even those which appear

In the tympanic area an acute infection may resolve rapidly and completely with or without treatment. If, however, perforation occurs, this is usually central and does not involve the surrounding bone; through the perforation a persistent mucopurulent discharge may develop.

In the attic vault acute infection may lead to rapid perforation through or behind Shrapnell's membrane, sometimes with necrosis of adjacent bone; alternatively, there may be epithelial desquamation and the collection of debris.

Cholesteatosis

If debris collects it may cause a slow perforation, usually associated with necrosis of bone, although occasionally the condition may subside and remain quiescent until another attack. These masses of debris give rise to the condition formerly known as cholesteatoma but which is now better described as cholesteatosis. Once formed the masses become quite big, and it is these cases which are the main exceptions to the definition given in the opening paragraph. The masses consist of epithelial cells, pus cells, organisms, and cholesterol; even when not actively infected they can erode neighbouring bony structures and may cause destruction of ossicles or, occasionally, exposure of the dura mater of the middle or posterior fossa and lateral sinus.

Reservoirs of Infection

It is important to remember that infection usually reaches the middle ear via the Eustachian tube, and the persistence of infection at the pharyngeal end of the tube may account for a chronic aural discharge. Also, a cellular mastoid may be infected at the time of the primary acute otitis and, while not going on to an acute mastoiditis, may remain a reservoir of infection constantly overflowing into the middle ear. In such cases the discharge may be minimal when the patient is recumbent but may become profuse when he raises his head—for example, on getting up in the morning.

The predominating organism is probably that which caused the original infection, but it may be any one of the many organisms which cause acute nasopharyngeal inflammation. Some form of streptococcus is probably the commonest, but in chronic cases the infection has invariably become a mixed one and is commonly resistant to chemotherapy or treatment with antibiotics, either local or systemic.

Clinical Course

The changes in the mucous membrane may vary from simple hyperaemia to complete destruction. In the simplest form the swollen mucosa, with epithelium intact, may encroach considerably on the cavity of the antrum, and in such a case the decongestive action of ephedrine (1%) combined with silver proteinate (10%) and spirit (10%) in water may be very beneficial. In

FIG. 1.—Diagrammatic section of left middle ear.

insidiously are likely to have arisen from forgotten or overlooked acute otitis media in infancy. About one case in five is directly attributable to the infectious diseases of childhood. Forster has stated that in taking case histories of children with chronic suppuration he has frequently found a hereditary tendency.

Patients with cleft palates whose widely open nasopharynxes are particularly prone to infection often suffer from an associated chronic suppuration of the middle ear.

Pathology

Turmarkin has pointed out that the middle-ear cleft is lined by ciliated epithelium in its tympanic or lower part and by squamous epithelium in the attic vault or upper region (Fig. 1). The two areas might therefore be expected to respond differently to acute infection.

the severer forms the epithelial covering is lost over considerable areas, with the formation of granulations and, if these become organized, adhesions or fibrous masses. However, where there is underlying necrosis of bone, organization of the granulation tissue rarely takes place. Sometimes polypoid masses consisting of granulation tissue form, and these may become partially organized and covered by epithelium.

Where resolution of the infection after destruction of the mucosa has been complete, areas of bare shiny bone may be seen through large inferior perforations and the remains of denuded ossicles may stand out clearly (Fig. 3, H).

In cholesteatosis bone may be eroded without the usual signs of suppuration, the enlarging cavity retaining everywhere a well-defined epidermal covering. In such cases there may be little or no demonstrable discharge. In other cases suppurative necrosis coexists or alternates with absorption of bone, and the pus may be so offensive as to form a social barrier between the patient and his fellows. In acute otitis media and chronic tubo-tympanic infections the pus is rarely offensive.

Now and again the erosion of cholesteatosis opens the whole vault, aditus, and antrum into the meatus, and nature is found to have performed a perfect radical mastoid operation. Occasionally a track will be formed under the integuments of the roof or posterior wall of the meatus, and a cholesteatotic mass will present far from its origin as a swelling; this is often mistaken for a furuncle. If the swelling is incised, foul-smelling material is discovered and bare bone can usually be felt.

Multiple perforations are said to be characteristic of tuberculous infection, and the tubercle bacillus may be found in the pus.

Signs and Symptoms

Apart from discharge from the ear and impairment of hearing, a large proportion of patients endure chronic suppuration of the middle ear for years without pronounced disturbance, either general or local. In fact many of those whose hearing is still good are unaware that anything is or ever has been wrong with their ears. This was clearly demonstrated in the examination of recruits for National Service: routine otoscopy revealed long-standing and often advanced chronic suppuration of which the candidates appeared quite genuinely unaware. While it might be thought that constant purulent discharge would be accompanied by systemic disturbance, it is a clinical fact that such is absent in most cases. Constitutional changes, such as fever and a raised pulse rate, should suggest the possibility of intracranial complication; rigors, the onset of facial paralysis, vertigo and vomiting, and neck rigidity are all of serious import.

Sometimes headache, which may be hemicranial in character and located particularly over the homolateral temporal region, is complained of: often this is not associated in the patient's mind with something wrong with his ear. When present it invariably indicates bone necrosis and may mean exposed dura mater. It is a strong indication for surgical exploration.

An acute flare-up of an old infection is always a dangerous situation, and when signs of acute mastoiditis develop immediate operation is indicated. It should be remembered that in old people with mastoiditis fever is often absent, and that in these subjects headache, local

tenderness, and constitutional disturbance are sufficient to warrant exploration.

The characteristics of the discharge have already been mentioned. Quiescent attic disease may easily escape notice on account of the formation of a scab or crust over the perforation and neighbouring meatal wall, which, because of its brown colour, is often mistaken for wax. All debris and crusting should be softened and removed by syringe or gentle mopping with a wool-headed probe before a meatus and drumhead are passed as normal.

Hearing

When the lesion is in the tympanic area hearing is impaired in almost every case, the loss being due to the partial or complete destruction of the membrana tensa, with consequent immobilization of the malleus and incus, or to hyperplastic changes in the fossa ovalis interfering with the mobility of the stapes. In those cases in which the membrana tensa has been largely destroyed appreciation of low frequencies is lost; high notes are often well heard. Yet it is surprising how well some patients with almost total loss of the drumhead, and even of the malleus and incus, can still hear. Good hearing is often associated with a moist ear, the moisture acting as a false drumhead. This fact has been utilized in chronic cases with dry ears: these patients often hear reasonably well if a drop or two of glycerin or liquid paraffin is instilled into their ears at fairly frequent intervals.

Many patients with attic perforation, however, have for all practical purposes normal hearing, and it may be difficult to explain the need for operation to a person who hears well and has been unaware of any pus in his meatus.

Diagnosis

An inspection of the ear can be made either by directing light from a head-lamp or frontal mirror down a suitably sized aural speculum or with a self-illuminating auriscope (Fig. 2). The first method has the advantage of leaving one hand free for mopping out discharge or removing debris with a wax hook or forceps. Self-

FIG. 2.—Appearance of normal left tympanic membrane.

illuminating auriscopes give good and magnified vision, but both hands are required to manipulate them gently and it is therefore difficult to swab out or remove debris through them.

It is most important to examine the second ear. If normal, it is a useful standard by which to judge the affected ear. It may, however, be diseased, although not complained about.

When there is much discharge or debris it is best to syringe out the meatus with warm lotion before attempting a detailed examination. If the meatal contents are

hard or impacted it may be necessary to soften them for several days before the meatus can be cleared. Glycerin, sweet oil, or a saturated solution of sodium bicarbonate is best for this purpose. Peroxide is not advised; it makes a frothy mess and results in a sodden meatal wall; the "fizzing" is often alarming and even painful to children and some adults. Badly impacted masses of epithelial debris may require instrumental removal under an anaesthetic. It is useless to try to make an accurate diagnosis until the meatus is clear.

As infected teeth, tonsils, adenoids, or accessory sinuses may contribute to tubal and hence to middle-ear infection, the need for their examination is self-evident.

A rough estimation of hearing may help to assess the extent of the disease and may influence treatment. Good hearing will always predispose to a conservative line of treatment if such can be undertaken safely. If there is no useful hearing radical surgery may curtail a long, tedious, and often unsuccessful treatment, without there being any fear of reproach for the destruction of function.

The old Ministry of Labour standard gives a useful rough classification. With the opposite ear occluded by a finger, not stationary but moving rapidly in and out at the entrance to the meatus, try a soft whisper, a forced whisper, an ordinary conversation, and a loud voice at 1 ft. (0.3 m.) from the tested ear, and grade 1, 2, 3, or 4 respectively according to which is first heard.

If a middle C tuning-fork (256 c./s.) is available compare air and bone conduction (Rinne's test) in both ears, and by placing the tuning-fork in the midline see if it is referred more to one ear than to the other (Weber's test). In middle ear deafness bone conduction is usually better than air conduction, and Weber's test is referred to the damaged ear (or worse ear if both are involved).

Polypi may present at the meatal orifice and thus be quite obvious. If deeper in the meatus they can usually be identified by the fact that they lie nearer the eye than the tympanum should, by their usually pink colour, their relative insensitivity, their mobility, and their tendency to bleed when touched or after syringing.

On the other hand, a red and bulging drumhead or swollen tympanic mucosa may be mistaken for a polypus. The first is an acute condition; a swollen mucosa is not insensitive to a probe, nor can a probe be passed around it.

Perforations vary considerably in shape, size, and situation (Fig. 3). They are often quite obvious, but, if not, their presence may be indicated by a granular margin, the protrusion of a bunch of granulations, or by a discharge. Attic perforations are often missed because of their high position.

A small perforation can sometimes be demonstrated by asking the patient to close the nose and mouth and blow out the cheeks forcibly; if the Eustachian tube is patent discharge will bubble through at the site of the perforation or air can be heard to squeak or whistle through it.

Masses of dead, white, greasy, and offensive debris protruding through a perforation or lying in the meatus usually mean cholesteatosis.

Many cases show periodic variations in the amount of discharge, depending on the weather, indulgence in swimming, recurrent coryza, etc., but an acute exacerbation of symptoms accompanied by mastoid tenderness must, as mentioned above, be regarded seriously. As a result of prolonged erosion thin barriers only may separate the infection from vital intracranial structures.

The complications which may occur are labyrinthitis, cerebellar abscess, cerebral abscess, meningitis, lateral sinus thrombosis, and facial palsy. The danger signals have already been mentioned. The prognosis in all but the last has been greatly improved by the advent of chemotherapy and antibiotics.

Treatment

Prevention is Better Than Cure: Cure is Better Early Than Late

Acute suppurative otitis media of infants and children should be carefully controlled. Often a period of in-patient treatment is advisable, and it should be a maxim that no suppurating ear is lost from observation until the discharge has ceased and the drumhead can be seen to be normal again or the site of a dry, clean perforation. A child should not be discharged from a fever hospital with a running ear. Any recurrence must be reported and treated.

Reliance on chemotherapy and antibiotics without visual evidence of a return to normal is dangerous. Fever, pain, and often discharge may abate, but unless the drumhead is seen to recover its normal lustre and landmarks latent infection may still be present.

Failure to resolve may be due to upper respiratory tract infection, of the adenoids particularly, or to spread from the middle ear to the mastoid. In the latter event infection of the mastoid will not necessarily become acute and may settle down to become a chronic reservoir of infection.

If local toilet—probably gentle irrigation and dry mopping are best—fails to give a dry ear, operative treatment of infected tonsils and adenoids or lavage of an infected sinus should be considered, and the mastoid should be carefully

FIG. 3.—Clinical appearance of some common perforations of the left tympanic membrane. A, Antero-inferior perforation. B, Kidney-shaped central perforation. C, Extensive attic excavation, exposing the head of the malleus. D, Small perforation through Shrapnell's membrane. E, Posterior and marginal perforation with granulation in attic region. F, Central perforation hidden by granulations. G, Granuloma hiding perforation through Shrapnell's membrane. H, Extensive loss of membrana tensa, showing bare bone of inner tympanic wall.

investigated. A radiograph may show unsuspected infection of a cellular mastoid, and a timely conservative operation may give both a dry ear and full hearing, and may save permanent damage which ultimately would have necessitated a radical operation.

In established chronic cases treatment may be conservative or operative.

Conservative Measures

In conservative treatment skilled cleansing is of paramount importance. This can be done by mopping under direct vision or, safely and painlessly, by syringing. Many solutions are used, but plain boiled water with or without sodium bicarbonate, 1 dr. to the pint (4 g. to 568 ml.), is as good as anything. The lotion should be used at body temperature, to prevent a caloric reaction of the labyrinth. After careful drying, 50 to 100% spiritus vini rectus can be instilled warm. If there is much discharge, this should be done daily or twice daily. Some prefer the so-called "dry treatment," and after cleaning they insufflate a powder such as boric acid (99 parts) and precipitated iodine (1 part), sulphathiazole, or sulphathiazole and penicillin.

Banham undertook conservative treatment in a number of Royal Air Force personnel with gratifying results. He preferred the dry treatment, and used sulphathiazole and boric powder in equal parts after trying several other combinations. Many cases were rendered dry and remained so while under observation for over 12 months. Causes of failure necessitating operation were mainly: (a) cholesteatosis which could not be removed through the perforation; and (b) marginal perforations with granulation, indicating necrosis of bone.

Granulations and polypi were not necessarily a bar to conservative treatment; these were removed under local analgesia (5% cocaine with a little 1/1,000 adrenaline). (Bonain's drops are probably more certain; they are composed of equal parts of phenol, menthol, and cocaine hydrochloride.) Cases with granulation tissue within the tympanum did not respond so successfully. Central, pre-central, and post-central perforations responded best.

If there was no improvement after two months, operation was advisable. Banham found that a high E.S.R. (20+) was an indication that conservative treatment might fail, and compared this state of affairs to that found in chronic osteomyelitis.

Banham's results were largely confirmed by Scott Stevenson and Ballantyne in a smaller series of cases in the Army. They suggested that, if after one month's trial the dry treatment failed, ionization should be tried for a further month and then operation should be considered.

Collins and Hughes found that local penicillin, with or without other chemotherapeutic agents, was of no value. Systemic penicillin is certainly of no value in chronic suppuration of the ear, except to resolve an exacerbation or control complications.

Operation

Operative treatment is the concern of the otologist. The aim is a dry safe ear, with the antrum and tympanum easy to inspect and with conservation of hearing. Of recent years the endaural approach has become popular; it certainly gives satisfactory results in a high proportion of cases, with the least disturbance of soft tissues, a safe approach to dangerous structures, and a good

cosmetic result. A discussion of the various skin-flaps and modifications of the classical radical mastoid operation would be out of place here.

Even in long-standing cases clearance of upper respiratory infections should always be a first step. Sometimes it will render conservative measures successful, and it certainly improves the chance that a radical operation will succeed, with early healing and epithelization.

Any patient who has had a radical mastoid operation should submit himself for regular inspection and toilet ever after, though this may well be at increasing intervals. The epithelial lining of his cavity is not very secure on its bed of bone, and any accumulation of debris may well lead to ulceration, baring of bone, and the formation of granulation tissue. Careful removal of scales and crusts, cauterization of any granular areas, and the insufflation of a powder or instillation of spirit drops are all that is required.

TUBERCULOSIS HEALTH SERVICE

A conference largely attended by tuberculosis medical officers and tuberculosis visitors and nurses was held at the Royal College of Nursing on January 13 to discuss the present and future administration of the service.

Dr. PHILIP ELLMAN, who presided, said that since the Ministry of Health took it over the tuberculosis service had had inevitable teething troubles. The problem he found most difficult was that of divided responsibility. Preventive action was the sphere of the local authority, while therapeutic action was the sphere of the Ministry. Thus the health visitor was the servant of the local authority, but the chest physician the servant primarily of the Ministry and secondarily to some extent also of the local authority. Who exactly, then, was the health visitor's master? If the health visitor was to do her work properly she must not only visit the patient at home but also be present when the patient came to the chest clinic. No health visitor worth her salt was going to be content to visit the patient in his home without a full knowledge of his condition. Pulmonary tuberculosis was one of the few diseases in which the individual patient was not the only problem to be considered. The incidence in contacts was five times as high as in the population as a whole. Again, what was to be the attitude towards the early curable case in relation to hospital admission? It was all very well to say that the advanced case must take second place, but the question was whether the advanced case was going to be the source of a number of early cases. In the field of prevention it was necessary to educate not only the community but medical students and general practitioners. Why, therefore, should not chest clinics be used as educational centres?

The Waiting-list

Dr. G. E. GODBER, Deputy Chief Medical Officer, Ministry of Health, said that in the past they had become so used to the old organization of the tuberculosis service based on local government boundaries—which were inappropriate to clinical services—that they were slow to perceive its failings. Tuberculosis had been separated off from the general body of medicine to a degree which seriously hindered treatment. It was still the most pressing of our hospital problems. There were long waiting-lists for hospital and sanatorium beds, and to obtain admission to a sanatorium might take many months. Since July, 1948, additional beds had been made available—in general hospitals and their annexes rather than in sanatoria—and the number of nurses increased. The placing of tuberculosis beds in general hospitals made it easier to obtain staff. The important thing was that there should be some place where something could be done at once for the early case.