Otitis externa in children

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SUMMARY. The commonest cause of ear-ache in children is otitis externa and five new cases of otitis externa will be seen for every case of otitis media.

Acute otitis externa and otitis media are quite different and distinct clinical entities in children: the former is a tender, dirty, pruritic ear, often recurring in children with simple febrile illnesses; the latter is more isolated than is realised, non-recurrent and usually accompanying upper respiratory catarrhal illness.

The fleeting nature of otitis externa as seen in childhood is typical of clinical material in general practice that presents quite differently from that in hospital practice. The long aetiological lists quoted in all series of cases of otitis externa in adults do not apply to otitis externa as seen in children.

Introduction

Much has been written about otitis externa, but there are no references to the condition in children in any recent review and only scant comment exists in the literature of general practice. After 25 years of general practice I believe that the commonest cause of ear-ache in children is acute otitis externa, and that this is a distinct and different entity from otitis media and must be considered in statistics of morbidity in general practice. For it is asserted that otitis media is not as common as is believed, and that many of the cases seen may, in fact, be suffering from otitis externa.

Keogh and Russell (1956) reviewed otitis externa. They consider that trauma, with or without itching, is clearly a precursor, but that it is an infective condition usually caused by pathogenic cocci or intestinal organisms. They reiterated the view that it is " most common in hot and humid conditions: rarer in cold climates," but made no mention of children. Beaney and Broughton (1967), studying tropical otomycosis in an important contribution, made no mention of age. An editorial in the *British Medical Journal* in 1969 used phrases similar to Keogh and Russell, but also made no reference to children. Another editorial in 1974 in the same *Journal* stated that the incidence of otitis externa is not as high as expected. Worgan (1969) made no mention of age and considered only chronic cases. Lund (1969) found otitis externa usually in adults (*sic*) and otitis media principally in children, particularly if unilateral. The Royal College of General Practitioners (1970) estimated an incidence of 50 cases each year of otitis media in an average general practice of 2,500 patients, with no reference to otitis externa. *Update* has had several otological reviews in recent years: Shaheen (1969) said otitis externa is uncommon in children. Peasegood (1971) claimed that ear-ache is one of the commonest symptoms in general practice, but made no reference to otitis externa. Livesley (1972) gave a high incidence of otitis media in children quoting different papers, but made no comment on otitis externa in differential diagnosis. Hoekleman (1974) reviewed otitis media emphasising a very high incidence and a relapsing tendency, but does recognise otitis externa. He referred to rubbing the ears, but did not differentiate otitis externa. In 1973, at the Royal Society of Medicine, at a combined meeting of the Sections of Otology and Determatology on otitis externa, there was unbelievably no reference to the conditions in children. " The condition is common in ear, nose and throat departments and in the medical care of service staff in warmer climates " (McDowall, 1974; Peterkin, 1974). A difference in emphasis may be noted in the literature, for otologists and dermatologists may only comment on the cases referred to them, and relate predominantly to pathology of the meatus, or to an auricular incident of a wider condition.

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Method

Our practice in Blackwater had 10,000 patients and 2,000 children under the age of five during the period 1968–1975.

Since 1969 at intervals three separate series of 100 new patients complaining of acute ear-ache have been carefully studied and compared. The first 100 (series 1) formed a pilot study to test the belief that otitis externa was very common. Obvious cases of non-otological ear-ache were excluded—e.g. mumps, cervical adenopathy, and mandibular arthopathy. In series 2 and 3, study of the problem was extended. The mean duration of time in weeks for each of the three series was 28.

Incidence

Table 1 shows the number of new cases of otitis externa and media seen in each series and a remarkable uniformity of incidence. In 1969, my total surgery caseload was 6,872 consultations, an average of 150 each working week, and 16·4 at each consulting session. This average weekly workload has continued.

TABLE 1

INCIDENCE OF OTITIS EXTERNA AND OTITIS MEDIA IN THREE SERIES OF 100 NEW CASES OF EAR-ACHE

Series	*Otitis externa*	*Otitis media*	*Total*
1	83	17	100
2	85	15	100
3	86	14	100

Hence one new case of otitis externa presented in every 49, 46 and 45 consultations respectively in the three series, i.e. one new patient every two days or at most two in every three days. The more severe cases were examined on a second or subsequent occasions, and on average 150 repeat consultations were made for every 80 new cases. It can be calculated that one follow-up case was seen in 27, 22 and 24 consultations respectively—or three or four follow-up cases every two or three days. The annual incidence is 160 new cases of otitis externa and 28 of otitis media for every 2,500 patients of the practice.

Although the symptoms were usually unilateral, 60 (35 per cent) of the 171 cases of otitis externa in series 2 and 3 occurred bilaterally in differing degree. Of the remainder in both series, the cases occurred almost equally in the left and right ear.

TABLE 2

FREQUENCY OF CONSULTATIONS OF 100 CASES OF OTITIS IN SERIES 3

Number of consultations	*Otitis externa*	*Otitis media*	*Total*
Once only	59	8	67
2 within 7 days	21	4	25
3 within 10 days	5	1	6
4 within 14 days	1	1	2
Totals	86	14	100

Table 2 shows the frequency of consultations for the 100 cases in series 3. In 67 cases, a firm diagnosis was made and no repeat consultation required. Second or third consultations were made within seven and ten days respectively for doubtful cases, and in severe cellulitis. All cases

were satisfactory within 14 days, including the few adults of chronic relapsing nature. Not one patient in the whole 300 required specialist advice or referral to hospital.

Age

It was obvious in series 1 and 2 that children predominantly were being seen; it was only in series 3 that age was noted. Table 3 shows that in the series 55 out of 86 cases of otitis externa occurred in children under ten years of age. In both series 2 and 3, there was no difference between male or female sex.

TABLE 3
INCIDENCE OF 100 CASES OF OTITIS BY AGE IN SERIES 3

Age (years)	*Otitis externa*	*Otitis media*	*Total*
0–9	55	10	65
10–19	9	3	12
20–29	9	1	10
30 & over	13	—	13
Total	86	14	100

Symptoms

Acute ear-ache was the common symptom in all patients seen: this may have ranged from a simple pain that woke a child at night to a more severe pain with cellulitis of the meatus. In children, pain was also common particularly on maternal effort to clean the meatus of wax. Many cases have a discharge and this may vary from an excess of wax to a glairy soft white ooze coating the whole canal. Mothers who are particularly sensitive about cleanliness of ears try desperately perhaps with cotton buds to clean out the wax; tenderness is marked, and the attempted cleanliness often resisted. This otorrhoea in children is not offensive as is common in adults.

Many patients complain of itch which is subliminal pain. This may be ostial (i.e. at the orifice of the meatus) or deeper in the meatus, and is often intense. Children when asked if their ears tickle will frequently nod or answer yes. Itching stimulates a scratch, with the finger, or any small object that will enter the meatus and if this is traumatic, superficial infection and cellulitis may follow.

The other serious and worrying symptom to parents and patients is the recurring nature of otitis externa. In 23 of the 86 cases of otitis externa, a worrying comment about this was made by parents of the patient. In my experience, this is not the case with otitis media, which I regard as an isolated unilateral, and non-recurrent condition. The relapsing tendency is so common as to be synonymous with a diagnosis of otitis externa, and it is this recurring tendency which is carried over into adult life. It is the lack of reports on otitis externa in children which has resulted in the belief that there is only an adult form.

Physical signs

The anatomy is important. The external auditory meatus is a canal 25mm long which stretches from the ostium (i.e. the orifice) of the auricle to the tympanic membrane. The wall of the lateral half of the meatus (the concha) is cartilaginous and lined by thick skin, with sweat, sebaceous, and ceruminous glands. The wall of the medial half of the meatus, containing the isthmus, is bony and lined by thin skin closely adherent to the periostium. The skin is continuous with the lateral membranous layer of the tympanic membrane. The blood supply of the skin of the postero-superior wall of the bony canal and its tympanic component is by the deep auricular branch of the internal maxillary artery surfacing from the squamo-tympanic fissure of the temporal bone, which is very often dilated and visible in isthmal otitis externa. It sends branches segmentally to the membrane lateral to the handle of the malleus, and also circumtympanic anastomosing with the vessels supplying the mucous surface of the tympanic membrane.

In otitis externa, inspection of the ear and the ostium of the meatus reveals swelling and often reduction in size of the ostium. There is a wide variation in the normal size of the lumen, but introduction of a speculum may be prevented by oedema, or tenderness. Digital pressure on the ostium or the tragus, traction downwards of the lobule, or supero-posteriorly of the auricle may all be painful and resented. Visible wax may be the normal brown colour and recent, or older, dry and flaking. Frequently there is a white, oozy or glairy discharge lining the canal, both cartilaginous and bony, or even the tympanic membrane. A pulsating light reflex is often seen in the discharge.

TABLE 4

INCIDENCE OF SITE OF CONGESTIVE PATHOLOGY OF OTITIS EXTERNA IN TWO SERIES OF 100 CASES

Series	*Ostial*	*Conchal*	*Bony*	*Tympanic*	*Total*
2	29	9	13	34	85
3	30	13	18	25	86

The incidence of site of the congestive pathology in series 2 and 3 is given in table 4. Ostial and conchal tend to occur together, as do bony and tympanic. Osteo-conchal otitis externa is the more obvious swollen, discharging, tender type of lesion. The bony-tympanic lesion is a deep, painful, possibly throbbing ear with hyperaemia of the bony canal, and obvious vessels emerging from the bony wall and coursing as described. The tympanic membrane usually looks otherwise healthy and normal. Occasionally tiny bullae may be seen on the surface of the tympanum that may be oedematous lymphatics in the infra-tympanic tissue, or oedematous surface cells of the lateral membranous layer. The anterior wall of the isthmal meatus cannot usually be studied adequately because of the bend forwards of the anterior wall.

An adequate electric auriscope with magnifying eyepiece is essential in a study of the external auditory meatus. A head lamp and simple speculum without magnification is inadequate to see the critical detail under examination. Furthermore, examination of young ears requires the greatest care and gentleness if the doctor/patient relationship is not to be disturbed.

Physical signs for deafness are only of limited value in diagnosis. Certainly if the meatus is filled with wax or debris, and the ostium reduced in luminal size, there is interference with hearing. But frequently when the tympanum is congested hearing tests and conduction are normal.

Differential diagnosis

All cases in these series were of aural pathology. The ears have been carefully studied and I have no doubt that the pathology was an external otitis in these cases quoted. The crucial and important diagnostic difference is from otitis media and it is the condition of the tympanum and the contents of the tympanic cavity that must be noted for the diagnosis to be made of otitis media. The mucous membrane lining the middle ear may be simply congested and this is visible as a dull redness through the tympanum. The malleus may also be a dull red, and there may or may not be an effusion. This may be a simple clear effusion perhaps with a fluid level, or bulging the drum slightly or considerably. I have seen distension of the drum by clear fluid, enough to produce a herniation of the mucus layer of the tympanum through a round perforation of the outer layer. The middle ear may, however, be filled with mucopus or pus, in which case the appearance of the drum is opaque of differing colours and consistency. Another common cause of distension of the tympanum in general practice is by air. Children with running or stuffy noses are frequently made to blow their nose by mother, and because the eustachian tube is so widely patent in children, it is easy to balloon the tympanum with air which is trapped.

In series 3 there were nine children presenting with acute ear-ache and signs suggestive of otitis externa, but who had ballooning due to forcible entry of air. Five of these were initially thought to have otitis media, because of the ballooning drum, but on instruction not to blow the nose forcibly and seen within 48 hours again, the diagnosis was changed to otitis externa, there being no evidence of medial congestion, or alteration in conduction of sound. None of the other four cases discharged or perforated, and although diagnosed as otitis media, evidence for this was slender and suspicious. Difficulty arises when there is congestion of the malleal and circumtympanic vessels—these are often visible in primary otitis media, because they anastomose with the vascular supply of the tympanic cavity and assist in its drainage. But this is secondary

otitis externa and occurs in the presence of an abnormal middle ear and an abnormal tympanum. In primary otitis externa these vessels are visible, but with an otherwise normal tympanum and tympanic cavity. Thus otitis media should only be diagnosed upon definite signs in the middle ear, and after excluding primary otitis externa.

TABLE 5
TREATMENT GIVEN IN 100 CASES OF OTITIS (SERIES 3)

Treatments	*Otitis externa*	*Otitis media*	*Total*
Penicillin G and topical steroid	3	5	8
Sulphadimidine and topical steroid	51	8	59
Topical steroid only	26	—	26
Other topical only	3	1	4
Nil	3	—	3
Totals	86	14	100

Table 5 shows the treatment given in the 100 cases in series 3. I have adopted a positive attitude to treatment. In primary first aid at home, the treatment in a child known to be liable to relapsing otitis externa is based on simple analgesics in adequate dosage and the hygroscopic effect of glycerine, usually kept in the kitchen, if topical steroid drops are not to hand. Examination next day establishes the diagnosis, and is soon enough to start further treatment. The benefit of a steroid application to the ostium or deep in the canal is beyond dispute—on occasion wax solvents with or without syringing are a preliminary requirement before the application of topical steroid drops. Many cases of local furuncles or osteo-conchal cellulitis require an antibiotic, and deep meatal lesions should have the protection of antibacterial agents in an organ so important to children. Sulphadimidine B.P. has consistently been found quite adequate in most cases. It is soluble in body fluids, and not protein bound, is palatable, acceptable and very rarely prone to toxic rashes, as are many modern antibiotics, and therefore thought to be a very useful drug in this age-group, which should not be subjected to the many toxic drugs available today, if possible.

This clinical management is quite different from that of otitis externa in adults: whereas adult therapy often consists of medicated wicks and packs placed in the meatus, not one of the cases in these series has required or was treated with local treatment other than steroid or hygroscopic drops. The response to simple treatment follows simple diagnosis in these cases in children. For the complicated web of aetiological causes of otitis externa in adults does not apply in childhood, although further follow-up of childhood cases into adult life by general practitioners could result in better definition in children.

Discussion

The external auditory meatus is a slender test-tube cavity with no evidence of circulation of air, except that cooler air would presumably enter along the inferior surface of the meatus downwards to the drum, rising there to replace warmer air travelling upwards along the superior surface to the exterior. The aural temperature is slightly higher than the mouth (Cross and Stratton, 1974) and this is related to brain metabolism, which is responsible for up to 70 per cent of total body heat production in new-born children, falling to 18 per cent of total body heat production in the resting adult.

Certainly in the first five years of life, children often suffer from episodes of simple fever with or without catarrh. Aural temperature must also be raised; indeed, the episodes of otitis externa in these series under study were consistently noted (but not quantified) in young children having mild non-specific febrile incidents. In my experience, it is also easy to think that the patnology is medial, but careful check and review may change this to external.

This critical approach is supported by the work of Savage and Gilsenan (1975). In a study of 135 children admitted to hospital within a 12-month period with febrile convulsions, 30 were found to have a pink drumhead. Of these, 22 were untreated and normal within five days. They concluded that pink drumheads in a child after a febrile convulsion should not uncritically be labelled otitis media, and that the hyperaemic drum is somehow related to the febrile state.

It is difficult to explain the pathology: the febrile or hyperaemic meatus will increase the aural temperature and air circulation, and aural sweating the humidity, and this may allow entry and initial aural growth of yeasts, fungi or organisms. A co-existing secretion of wax on the antero-inferior surface of the meatus, at the site of air entry, may be developed as part of the child's aural immunological reaction. As Beaney and Broughton (1967) emphasise, wax is nature's waterproof lining of the meatus. They made a careful clinical and pathological study of tropical otomycosis, which has an application in the hyperaemic external ear of a febrile child. They emphasise the alteration of the normal protective acid pH in a sweating, hot ear. The lipid mantle, i.e. the lining of wax, preserves the viability of the epithelium, and they assert that swimming and diving can remove or damage the altered lipid mantle, and allow fungal spores to gain entry and germinate, particularly to form a nidus in the pre-tympanic sulcus. This cannot apply so markedly in the young child in a temperate climate, but the febrile child with ear-ache frequently does have visible sweat, and ceruminuous gland activity, itself often associated with local pain and tenderness. Adults also have visible sebum on meatal hairs. The glairy white, oozy sludge so often seen in more severe forms of otitis externa consists of desquamated epithelial debris saturated with serum, aural sweat, and sebum; there may or may not be fungi, for there is certainly no offensive smell in children as is so often noted in adults. On occasion sheets of exfoliated epithelium or casts may be seen particularly in adults, occasionally in children and removed from the meatus, leaving raw and exposed sub-epithelial tissue. Beaney and Broughton (1967) found aspergillus and *Candida albicans* the two common fungi—spores being carried by droplet spread in conditions of high environmental humidity. Fungi, in their view, are often associated with pathogenic bacteria—*Staph. aureus*, *Ps. pyocyaneus* and *E. coli*, and this supports the views of Keogh and Russell. In my series, no serious attempts were made to identify organisms, yeasts or fungi, but no growth was ever reported from many swabs taken in children. In treatment, Beaney and Broughton believed at that time (1967) that topical steroid drops were harmful in that fungal infection was predisposed by their use. Their treatment for adults with hydrargaphen wicks is completely different from the treatment I use for children, whose ostia are so small that wicks could not be inserted, nor are they necessary. Similarly the small lumen allows only superficial attempts at investigation, for unless the most careful, but quick and gentle examination is made, there can be aggravation of pain, and damage to patient confidence, so easily recalled by children on subsequent occasions.

As I believe there are two separate, different and distinct clinical conditions, general practitioners are recommended to scrutinise each case of ear-ache with a more critical approach; only they will be able to note the difference in the two entities, for their hospital colleagues are too remote to be able to study the common detail which arises so fleetingly in the medical history of childhood.

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