

Diseases of the Ear that Cause Inflammation

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ABSTRACT:

One of the most frequent illnesses a paediatrician sees is inflammatory disease of the middle and external ear. Inflammations of the inner ear, which are less frequent, require immediate and specific care. Each case needs special management, which includes a thorough history, physical exam, any required investigations, and when necessary, a proper referral to an otolaryngologist. The goal of the article is to assist in developing a strategy for treating inflammatory ear disorders. While vertigo, tinnitus, and sensory hearing loss make up the symptom complex for inner ear infections, otalgia is the most noticeable symptom of external and middle ear inflammations. To implement a targeted treatment, it is vital to comprehend the fundamental pathophysiology of the inflammatory illness. The cornerstone of the investigative workup consists of audiometry impedance testing, microbiology of discharge, and occasionally an ABR and CT scan. Based on the precise diagnosis, the treatment is tailored. An otolaryngologist is frequently needed to assist with it. The need for any surgical intervention may need to be decided, especially in cases of acute otitis media, an external canal abscess, or acute mastoiditis. A case of labyrinthitis or chronic otitis media with facial palsy or vertigo requires immediate attention.

Keywords: Vertigo; Acute mastoiditis, Otagia.

INTRODUCTION:

Some of the most frequent issues that children with inflammatory ear disorders present with in a paediatric clinic. They typically affect the middle and external ears. Inflammation of the inner ear is quite uncommon and typically results from the spread of an infection from the cerebral cavity or middle ear. A thorough head and neck exam and a thorough medical history will frequently yield enough data to make a clear diagnosis. The diagnostic process requires specific investigations, such as those in audiology and radiology, and repeated examinations along with treatment will help determine the ultimate diagnosis. Referral to an

otolaryngologist may be necessary for certain conditions or their consequences. The purpose of this article is to highlight significant pathologic processes and therapeutic recommendations while also aiding in the formulation of a diagnostic strategy for treating inflammatory illnesses at various regions of the ear.

To pinpoint the location and nature of the pathology affecting the ear, it is important to confirm the presence of a number of symptoms during the investigation. These include facial paralysis, pruritus, otalgia, otorrhea, hearing loss, swelling, vertigo, tinnitus, and vertigo. Each symptom's location, degree, and nature should be identified, along with its cause and any mitigating circumstances. It is important to take note of the timing of each symptom since those that constantly recur, such as atopic dermatitis causing otitis externa, may be signs of a more widespread illness.

Otalgia

When there is an issue with the skin, auricular perichondrium, external ear canal, or external layer of the tympanic membrane, it might result in external ear pain (TM). Commonly, pressure from the middle ear placed on the TM causes discomfort in the middle ear. Additionally, pain may develop if the illness affects the dura and periosteum in addition to the temporal bone. Otalgia can originate primarily from the ear (otologic) or be referred from another source due to the strong sensory innervation of the external and middle ears (nonotologic)

Otorrhea

There are different types of ear discharge that might come from the middle or external ear. Otitis external, especially of the lateral cartilagenous canal, is compatible with the drainage of cerumen or squamous debris. Discharge that is purulent, bloody, serous, or mucoid might result from inflammation in the external ear canal or from the middle ear via a rupture in the tympanic membrane. One would be wary of a CSF fluid leak with trauma or an iatrogenic fluid instillation if there was a clear discharge.

Hearing Loss

The kind of hearing loss—conductive, sensorineural, or mixed—can reveal the location of the illness process. The external and middle ear's sound-conditioning mechanisms are more frequently affected by inflammatory illnesses. If there is an acute sensorineural loss that is also present with the imbalance, this could be an indication of inner ear inflammation.

Vertigo

Numerous inflammatory ear conditions, such as lightheadedness, giddiness, and vertigo, can cause dizziness in one of its many forms. These include recurrent falls that are not explained, extraordinary clumsiness, and frequent bumping into things in children. True vertigo, the sensation that the patient or the surrounding environment is spinning, typically denotes an

issue with the inner ear's balancing system. This can be distinguished by episodes that can last a few seconds but are frequently longer. The symptom may also be accompanied by hearing loss, ataxia, past-pointing, nausea, and nystagmus. It is frequently made worse by head movement.

Tinnitus

Tinnitus can be caused by a variety of issues, from a serious inner ear ailment to an increased sensitivity to regular body noises [1]. Tinnitus frequently coexists with hearing loss in inflammatory ear disorders, and periodic evaluations may reveal a change in the severity of hearing loss.

Facial Paralysis

Usually, diseases affecting the nerve itself, like Bell's palsy and herpes zoster oticus, lead to facial nerve abnormalities. Inflammatory ear illnesses, however, may result in facial paralysis because the facial nerve travels a tortuous path through the temporal bone, either by infection, inflammatory infiltration, or compression.

Pruritus

Being a sensation unique to the skin, pruritus represents disease processes at the exterior canal of the skin 2. It highlights the likelihood that a wide range of dermatological disorders could be the root of external ear illness. It may be a sign that the inflammation in the external ear canal has subsided, but it could also be the root of any recurrent issues.

A thorough history should include questions about other organ systems. For instance, as seen in Wegener's granulomatosis, the patient's middle ear effusion may be accompanied by nasal discomfort, hemoptysis, and hematuria. The current presenting problem may signal a recurrence of the disease in people who may have previously undergone ear surgery for cholesteatoma. The patient's medication history and drug sensitivities are particularly crucial, as some topical drugs may result in a localised allergic reaction. Even the patient's leisure pursuits may point to the pathology's etiological agent, as is the case with surfers who have external ear canal exostoses.

EXAMINATION:

Inspection of the auricle and its surrounding tissues comes first in a physical examination of the ear, then manipulation of the pinna and otoscopic vision of the external auditory canal and tympanic membrane. Note in particular the fluctuance of an infected cyst that needs drainage or the presence of white squamous debris within a perforated ear drum to indicate a cholesteatoma. Other symptoms to look out for include the beefy red pinna sparing the lobule associated with perichondritis, the foul green otorrhea that is characteristic of pseudomonas. The issue ear is compared with the contralateral ear after the latter has undergone examination.

Through the use of whispering and running fork procedures, hearing function can be assessed. Nystagmus is noted, the patient's gait is observed, and tests for cerebellar impairment are used to determine the vestibular function. Positional vestibular impairment can be easily detected with positional and positioning tests (Hallpike manoeuvre). A full head and neck exam is necessary as always, with a focus on checking the cranial nerves, the postnasal area, and the neck for cervical lymph nodes.

INVESTIGATIONS:

For infectious infections of the external and middle ear, microbiologic tests may be necessary to identify the organisms and their susceptibility to particular drugs. Occasionally, when acute otitis media is resistant to conventional antibiotic therapy, tympanocentesis for microbiologic tests may be advised. The extent of disorders like malignant otitis externa or cholesteatoma can be determined with the aid of radiologic examinations like computed tomography (CT) and radionuclide scans. These tests establish a baseline and aid in formulating a therapy strategy.

In order to evaluate middle and inner ear inflammatory events, hearing evaluation using audiological devices such as auditory brainstem response (ABR), tympanometry, and conventional audiometry is necessary. The doctor must ascertain the underlying reason of the patient's deafness; if diagnostic audiology is not offered, the otolaryngologist will make the necessary referrals and send the patient to a facility where testing can be performed. In cases where immunological problems are suspected, such as otitis media with *Pneumocystis pneumoniae* in HIV-positive patients, specialised laboratory investigations may be necessary. Otologic symptoms can be caused by a variety of systemic immunologic inflammatory disorders. These include Cogan's syndrome, relapsing polychondritis, and rheumatoid arthritis. It will be necessary to refer them to doctors experienced in treating these unusual problems.

MANAGEMENT:

The diagnosis of inflammatory disorders must be precise in order to be treated. Treatment has been adequately explained [3,4,5]. If the external ear is the location of the inflammation, one should ascertain whether it is localised or widespread, infectious or noninfectious. Most patients have infectious, localised diseases when they first arrive, which can be treated with topical medications and conservative approaches. A satisfactory outcome is typically achieved by eliminating the infection's source, using both systemic and topical antibiotics, and performing rigorous cleaning. Consultation with an otolaryngologist may be required in circumstances when the etiologic agent is challenging to eradicate, the symptoms are severe, or the diagnosis is not obvious.

It's critical to comprehend the processes by which the ear canal heals following an inflammatory event. The meatal skin's suppleness is reduced, and the ceruminous and

sebaceous glands atrophy as a result of exogenous and endogenous factors such fluid maceration, chemical and mechanical damage, allergies, and diabetes. The end consequence is meatal skin that is dry, a chemical imbalance, and greater susceptibility to bacterial and fungal illness. -6. pH, temperature, moisture content, and aeration of the area are elements that are critical for bacterial growth in the canal. The development of chronic otitis externa with recurrent bouts of bacterial exudative inflammation may result from alteration to these protective components.

Avoiding self-cleaning of the external meatus with inappropriate tools, using medications to sooth pruritus and lubricate the skin, and, in the case of chronic recurrent otitis externa, routine otologist treatment are all examples of preventative strategies. A diffuse otitis externa may conceal the presence of a foreign body or a malignant otitis externa, which is another crucial consideration. In children, a surgical evaluation may be required. There are two types of middle ear inflammation: acute and chronic.

Middle ear effusions' pathophysiology has previously been covered in this journal. Surgery is frequently needed to treat an otitis media complication. A young kid with otitis media who additionally exhibits post-auricular edoema, facial nerve paresis, vertigo, or unrelenting excruciating pain has to be evaluated right once; radiological tests could be required to rule out cerebral disease extension. The course of treatment may include tympano-mastoidectomy, intravenous antibiotics, a simple myringotomy and tube insertion, or even a craniotomy. A cholesteatoma may be present if there is a marginal perforation, a deep retraction pocket, or persistent painless otorrhea. These instances need to be quickly submitted to an otolaryngologist because these lesions have a predisposition to degrade bone. Although the prevalence of intracranial problems linked to acute otitis media has decreased with the development of antibiotics, children with chronic otitis media continue to often develop intracranial abscesses. Despite advances in technology and medical care, these major consequences still result in high rates of morbidity and mortality [7, 8]. Other issues need less immediate evaluation. A tympanoplasty can be used to repair a persistent tympanic membrane perforation in an older child with healthy eustachian tube function. Tympanosclerosis can result in ossicular chain fixation, which can be treated with either hearing aids or an ossiculoplasty.

Inflammatory illnesses of the inner ear that are acquired typically cause temporary sensorineural hearing loss as well as vestibular imbalance. The most frequent reason for otitis media with effusion in children. Any kid with otitis media and progressive or fluctuating sensorineural hearing loss should have a thorough examination to rule out significant labyrinthitis. Myringotomy, tube insertion, and the administration of intravenous antibiotics may be necessary as a result. As the hearing loss may worsen, more involved surgery may be needed to treat the cholesteatoma or the perilymph fistula. Additionally, a superb labyrinthitis that develops from a serous labyrinthitis can have severe effects like meningitis.

Sensorineural hearing loss that might develop significant may be related with congenital inflammatory diseases of the inner ear. Early auditory rehabilitation and cochlear implantation may help prevent the detrimental consequences of early-onset deafness on the development of speech and language, hence these instances should be diagnosed as soon as feasible. It's critical to distinguish between Bell's palsy and herpes zoster oticus (HZO). Face paralysis, vesicles in the external auditory meatus, and excruciating neuralgic pain are all symptoms of HZO. [11] In 40% of cases, severe sensorineural hearing loss develops. The long-term outlook for facial nerve function is not good. Acyclovir therapy administered early on with vigour may have better results. [12]

CONCLUSION:

Some of the most frequent issues that patients present to their family doctor are inflammatory illnesses of the ear. There may be a wide range of differential diagnoses. The site and kind of inflammation are often determined by a thorough history, physical examination, and pertinent investigations. Each disorder's particular management is thoroughly detailed. Understanding the fundamental pathophysiology of the external ear and middle ear during the phase of inflammation resolution is essential to management, as is identifying complications that need for expert care from an otolaryngologist.

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