

Diseases of the middle ear

Acute Suppurative Otitis Media:

Acute suppurative otitis media may be viral or bacterial and is accompanied by signs of pain, pressure sensation, diminished hearing and occasional drainage. It is acute both in name and in onset in the patient. This disease is most commonly seen in children, but adults are not immune to this problem. This constitutes one of the most common reasons for a visit to the pediatrician.

The inflammation causes pressure and acidity behind the eardrum, leading to acute, sometimes exquisite, pain. The most common bacteria continue to be streptococcus and hemophilus strains, but other organisms can also be involved. Fortunately most acute infections will resolve even without specific treatment. It is because of that fact that many physicians now advocate the use of pain management alone in an uncomplicated infection, reserving the use of antibiotics for cases which persist with severe pain beyond the first 2-3 days. Rarely, the infection is problematic enough to require more than antibiotics alone. In those instances drainage of the ear by opening a hole through the eardrum is done (a myringotomy or tympanotomy). This usually is used only when all else fails or a complication ensues.

Occasionally, complications occur during an episode of acute otitis media. Such complications can involve the structures of the ear itself resulting, for instance, in facial paralysis, a perforation of the eardrum, or inner ear infection (labyrinthitis). Rarer still, the bone of the mastoid can become so infected that it begins to die and dissolve away.

This is termed coalescent mastoiditis and it requires surgical intervention when it occurs.

Fortunately these are all rare.

Recurrent acute otitis media can indicate the need to pursue the insertion of PE tubes for preventative purposes when the usual treatments fail to solve the problem..

Please see the pediatric section for a discussion of that management.

Chronic Suppurative Otitis Media

Chronic suppurative otitis media manifests in most instances by (1) **recurring** or **persistent drainage** from the ear, (2) hearing loss, and (3) infrequent bouts of pain. By definition, there is some form of barrier breakdown between the skin-lined outer ear canal and the mucosa-lined middle ear: This is most often a tympanic membrane perforation. The condition occurs over months to years of time; with varied intervals between episodes of difficulty.

Only the physical examination can sort out the various difficulties that are a potential part of this disease process. The usual otoscopic examination may not permit full evaluation of the tympanic membrane. Epithelial debris (dead skin), mucous and even cerumen



can all disguise the presence of the barrier breakdown or perforation, which was mentioned above. A **microscope** and a **suction apparatus** are therefore essential. They allow the physician to meticulously clean and inspect the entire ear canal and tympanic membrane. The presence of a **perforation** and history of recurrent drainage with hearing loss confirms the diagnosis of chronic suppurative otitis media.

The physician will also examine the ear for the presence of disruption of the ossicles (“little bones”) of vibration in the middle ear and will assess nerve structure integrity. These too of course are important aspects of evaluation used in planning therapeutic intervention.

Therapy for chronic suppurative otitis media can vary from medical therapy, which includes meticulous cleaning of the ear as well as intervention with ear drops and on occasion, oral antibiotic therapy. Surgical intervention may also be required, and may range from **tympanoplasty** through and including **mastoidectomy**. Either of these surgical interventions may also be accompanied by **ossicular chain reconstruction**, attempting to replace the lost vibration ability of those three little bones within the middle ear cavity.

Cholesteatoma

One cause of persistent and recurrent drainage from the ear is in many instances a cholesteatoma; a disease characterized by the presence of skin within the middle ear and or mastoid cavity. This particular process is often combined with infectious production of mucous, pus, and granulation tissue (which is an inflammatory response to the epithelium.) A combination of skin and granulation tissue has been shown to erode bone, which will progressively result in ever-increased difficulties with the ear structure. It acts as a local tumor which invades and damages neighboring structures. Not uncommonly this results in erosion of the ossicular chain,



(malleus, incus and or stapes) thus increasing the hearing loss. If left untreated the potential exists for this disease process to erode into the labyrinth or the inner ear structures causing severe to profound hearing loss and severe vertigo (a balance disorder). It also may result in facial nerve weakness or paralysis. Erosion can also enter the area of the cranial cavity resulting in possible abscess formation in the brain area.

Again, this is not a tumor but rather a disease process that acts locally much as a tumor does. It therefore requires surgical removal as a tumor would. Precise surgical treatment depends upon the position and involvement of the cholesteatoma. As each person is somewhat different, your individual disease process will require that the physician involved with your care tailor surgical approaches from tympanoplasty through tympanomastoidectomy with or without ossicular reconstruction according to the need at the time of surgery.

Otosclerosis

The disease of **otosclerosis** is a problem related to decreased motion of the **stapes**, one of the small bones, or ossicles, behind the eardrum. An over-growth of bone around the stapes' base impairs its normal vibratory capacity. This diminishes sound conduction from the eardrum into the inner ear. This type of block in sound conduction is called a conductive hearing loss, which is the hallmark of otosclerosis.

Otosclerosis may occur in one or both ears. Commonly it does not have an equal onset time frame in each ear when it does occur bilaterally. It evokes essentially no other significant symptomatology. The process may on occasion also result in an additional

sensorineural hearing loss or inner ear hearing loss, which appears to be an occurrence when the focus of bony overgrowth invades the inner ear and perhaps results in activities of enzymes that affect the function of the inner ear. For the most part, however, otosclerosis presents clinically as a conductive hearing loss that may have a familial component, that is, other family members may have this process. It would appear that there might also be a viral component to this; at least research suggests that is a possibility.

Otosclerosis may be treated by one of two methods. A hearing aid system will increase the volume entering the external auditory canal, forcing sound through the stiff middle ear bones. This can restore hearing to a level that is basically still normal for most all patients with a conductive component to their hearing loss. Of course a sensorineural component can also be treated, but is not restorable quite to normal in the same way. A second option is surgical intervention. Surgical intervention consists of procedure called a **stapedotomy or Stapedectomy**. A stapedotomy is a small hole, made in the footplate or base of the stapes bone. This opening then allows restoration of hearing by placement of a prosthetic stapes bone which travels from the incus bone into the hole at the stapes' base. Stapedectomy is similar however involves partial or complete removal of the stapes footplate. The stapes procedure is an elegant operative intervention which can yield dramatic results.