Chronic ear infection

Chronic ear infections may be due to several causes including a hole in the ear drum, poor Eustachian tube function, or skin growing into the middle ear and mastoid bone (cholesteatoma). Common symptoms include hearing loss, discharge, tinnitus (ringing in the ears), fullness, dizziness, and rarely facial nerve weakness. The treatment of this condition usually requires a combination of medical management and surgery.

FUNCTION OF THE NORMAL EAR

The normal ear depends on multiple parts that transmit sound waves to the inner ear. The ear canal, ear drum, and three ear bones (ossicles) are critical for the sound wave delivery to the inner ear. Loss of hearing from one of these structures results in a *conductive* hearing loss. With chronic ear infections, a problem with any of these parts can cause a significant conductive hearing loss. The inner ear includes the cochlear and the hearing nerve. Hearing loss from abnormalities of the inner ear results in *sensorineural* hearing loss. The inner ear is rarely affected by chronic ear infections, so by correcting the parts affected by the chronic ear infections, hearing may be improved.

THE DISEASED MIDDLE EAR

Disease involving the ear drum or one of the three ear bones may cause conductive hearing loss. This may be due to a hole in the ear drum, scar tissue in the middle ear, or destruction of the ear bones by a cholesteatoma. By repairing the hole in the ear drum or replacing the ear bones, hearing may be improved.

CARE OF THE EAR

Care of the ear with chronic infections is important to prevent progression of the disease. If there is a hole in the ear drum, water should not be allowed in the ear canal. The easiest way to prevent this is to use a cotton ball coated with Vaseline while showering and avoid water activities. If you are considering swimming, ask your doctor.

If the ear begins to drain, this may be a sign of a more serious problem. Call your doctor. Many times the drainage will stop by keeping the ear dry and placing antibiotic drops. A cotton ball may be used to catch any drainage.

MEDICAL TREATMENT

The most common medical treatment is antibiotic ear drops. Sometimes, your doctor may apply a powder in the office or have you apply the powder at home. Oral antibiotics are seldom needed.

SURGICAL TREATMENT

Often the management of chronic ear disease is surgery. A hole in the ear drum may cause drainage and hearing loss that are usually improved with repair of the ear drum. In cases where the skin of the eardrum has entered the middle ear or mastoid (a condition called a cholesteatoma), more extensive surgery is needed.

The primary goal of surgery for chronic ear infections is to prevent more serious infections from occurring. However, with newer surgical techniques, hearing may be improved in most cases. Reconstructing the small ear bones can be achieved with multiple techniques. The most common technique is to replace the missing ear bones with a titanium prosthesis.

Sometimes it is necessary to plan a second surgery at a later date, especially if the disease is caused by cholesteatoma. Recurrence of cholesteatoma is not uncommon after surgery and a second surgery will evaluate for possible recurrence. In addition, hearing results tend to be better if the reconstruction is performed at a second surgery.

MYRINGOPLASTY

A myringoplasty is a procedure to repair a hole in the eardrum. The ear bones are not affected by the disease. For a small perforation, the repair may be done in the clinic with a paper patch or by placing a small piece of fat through the perforation. More often the procedure is performed in the operating room under general anesthesia. A small incision is made behind the ear and the covering (fascia) of the chewing muscle over the ear is used to repair the hole.

This is an outpatient procedure and patients may return to work in 3-5 days. It is important to keep the ear canal dry while the repair is healing. This is easily accomplished with a cotton ball and Vaseline. After about six weeks, hearing will usually be improved.

TYMPANOPLASTY

An ear infection may cause a hole in the ear drum and/or damage the three ear bones that transmit sound from the ear drum to the inner ear and hearing nerve. Tympanoplasty is the operation performed to eliminate any infection and repair both the sound transmitting mechanism and any hole in the eardrum. This procedure seals the middle ear and improves the hearing in many cases.

Most tympanoplasties are performed through an incision behind the ear under general anesthesia. The hole in the eardrum is repaired with tissue called fascia which is located over the ear. Sound transmission to the inner ear is accomplished by repositioning or replacing diseased ear bones with a prosthesis usually made of titanium.

In some cases it is not possible to repair the sound transmitting mechanism and the eardrum at the same time. In these cases the eardrum is repaired first and, six months or more later, the sound transmitting mechanism is reconstructed. (See planned second stage.)

TYMPANOPLASTY WITH MASTOIDECTOMY

Active infection may in some cases cause the skin of the ear canal to grow through a perforated eardrum into the middle ear and mastoid. When this occurs, a skin-lined cyst known as *cholesteatoma* is formed. This cyst may continue to expand over a period of years and destroy the surrounding bone. If a *cholesteatoma* is present, the drainage tends to be more constant and frequently has a foul odor. In many cases the persistent drainage is due only to chronic infection in the bone surrounding the ear structures.

Once a cholesteatoma has developed, or the bone has become infected, it is rarely possible to eliminate the infection by medical treatment. Antibiotics placed in the ear only result in a temporary improvement in most cases and recurrent drainage is common once the ear drops are stopped.

A cholesteatoma or chronic ear infection may persist for many years without difficulty except for the annoying drainage and hearing loss. It may by local expansion and pressure involve important surrounding structures. If this occurs the patient will often notice a fullness or a low grade aching discomfort in the ear region. Dizziness or weakness of the face may rarely develop. If any of these symptoms occur it is imperative that one seek immediate medical care. Surgery may be necessary to eradicate the infection and prevent serious complications.

When the destruction by cholesteatoma or infection is widespread in the mastoid, the surgical elimination of this may be difficult. Surgery is performed through an incision behind the ear. The primary objective is to eliminate infection resulting in a dry, safe ear.

In most patients with cholesteatoma, it is not possible to eliminate infection and restore hearing in one operation. The infection is eliminated and the eardrum rebuilt in the first operation. This requires a general anesthetic and is usually done as an outpatient procedure. The patient may usually return to work in less than a week.

When a second operation is necessary, it will be performed six to twelve months later, to restore the hearing mechanism and to reinspect the ear spaces for any residual (remaining) disease. See below.

TYPES OF MASTOID SURGERY

There are two techniques of mastoid surgery: canal wall up and canal wall down. The decision on which technique is usually made at the time of surgery.

Canal wall up mastoidectomy is preferred because little, if any, precautions are necessary after the ear has healed (3 to 4 months).

Canal wall down surgery is necessary about 10% of the time because of the extent of the disease or the development of the mastoid bone. Healing may be prolonged. Canal wall down

surgery results in a larger ear opening (meatus) but little difference in the appearance of the ear. Periodic cleaning of the mastoid (ear) cavity is necessary indefinitely and it may be necessary to avoid water in the ear.

TYMPANOPLASTY: PLANNED SECOND STAGE

The purpose of this operation is to reinspect the ear spaces for disease and to improve the hearing.

More often than not surgery is performed from behind the ear under general anesthesia. The ear is inspected for any residual (remaining) disease. Sound transmission to the inner ear is accomplished by replacing missing ear bones.

The surgery is performed as an outpatient procedure and the patient may return to work in less than a week. Healing is usually complete in eight weeks. Hearing improvement is frequently noted at that time.

TYMPANOPLASTY WITH REVISION MASTOIDECTOMY

The purpose of this operation is to eliminate discharge from a previously created mastoid cavity defect and to improve the hearing.

The operation is performed under general anesthesia through an incision behind the ear. The mastoid cavity may be obliterated with bone. At times, the ear canal is rebuilt with cartilage or bone. The eardrum is repaired and, if possible, the hearing mechanism is restored. In most cases, however, a second operation is necessary to obtain hearing improvement (see Tympanoplasty: Planned Second Stage).

Complete healing of the inside of the ear may take four months.

MODIFIED RADICAL MASTOIDECTOMY

The purpose of this operation is to eradicate the infection without consideration of hearing improvement. It is usually performed in those patients who may have very resistant infections or have infection in an only hearing ear. Occasionally, it may be necessary to perform a radical mastoid operation in some cases that originally appeared suitable for a tympanoplasty. This decision is made at the time of surgery.

The radical mastoid operation is usually performed under general anesthesia as an outpatient. Complete healing may require up to four months.

YOUR OUTLOOK WITH SURGERY

Drainage: Eardrum grafting is successful in over 90% of patients, resulting in a healed, dry ear. Factors that may lead to less successful grafting include young age, revision surgery, or Eustachian tube dysfunction.

Hearing: Hearing improvement following surgery depends upon many factors, among which are the extent of the ear bone damage and the ability of the ear to heal properly.

In some cases two operations will be necessary in order to improve or maintain the hearing. In this case your hearing may be worse in the operated ear between the first and second stage.

WHAT TO EXPECT FOLLOWING SURGERY

There are some symptoms that may follow any ear operation.

Taste Disturbance and Mouth Dryness Taste disturbance and mouth dryness are not uncommon for a few weeks following surgery.

In some patients this disturbance is prolonged.

Tinnitus Tinnitus (head noise), frequently present before surgery, is almost always present temporarily after surgery. It may persist for one to two months and then decrease in proportion to the hearing improvement. Should the hearing be unimproved or worse, the tinnitus may persist or be worse.

Numbness of Ear Temporary loss of skin sensation in and about the ear is common following surgery. This numbness may involve the entire outer ear and may last for six months or more.

Jaw Symptoms The jaw joint is in intimate contact with the ear canal. Some soreness or stiffness in jaw movement is very common after ear surgery. It usually subsides within one to two months.

Ear Drainage—It is common to have bloody drainage from the ear canal for 3-5 days after surgery. A cotton ball can be used and changed as needed. If the drainage turns yellow or becomes foul--smelling, you should call your doctor.

RISKS AND COMPLICATIONS OF SURGERY

Fortunately major complications are rare following surgery for correction of chronic ear infection.

Ear Infection—Ear infection, with drainage, swelling and pain, may persist following surgery or, on rare occasions, may develop following surgery due to poor healing of the ear tissue. When this is the case, additional surgery might be necessary to control the infection.

Loss of Hearing may be further impaired permanently in about 3% of cases due to the extent of the disease present or due to complications in the healing process; nothing further can be done in these instances. On occasions there is a total loss of hearing in the operated ear.

In some cases a two--stage operation is necessary to obtain satisfactory hearing and to eliminate the disease. The hearing is usually worse after the first operation in these instances.

Dizziness—Dizziness may occur immediately following surgery due to swelling in the ear and irritation of the inner ear structures. Some unsteadiness may persist for a week postoperatively. On rare occasions dizziness is prolonged.

Facial Paralysis—The facial nerve travels through the ear bone in close association with the middle ear bones, eardrum and the mastoid. A rare postoperative complication of ear surgery is temporary paralysis of one side of the face. This may occur as the result of an abnormality or a swelling of the nerve and usually subsides spontaneously.

On very rare occasions the nerve may be injured at the time of surgery or it may be necessary to excise it in order to eradicate disease. When this happens a skin sensation nerve is removed from the upper part of the neck to replace the facial nerve. Paralysis of the face under these circumstances might last six months to a year and there would be a permanent residual weakness. Eye complications, requiring treatment by a specialist, could develop.

Hematoma—A hematoma (collection of blood under the skin) develops in a small percentage of cases, prolonging hospitalization and healing. Reoperation to remove the clot may be necessary if this complication occurs.

Complications Related to Mastoidectomy

A *cerebral spinal fluid leak (leak* of fluid surrounding the brain) is a very rare complication. Reoperation may be necessary to stop the leak.

Intracranial (brain) complications such as meningitis or brain abscess, even paralysis, were common in cases of chronic otitis media prior to the antibiotic era. Fortunately these now are extremely rare complications.

TRAVEL RESTRICTIONS FOLLOWING SURGERY

You should have someone drive you from the hospital. Air travel is permissible 48 hours after surgery.

GENERAL COMMENTS

If you do not have surgery performed at this time, it is advisable to have annual examinations, especially if the ear is draining. Should you develop dull pain in or about the ear, increased discharge, dizziness or twitching or weakness of the face, you should immediately consult your physician.