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WELCOME

Welcome to the Michigan Ear Institute, one of the nation's leading surgical groups specializing in hearing, balance and facial nerve disorders. The Michigan Ear Institute is committed to providing you with the highest quality diagnostic and surgical treatment possible.

Our highly experienced team of physicians, audiologists and clinical physiologists have established international reputations for their innovative diagnostic and surgical capabilities, and our modern, attractive facility has been designed with patient care and convenience as the foremost criteria.

It is our privilege to be able to provide care for your medical problems and we will strive to make your visit to the Michigan Ear Institute a positive and rewarding experience.

CHRONIC EAR INFECTIONS

The diagnosis of chronic otitis media (long standing infection of the middle ear) has been determined as the cause of your ear problem. The reason that you have come to your doctor may be drainage from the ear, hearing impairment, tinnitus (head noise), dizziness, pain, or weakness of the face. What symptoms that you may have depends on the extent of disease and its location.

TYPES OF HEARING IMPAIRMENT

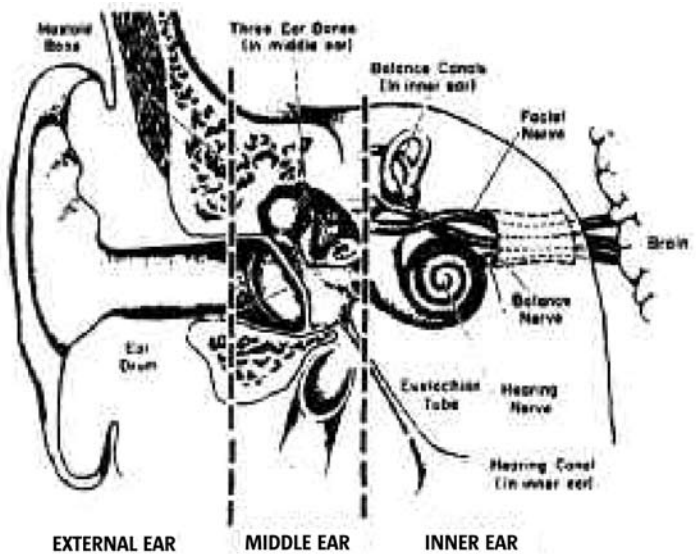
- 1 Conductive hearing impairment is caused by either external ear or middle ear disease.
- 2 Nerve or sensorineural hearing impairment is due to inner ear disease or hearing nerve problems.
- 3 Mixed hearing loss is a combination of conductive and nerve hearing loss.

NORMAL ANATOMY AND FUNCTION

To facilitate an understanding of the normal function of the ear, we will divide it into three parts: an external ear, a middle ear and an inner ear. Each part performs an important function in the process of hearing.

The external ear is made up of an auricle (the part visible on the head) and the ear canal. These structures gather the sound and direct it towards the ear drum membrane.

The middle ear chamber lies between the external ear and the inner ear. This air filled chamber is connected to the back of the throat by the Eustachian



tube which serves as a pressure equalizing valve. The middle ear consists of the tympanic membrane (ear drum) and three small ear bones; malleus (hammer), incus (anvil) and stapes (stirrup). These structures transmit sound vibrations in the inner ear. The middle ear is normally filled with air when the eustachian tube is functioning properly.

Immediately behind and continuous with the middle ear space is a bony honeycomb of air pockets called the mastoid.

The inner ear has two interconnected chambers, the cochlea (hearing chamber) and the labyrinth (balance chamber). These are encased in bone and contain two separate fluids (endolymph and perilymph). The fluid bathes the delicate hair cells of hearing and of balance. Fluid waves in the hearing chamber stimulate the hair cells which generate electrical impulses, which are transmitted via the hearing nerve to the brain for interpretation as sound. Movement of fluid in any of the balance chambers will result in electrical impulses which are interpreted in the brain as motion or movement.

CAUSES OF HEARING IMPAIRMENT

Problems affecting the external ear may be due to an infection, presence of too much ear wax, or an abnormal growth in the ear canal. The middle ear problem may be due to a hole in the eardrum, destruction of one or all of the three ear bones, a skin cyst (cholesteatoma) or scar tissue. These problems can usually be corrected with surgery.

A nerve hearing loss may be caused by disturbances of the inner ear, or from a breakdown in the hearing nerve transmission.

CARE OF THE EAR

If a hole in the ear drum is present, you should not allow water to get in your ear canal. This may be avoided by placing a Vaseline coated cotton ball in the ear when showering or washing your hair. Swimming may be possible in certain cases if you use a small earplug and a swim cap pulled over the ears and precautions are used. Talk to your doctor.

You should not blow your nose as any infection in your nose may spread to your ear through the eustachian tube. Any nasal secretions should be drawn backward through the nose into the back of the throat and then expectorated. If it is absolutely necessary to blow your nose, compress one nostril while blowing the other.

In the event of ear drainage, the ear canal should be kept clean by means of a small cotton tipped applicator. Medication, as prescribed, should be used if discharge is present or when it occurs. Cotton is placed in the outer ear to catch any discharge but should not be allowed to block the ear canal.

EXPLANATION OF DISEASE PROCESS

Your disease may be caused by a perforation (hole) in the eardrum or a cholesteatoma (skin cyst). If a perforation is present, chronic drainage and infection may occur. This alone will put the ossicles (bone of hearing), mastoid bone, inner ear, or facial nerve at a great risk. Surgery to close the hole is strongly recommended. Occasionally, it will be necessary; to stage the operation in order to clear the infection and then rebuild the hearing mechanism.

A cholesteatoma (skin cyst) is an abnormality that usually arises from a collapsed portion of the eardrum. The cyst continues to grow slowly causing destruction of the ossicles (bones of hearing), mastoid bone, inner ear canals, or facial nerve. Because of this cholesteatoma, chronic infection may occur. Usually it is necessary to stage the operation. The first stage is done to remove the cholesteatoma and any infection, and to reconstruct the eardrum. Your hearing may occasionally be somewhat worse after the first operation. The second stage is to check for recurrent or residual cholesteatoma or infection (found in 5-15% of the operations) and then to attempt to rebuild the hearing mechanism. If your operation has been staged, it is imperative to have the second operation in 6-12 months following the first operation.

MEDICAL TREATMENT

Medical treatment will often control ear drainage. The ear is usually cleaned by your physician in the office. Ear drops or cream may be used to correct the infection. Antibiotics by mouth may be helpful in certain cases.

Examination Reveals:

Left

Right

Severe scarring of the ear drum and middle ear

A hole in the ear drum

A cholesteatoma (skin cyst) in the external ear, middle ear or mastoid

Partial or total destruction of one or more of the middle ear bones

A mastoid cavity

Your surgeon believes that you are a satisfactory surgical candidate at this time for:

Left

Right

A myringotomy operation

A tympanoplasty operation

A tympanoplasty with mastoidectomy

A tympanoplasty planned second stage

A tympanoplasty with revision mastoidectomy

Modified radical mastoidectomy

Mastoid obliteration operation

If you do not have surgery, it is important to have frequent hearing exams, especially if your ear is draining. If you have pain in or around the ear, increased drainage or dizziness, twitching or numbness in your face, call us immediately.

YOUR OUTLOOK WITH SURGERY

- 1** If this is your first operation, eardrum grafting is successful in over ninety percent (90%) of the patients resulting in a healed and dry ear.
- 2** Hearing improvement following surgery depends on many factors discussed in the text.
- 3** In your case, two operations may be necessary in all likelihood in order to improve the hearing. In this case, your hearing may be worse in the operated ear between operations. It is imperative that the second stage operation be performed to rule out the possibility of recurrent or residual disease in the ear in addition to an attempt at hearing improvement.

SURGICAL TREATMENT

For many years, surgical treatment was used for chronic otitis media exclusively to control infection and prevent serious complications. Advancements of surgical techniques have now made it possible to rebuild the diseased hearing mechanism in most cases.

Various tissue grafts may be used to replace the eardrum. These include the covering of the muscle from above the ear (fascia) and covering of ear cartilage (perichondrium), or covering from the skull (pericranium). A diseased ear bone may be replaced by a plastic part, cartilage, transplant or the diseased bone may actually be reshaped or repositioned.

A thin piece of plastic frequently is used behind the eardrum to prevent scar tissue from forming and to promote normal function of the middle ear and motion of the eardrum. When the ear is filled with scar tissue or when all ear bones have been destroyed, it may be necessary to perform the operation in two stages. At the first stage, a piece of stiff plastic is inserted to allow more normal healing without scar tissue. At the second operation, this plastic may be removed, recurrent or residual disease is looked for, and an attempt for restoring hearing is performed. A decision in regards to staging the operation is made at the time of the first surgery.

MYRINGOPLASTY

This operation is performed to repair a hole in the eardrum when there is no middle ear infection or disease of the ear bones. This procedure closes the middle ear in a natural way and may improve hearing. Surgery is performed under local or general anesthesia. Tissue grafts are used to repair the defect in the ear drum. The patient may be hospitalized for one night and may return to work within a week. Healing is complete, in most cases, in eight weeks at which time any hearing improvement is usually noticed.

TYMPANOPLASTY

The purpose of a tympanoplasty is to inspect the ear spaces for disease and to attempt to improve the hearing loss. The operation is performed to elimi-

nate any infection and repair both the sound transmitting mechanism and the eardrum. This surgery may improve the hearing loss. The surgery may be done in one or two phases.

The Surgery

A tympanoplasty is an outpatient procedure with some patients going home the same day and some being hospitalized for one night following surgery

Most tympanoplasties are performed through an incision behind the ear, under a local or general anesthetic. The surgery may also be performed through the ear canal. The perforation is repaired with fascia or perichondrium. Sound transmission is accomplished by repositioning or replacing diseased ear bones. Occasionally, a piece of cartilage is used to stiffen the eardrum and attempt to stop recurrent retraction pockets or cholesteatoma.

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 to twelve months later the sound transmitting mechanism is reconstructed. If a second surgery is necessary the ear will be inspected for any remaining or recurrent disease. Sound transmission to the inner ear is accomplished by replacing missing ear bones.

Post Surgery

In most cases you may return to work in a week to ten days. Healing is usually complete in eight weeks. Hearing improvement may not be noted for a few weeks.

MASTOIDECTOMY

The mastoid space connects directly with the middle ear space. There are important structures in and adjacent to the mastoid including the brain, inner ear and facial nerve. This makes infections risky

and surgery delicate. Almost any active process like infection or cholesteatoma will involve both spaces. Therefore, mastoid surgery is frequently necessary, in conjunction with tympanoplasty, to adequately treat the existing problem.

The mastoidectomy is the name of the procedure to clean out the mastoid. This is generally done through an incision behind the outer ear. The outer layer of bone is then removed and the abnormal contents are cleaned out. At the completion, the incision is either glued back together or closed with dissolvable sutures and requires little care.

The mastoidectomy, with or without a tympanoplasty, is an outpatient procedure. One can expect to be discharged after surgery or the following morning. Three weeks of restricted activity are advised. If your regular activities involve heavy lifting expect three weeks off, although most can return to near normal activity much sooner.

MYRINGOTOMY WITH TUBES

Sometimes at the time of surgery for chronic ear infections ventilation is needed to allow equalization of pressure in the middle ear space and allow healing. This will be decided at the time of the operation if this is necessary. A myringotomy (an incision in the eardrum membrane) is performed to remove the middle ear fluid and allow aeration. A hollow plastic tube (a ventilation tube) is inserted to prevent the incision from healing and to assure middle ear ventilation. This plastic tube usually remains in place for six to nine months which allows adequate healing. When the tube dislodges the eardrum heals and the Eustachian tube hopefully will resume its normal pressure equalizing function.

Sometimes a more permanent tube may be placed through the eardrum. This may last several years at

a time. Sometimes the tube may be placed through a portion of cartilage in order to secure it in place against the eardrum and allow it to stay even longer.

TYMPANOPLASTY: PLANNED SECOND STAGE

The purpose of this operation is to inspect the ear spaces for disease and to attempt to improve the hearing. Surgery may be performed through the ear canal or from behind the ear, under a local or general anesthetic. The ear is inspected for any remaining or recurrent disease. Sound transmission to the inner ear is accomplished by replacing missing ear bones.

The patient may be hospitalized for one night and may return to work in about one week. Healing is usually complete in six to 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 if possible to improve the hearing. The operation is performed under general anesthesia through an incision behind the ear. 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, a second operation is necessary to obtain hearing improvement.

The patient may be hospitalized for one night and may return to work after one or two weeks. The healing of the inside of the ear may take three or four months.

(MODIFIED) RADICAL MASTOIDECTOMY

The purpose of this operation is to eliminate the infection without consideration of hearing improvement. It is usually performed on those patients who have very resistant infection. Occasionally, it may be necessary to perform a radical mastoid operation in some cases that originally appeared suitable for a tympanoplasty. The decision is made at the time of surgery. A fat, muscle or bone graft to the ear is necessary, at times, to help the ear heal properly.

The radical mastoid operation is performed under general anesthesia and may require one night of hospitalization. The patient may usually return to work in one to two weeks. Complete healing may require up to four months.

MEATOPLASTY

If a modified radical or a radical mastoid is performed the opening to the ear canal sometimes needs to be enlarged. This is called a meatoplasty. This is performed by removing a portion of the cartilage and perhaps some of the skin of the ear canal so that it can be widened. This allows easy access for cleaning and removal of any debris or cholesteatoma that may develop in the future. This can then allow cleaning in the office setting.

After this operation you will need to use drops in the ears to keep the packing that is in the ear in place and moist. The packing allows the opening to stay widened and scar into position.

MASTOID OBLITERATION OPERATION

The purpose of this operation is to eliminate any mastoid infection and to obliterate or fill any previously created mastoid cavity. Hearing improvement is usually not considered.

The operation is performed under general anesthesia through an incision behind the ear. The mastoid space is filled with fat, muscle or bone. The patient may be hospitalized for one night and may return to work in one to two weeks. Complete healing may require three or four months.

WHAT TO EXPECT FOLLOWING SURGERY

There may be some symptoms that may follow any ear operation.

Taste disturbance and mouth dryness

It is not uncommon for there to be taste disturbance and mouth dryness following ear surgery. In some cases the disturbance is prolonged and permanent. This is due to involvement of a nerve that goes through the middle ear with the disease process. It supplies taste sensation to only one part of the tongue.

Tinnitus

Tinnitus (head noise) frequently is present before the surgery and most often is present temporarily after the surgery. It may persist for one to two months and then decrease in proportion to the improvement of your hearing. It may also persist especially if the hearing loss does not improve or worsens. The tinnitus may persist and may become worse.

Ear numbness

Temporary loss of skin sensation in and around the ear is common following surgery. This numbness may involve the entire outer ear and may persist for six months or may be permanent.

Jaw Symptoms

The joint where the jaw is located is located at the front of the ear canal. Some soreness or stiffness in the jaw movement is very common after ear surgery. This soreness or stiffness will decrease and usually go away within one to two months.

Drainage behind the Ear

On occasion the surgeon will need to insert a drain tube behind the ear. The need to insert a drain after surgery is usually not apparent before the surgery. Should a drainage tube be needed it will be removed during the post-operative phase of healing.

Ear Pressure

Ear pressure or a “popping” sensation or mild equilibrium disturbance may occur from the packing in the middle ear. When the packing is removed post-operatively this sensation will disappear.

RISKS AND COMPLICATIONS OF SURGERY

Fortunately complications are uncommon following surgery for correction of chronic ear infections. Rarely there may be a complication that occurs.

Ear Infection

Ear infection with drainage, swelling and pain may persist following surgery or on a rare occasion may develop following surgery. This in part is due to poor healing of the diseased ear tissue. When this is the case additional surgery may be necessary to control the infection.

Loss of Hearing

In three percent (3%) of the ears operated the hearing is further impaired permanently due to the extent of the disease present or due to complications in the healing process. On very rare occasions there is 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. Some patients with chronic ear infection due to cholesteatoma have a labyrinth fistula (abnormal opening into the balance canal). When this problem is encountered dizziness may last for six months or more.

Facial Paralysis

The facial nerve travels through the ear bone and is in close association with the middle ear bones, eardrum and the mastoid. A rare post-operative complication of ear surgery is paralysis of one side of the face. This may occur as a result of an abnormality or a swelling of the nerve and usually improves spontaneously. On rare occasions, the nerve may be injured at the time of surgery or it may be necessary to remove it in order to eliminate the disease.

When this takes place a skin sensation nerve is removed from the upper part of the neck to replace the 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 may require treatment by a specialist.

Hematoma

A hematoma (collection of blood under the skin) develops in a small percentage of cases. This hematoma may prolong the healing process and require longer hospitalization. Re-operation to remove the clot may be necessary if this complication occurs.

Cerebral Spinal Fluid Leak

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

Brain Complications

Intracranial complications such as meningitis or brain abscess and sometimes even paralysis were common prior to treatment with antibiotics were available. Fortunately these are now extremely rare complications of surgery.

Anesthetic Complications

Rarely are there complications associated with anesthesia. These will be discussed with you by the anesthesiologist.

Michigan Ear Institute



Chronic
Ear
Infections

Received by

Patient Signature

Date

