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TYMPANOSTOMY (EAR TUBES) (10/20)

PREOPERATIVE INFORMATION

The ear is much more than the flexible soft tissue that attaches to the side of your head. The ear is actually very complex. It is divided into 3 parts called the outer, middle, & inner ear. Each part performs an important function for the process of hearing. The outer ear consists of an auricle and ear canal. The eardrum is a very thin membrane that separates the outer ear from the middle ear. The middle ear is an air filled chamber containing 3 small bones called ossicles. They connect the eardrum to the inner ear and are named individually the malleus (hammer), incus (anvil) and stapes (stirrup). The air chamber in the middle ear connects the back of the nose to the Eustachian tube. This tube serves as a pressure-equalizing valve and as a drain. In infants and young children, the Eustachian tube is short and flat. By age 7, the Eustachian tube is larger and more upright which improves its ability to function.

Many problems within the middle ear space are related to the Eustachian tube. Normally, the Eustachian tube opens with swallowing and yawning. Obstruction, or blockage of the Eustachian tube creates negative pressure and over time can pull the eardrum inward. If this occurs some clear fluid may be drawn from mucous membranes into the middle ear space causing a fluid buildup. This frequently occurs in children with upper respiratory infections or allergic symptoms. If bacteria or a virus enters the middle ear fluid through the Eustachian tube an upper respiratory infection called acute otitis media may develop. This is often accompanied by symptoms of fever, ear pain, irritability and sometimes drainage. Children have a greater risk for ear infections if they are in daycare, bottle feed or are around passive cigarette smoking. Causes of Eustachian tube problems may include an immature Eustachian tube, a cleft palate, infections, allergies or enlarged adenoids. The adenoids are tonsil-like tissues that are located in the back of the nose, next to the opening of the Eustachian tube.

The last part of the ear is called the inner ear. It contains a structure called the cochlea that is shaped much like a snail's shell. This organ contains small hair cells bathed in fluid. When fluid in the cochlea is moved by sound waves, electrical signals are sent to the brain – resulting in hearing! Normal hearing occurs when the sound waves pass through the ear canal, vibrating the eardrum. Otitis media usually causes some conductive hearing loss. Due to an increase in middle ear fluid and eardrum thickening, the sound vibrations that travel through the ossicles are reduced. This hearing loss usually goes away once the fluid is removed.

Potential reasons for ear tube placement procedure include:

- A substantial hearing loss in patients with otitis media
- Poor response to antibiotics
- Otitis media with fluid for more than 3 months
- Recurrent episodes of acute otitis media
- Chronic retraction of the eardrum.
- Significant Eustachian tube problems with flying or altitude changes

BENEFITS OF THE PROCEDURE

- Tympanostomy involves the creation of a small hole in the eardrum called a myringotomy and the gentle placement of a small tube through this opening.
- Otitis media is the second most common childhood infection, surpassed only by the common cold. Because the number of episodes of otitis media declines after surgery, the need for antibiotics is also reduced, and decreases the likelihood of developing antibiotic-resistant bacterial ear infections. The most common type of hearing loss related to chronic otitis media with effusion (fluid) is a conductive hearing loss. After myringotomy with removal of fluid from the middle ear space, and tube placement, the conductive hearing loss is usually resolved.
- Tube placement also helps avoid other complications of chronic ear disease. These include permanent holes in the eardrum, scarring of the eardrum and bones, adhesive otitis media, bone deterioration, cholesteatoma (dead skin cells) deposits, development of eardrum retraction pockets, and hearing loss.



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- Because they help correct conductive hearing losses that occur with fluid behind the eardrum, tubes can also help improve speech development. Some aspects of development are especially vulnerable to the intermittent hearing losses caused by fluid behind the eardrum.

RISKS OF THE PROCEDURE

The procedure is not particularly painful. Most over the counter pain medicines relieve the discomfort associated with this procedure. However, there are some risks associated with any surgical procedure. Standard surgical risks may include fever, infection, bleeding and allergic or adverse reactions to anesthesia medications. Fortunately complications associated with the placement of tubes are very low. The most common complication is recurrent or persistent drainage from the ear. This fluid may be clear or appear cloudy and may occur in up to 20% of patients. Often this is seen after an upper respiratory infection or seasonal allergies since fluid that was once trapped behind an intact eardrum is now free to drain out the ear.

The following complications are possible, but relatively rare:

- The tube may stay in longer than desired. Most tubes will fall out within a 2-year period. In some children the tubes do not fall out of the eardrum within the expected time and may require removal at a future date. On the other hand the tube may also fall out prematurely. This can be managed by close observation over time.
- Some swollen tissue may develop around the edges of the tube. This may lead to infection, bleeding and drainage from the ear. The tube may need to be removed if it does not clear with treatment.
- The eardrum may become thinned and retract into the middle ear space. This can occur despite the normal function of the tube.
- A hole in the eardrum may persist after the tubes fall out. Usually the hole will heal spontaneously, however additional surgical treatment may be required.
- Heavy scarring, or calcification of the eardrum can occur. This is called myringosclerosis and normally does affect hearing.
- Skin from the outside of the eardrum may be introduced into the middle ear space causing debris from dead skin cells, called cholesteatoma, to develop. This can lead to trapping of skin within the middle ear. If this occurs additional surgery will be necessary.
- It's extremely rare to develop a permanent hearing loss after tympanostomy. Many of these complications are also seen as a result of disease.

ANESTHESIA

Your anesthesiologist is fully licensed to administer anesthesia. Before surgery, you will have the opportunity to discuss the risks of anesthesia in detail. They will be able to tell you about the types of medicines that will be used, their duration and any possible side effects. Typically this procedure is very brief and requires a minimal amount of medication. In children, tubes are usually placed in the operating room under general anesthesia by mask. Insertion of a breathing tube is usually not required. Most anesthesiologists do not routinely require placement of an I.V. fluid line for this procedure. Keep in mind, however, that if your child has any special medical problems, the anesthesiologist will take whatever measures are needed to ensure a safe anesthesia experience. After the tubes have been properly positioned in the eardrum, your child will be awakened by the anesthesiologist and transported to the recovery room. Once surgery is completed, a short stay in the recovery room is required. The nurses will monitor your child while the anesthesia wears off. Frequently during this time period children are disoriented, appear uncomfortable and may be very irritable. This usually lasts less than an hour.

Call your doctor if your child develops an acute illness or has an asthma attack within 3 days of the scheduled surgery. If your child is exposed to measles, mumps or chicken pox within 21 days of procedure, you should also notify your doctor. He or she may want to reschedule the procedure.

POST-PROCEDURE CARE

Pain and Nausea

- Tympanostomy is not a painful procedure. Any discomfort should easily resolve with acetaminophen (*Tylenol*).



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- Nausea may result from the effects of the general anesthesia and may last for up to 36 hours after surgery. A low-grade fever may also result from the anesthesia.

Medication Instructions

- Antibiotic ear drops will be administered during surgery and the remainder of the bottle will be given to you to continue at home postoperatively. This will prevent blood from obstructing the new tube, sterilize the middle ear, and prevent postoperative persistent ear discharge.
- Use the prescribed drops: **4 drops each operated ear 2 times a day** for as long as your doctor recommends. Many children do not like the drops, but they are important to help reduce inflammation and to prevent the tubes from plugging. It is often helpful to warm the drops to body temperature to reduce irritation in young children.
- If there is thick mucus, an acute infection or excessive bleeding at the time of surgery, your doctor may instruct you to regularly use these drops for a longer period of time.
- Have your child lying down with the ear you are treating up, and put in one drop. Wiggle the ear or push in front of it to be sure the drop disappears, and does not lodge in the outer ear canal. Then follow with more drops and pump the prominent tissue in front of the ear canal to ensure that the drops are pushed deeper into the ear canal and middle ear. Hold your child's head in this position for one minute. Repeat the procedure for the other ear if appropriate.
- It may be helpful to place a piece of cotton on the outside of the ear canal for five minutes to prevent soiling his/her clothes. It is not necessary to keep cotton in the ear canal for longer periods.
- After the completion of treatment, store the remainder of the drops (until the expiration date) in case drainage recurs.
- It is normal to have a small amount of blood-tinged drainage from the ears for a few days after surgery. If you use the drops for the entire prescribed period and there is still active drainage from the ears, continue using the drops for one full week.
- As long as the drainage resolves within one week of starting the antibiotic ear drops, it is not necessary to make an appointment sooner than previously planned. Treating with antibiotic ear drops is curative in the majority of cases and avoids the unpleasant experience of suctioning and cleaning the ear canal in the office.
- If ear drainage persists beyond one week despite treating with antibiotic ear drops, call our office during regular office hours.

Ear Infections After Ear Tubes

- Ear tubes decrease the likelihood of infections. However, it is still possible to occasionally get an ear infection. If the tubes are open and functioning, there will always be drainage when the ear is infected. The drainage can be clear, yellow, brown, green or even bloody.
- The typical symptoms of fever, earache, irritability, and pulling at the ears usually do not occur since pressure cannot develop behind the open eardrum.
- The major cause of ear infections after tubes is a concurrent viral illness ("cold"). This usually starts with the runny nose and possibly even fever. Since a new onset runny nose is almost always viral (98% likelihood), oral antibiotics are not effective and are not indicated.
- When the ear does become involved (more commonly with severe colds and in young children), drainage usually starts 3-5 days after the runny nose. Typically, drainage starts like a runny nose - clear at first for a few days before turning yellow or green.
- If the ear does start draining, then antibiotics are indicated, but in the more potent and effective form of antibiotic ear drops rather than oral antibiotics. A higher concentration of antibiotics in ear drops (2000-fold higher dose than oral antibiotics) can be directly given to the ear without the side effects of diarrhea or whole body antibiotic resistance.
- When there is drainage from the ear, we recommend that you immediately start treatment on your own with the previously prescribed antibiotic ear drops. These antibiotic ear drops should be left over from the original surgery or available as refills on a previous prescription. Please administer **4 drops twice a day for one full week**.
- Notify our office during regular business hours if *bloody drainage* is seen in the ear. This bloody drainage is usually an overactive healing response to the tube in the eardrum or the tube is extruding. Usually your doctor will prescribe an antibiotic ear drop combined with a steroid to resolve this problem. In this specific situation, it is best to have an office appointment with us once the drops are completed.
- If the drainage persists even after using the antibiotic ear drops for one week, please call our office during regular office hours.



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- If the ear tubes are in place and open, unless there is drainage, the ears are not infected. The tubes can become plugged, however and if they are, there are two ways to unplug them. We can mechanically unplug them in the office or we can try with ear drops. A plugged tube is not an emergency. Please call during regular office hours should this occur.

Does My Child Need To Wear Earplugs

- It is usually **not necessary** to keep water out of the ear after tube placement. Despite what you may have heard before, earplugs are no longer routinely needed after ear tube placement.
- Fortunately, several studies have convincingly shown that showering, hair rinsing, and head submersion in clean tap water do not promote water entry into the middle ear. Submersion in soapy water does increase the probability of water contamination.
- Pool water infrequently enters the middle ear with head submersion, but deeper swimming (under 2 feet of water) does increase the risk of infection.
- Risky behaviors include submersion in soapy water, submersion below 2 feet of water or submersion in very contaminated water (canals, pools, lakes, etc.).
- Therefore if an ear infection occurs after water exposure, or if swimming is anticipated in deep or contaminated water, then it would be beneficial to wear earplugs.
- If it becomes necessary to keep water out of the ear, a simple and cost effective approach is to use fitted earplugs (*Doc Proplugs*). These can be fitted and purchased (\$12.00) in our office on the first postoperative office visit or sooner. If you do not have them or are using drops, temporarily use cotton with a small amount of petroleum jelly on the outside. Other less effective options such as silicone plugs (*Mack plugs*, etc.) can be purchased from your pharmacy without a prescription, but often fall out in young children because of their floppy ear canals.
- Our audiology staff can make custom molded earplugs if none of the above options are effective.
- For additional protection, either a bathing cap or a Velcro/neoprene headband (*Band-it*) may be purchased in our office.
- If water contamination of the ear accidentally occurs, start ear drops twice a day for one week. If drainage persists beyond one week, call the office during regular business hours.

Hearing

- Hearing is usually improved immediately after surgery since the surgery removes the fluid behind the eardrum. Some patients seem to be more sensitive to loud noises for a period of time after surgery. A postoperative hearing test is often performed to confirm improvement in hearing. Call our office during regular office hours to schedule an appointment and hearing tests.

Tube Duration

- Most ear tubes usually stay in place for about 12-15 months, but in some situations last only a few months or up to many years. Tubes seem to come out sooner in younger patients.
- As the eardrum grows the tubes are gradually pushed out unnoticed on their own much like a sliver stuck in the finger.
- The residual hole in the eardrum usually closes within a few days after the tube falls out. Infrequently, the ENT doctor might need to remove the tubes.

Air Travel

- As long as the tubes are functioning, there should be no discomfort with the ears on the flight. In fact, your child will have an easier time equalizing pressure than other.

Follow Up

- You should make a postoperative appointment as determined by your surgeon between 1-3 weeks after surgery. Thereafter, you are expected to follow up at **6-9 month intervals** until the tubes extrude.
- Please do not forget to follow up with us. It is important that an ear specialist see you on a regular basis.

Questions

- When you call the office with questions, our nurse will have your child's chart and discuss the problem with you. She will discuss the problem with the doctor, and will contact you with a response. With the many calls that come in, we



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have found this to be the most efficient way to be sure everyone receives proper attention. After weekends, holidays, or vacations, calls reach a maximum and your return call may take a little longer. Please be patient with us.