Management of Cerumen Impaction in the Primary Care Setting

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Where principle is involved, be deaf to expediency.

—Matthew Fontaine Maury

Learning Objectives:
1. Describe the anatomy and physiology relevant to cerumen.
2. Explain proper ear hygiene to prevent cerumen impaction.
3. List the medical indications for cerumen removal.
4. Describe medically-sound remedies for cerumen impaction, including indications, contraindications and modifications in special circumstances.

Primary Reference:
   http://journals.sagepub.com/doi/pdf/10.1177/0009922815594761

Author’s note: The primary reference offers a concise review, but interested readers can refer to the 2017 American Academy of Otolaryngology - Head and Neck Surgery Clinical Practice Guideline by Schwartz, et al. for an in-depth discussion.
   http://journals.sagepub.com/doi/pdf/10.1177/0194599816671491

CASE ONE:

2-year-old Cher Oomen presents to your office accompanied by her father for evaluation of fever and fussiness for the last 3 days. She had bilateral tympanostomy tubes placed 6 months ago for frequent ear infections. She has a temperature of 102 degrees but an otherwise benign exam except for earwax occluding 100% of the right ear canal and 90% of the left ear canal, leaving you unable to evaluate the tympanic membranes using the handheld otoscope in your office. The patient’s father reports that she tends to produce a lot of earwax which has made it difficult for providers to evaluate her ears in the past.

1. What is cerumen and why do we have it?
   Earwax is a naturally occurring mix of sebum and secretions from apocrine sweat glands and sloughed epithelial cells. It protects and lubricates the skin of the ear canal and is regularly extruded through the external auditory meatus, assisted by jaw movements. It also has bactericidal properties.

2. Under what circumstances does cerumen need to be removed?
   Cerumen removal is indicated when there is cerumen impaction, which is generally defined as an accumulation of cerumen that causes symptoms or prevents a needed assessment of the ear canal, tympanic membrane, or audiovestibular system. The term cerumen impaction can be applied whenever these conditions are met, and does not necessarily mean that the ear canal is entirely occluded.

   Symptoms from cerumen impaction include hearing loss, tinnitus, fullness, itching, otalgia, discharge, and cough. Cerumen impaction is also a frequent cause of failed hearing exams, with hearing loss ranging from 5-40 dB depending on the degree of occlusion; hearing acuity diminishes after the cross-sectional area of the ear canal is reduced by more than 80%. Children who fail hearing exams or are at risk for doing so due to the extent of cerumen accumulation (i.e., >80% occlusion) should be evaluated and treated for cerumen impaction, if present.

   Cerumen impaction should be distinguished from other processes causing debris in the ear canal such as bacterial or fungal otitis externa, which are associated with erythema and swelling of the ear canal, white or yellow purulent discharge, and sometimes malodor. A cholesteatoma is a ball of keratinized
squamous epithelium in the *middle* ear resulting from chronic negative pressure in the middle ear due to recurrent otitis media, and can resemble a ball of earwax “stuck” to the tympanic membrane. Its capacity to cause erosion of surrounding tissues (e.g., the middle ear bones) compels referral to an otolaryngologist (ENT) for removal.

In a 2017 Clinical Practice Guideline, the American Academy of Otolaryngology - Head and Neck Surgery (AAO-HNS) recommends that cerumen should not be removed in patients who are asymptomatic or who do not require an ear examination, unless the patient may not be able to express symptoms (e.g., young children, those with cognitive impairment). Some patients are more prone to accumulation of earwax which can lead to impaction. It is estimated that 10% of all children are affected by cerumen impaction. In this patient, visualization of the tympanic membranes and tympanostomy tubes is necessary to evaluate the cause of her fever, thus cerumen removal is indicated.

3. **How would you approach cerumen removal in this patient? What are other effective treatments for cerumen impaction?**

There are three general treatment options for cerumen impaction: irrigation, manual removal, and use of cerumenolytic agents. The best option for a particular patient depends on the expertise of the clinician, available resources, urgency of cerumen removal, and other patient circumstances including the patient’s ability to tolerate a procedural intervention, previous ear surgeries, underlying disease such as diabetes or immunodeficiency, or congenital ear anomalies. In practice, two or more methods are often used simultaneously or in sequence. For example, installation of cerumenolytic drops to soften the ear wax 15 minutes prior to irrigation or manual removal can decrease discomfort with these procedures.

Irrigation, or ear syringing, is a generally effective method which involves using a plastic or metal syringe to flush the wax out by a jet of warm water, ideally at body temperature to prevent caloric effects. A solution of dilute hydrogen peroxide may be used as an alternative to warm water and its acidic properties may be beneficial in helping to prevent ear canal infection following the procedure. However, studies have shown that water alone is more effective and faster than hydrogen peroxide at disintegrating ear wax. If ear canal inflammation is present, hydrogen peroxide may cause additional irritation and pain.

AAO-HNS guidelines advise *against* irrigation in those with a perforated tympanic membrane, patent tympanostomy tubes, active otitis externa (risk of worsening the infection or introducing a water-borne pathogen), or history of ear surgery, as the tympanic membrane may be thinned or atrophic, and thus more vulnerable to perforation when pressure is applied. Irrigation should also be avoided in patients with anatomic ear abnormalities that may trap water in the ear canal such as malformations, osteomas, exostoses, and scar tissue. Procedural complications are rare but can include temporary dizziness, perforation of the tympanic membrane, trauma to the skin of the ear canal, and otitis externa. Consider other methods of removal in those with immunocompromise such as AIDS or diabetes mellitus. Of note, the procedure may be hard for young children to tolerate.

Manual removal of earwax involves the use of ear curettes, hooks, forceps, or microsuction under *direct* visualization of the ear canal. This is often the fastest option in the office setting and is the best way to ensure adequate cerumen removal if appropriate equipment is used. In the primary care office, a monocular otoscope with low power magnification is typically used for direct visualization of the ear canal but can be difficult to manage while simultaneously using a curette to remove earwax. If available, a lighted curette may be helpful in ensuring adequate visualization the canal during manual earwax removal. In the ENT office, a high-powered binocular microscope is used to visualize the canal which improves depth perception and allows a more detailed view of the ear. In this case, the examiner’s hands are free to use a curette for manual disimpaction.

Manual removal of earwax has a higher potential for ear canal trauma, and should be used with caution in patients on blood thinners or those with coagulation disorders. This technique is preferred for patients who do not meet criteria for irrigation.

Cerumenolytics are wax softening agents that are used to dissolve cerumen and are often used in combination with irrigation or manual removal with good effect. These solutions can cause irritation of
the ear canal if otitis externa is present. Safety in children less than 3 years old has not been definitively established, however, cerumenolytic studies have been performed in children as young as 6 months of age without significant reported adverse events.

Types of cerumenolytic drops include water-based drops like Cerumenex and Colace which act as a surfactant to reduce tension at the oil-water interface in ear wax, fragmenting and disintegrating cerumen. Hydrogen peroxide, sodium bicarbonate, and saline are also water-based cerumenolytics. In contrast, oil-based drops lubricate and soften cerumen, and include almond oil, mineral oil, and Earex, which is a combination of peanut, almond, and camphor oil. Other non-water, non-oil cerumenolytics include Audax, which contains glycerin to soften ear wax, and Debrox, which contains carbamide peroxide as a softening detergent.

A Cochrane review looking at cerumenolytic solutions showed that no specific agent was superior to another and none were superior to the more cost-effective use of either saline or water. However, high-quality studies are lacking and if choosing to use a product other than water, in vitro studies suggest that true cerumenolytics (i.e., water-based or non-water/non-oil-based) are better for cerumen disintegration than oil-based lubricants. Debrox and Cerumenex are obtained easily over the counter and are well tolerated by patients. Some providers avoid Colace for home use because it can be hard to remove once it dries in the canal.

CASE TWO:

Earnest is a 16-year-old with Down syndrome and type I diabetes who presents to your office with right ear pain of 1 week duration. He has been taking swimming lessons at the community center twice per week. He has known bilateral ear canal stenosis and wears hearing aids for sensorineural hearing loss. On exam, you note that his right ear canal is erythematous and edematous with purulent discharge, however you cannot visualize the tympanic membrane due to cerumen impaction.

4. Which patients are at high risk of cerumen impaction?

Those at high risk of cerumen impaction include children with hearing aids; skin conditions such as eczema, seborrheic dermatosis, and ectodermal dysplasia; or anatomic abnormalities including congenital or acquired ear canal stenosis, exostoses or osteomas of the external auditory canal, and older children with cognitive impairment. In a study of children with Down syndrome, 39% had stenosis of the external auditory canal which was frequently complicated by cerumen impaction.

5. What preventive measures can be recommended to families in order to prevent earwax impaction?

For most children, no specific preventative measures are necessary. It is sufficient to clean the ears during bathing (as one would do for any other body part), and obtain routine evaluation of hearing and ear hygiene during health supervision visits. However, many families believe that their children’s ears should be cleaned on a regular basis at home in order to clear small particles or relieve itching. Cotton-tipped swabs are commonly employed for this purpose, though up to 9% of people report cleaning-related injuries to their ears. In addition to causing injury, cotton-tipped swabs can worsen cerumen impaction by serving to push cerumen deeper into the canal. For these reasons, pediatric providers should emphasize that ears should not be over-cleaned, and that no foreign objects should be placed in the ear canal, including cotton-tipped swabs. Specific preventative measures might focus on those who are at high risk for cerumen impaction as listed above, plus children who produce an excessive amount of wax which has previously caused symptoms. In these patients, as well as families of older children who strongly desire preventative measures, there are several safe and effective options. Studies have demonstrated the benefit of regular use of water, saline, and various cerumenolytic drops as noted above. The optimal frequency and duration of these therapies are not defined, though there is concern for skin irritation with chronic use of organic cerumenolytics, and olive oil drops should not be used chronically as they have been shown to increase ear canal debris over time. The AAO-HNS statement suggests that saline and other
nonorganic solutions might be preferable for long-term use. For patients with a known history of cerumen impaction, it is useful to have them instill cerumenolytic drops in each ear for 5-10 minutes daily for 2-3 days prior to a planned ear exam in order to facilitate easier manual removal or irrigation, if necessary.

Hearing aid users should have regular ear examinations every 3 to 6 months, with assessment for cerumen impaction. Hearing aids disturb the self-cleaning process of the ear and stimulate cerumen glands leading to excessive ear wax production. Cerumen impaction can affect hearing aid performance, reducing the intensity of the sound reaching the hearing aid. It can also affect the ability of the hearing aid to fit properly. It is important for hearing aids to be cleaned on a regular basis and for patients with hearing aids to have their ears checked at every office visit.

While people with diabetes mellitus do not have a higher risk for cerumen impaction, the pH of diabetic cerumen is higher than normal, which may increase the risk of infection. In these patients, trauma to the ear canal must be minimized during cerumen removal, and it may be beneficial to use ear drops to re-acidify the ear canal post-irrigation, such as 2% acetic acid.

Some families use ear candling as a means of cerumen removal. This method employs the use of a hollow candle that is burned with one end in the ear canal and theoretically creates a vacuum which draws wax out of the ear. Another theory is that the candle melts the wax, which is extruded out of the ear over the next several days. Studies have shown that ear candling does not, in fact, produce negative pressure and that ears treated with candling have more debris in the canal following the procedure. The FDA has issued a warning against the use of ear candling due to risk of burn injury, and the AAO-HNS advises against its use.

6. When should a patient be referred to an otolaryngologist for cerumen impaction?

Referral to an otolaryngologist is indicated when a provider cannot adequately perform cerumen removal or if symptoms persist once cerumen is cleared. Often, patients with small ear canals or growths within the canals require specialized equipment to visualize the ear canal appropriately. Referral is also indicated if the patient cannot tolerate standard cerumen removal procedures in the primary care office, as might happen with very young children, and those with cognitive impairment, behavioral difficulties, or autism.

Additional References:

Resources: