Ear and Nose Foreign Bodies

"It is all about the tools"

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Introduction

Ear and nose foreign bodies occur commonly in children. Most pediatricians, family practitioners, emergency medicine physicians, and general health care providers have or will have patients with a foreign body in either their ear or nose. Removal of the foreign body can be extremely easy or painfully difficult depending on the location, type of foreign body, cooperation of the patient, trauma to the ear from previous attempts, tools available for removal, and the experience of the person removing the foreign body.[1,2] Multiple articles have evaluated different techniques in the removal of nasal or ear foreign bodies and the different type of foreign bodies removed with these techniques.[1-4] The few larger studies attempt to identify foreign bodies and their successful removal rates, and the associated complication rates.[1,2] The most common foreign bodies are usually round and cylindrical shaped (beads, peas, popcorn kernels).[1-4] Unfortunately, much of the literature is made up of case reports with very few large retrospective reviews or prospective studies. Nevertheless, plenty of techniques are available for the practicing health care provider to attempt a removal of a nasal or ear foreign body. If these attempts fail, or the type or location of the foreign body carries a high failure rate, then otolaryngology referral is indicated.

This article reviews specific techniques in the removal of nasal and ear foreign bodies and discusses the advantages and disadvantages that go with each technique. Like most home improvement projects, one cannot do the job without the proper set of tools, and each foreign body requires its own special tool or technique for removal. After reviewing this article the reader should be familiar with the different techniques, the advantages and disadvantages of each technique, which foreign bodies have a higher success rate of removal with certain techniques, and which foreign bodies should automatically be referred to specialty-trained physicians (otolaryngology).

Ear Foreign Bodies

Signs and Symptoms of Ear Foreign Bodies

Ear foreign bodies are usually painless and the patient may present with the sensation that something is in the ear. Otorrhea may also occur. Often the foreign body will be noticed on a routine examination. There have been case reports of intractable hiccups or coughing associated with an ear foreign body, though this is rare.[5,6] Most pediatric patients present simply with the history of "Mom, I put this bead in my ear."

Ear Foreign Bodies Words of Wisdom

What Objects Are More Likely to Fail?

Two articles have tried to determine the location and type of foreign bodies that are more likely to fail removal and require otolaryngology referral.[1,2] The external ear canal can be divided into 2 regions, the lateral one

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third and the medial two thirds. The medial two thirds is narrower, boney, and lined with very vascular and sensitive layers of skin. A foreign body in this area also lies closer to the tympanic membrane, making movement of the foreign body more difficult and complications greater. Schulze et al[1] showed that otolaryngologists had a significantly higher success rate than nonotolaryngologists at removal of foreign bodies medial to the bony isthmus. They also showed that spherical foreign bodies (beads, BBs) demonstrated the largest difference in success rates between them. In contrast, patients with soft and irregular foreign bodies (paper, tissue, cotton) had a very high success rate of removal by nonotolaryngologists. This intuitively makes sense, since irregular soft objects are easy to grasp with forceps (most common tool used by nonotolaryngologists), whereas spherical foreign bodies are much more difficult and do not offer a free edge to grasp.[1] DiMuzio et al[2] also showed that graspable-type foreign bodies can be successfully managed by nonotolaryngologists, whereas nongraspable types should be referred to an otolaryngologist.

When to Refer Directly to an Otolaryngologist?

Ear foreign bodies are much harder to remove then nasal foreign bodies and carry a much higher complication rate (tympanic membrane rupture and external ear canal trauma). The rule of "do no harm" should be first and foremost on the mind of the treating physician. Otolaryngology referral should be considered for any patient who has already had an attempt at removal in an outside institution, is unable to be kept still long enough for removal, or whose ear foreign body has a high likelihood of failure (up against the tympanic membrane, spherical or nongraspable object). Otolaryngologists are skilled at foreign body removal and most have the ability to use otomicroscopy, making the removal of the foreign body much easier.

Sedation?

Children who have been previously traumatized or are unable to be held still long enough for foreign body removal may need sedation, though it is our experience that most patients can usually be managed with some education (talk to the patient about the procedure), distraction (movies, music, soothing parental voice), and a strong pair of hands.

An ear block may be performed to anesthetize the external ear, but this requires multiple injections and may be more traumatic to the patient than the foreign body removal. For this reason, ear blocks are not recommended.

If sedation is to be performed, the patient's vital signs should be monitored appropriately with a trained medical person who is not performing the procedure. The sedating physician should be able to take care of any of the complications associated with the sedation. Intranasal versed is helpful for the anxious patient but does not provide pain relief. Intramuscular or intravenous ketamine provides both analgesia and sedation for the patient but requires the patient to be monitored closely and prolongs the patient's medical visit. Propofol with its short half-life and deep sedation is ideal for short procedures but requires intensive monitoring with someone specifically managing the airway. There are many other medications appropriate for sedation of patients with an ear foreign body and it is important that the physician performing the sedation is comfortable in the use of these medications.

Specific Techniques for Removal

Graspable Instrument (Alligator Forceps)

Alligator forceps are the most common tool used for removal of an ear foreign body by the nonotolaryngologist. The alligator forceps is ideal for graspable objects such as paper, erasers, or tissue. They are not ideal for hard, spherical shapes such as beads (unless there is a hole) or popcorn kernels. Alligator forceps are also useful when the foreign body can be directly visualized from the external ear canal.

Suction (Schuknect FB Catheter)

The Schuknect FB catheter is a suction catheter with a plastic umbrella at the end used to attach to the foreign body. The catheter is ideal for hard, round, spherical shaped objects specifically in the lateral one third of the ear canal. Direct visualization of the object is important since the catheter must be placed directly on the object with a good seal obtained. The catheter does not work as well for foreign bodies in the medial two thirds of the ear canal where it is narrower, and it is sometimes difficult to keep enough suction pressure on the foreign body for removal. Care must be taken when using the catheter not to push the foreign body farther into the ear canal.

Curved Hook

This tool is also ideal for hard, spherical shaped objects in the lateral one third of the ear canal.

There must be enough room in the ear canal to pass the right angle hook by the foreign body and not push the foreign body farther into the canal. Direct visualization is ideal so as not to cause trauma to the ear canal with the hook. The right-angle hook should not be used for foreign bodies in the medial two thirds of the ear canal because of increased risk of tympanic membrane perforation or traumatic injury of the ear canal.

Irrigation (Vegetable Matter and Disk Batteries Contraindicated)

Irrigation is helpful for small particulate matter that is difficult to grasp with either forceps or a suction catheter (broken eraser, sand, silly putty). It is also helpful for insect removal (cockroaches). Disk batteries and vegetable matter are absolute contraindications to irrigation. Disk batteries may cause an alkaline necrosis with the irrigation, and vegetable matter may expand with moisture, making foreign body removal even more difficult.

Cyanoacrylate (Superglue®)

Beneger et al[7] reported 2 cases of successful and 1 case of unsuccessful removal of a foreign body from the ear canal using cyanoacrylate (superglue®). They used a blunt plastic stick and applied a small amount of the cyanoacrylate glue. The stick was introduced into the ear canal under direct visualization until the foreign body was touched. The stick was left on the foreign body for approximately 30 to 60 seconds and then the stick was removed with the foreign body in 2 of the 3 cases.

This is a very unique and easy method for removing an ear foreign body. The major disadvantages to this procedure are that the foreign body must be directly visualized in order to place the stick with the cyanoacrylate on it, the object needs to have a smooth surface for placement of the glue, and most importantly, the patient must remain absolutely still or the otolaryngologist will be removing 2 foreign bodies from the patient's ear. This method is not recommended in any patient who cannot sit still or needs to be held during foreign body removal, making it not ideal for the pediatric population.

Use of 3% Hydrogen Peroxide or Acetone to Remove Cyanoacrylate

Hydrogen peroxide 3% and acetone have both been described in the literature for removal of cyanoacrylate (superglue®) from the ear. These compounds will come in handy when persons mistake cyanoacrylate for their cortisporin otic drops, or when attempted removal of a foreign body with cyanoacrylate goes awry. In a case report, 3% warm hydrogen peroxide was poured into the ear and allowed to bubble for 10 minutes and then carefully sucked out under the microscope. Reexamination revealed that the glue had partially debonded from the canal wall. A second application of peroxide was needed before the cast came out in one piece. There was no damage to the tympanic membrane or canal wall.[8] In another case report, acetone was successfully used to remove cyanoacrylate.[9]

Acetone for Removal of Gum

Acetone has also been described in the literature for the removal of gum. Chisholm et al[10] described placing a few drops of acetone into the ear canal under microscopic guidance and leaving it for approximately 5 minutes. The chewing gum was then removed by use of forceps with minimal effort, no discomfort to the patient, and no damage to the ear canal or tympanic membrane. The ear canal was irrigated after the procedure with sterile water, since acetone vapor has been shown to be an irritant to mucous membranes.

Author's Recommendations for Removal

Since ear foreign bodies are much harder to remove than nasal foreign bodies, early referral or consultation with otolaryngology is recommended. I automatically refer patients to otolaryngology if someone has already attempted and failed at the foreign body removal, or if the foreign body is smooth, hard, or cylindrical, and up against the tympanic membrane.

Alligator forceps are recommended for any graspable object, and the Schuknect foreign body catheter is recommended for smooth, nongraspable objects. Cyanoacrylate is not recommended for foreign body removal in the pediatric population. The treating physician must always remember "do no harm" and refer early.

Nasal Foreign Bodies

Signs and Symptoms of Nose Foreign Bodies

Foreign bodies of the nose usually present the same way as foreign bodies of the ear, except this time it is "Dad, I put this bead up my nose." Headache and sneezing have also been associated with nasal foreign bodies, but again, in the pediatric popu-

lation this is rare. If the foreign body of the nose goes unrecognized, the patient can present with unilateral mucopurulent nasal discharge. Any patient who presents with these symptoms should be considered to have a nasal foreign body until proven otherwise.

Nasal Foreign Bodies Words of Wisdom

What Objects Are More Likely to Fail?

Most nasal foreign bodies can be safely removed by a nonotolaryngologist. Because of the many different types of nasal foreign bodies, physicians should have several techniques at their disposal. In our study at Primary Children's Medical Center in Salt Lake City, Utah, 24 different types of foreign bodies were removed, and the physicians used 5 different techniques. Forty-seven of 48 foreign bodies were removed by a nonotolaryngologist. Otolaryngology was consulted in one patient because of the chronic nature of the foreign body and concerns of a possible tumor or mass.[4]

When to Refer Directly to Otolaryngology?

Because nasal foreign bodies are easier to remove than ear foreign bodies, otolaryngology consultation occurs less frequently. Otolaryngology should be consulted when there is concern of a tumor or mass, or when the foreign body is unable to be removed by the treating physician. Mucus, edema, granulations, or bony destruction may occur with a chronic foreign body, making it difficult to visualize and remove the foreign body. In those cases otolaryngology consultation is warranted.

Sedation

Sedation is usually not recommended in most nasal foreign body cases because of the ease of removal, short length of the procedure, and, most importantly, the need for the patient to have a good gag and cough reflex to prevent aspirating the object if it were to be pushed posterior into the oral pharynx. In our study, no patients were sedated.[4] If the patient is anxious, intranasal versed may be used, but strict adherence to sedation guidelines should be followed.

Local Anesthetic and Vasoconstrictor

All patients should be premedicated with several drops of both 1% lidocaine without epinephrine, and 0.5% phenylephrine (Neo-Synephrine®) instilled into the nostril to provide local anesthesia and decrease mucosal swelling, unless there are contraindications to these medications (allergies, chronic medical problems).

Specific Techniques for Removal

Graspable Instrument (Alligator Forceps)

As in ear foreign bodies, alligator forceps are excellent at removing soft, graspable foreign bodies, especially if they are located in the anterior nares.[4,11] The disadvantage of this method is that some foreign bodies (bread, paper) may pull apart leaving portions still in the nose. The possibility also exists of pushing the foreign body further posterior. Many parents report that they pushed the foreign body in farther while trying to remove it at home.

Foley Catheter

This is one of the most common methods used for nasal foreign bodies, and in our study was used almost as commonly as alligator forceps.[4] Depending on the size of the patient, we use a 5 or 6 Fr. Foley balloon catheter to remove many foreign bodies. The patient should be premedicated with lidocaine without epinephrine and phenylephrine. The patient is placed in the supine position. After a check that the balloon inflates properly, it is lubricated with 2% lidocaine jelly and advanced past the object. The balloon is inflated with 2 or 3 milliliters of air and the catheter withdrawn gently, pulling out the foreign body. The balloon's inflation may need to be varied depending on the size of the nasal foreign body and the size of the patient's nares. This procedure works well for foreign bodies that are in the posterior nasal pharynx, or nasal foreign bodies that are round, smooth, and nongraspable. The Foley catheter may also be used when direct visualization of the foreign body is difficult. The Foley catheter technique does not work if the nasal foreign body is so big that it occludes the nasal passage and the catheter cannot be passed posterior to it.

Curved Hook

A curved or right-angle hook is excellent for removal of nongraspable objects (beads, popcorn kernels), especially in the anterior nares.[11] The hook is first passed behind the object and the tip rotated to rest just behind the foreign body. The hook is gradually removed withdrawing the foreign body out the nose. In the case of beads with holes in them, the hook can be placed within the hole and gently removed. The

curved hook should not be used if the foreign body cannot be directly visualized or the object is in the posterior nares.

Suction (Schuknect FB Catheter)

As previously discussed in the ear foreign body section, a Schuknect suction catheter is a metal suction catheter with a plastic umbrella at the tip. The plastic umbrella is placed against the object and the suction applied. The object is removed from the nose as the catheter is removed. This technique works best for round, smooth objects in the anterior nares. The suction catheter does not work as well for posterior nasal foreign bodies or foreign bodies that are tightly lodged.[4]

Nasal Positive-Pressure Technique (Bag-mask, Male-male Tube Adapter, Parent's Kiss)

There have been multiple reports in the literature of using positive pressure to remove a nasal foreign body. They all have the same concept, which is positive pressure being applied to the patient's contralateral nostril or mouth. The pressure will force the nasal foreign body out of the affected nostril.[4,12-14] This technique works best for round or cylindrical foreign bodies that are occluding the nasal passage.

When the bag-mask technique is used, the patient is placed in a supine position and restrained if needed. The contralateral nares is occluded with external pressure. An anesthesia bag connected to high-flow oxygen at 10–15 liters per minute, with a mask that covers only the mouth, is allowed to expand with the thumbhole covered. If this pressure is not sufficient, the bag may be compressed, expelling the foreign body or at least moving the foreign body to a more anterior position allowing for it to be grabbed by forceps. Although there is a theoretical potential for barotraumas to the tympanic membrane or lower airway, a review of the literature reveals no adverse side effects of this procedure.

The male-male tube adapter technique works in the same way as the bag-mask technique except a male-male tube adapter hooked up to wall oxygen is place in the contralateral nares instead of a mask covering the patient's mouth. Navitsky et al[12] reported 9 patients who had a nasal foreign body successfully removed with this technique. There were no complications in any of the patients, and on follow-up, 5 of the 9 parents described the procedure as less traumatic than a vaccine injection.[12]

"A parent's kiss technique" works the same way as the abovementioned techniques. A parent is instructed to make a firm seal with their mouth over the child's open mouth, and then give a short, sharp puff of air into the child's mouth. The contralateral side of the nose is occluded with a thumb. The nasal foreign body is usually expelled or at least moved anterior allowing for easier forceps removal. Botma et al[13] reported 15 of 19 patients who had a nasal foreign body removed successfully with this technique. There were no complications in any of the patients, and all parents thought the technique was acceptable.

Nasal Wash

Lichenstein et al[15] described 3 patients in whom the nasal wash technique was used successfully. They recommend filling a bulb syringe with approximately 7 milliliters of sterile normal saline and placing it in the contralateral nostril. The bulb syringe is forcibly squeezed and the object is propelled out by the flow of saline back through the nasal passage. There were no complications in any of the patients.[15] This method has many disadvantages. Forcibly irrigating saline through the nose is uncomfortable and carries a significant risk of aspiration. This method of nasal foreign body removal is not recommended, since there are many less irritating and dangerous methods available for removal.

Cyanoacrylate (Superglue®)

Cyanoacrylate has also been described in the literature for the removal of nasal foreign bodies.[16] The risks and disadvantages as discussed in the ear foreign body section also pertain to nasal foreign bodies. For this reason cyanoacrylate is not recommended for nasal foreign body removal.

Author's Recommendations for Removal

Alligator forceps work well for any graspable foreign bodies in the anterior aspect of the nostril. Round, cylindrical, nongraspable objects are easily removed with either the Foley catheter technique or the positive-pressure technique. The positive-pressure technique is also useful for objects located in the posterior aspect of the nares. If the object is not removed, it is at least pushed forward, allowing it to be grasped by alligator forceps.

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