Ear, Nose, and Throat Urgencies in Children

Urgent message: Many infections and injuries of the ear, nose, or throat are unique to the pediatric population. Parents view many of these processes as urgent, leading them to seek immediate medical attention.

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Introduction

Children tend to be especially susceptible to a wide range of infectious illnesses, as well as vulnerable to a host of minor traumas to or affecting the ear, nose, or throat. This, added to the fact that they typically are less able to clearly articulate pain or other symptoms than adults, leaves it to the clinician to fill in the "blanks" when taking a history or formulating a diagnosis.

This article will help the urgent care practitioner to understand the diagnosis and treatment of some of the common infections and injuries that affect the pediatric ear, nose or throat.

Acute Otitis Media

Acute otitis media (AOM) is the most common infection for which antibiotics are prescribed to children in the United States; in 2000, there were 16 million office visits for AOM alone.

The American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP) issued a clinical practice guideline on the diagnosis and management of AOM in 2004 to streamline the care of this common pediatric infection. It specifies that the diagnosis of AOM requires:

- a history of acute onset of symptomatology
- the presence of middle-ear effusion
- *and* signs and symptoms of middle-ear inflammation.

The presence of a middle-ear effusion can be determined by a bulging tympanic membrane (TM), limited mobility of the TM, the presence of an air-fluid level behind the TM, or frank otorrhea.

Signs and symptoms of middle-ear inflammation include erythema of the TM and/or otalgia.

With the diagnosis in hand, the first issue to address in a child with AOM is pain. Pain control can be achieved by oral analgesics, including acetaminophen or ibuprofen. The use of topical agents is also ac-

Table 1. Common Pharmacotherapy for AOM

	Antibiotic	*Dosing*
First-line	Amoxicillin	80-90 mg/kg/day divided BID
Treatment failure/severe illness	Amoxicillin-clavulanate	90 mg/kg/day (amoxicillin component with 6.4 mg/kg/day clavulanate) divided BID
Penicillin allergy (not urticarial anaphylaxis)	Cefdinir Cefpodoxime Cefuroxime	14 mg/kg/day QD or BID 10 mg/kg/day QD 30 mg/kg/day divided BID
Penicillin allergy (urticaria/anaphylaxis)	Azithromycin Clarithromycin	10 mg/kg/day 1, 5 mg/kg/days 2-5 15 mg/kg/day divided BID

ceptable in the urgent care center; our standard practice is to not prescribe for home use, however. It should also be noted that topical analgesics cannot be used through a perforated TM.

Observation without the use of antibiotics is an option in certain patients, especially if the diagnosis is uncertain, the child is older, the symptoms are less severe, and the family has reliable follow-up.

Treatment

Several treatments are recommended for AOM, including contingencies for children who are allergic to penicillin (**Table 1**).

Amoxicillin remains the first-line agent for treating AOM. The current dosing recommendation is 80 mg/kg/day to 90 mg/kg/day divided in two doses. This dosing will treat both susceptible and intermediate-resistant pneumococci. Treatment is usually 10 days but may be shortened to five to seven days in the older child.

Amoxicillin-clavulanate is used when high-dose amoxicillin treatment has failed. This is usually defined as persistence of symptoms without improvement after 48 to 72 hours of therapy. Amoxicillin-clavulanate is also recommended as first-line therapy for severe illness or when *Haemophilus influenzae* or *Moraxella catarrhalis* is likely. Dosing is 90 mg/kg/day based on the amoxicillin component (with 6.4 mg/kg/day clavulanate component) divided twice daily.

In penicillin-allergic patients where the allergy is *not* anaphylaxis, cephalosporins such as cefdinir, cefuroxime, or cefpodoxime may be used.

If the penicillin allergy *is* anaphylaxis, then a macrolide such as azithromycin or clarithromycin may be used.

Otitis Externa

Otitis externa (swimmer's ear) is usually seen in the summer months. Risk factors include:

- high humidity
- warmer temperatures
- local trauma
- maceration of the skin
- exposure to water with high bacterial counts
- swimming.

The antimicrobial properties of cerumen are thought to play a protective role in the development of otitis externa. Children present most commonly with pain that is exacerbated by manipulating the pinna of the ear. On exam, the practitioner will likely see erythema and edema of the ear canal with thick clumpy otorrhea.

Treatment

Treatment of otitis externa is with topical antibiotics. Neomycin-polymixin B-hydrocortisone preparations are very effective, although contact hypersensitivity can occur and there is a rare risk of ototoxicity with the aminoglycoside component.

Fluoroquinolones are very effective options for treatment without the issues of contact hypersensitivity or ototoxicity. If the secretions are thick, suctioning or swabbing prior to administration of therapy may be of benefit. The use of an ear wick is also an option in the edematous ear canal.

Mastoiditis

Mastoiditis is a suppurative complication of AOM. It is most common in children <10 years of age, with peak occurrence in children younger than 2 years.

Clinically, mastoiditis can be separated into acute and chronic categories. Acute mastoiditis can be further subdivided depending on the involvement of the mastoid bone.

Acute mastoiditis with periosteitis occurs when there is an undrained collection of pus extending to the periosteum but not involving the bone. This can usually be treated with myringotomy and IV antibiotics.

Acute coalescent mastoiditis has necrosis and demineralization of the mastoid air cells and extension into the mastoid bone. This entity requires surgical drainage.

Children with mastoiditis will present with postauricular pain and erythema with outward displacement of the pinna on the affected side. These children may also have fever, otorrhea, headache, rhinorrhea, and hearing loss. A history or evidence of AOM is usually present, but the absence of these does not exclude the potential diagnosis of mastoiditis.

"Imaging the sinuses is not necessary in children <6 years of age and remains controversial in children >6 years of age."

CT of the mastoids with IV contrast is the imaging modality of choice. If the diagnosis is made, prompt involvement of the otolaryngologist (ENT) is essential, as these children usually require IV antibiotic therapy and, often, some surgical intervention.

Cerumen Impaction

As noted previously, cerumen has beneficial antimicrobial properties. However, its presence is often frustrating for the practitioner examining a child's ear.

Treatment

There are three general categories of options for removal: irrigation, ceruminolytics, or manual removal.

- *Irrigation* is effective, but can cause pain and/or trauma to the ear canal. Tympanic membrane perforation, the development of vertigo, and otitis externa are noted complications.
- *Ceruminolytics* are easy to apply but are no more effective than saline or water for removal. Allergic reactions to the product and pain with application are noted complications.
- *Manual removal* with a fiberoptic curette or other instrument is effective in removing cerumen but requires more skill on the practitioner's part and more cooperation on the child's part. Pain and laceration of the skin lining the ear canal are complications of this procedure.

In addition, we and other providers have had success using docusate as a softener.

Traumatic Tympanic Membrane Perforation

Children will most commonly obtain a traumatic tympanic membrane perforation due to poking an object in the ear canal. It can also occur after a slap to the side of the head.

Symptoms include pain and bloody drainage.

Treatment

Any perforation that is accompanied by hearing loss, vertigo, or facial nerve paralysis needs urgent ENT consultation.

Clean perforations should heal in two to three weeks. During that time, the ear should be kept clean and dry. Topical antimicrobials should be prescribed for 10 days.

This child needs close follow-up to reevaluate the ear to ensure proper healing of the TM.

Sinusitis

Knowledge of sinus development in children can aid the practitioner in considering the diagnosis of sinusitis in children.

The ethmoid and maxillary sinuses are present at birth.

The sphenoid sinuses are present by age 5 years.

Frontal sinuses appear around age 7 to 8 years, but are not fully developed until late adolescence.

As paranasal sinuses are a common site of infection in children and adolescents, in 2001the AAP issued a clinical practice guideline on the management of sinusitis.

Sinusitis in children is a clinical diagnosis that can be divided into the subgroups acute, subacute, and recurrent acute.

Acute sinusitis can be defined as upper respiratory symptoms that are persistent or severe. Symptoms are considered "persistent" if they are present for 10 to 14 days but less than 30 days and include a nasal or post-nasal discharge of any quality or the presence of a daytime cough. Severe symptoms include the presence of a fever greater than 39° Celsius or the presence of purulent discharge for at least three to four consecutive days. These children often appear ill.

In *subacute sinusitis*, the symptoms are present for 30 to 90 days.

In *recurrent acute sinusitis*, the child has three episodes of acute sinusitis in six months or four episodes in 12 months with resolution of symptoms between each episode.

Imaging the sinuses is not necessary in children <6 years of age and remains controversial in children >6 years of age. CT scans should be reserved for those patients where surgery may be indicated.

Treatment

Treatment of acute sinusitis is the same as for AOM (**Table 1**), with high-dose amoxicillin being the first-line treatment.

Amoxicillin-clavulanate can be used for children not improving on amoxicillin, those with moderate to severe illness, those in daycare or those who have been recently treated with antimicrobials.

In penicillin-allergic patients, the alternatives are the same as in AOM. The duration of therapy is controversial, with authors recommending 10, 14, 21, or even 28 days of treatment.

Complications of acute sinusitis can result from delay of treatment, incomplete treatment, or antibiotic-resistant organisms and are caused by direct spread in infection to adjacent structures including the orbit, brain, and subgalea.

Orbital cellulitis can be preseptal, postseptal, or have the presence of an abscess. Affected children present with erythema and edema of the periorbital tissues. Proptosis and limited extra-ocular muscle movements suggest a deeper site of infection.

Cavernous sinus thrombosis can occur by any tissue infection of the midface, orbit, or sinus.

The presence of a cranial nerve palsy with an orbit or sinus infection should raise suspicion for the practitioner. Intracranial spread most commonly occurs from the frontal sinuses and is, therefore, more frequently seen in adolescents. These complications include empyema, cerebritis, or brain abscess.

If considering any of these complications of acute sinusitis, CT scan with intravenous contrast is the recommended diagnostic modality. The presence of any of these complications requires prompt referral to the appropriate surgical sub-specialist and initiation of intravenous antibiotic therapy.

Epistaxis

In children, the most common causes of epistaxis are upper respiratory infections and nose picking. Other causes include sinusitis, facial trauma, or foreign bodies.

When obtaining the history of a child presenting with acute epistaxis, the presence of easy bruising, bleeding from other sources, weight loss, constitutional symptoms, or family history of a bleeding disorder should prompt further investigation.

Blood work, if indicated, should include a complete blood count and coagulation studies. An x-ray or CT scan can be obtained if there is suspicion of a foreign body that is not readily visualized or a mass is suspected.

"Some providers find that using a rolling motion when applying cautery is most effective."

The classification of epistaxis is based on the location of bleeding. Anterior bleeding represents 90% of episodes of epistaxis. Kiesselbach's plexus is a venous plexus located on the anterior nasal septum. It is fragile and prone to trauma. Bleeding from this site tends to be a slow, persistent oozing. Posterior bleeding involves the sphenopalatine artery. The arterial bleed is more profuse and is more likely to cause severe hemorrhage, aspiration, and even airway compromise.

Treatment

If the child presents with no active bleeding, treatment is limited to nasal hydration and ways to minimize recurrence.

If mild bleeding is present, the head can be kept mildly elevated, but not hyperextended, and the nostrils can be pinched for five to 30 minutes. The bleeding will likely resolve in five to 10 minutes.

If more significant or persistent bleeding is present, there are several options for therapy. Gauze soaked with a nasal decongestant spray, 1:10,000 epinephrine or phenylepherine, can be applied to the affected nostril to induce vasoconstriction.

If a bleeding point is visible, chemical cautery with silver nitrate is an option. The stick can be applied to the bleeding point with firm pressure for up to five seconds; longer contact is not advisable. Some providers find that using a rolling motion when applying cautery is most effective.

If packing is indicated for anterior bleed, petroleum jelly gauze can be used. There are also commercial nasal tampons available for use. Packing a posterior bleed is more difficult and should be done in conjunction with an ENT specialist. Gauze or a balloon can be used.

A more detailed, though not child-specific, discussion of epistaxis was featured in the October 2008 issue of *JUCM*.

Nasal Fractures

Nasal fractures account for most facial injuries in children. Epistaxis usually occurs with the original injury. Significant edema can limit the initial examination of

the child and prevent recognition of deformity or deviation for several days. X-rays are notoriously unreliable in assisting with the diagnosis.

When examining a child with a suspected nasal fracture, be aware that the nasal septum should be evaluated for the presence of deviation or hematoma. A septal hematoma needs to be drained as soon as possible. Attention should be paid to the presence or absence of cerebral spinal fluid (CSF) rhinorrhea. If CSF rhinorrhea is present, a CT scan should be obtained to evaluate the extent of the nasal fracture. Both septal involvement and CSF rhinorrhea require prompt ENT evaluation.

In the absence of these, the child can follow up with the primary care provider in three to four days, after the swelling decreases, to determine the need for referral to ENT for reduction.

Gingivostomatitis

Gingivostomatitis is the most likely presentation of a primary herpes simplex virus 1 infection commonly affecting children between 1 and 4 years of age. Often, these children will have fever for several days prior to any oral findings, which include erythematous marginal gingiva with yellowish fluid-filled vesicles on the mucosa, palate, and tongue which rupture and ulcerate. The ulcers are ultimately covered by a gray-yellow membrane.

This illness is self-limited, usually lasting seven to 14 days.

The most common complication is dehydration due to pain.

Treatment

Pain control can usually be achieved with acetaminophen or ibuprofen. Topical therapy is an option but can be challenging in the patient who cannot swish the medication and then spit it out. The practitioner must be cautious about excessive dosing of some topical therapies (i.e., diphenhydramine, lidocaine).

There is insufficient evidence that acyclovir plays any role in the treatment of gingivostomatitis.

Table 2. Common Viruses Causing Pharyngitis	
Influenza virus Parainfluenza virus Rhinovirus	Coronavirus Adenovirus Respiratory syncytial virus

Parental reassurance is important. Practitioners should provide parents with creative ways of hydrating their child, including using popsicles and other cold foods, as well as using straws if the child is coordinated enough.

Acetaminophen suppositories provide an analgesic option for the child who refuses any oral medication.

Hand, Foot, and Mouth Disease

Hand, foot, and mouth disease is caused by enteroviruses, typically coxsackievirus, and usually presents in the spring and summer.

The children are often febrile and fussy.

Painful ulcerations are seen most commonly on the soft palate but can occur elsewhere in the mouth. Erythematous papulovesicular lesions can be seen on the hands and feet.

As in gingivostomatitis, dehydration due to pain is the biggest concern.

Treatment

This illness is self-limited and supporting the child with adequate analgesia and hydration is key.

Pharyngitis

Viruses are the most common etiology of pharyngitis in children (**Table 2**). These often present in the winter months.

Epstein-Barr virus (EBV) is another viral etiology of acute pharyngitis.

Group A beta-hemolytic streptococcus (GAS) accounts for 15% to 30% of cases of pharyngitis in children.

Certain findings in the history and physical exam of a child with pharyngitis may assist the practitioner in determining the cause of the illness, whether it is viral or bacterial.

Findings suggestive of a viral etiology include: conjunctivitis, coryza, cough, diarrhea and/or viral exanthema.

Findings suggestive of GAS as the etiology include: sudden onset of symptoms, fever, headache, nausea, vomiting, abdominal pain, tender and enlarged cervical lymphadenopathy, scarlatiniform rash, patchy tonsillar exudates and a history of exposure.

GAS can be diagnosed with a rapid antigen test or throat culture.

Treatment

Treatment is indicated for those children in whom positive diagnosis is made. Oral antibiotics are recommended for 10 days, although there is some literature supporting a five-day course in adolescents.

As GAS has not developed any resistance, standard-dose penicillin or amoxicillin is the treatment of choice. A first-generation cephalosporin or macrolide can be used in patients with a penicillin allergy.

Infectious Mononucleosis

Infectious mononucleosis is caused by EBV. Affected children present with severe pharyngitis, as well as generalized lymphadenopathy and splenomegaly.

Laboratory findings can include a presence of atypical lymphocytes on a complete blood count with differential, a positive heterophile antibody or specific antibodies to EBV. Treatment is supportive.

Peritonsillar Abscess

Abscesses can form in the potential space bounded by the tonsillar pillars, piriform fossa, and hard palate. Infection usually begins superficially and extends into deeper tissues. The exact mechanism of initial abscess formation is unknown. Peritonsillar abscesses are polymicrobial, with a combination of GAS and anaerobes seen.

The child with a peritonsillar abscess will present with a gradually increasing sore throat accompanied by ipsilateral ear pain, trismus, dysphagia, and a "hot potato voice."

These children are often febrile. The diagnosis can be made clinically. On exam, the uvula deviates away from the affected side due to peritonsillar mass effect. Erythema and fluctuance are present, along with ipsilateral cervical lymphadenopathy. Radiography can be used to identify other causes if uncertain.

Treatment

Treatment includes tonsillar aspiration or surgical drainage accompanied by intravenous or oral antibiotics. Children with peritonsillar abscesses are often hospitalized for observation to prevent toxicity, airway compromise, sepsis, or other complications.

Retropharyngeal Abscess

The retropharyngeal space is bounded by the buccopharyngeal fascia, prevertebral fascia, and the carotid sheaths. Retropharyngeal infections can be

medical, traumatic, or idiopathic in origin. Retropharyngeal abscesses occur most commonly in children <6 years of age.

Signs and symptoms include a prodromal nasopharyngitis with an abrupt onset of fever and dysphagia. These children will exhibit trismus and drooling, as well as limitation of neck movement with extension. Respiratory distress and stridor are late signs.

Retropharyngeal abscesses are most commonly caused by streptococcus viridans, streptococcus pyogenes, staphylococcus epidermidis, or staphylococcus aureus. *Haemophilus* influenza, *Klebsiella*, and anaerobes are other important causes.

Widening of the retropharyngeal space and bulging soft tissue of the posterior pharynx can be seen on lateral neck radiograph. CT scan with intravenous contrast can help distinguish between a true abscess and cellulitis. A chest radiograph can be useful in evaluating for the potential complications of aspiration pneumonia or mediastinitis.

Treatment

Treatment includes the initiation of intravenous antibiotics and admission to the hospital. Early involvement with an ENT specialist to evaluate the need for surgical intervention is paramount.

Postoperative Tonsillectomy Bleeding

Tonsillectomy is one of the most common surgical procedures performed in children. As the procedure is commonly performed in the outpatient setting, postoperative bleeding can present to the urgent care practitioner.

Primary hemorrhage occurs within the first 24 hours and most commonly in the postanesthesia care unit. Secondary or delayed hemorrhage can occur up to 21 days postoperatively, but most commonly between days 5 to 10. Approximately 3% of children will have a delayed hemorrhage.

In evaluating the child with a postoperative bleed, first and foremost, keep the child calm. Consult with the ENT provider and alert him or her to the presence of an adenoidectomy, operative complication, and/or prior hemorrhage.

On exam, vital signs, presence of frank bleeding, oozing or clot, and the presence of eschar are all important to relay, as well. Often, complete blood count and coagulation studies are indicated, along with intravenous hydration.

Treatment

If a clot is present, do not remove it. If there is severe, active bleeding, use gauze and apply digital pressure. Often, these children will need intervention in the emergency department or operating room by their ENT provider.

Summary

Many infections and injuries to the pediatric ear, nose, or throat can be evaluated and treated in the urgent care setting. An understanding of the more severe infections and injuries is important for the practitioner. Recognizing these entities—and prompt referral to the ENT specialist or emergency department—will ensure appropriate care for the patient.■

Resources

- Subcommittee on Management of Sinusitis and Committee on Quality improvement. Clinical practice guideline: Management of sinusitis. *Pediatrics*. 2001;108(3):798-808.
- Subcommittee on Management of Acute Otitis Media. Diagnosis and management of acute otitis media. *Pediatrics*. 2004;113(5):1451-1465.
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