Otolaryngology (Ear Nose and Throat)

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1 Introduction

The conditions in this chapter focus on the structures of the ear, nose, and throat involved in potential emergent pathophysiology. Epistaxis is covered first as the most commonly encountered otolaryngology-related issue in primary care. Infections of the throat and neck follow (peritonsillar and retropharyngeal abscesses, Lemierre's syndrome, and epiglottitis). The emergent ear infections of mastoiditis and malignant otitis externa are covered subsequently. A discussion of peripheral versus central vertigo addresses the discernment between benign and emergent causes of vertigo in the ambulatory patient. Sudden sensorineural hearing loss and the rare emergent complications of acute rhinosinusitis are covered last.

2 Epistaxis

Epistaxis is a common complaint in both the outpatient and emergency settings. While nose bleeds are often self-limited, severe epistaxis can be seen in 0.2% of patients and can result in life threatening hemorrhage and may require urgent intervention. Understanding the etiology, anatomical location, and associated comorbidities in patients with epistaxis is essential for effectively triaging and providing excellent care.

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2.1 General Considerations

In advance of laboratory data, clinical history and physical exam will dictate urgency of evaluation and further treatment. The patient should be promptly evaluated for active signs of bleeding and potential for airway compromise. Patients who are incapable of protecting their airway due to loss of consciousness or severe neurological trauma (GCS <8) should proceed with intubation prior to nasal intervention. Moreover, systemic signs of hemodynamic instability including pallor, dry mucous membranes, tachycardia, orthostatic hypotension, or loss of consciousness, often indicate the need for urgent evaluation and intervention. Therefore, accurately quantifying volume of bleeding is essential. At greater than 100 mL of blood loss, visual estimation has been demonstrated to be grossly inaccurate amongst both medical and non-medical personnel. However, as a general reference, the U.S. cup contains 236 mL of fluid. The availability of low continuous wall suction can therefore be beneficial for patient comfort and quantification of active bleeding. While there is no global definition for severe epistaxis, bleeding of greater than 500 mL is often concerning due to changes in hemodynamic stability. Moreover, the UK epistaxis audit reviewed 1826 cases of epistaxis and defined severe bleeding as lasting greater than 30 min over a 24-h period.

2.2 History

A thorough history with regard to medications, social practices, and medical conditions should be obtained. Common etiologies can include digital or other trauma (such as nasogastric tube insertions), mucosal irritation and dryness, or use of steroid nasal sprays. However, less common etiologies should also be considered such as septal perforation, substance use, sinonasal cancer, arteriovenous malformations, and autoimmune-related disorders (such as granulomatosis with polyangiitis or immune thrombocytopenic purpura). Severe epistaxis also can be associated with medical conditions such as renal failure, hepatic failure (especially with alcohol), hypertension, and diabetes. Congestive heart failure is a common risk factor due to increased pressures in the vascular supply to the nose. A family history of bleeding disorders can also prompt the need for further testing for inherited diseases such as Von Willebrand's disease or other hemophilia. It is also important to elicit a thorough history including prior epistaxis, use of antiplatelet, or anticoagulation medications. Easy bruising, skin rashes such as petechiae or purpura, or bleeding after wisdom teeth extractions are also suspicious features for bleeding diathesis. Recurrent epistaxis may also be suspicious for malignancy in patients with other risk factors such as tobacco use, radiation or wood dust exposure, or prior history of nasopharyngeal cancer. Intranasal drug abuse can also present with recurrent epistaxis and potential septal perforation secondary to avascular necrosis of the septal cartilage. These medical conditions are important in evaluating patients with epistaxis as they give prognostic information as to whether the bleeding will be controlled in the clinic.

2.3 Exam

If the patient is actively bleeding, having the patient gently blow into a tissue can allow better evaluation of the nose. Anterior rhinoscopy with use of a nasal speculum (if available) should be performed on all patients with active epistaxis in conjunction with a use of a light source such as a headlight or otoscope as it may provide direct visualization of the source of bleeding. Often an area of bleeding or clot in the anterior nares in Kiesselbach's plexus can be appreciated in anterior epistaxis. However, the nasal floor, inferior and middle nasal turbinates and lateral nasal wall should also be examined carefully. Bleeding from both nares, hematemesis, or the presence of dark, melanotic stools may represent posterior epistaxis which may require additional packing or specialized intervention.

2.4 Diagnostics

In general, the treatment of epistaxis in the majority of patients is performed prior to obtaining laboratory information. In patients taking anticoagulation, a PT/INR may be necessary for determining if the patient is in a supratherapeutic window which may require correction. A CBC can also be helpful in estimating blood loss, specifically when trended over a period of time. While there is generally no role for imaging unless for preoperative planning purposes. Other testing will depend on the history obtained from the patient (autoimmune work up, malignancy workup, etc.).

2.5 Treatment

Treatment of epistaxis can be divided into two primary types based on anatomic location: anterior or posterior. Anterior epistaxis is by far the most common and can often be controlled in an outpatient setting in an otherwise healthy patient. Treatment of anterior epistaxis includes the use of 5–6 sprays of oxymetazoline (if available) in each nares coupled with firm constant pressure of the alar cartilages against the septum for 20 min without alleviation. Providers may therefore find it effective to concurrently perform a review of the patient's medical history during this time.[1] In general, care should be taken to refrain from inserting foreign materials into the nares as these may cause further mucosal trauma, may become foreign bodies, or may shunt bleeding into the posterior oropharynx. Cessation of bleeding usually indicates that a clot has formed, and further intranasal intervention should be avoided. To promote mucosal healing following cessation of bleeding, the patient

[1] Caution should be taken in patients with severe pulmonary hypertension which may be exacerbated by oxymetazoline.

should use an intranasal saline spray or spray-gel to prevent drying of the mucosa or clot.

Due to its location, posterior epistaxis arising from the posterior septum, nasopharynx, and posterior turbinates are unlikely to be effectively treated with vasoconstrictive nasal sprays and anterior nasal pressure. In these cases, referral to the otolaryngology office or ED for insertion of packing material in the posterior nose and nasopharynx is typically performed using non-absorbable packing material. Specifically, the use of double balloon catheters (anterior and posterior) was shown effective in controlling up to 70% of patients with posterior epistaxis. Otolaryngology should usually be consulted in most cases of severe posterior epistaxis to evaluate if there is need for additional intervention.

Recurrent epistaxis or epistaxis which is refractory to pressure and vasoconstricting agents may require additional interventions such as chemical cauterization, placement of absorbable or non-absorbable intranasal packing, or operative intervention. If utilized, packing should be inserted as atraumatically as possible. While there is no standard for the duration of packing, it is typically recommended that packing should remain no longer than 5 days. The use of tetracaine spray or lidocaine infused lubricants may make packing more tolerable in patients.

Key Points

- Bleeding from bilateral nares and large amounts of blood (>500 cc) originating from the posterior oropharynx may be indicative of posterior epistaxis which often needs to be managed in the ED.
- Patients encountering epistaxis with multiple medical comorbidities which is intractable to pressure and intranasal oxymetazoline often cannot be managed in an outpatient clinical setting.
- Patients on coumadin may need to be referred to the ED for a stat PT/INR.

3 Peritonsillar Abscess

Peritonsillar abscess (PTA) is a polymicrobial bacterial infection in the parapharyngeal space of the oropharyngeal cavity. Although patients may be toxic appearing, if treated effectively, the majority of patients will often make a speedy recovery.

3.1 General Considerations

The overall incidence for patients developing a PTA is 30 cases/100,000 people per year. The incidence of PTA often increases from childhood to peak in adolescents and young adults with subsequent decline amongst older adults. While there is no statistical association between the incidence of PTA's with seasonal

variations, anecdotally most providers feel that there is an increase in the fall and winter time associated with the increased incidence of group A strep pharyngitis infections.

3.2 History

A comprehensive history is critical for elucidating between acute pharyngitis, tonsillitis, malignancy, and peritonsillar abscess. Patients with a PTA will often present with a history of worsening unilateral sore throat, dysphagia, odynophagia, and upper respiratory infection symptoms which have developed over the course of several days. Classically, patients may have a muffled "hot potato" voice, though more subtle voice changes can be found. Fevers and chills are also often reported along with malaise. As the abscess progresses, patients may subsequently develop worsening trismus (secondary to inflammation of the pterygoid muscles) and ear pain (referred pain). In addition, it is also critical to establish if the patient has trialed oral antibiotics and for what duration. Peritonsillar abscesses are almost exclusively characterized by their unilateral behavior. While bilateral PTAs are described, the presence of bilateral tonsillar swelling and/or exudates are likely indicative of acute pharyngitis which can be managed more conservatively.

3.3 Exam

A full and detailed head and neck exam is essential for the appropriate diagnosis of PTA.

The most common exam finding is displacement of the uvula away from the affected side with obvious mass effect of the affected tonsil which is displaced medially and anteriorly. The exam may be limited by reduced mouth opening. Therefore, a headlight and multiple stacked tongue depressors may be beneficial to open the mouth sufficiently in order to obtain an accurate exam. Care should be taken to assess the floor of mouth and submandibular region to rule out other potential sources of infection. Lymphadenopathy of the submandibular and upper cervical lymph nodes of the ipsilateral neck may also be present. However, bilateral lymphadenopathy with exudative tonsillitis should raise the suspicion for mononucleosis.

3.4 Diagnostics

A CT scan is 100% sensitive for a peritonsillar abscess. If aspirated, culture data is critical for ensuring appropriate antibiotic selection if there is recurrence.

3.5 Treatment

The primary treatment of a peritonsillar abscess involves antibiotics and steroids +/− drainage as dictated by exam and imaging findings. Antibiotic selection should take into account if the patient has failed outpatient therapy and if there is high concern for a drug resistant organism. Augmentin is often an excellent choice in patients with prior history of failure on amoxicillin or clindamycin. In the emergency room setting, patients often report significant symptomatic improvement following Intravenous dexamethasone, particular in the cases of odynophagia with poor PO intake.

Drainage of a peritonsillar abscess is typically performed in the ED or ENT office. Patients who are refractory to initial medical management or with imaging suggestive of a >2 cm abscess typically are taken for surgery. Drainage often includes needle aspiration and/or a stab incision which provides a pathway for egress. Cultures of the aspirated fluid is critical for future antibiotic selection, particularly when there is concern for recurrence.

Key Points

- A peritonsillar abscess is characterized by a markedly painful antero-medially displaced tonsil with deviation of the uvula away from that tonsil.
- In cases of doubt, a CT scan can rule out the diagnosis.
- Peritonsillar abscesses often require drainage which can be safely performed in the ENT clinic or emergency room setting in most cases.

4 Retropharyngeal Abscess

A retropharyngeal abscess is a rare but critical deep neck infection which arises posterior to the deep cervical fascia in a potential space which extends from the skull base to the posterior mediastinum. The retropharyngeal space contains two lymph node chains which typically drain the nasopharynx (including adenoids), paranasal sinuses, middle ear, and Eustachian tube.

4.1 General Considerations

Retropharyngeal abscess occurs mainly in children less than 5 years of age but in rare cases it can occur in adults. Infections are often found to be polymicrobial. Additional concern for pharyngeal injury or trauma secondary to foreign bodies (fish bone) or iatrogenic procedures (such as endoscopy, nasogastric tube insertion, and intubation) may also result in the development of a retropharyngeal abscess.

4.2 History

In the majority of cases, patients typically present following a several day history of upper respiratory illness. Symptoms such as severe sore throat, odynophagia, dysphagia are often common along with fever and chills. As the abscess progresses, patients may go on to develop nuchal rigidity, neck tenderness, drooling, and ultimately respiratory distress. Changes in voice may also be reported. Patients with high suspicion for retropharyngeal abscess should be managed in the emergency room setting.

4.3 Exam

The patient may have a fever and be toxic appearing. They will also often be uncomfortable. Signs of acute distress such as stridor, tripoding, or increased respiratory rate should prompt urgent consultation with otolaryngology for possible intervention.

4.4 Diagnostic Testing

CT neck with contrast is useful for determining the extent of abscess formation and can guide the operative approach for intervention. In the absence of a CT, lateral soft tissue radiograph is a quick and easy study to evaluate for RPA in patients who are otherwise stable. A CBC and blood cultures may also be useful.

4.5 Treatment

Prompt initiation of IV antibiotics is essential for treating patients with retropharyngeal abscesses. Similar to other abscess, antibiotic selection is essential and a detailed history of prior antibiotic use elucidates concerns for antibiotic resistant organisms. In otherwise stable patients, failure for improvement over 24–48 h typically will prompt the need for possible surgical drainage with otolaryngology.

Key Point

- Patients with retropharyngeal abscess are typically young children who present with severe throat pain which can progress to airway compromise. Treatment is typically performed in an emergency medicine setting and requires prompt initiation of antibiotics.

5 Lemierre's Syndrome

First described in 1936, Lemierre's syndrome occurs typically in response to oropharyngeal infections and is characterized by thrombophlebitis of the internal jugular vein with possible metastatic septic emboli and bacteremia.

5.1 General Considerations

The condition is rare with an annual incidence of 3.6 cases per one million people with the majority of cases occurring in patients between the ages of 14 and 24, with a possible male predominance. Lemierre's syndrome is caused by members of the normal oropharyngeal flora and the most common pathogen is *Fusobacterium necrophorum.* Other infections besides pharyngeal infections can cause Lemierre's including dental infections, sinusitis, otitis media, and parotitis. The onset is usually 1–3 weeks after the original infection. While the exact mechanism has not been fully elucidated, it is hypothesized that infection of the oropharynx extends into the lateral pharyngeal space resulting in direct or hematogenous spread to the internal jugular vein.

5.2 History

Fever and neck pain may be reported. A history of concurrent or preceding infection of the head and neck is often reported and in most cases is related to pharyngeal infection. Historical elements of pulmonary complications such as cough, hemoptysis, shortness of breath, and pleuritic chest pain are common. The joints are also commonly affected causing arthralgias and arthritis. Visceral abdominal internal abscess may also occur in liver, spleen and kidney.

5.3 Exam

Tenderness over the neck is the most common finding. The angle of the jaw or the area of the sternocleidomastoid may also be affected. Erythema, swelling, and induration may be present over these areas. Of note, almost half of patients may not have neck findings on presentation. If there has been spread to other organs then abnormalities of exam of those organs may be present. Adventitious lung sounds may be present. Abdominal or flank tenderness may be present with abscesses of internal organs. Moreover, a careful neurological exam is necessary to evaluate for possible development of intracranial abscesses.

5.4 Diagnostics

A CT of the neck with contrast is the study of choice. A carotid ultrasound may also be ordered but is less sensitive. The chest is the most common site of septic emboli deposition and a CT with contrast is the test of choice.

5.5 Treatment

The use of antibiotics including beta-lactamase inhibitors is essential. While there is no consensus for the use of anticoagulation in patients with Lemierre's syndrome, the risks and benefits should be considered prior to its use. Surgical intervention is often limited.

Key Points

- Lemierre's syndrome is an uncommon infection of the internal jugular vein usually after an oropharyngeal infection.
- In up to half of cases, the neck has minimal or no symptoms.
- The lung is the most common site of embolization and symptoms commonly arise from this organ system.
- A multidisciplinary approach is essential to prevent and treat septic shock and embolic spread to other organ systems.

6 Epiglottitis

Epiglottitis is a rare bacterial infection of the tissues of the neck surrounding the glottis.

6.1 General Considerations

Epiglottitis also known as supraglottitis is now rare following routine vaccination of children against *H. influenzae* type B; however, cases can still occur in adults due to *Streptococcus* and *Staphylococcus* species and waning immunity or lack of vaccination. Epiglottitis can occur at any age and in the older age groups the presentation may be more subtle. Risk factors are immunodeficiency including HIV and diabetes, end-stage renal disease, and substance abuse.

6.2 History

Fevers may be reported. The cardinal symptom of both epiglottitis and retropharyngeal abscess is a severe sore throat. A change in voice quality may be reported.

6.3 Exam

The patient may have a fever and be toxic appearing. Often the patient will be anxious and appear uncomfortable. A telltale sign of epiglottitis is marked tenderness with manipulation of the hyoid bone and a normal appearing oropharynx. In the later stages, the patient may be in a tripod or sniffing position due to respiratory distress. Care should be taken with any manipulation of the airway including use of a tongue depressor due to concern for laryngeal spasm. The patient often cannot control secretions or stridor may be present.

6.4 Diagnostics

Radiographs will not typically be ordered as an outpatient; however, lateral neck radiographs of epiglottitis typically show the thumbprint sign of a swollen epiglottis.

Key Points

- Both retropharyngeal abscess and epiglottitis are associated with severe throat pain.
- A reported severe throat in the absence of oropharyngeal erythema and with marked tenderness with manipulation of the hyoid bone should raise concern for epiglottitis.
- If symptoms are accelerating, emergency services may need to be called.

7 Mastoiditis

Mastoiditis is a serious infection of the mastoid cavity (a portion of the temporal bone) which is typically a complication of progressive otitis media.

7.1 General Considerations

Acute otitis media is an infection of the middle ear space, which is bounded by the tympanic membrane (ear drum), cochlea and labyrinth medially, mastoid cavity superoposteriorly, and Eustachian tube anteroinferiorly. The middle ear space communicates with the mastoid air cells via the antrum which allows for the potential spread of serous fluid or infection. Although extremely rare, complications of acute otitis media can include meningitis, epidural abscess, petrous apicitis, the development of abscesses, or lateral sinus thrombosis.

7.2 History

Often there is a history of preceding URI symptoms or several days of current symptoms leading to the diagnosis of otitis media. Patients will often subsequently develop fevers. Symptoms of otitis media are present such as otalgia, hearing loss, tinnitus or vertigo. Patients may have also failed more conservative measures.

7.3 Exam

The patient may be febrile. The TM may be bulging and erythematous with purulence visualized behind the TM. Hearing is often reduced in the affected ear. Erythema and/or tenderness of the postauricular skin is the tell-tale sign of mastoiditis and must be examined in every patient. When severe, this can result in protrusion of the auricle due to edema. The cranial nerves should be assessed to address concern for intracranial extension. Abscess eroding through the sternocleidomastoid muscle, known as a Bezold abscess, may also be seen as a rare complication.

7.4 Diagnostics

A CT scan may be performed, but it is important to note that fluid in a mastoid cavity alone is not sufficient for the diagnosis of mastoiditis. Mastoiditis is a clinical diagnosis. If CT is performed, many people with allergic rhinosinusitis or who have had a recent URI, will have transient fluid in their mastoid cavities. Specific signs of mastoiditis, however, include erosion of the bony septae between air cells, erosion of the outer cortex of the mastoid cavity, extracortical spread of infection or abscess into the sternocleidomastoid muscle, or signs of dural thickening or inflammation. Blood markers for infection such as ESR and CRP are also usually elevated.

7.5 Treatment

The treatment of mastoiditis includes the prompt administration of IV antibiotics and typically surgical intervention with at least the placement of a pressure equalizing tube and/or mastoidectomy.

Key Points

- Mastoiditis is characterized by fever, a protruding auricle and mastoid tenderness.
- A CT can confirm the diagnosis if there is erosion of bony septae, however, fluid alone is not indicative of mastoiditis.

- Mastoiditis is an invasive infection that requires IV antibiotics and urgent otolaryngology consultation.

8 Malignant Otitis Externa

Malignant otitis externa is a severe bacterial infection of the external tissues of the ear canal often invading the mastoid or temporal bone (osteomyelitis).

8.1 General Considerations

Malignant otitis externa is usually due to progressive otitis externa ("swimmers ear") which spreads to the bony–cartilaginous junction of the external auditory canal. Malignant otitis externa is most common in patients with diabetes mellitus, the elderly, and patients who are immunocompromised. Organisms are varied and may include fungal organisms, especially when topical antibiotic drops have been previously used. However, the majority of cases are caused by *Pseudomonas aeruginosa*. The preceding infection of otitis externa is also known as swimmer's ear: however, there are other risk factors besides swimming, including use of ear plugs, dermatitis in the ear, use of cotton swabs, and use of chemicals near the ear such as hair dyes and sprays.

8.2 History

The typical presenting symptom is out of proportion pain in the ear canal and conchal bowl which is worsened with touching the ear itself. Patients will often state that they are unable to sleep or use a cell phone to that side. Other symptoms can include headache or earache with vertigo or hearing loss. It is important to assess the patient's past medical history including prior use of topical or enteral antibiotics, control of their diabetes, and recent use of other immunosuppressant medications such as steroids.

8.3 Exam

Pain with manipulation of the auricle is almost always present. The finding of black colonies (aspergillus) or white patches (candida) can lead to a diagnosis of fungal origin. The external auditory canal is typically erythematous and can be swollen. Patients will often have difficulty tolerating otoscopy examination. If visible, involvement of the bony–cartilaginous junction of the external auditory canal is pathognomonic for malignant otitis externa.

8.4 Diagnostics

A CT of the temporal bone is the most sensitive modality for evaluating the external auditory canal. Cultures can be useful in cases of persistent disease to rule out multidrug resistant pseudomonas.

8.5 Treatment

Topical anti-pseudomonal ear drops with steroid in the case of bacterial infection +/− oral antibiotics vs. topical antifungal ear drops with steroid. Possible placement of an ear wick to ensure antibiotic penetration in the setting of canal edema. Prompt serial otolaryngology examination for serial debridement.

Key Points

- Malignant otitis externa is a contiguous osteomyelitis caused by a severe otitis externa infection.
- Risk factors are age, uncontrolled diabetes, and immunosuppression.
- Long term IV antibiotics are required (at least 6 weeks) usually with serial arthroscopic debridement and topical antimicrobial drops.
- CT can confirm the diagnosis.

9 Vertigo

Vertigo, or the sensation of imbalance secondary to vestibular dysfunction, is one of the most frequently encountered otolaryngology related pathologies. Vestibular vertigo is thought to account for 25% of dizziness complaints and occurs in about 1.4% of the population each year.

9.1 General Considerations

In general, there are two types of vertigo: peripheral vs. central.

9.1.1 Peripheral Vertigo

Many common etiologies of peripheral vertigo include benign paroxysmal positional vertigo (BPPV), vestibular neuronitis or labyrinthitis, otitis media, trauma, Meniere's disease, superior semicircular canal dehiscence syndrome, or toxin induced. *Labyrinthitis* will typically present with both auditory and vestibular dysfunction and can be secondary to viral or bacterial infections and induce inflammation of the inner ear. It can also result in acute sensorineural hearing loss

(SNHL). *Vestibular neuronitis* on the other hand typically results in vestibular dysfunction alone and is thought to be secondary to a viral infection of the vestibular nerve and vestibular apparatus. In viral etiologies, patients may often present with a URI prodrome. As the most common cause of non-infectious peripheral vertigo, *BPPV* occurs secondary to displacement of otoliths within the vestibular canals which stimulate one, if not more, axis of movement in sudden bursts. Although *Meniere's disease* is less common, it typically is associated with aural fullness, fluctuating SNHL, tinnitus, and intermittent vertigo (drop attacks). In the setting of trauma, a full work up should be performed to evaluate for evidence of violation of the otic capsule or labyrinth as these can precede a perilymph fistula.

9.1.2 Central Vertigo

Central causes of vertigo can include neurological disorders (multiple sclerosis, Parkinsonism, seizure, stroke, vascular insufficiency, cerebellar lesions, metabolic disorders, intoxication, migraine, and iatrogenic). Acute persistent severe vertigo, particularly in the setting of additional neurologic deficits, should be considered a stroke until proven otherwise. Multiple sclerosis and other neurological disorders can also present with additional neurological findings in the absence of a cerebral vascular event. Symptoms which are progressive over several months and associated with headaches or intraocular papilledema may suggest the presence of a cerebellar pontine angle tumor.

9.2 History

Asking the patient to describe specific sensations is paramount to ensure appropriate diagnosis and treatment. Patients with vertiginous sensations will describe active movements such as "spinning" or "whirling." Disequilibrium on the other hand is often described as feeling "off-balance." Whereas people with presyncope will often use words such as feeling "lightheaded" or "faint."

The onset and duration of symptoms is also paramount. Vertiginous symptoms that are seconds to minutes are often associated with BPPV or vascular insufficiency whereas hours of vertigo symptoms are more often associated with Meniere's disease or migraine. Vertigo related to vestibular neuronitis or labyrinthitis can typically last days given its inflammatory etiology whereas constant vertigo which is not relieved with positioning or time is likely related to a central etiology. Other components include the presence of otitis media, aural fullness, tinnitus, and hearing loss which are also important particularly when preceded by a history of recent URI symptoms.

9.3 Exam

In the case of infectious etiologies, fever may be present. The findings of otitis media may be present. Nystagmus may be present with both labyrinthitis and vestibular neuronitis. A full neurological exam should be performed on any patient presenting with acute vertigo symptoms. A HINTS exam (head impulse, nystagmus, and test of skew) is also useful for differentiating between central and peripheral vertigo. A Dix–Hallpike exam (lying the patient down while supporting their head and having them fix their eyes) can be helpful to diagnose BPPV and should elicit gaze-evoked rotatory nystagmus towards the side of the stimulus lasting 10–60 s with vertigo.

9.4 Diagnostics

Neurological examination with a head CT with thin cuts through the temporal bone can be a useful first step. Additional imaging can include an MRI brain as well as MRA (magnetic resonance angiography) if there is high suspicion of stroke or vascular insufficiency. Outpatient testing using videonystagmography (VNG) and audiogram can also be helpful for monitoring persistent deficits.

9.5 Treatment

Treatment varies based on the etiology of vertigo. Diagnosis is critical for appropriate treatment of patients with vertigo.

Key Points

- Vertigo is complex yet can be divided into central and peripheral causes.
- Rapid neurologic examination and imaging to rule out neurovascular compromise is essential.
- While acute labyrinthitis secondary to otitis media may require use of antibiotics, steroids can otherwise be beneficial to abate inflammatory causes of vertigo.

10 Sudden Sensorineural Hearing Loss

Sudden sensorineural hearing loss should be considered a medical emergency and requires prompt examination to rule out stroke and traumatic etiologies of hearing loss.

10.1 General Considerations

Sudden sensorineural hearing loss (SSNHL) is characterized by acute sensorineural hearing loss occurring over at least three consecutive test frequencies and developing over a 72-h period. Approximately 5–20 per 100,000 people per year in the USA are afflicted and there is no sex predisposition. Any age can be affected by SSNHL, though incidence in middle age is most common. SSNHL is almost always unilateral and most cases are idiopathic. Recovery of hearing depends on the severity and etiology of the hearing loss, however, there is often a worse prognosis if associated with vertigo, deafness, or a delay in treatment initiation. When identified, infectious (viral, lyme disease, and syphilis), and otologic etiologies occur most frequently. Primary otologic etiologies, most often medications (loop diuretics, sildenafil) are also very common. However, SSNHL can be related to neoplastic (masses, hyperviscosity syndrome), Neurologic (stroke, multiple sclerosis) and metabolic syndromes (diabetes), and autoimmune diseases and vasculitis. The latter two are often most frequently encountered in the case of bilateral SSNHL, although rare. Unfortunately, in the majority of SSNHL a definitive cause is never identified.

10.2 History

Patients will typically present with sudden loss of hearing upon waking or that progressively worsens throughout the day. This is sometimes perceived as a fullness or blockage of the affected ear and therefore patients may defer evaluation. History of concurrent URI may suggest acute otitis media. More than 90% of patients with SSNHL will have ipsilateral tinnitus and a large percentage will have vertigo. A previous history of such symptoms or fluctuating symptoms may lead to a diagnosis of Meniere's disease the evaluation of which is not urgent. Pain is occasionally reported or paresthesias. Hearing loss associated with other symptoms such as headache or diplopia may indicate a neurovascular etiology and require urgent imaging. Recent head trauma, barotrauma, or noise exposure can also cause abrupt hearing loss and a history of these factors can obviate the need for extensive urgent evaluation. If there is a tympanic membrane rupture, associated with noise or barotrauma the patient should be instructed regarding strict water precautions and follow up with expedited ENT referral.

10.3 Exam

The external ear canal should be inspected in addition to the tympanic membrane. A painful ear should not be irrigated if cerumen impaction is present. If the primary care clinician cannot manually dis-impact the ear, a referral to ENT is

appropriate. A full neurological exam should also be performed. The clinician must make every effort to discern conductive from sensorineural hearing loss. In this regard, a tuning fork (512 Hz) can be used in the performance of the Weber test. In the Weber test, the struck tuning fork is placed midline (such as the forehead) and the sound will lateralize away from the affected ear in sensorineural hearing loss. A Rinne test (testing between air or in front of the ear vs. bone conduction, placed on the mastoid bone) will often be equivocal in the case of SNHL.

10.4 Diagnostics

Testing should be tailored to the clinical scenario. Some testing commonly utilized is complete blood count and metabolic panel (multiple myeloma, diabetes), inflammatory markers (ESR and CRP) for autoimmune diseases and vasculitis. An ANA is typically part of the evaluation. Consideration for an MRI of the brain should be had in all cases.

10.5 Treatment

Early initiation of steroids with either 60 mg oral prednisone daily (in adults) and/or with intratympanic injections, for a minimum of 10–14 days increases the rate of spontaneous recovery in SSNHL. Patients will often demonstrate the greatest recovery in the first 2 weeks.

Key Points

- Sudden sensorineural hearing loss (SSNHL) is defined as sudden hearing loss occurring over 72 h or less.
- While most cases are idiopathic, evaluation should be tailored to the clinical scenario.
- Otolaryngology evaluation for intratympanic steroid injections should be a consideration, and for cases of possible SSNHL where cerumen is unable to be manually disimpacted by the primary care clinician.

11 Acute Rhinosinusitis

Diagnosis of *acute rhinosinusitis* (*ARS*) is based on the sudden onset of >2 nasal symptoms for a duration of up to 12 weeks. While rare, complications of sinusitis can be severe and life threatening.

11.1 General Considerations

The prevalence of rhinosinusitis in the general population varies from 6 to 15%. Complications of sinusitis can be grossly classified as either extracranial or intracranial. Extracranial complications are from infection of the sinuses which spread to the premaxillary subcutaneous tissue, forehead overlying the frontal sinus (Pott puffy tumor), and extending into the eye. The Chandler classification is useful for categorizing ophthalmologic complications and include: preseptal cellulitis, postseptal cellulitis, subperiosteal abscess, orbital abscess, and cavernous sinus thrombosis. Cavernous sinus thrombosis shares some symptoms with orbital cellulitis which most often arises from the posterior ethmoid or maxillary sinuses (see Chapter on "Ophthalmology"). These often require joint evaluation by both otolaryngology and ophthalmology to ensure source control and eye integrity. Intracranial complications include epidural and subdural abscesses, superior sagittal sinus thrombosis, and meningitis. Epidural abscess is the most common intracranial complication and most likely arises from ethmoid or frontal sinusitis. While usually benign, mucoceles can become mucopyoceles and cause osteomyelitis or intracranial abscesses. Patients with poorly controlled diabetes or other immunosuppressive states may be susceptible to additional complications of infection, including development of invasive fungal sinusitis.

11.2 History

The history is typical for a non-resolving acute rhinosinusitis. Significant fevers may be reported which are uncommon for rhinosinusitis. Pain is often referred to the eye and forehead with epidural abscess. Cavernous sinus thrombosis can cause visual impairments such as double vision. Fever and pain over the frontal sinus are consistent with Pott's puffy tumor requiring IV antibiotics.

11.3 Exam

Significant fever, eye pain, and sinusitis should raise concern for an emergent complication. Cranial neuropathies especially of cranial nerve six and proptosis should be referred to the ED. Necrotic or darkened nasal turbinates in diabetics or immunosuppressed patients should be referred for emergent care to rule out possible invasive fungal sinusitis.

11.4 Diagnostics

Thin cut (~1 mm) CT with contrast is an effective first diagnostic test for identifying complications of sinusitis. In the case of concern for intracranial complications, MRI can be more sensitive for identifying dural inflammation and perivascular invasion. Purulence emanating from the middle meatus warrants culture.

11.5 Treatment

Prompt initiation of IV antibiotics is imperative in the treatment of complicated ARS. Otolaryngology and/or ophthalmology consultation is often necessary to ensure appropriate source control. Invasive fungal sinusitis is often life threatening and involves serial debridement of the sinuses.

Key Points

- The presence of significant fever or an abnormal neurological exam in cases of sinusitis should raise concern for an emergent complication.
- Mold visualized as darkened or black spots on the turbinates in poorly controlled diabetic or immunosuppressed patients should be referred to the ED to rule out invasive fungal infection.

12 Miscellaneous

12.1 Foreign Bodies

12.1.1 General Considerations

Foreign bodies in the ear, nose, and throat are commonly encountered in the primary care setting.

12.1.2 Ear

Foreign bodies in the ear can often be removed by the primary care clinician using an otoscope and forceps or a suction catheter. Insects may be immobilized with the installation of lidocaine. Extreme care should be taken to avoid trauma of the canal wall skin and the tympanic membrane. Foreign bodies which are visualized to perforate the tympanic membrane warrants otolaryngology evaluation give the risk of

injury of the ossicles and/or the inner ear. Clear fluid draining from the perforation may suggest a perilymphatic fistula. Following removal, ear drops containing an antibiotic and steroid should be prescribed for 5 days to ensure canal wall healing following trauma.

12.1.3 Nose

A frequent event in children, patients will often present after multiple attempts from the parents which inadvertently lodges the object more posteriorly. Most foreign bodies can be visualized on anterior rhinoscopy and can be removed with the assistance of Bayonette forceps or soft-catheter suction if available. Utilizing oxymetazoline (if available) is essential to provide decongestion and enlarge the nasal passage to facilitate removal. A Fogarty balloon can also be an effective tool for removal of foreign bodies if available. Care should be taken not to cause trauma to the nasal septum or head of the turbinates as this can result in bleeding making it more difficult for future attempts at removal. If unable to remove, the patient should be given nasal saline spray and a prophylactic antibiotic to protect against toxic shock syndrome with subsequent referral to an otolaryngologist.

12.1.4 Throat

Particularly in children, stridor, dyspnea, tachypnea, changes in voice, and tripoding are concerning for migration into the airway and require urgent bronchoscopy and evaluation for removal. In adults, patients will classically present with having a "fish bone" stuck in the throat. AP and lateral XR of the neck can be useful for identified foreign objects when radiopaque. In most cases, a foreign body is not identifiable in which case otolaryngology consultation is needed for flexible fiberoptic laryngoscopy. In children, the presence of a button battery (seen as two concentric rings on XR) should be treated urgently as battery acid leakage may erode through the esophagus into the neck.

Further Reading

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