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Normal otoscope exam

Clinicians utilize an otoscope exam to evaluate the external auditory canal (EAC), tympanic membrane (TM), and middle ear. This involves inspecting the EAC and TM, noting specific landmarks such as color, bulging, and perforation. The pneumatic attachment enables pressure application to assess TM mobility. Mastering the otoscope exam facilitates accurate diagnoses and targeted treatment. Early stages of otologic diseases may not present with noticeable symptoms, emphasizing the importance of routine exams by primary care clinicians. To inspect the right ear, the examiner holds the otoscope between their thumb, first, and second fingers, with the fifth finger on the patient's head for stability. The EAC is manipulated to allow proper visualization of the TM. For adults and older children, retraction in a posterior and cephalad vector is recommended, while neonates require retraction in an inferior direction. Inspecting the external auditory canal reveals cerumen impaction, foreign objects, canal edema, erythema, and otorrhea. The tympanic membrane separates the external ear from the middle ear, with normal landmarks including color, bulging, perforation, and translucency. Pneumatic otoscopy helps determine TM mobility by applying air pressure to assess its response. There are three primary approaches for addressing middle ear issues: irrigation, cerumenolytic agents, and manual removal. If multiple attempts at removal are unsuccessful, referral to an otolaryngologist may be necessary.[14][3][15] Acute Otitis Media (AOM) is characterized by the accumulation of fluid in the middle ear, primarily affecting children aged 6-24 months. The most reliable symptom is otalgia, with up to two-thirds of patients presenting with fever. However, some cases may involve non-specific symptoms like irritability, headache, poor sleep, and feeding difficulties. Otoscopic examination is crucial for diagnosing AOM, where the tympanic membrane (TM) appears bulging, opaque, erythematous, and immobile.[16][17] The preferred treatment for AOM involves high-dose amoxicillin, with alternative options like amoxicillin/clavulanate if the patient has taken amoxicillin recently or shown no improvement after 2-3 days. Patients with a penicillin allergy may receive oral cephalosporins, and those who do not respond to these treatments can be treated with intramuscular or intravenous ceftriaxone or clindamycin. However, antibiotics like azithromycin and trimethoprim/sulfamethoxazole should be avoided due to high rates of resistance.[14][18-21] Tympanostomy tube placement is the preferred treatment for recurrent AOM. Otitis Media with Effusion (OME) refers to the accumulation of fluid in the middle ear space without evidence of inflammation or infection. OME is a common pediatric condition, affecting 20% of children. The diagnosis involves combining clinical signs and otoscopic findings, which typically include ear fullness and conductive hearing loss. On examination, the TM appears opacified with a loss of light reflex, often accompanied by retraction and decreased mobility. Unlike AOM, bulging of the TM is not characteristic of OME. Most cases are self-limiting, and antibiotics, oral decongestants, or intranasal corticosteroids are ineffective treatment options.[21][22-24] Patients often experience precursor symptoms such as ear fullness and hearing loss due to canal edema and debris accumulation in cases of otitis externa. Otoscopy findings reveal ear canal edema, erythema, and thick seropurulent otorrhea, which can be malodorous. Audiologic testing helps rule out middle ear involvement in most bacterial cases (around 90%), but fungal pathogens account for approximately 10%. Whitish studs or small black "fungal balls" are present in fungal infections. Treatment of uncomplicated otitis externa includes clearing the ear canal, topical antimicrobials, and pain control. Oral antibiotics are prescribed for patients with poorly controlled diabetes mellitus or immunosuppression. Malignant otitis externa (MOE) is a severe sequelae of OE, characterized by an invasive infection of the EAC and skull base. Early diagnosis is crucial; MOE should be considered in patients with refractory OE, fever above 39 °C, diabetes mellitus, or immunosuppression. Granulation tissue visible along the floor of the ear canal at the bony-cartilaginous junction (isthmus) may indicate MOE on an otoscope exam. Cranial nerve exams are warranted when evaluating for MOE. Spread to the stylomastoid foramen can present with facial nerve palsy, while spread to the jugular foramen can present with glossopharyngeal, vagus, or accessory nerve palsies. Magnetic resonance imaging and computed tomography (CT) scans without contrast are useful in diagnosis. Cholesteatomas are abnormal collections of keratinized squamous epithelium involving the middle ear and mastoid. They progress slowly, and the clinical presentation is usually insidious. Early signs include conductive hearing loss and painless otorrhea. Granulation tissue or polyps seen in the ear canal may indicate a cholesteatoma. Cholesteatomas are treated surgically, and early detection depends on an accurate otoscope exam. Acquired cholesteatomas present with recurrent painless, malodorous otorrhea, while congenital cholesteatomas often present asymptotically compared to acquired ones. As they grow, they can decrease hearing by middle ear bone chain erosion or mass effect. Due to the transparency of a normal tympanic membrane, congenital cholesteatomas are visible during an otoscope exam. Tympanic membrane perforation (TMP) is caused by direct trauma, infection, pressure changes, or a tumor. Patients typically present with otalgia, otorrhea (may be bloody), tinnitus, or hearing loss. Perforations should be easily visible using an otoscope. Performing an otoscope exam is crucial to diagnose ear-related conditions, such as perforations, vertigo, or bleeding, which may require urgent Otolaryngology consults. A superoposterior perforation may indicate the presence of a cholesteatoma, necessitating further evaluation. Most tympanic membrane perforations (TMPs) resolve on their own, but clinicians should ensure adequate pain control and advise patients to keep the affected ear dry, avoiding otic drops unless there's an accompanying infection. For severe cases, surgical intervention via tympanoplasty may be necessary when spontaneous healing is unlikely. The otoscope exam assesses the external auditory canal, tympanic membrane, and middle ear, enabling accurate diagnoses and targeted treatment. Early stages of otologic diseases can present without noticeable symptoms like ear pain or hearing loss. ENT complaints account for a significant proportion of primary care consultations, highlighting the importance of mastering the otoscope exam. Audiologists play a vital role in evaluating patients with suspected otologic pathology and should be skilled in performing and communicating otoscope exam findings. However, limited exposure to proper otoscopy training in healthcare programs can decrease comfort levels among students, negatively impacting patient outcomes and healthcare resource efficiency. To address this issue, all healthcare professionals must narrow the knowledge gap regarding the otologic examination through education and self-training. Several methods and resources are available, including those that have shown improved diagnostic accuracy after implementation. Enhanced knowledge of otoscopy will lead to better interprofessional communication, increased patient-centered care, improved outcomes, higher patient safety, and enhanced team performance. Before conducting an ear examination, ensure no relationships with ineligible companies. Begin by introducing yourself to the patient and explaining the examination process. Wash your hands thoroughly to maintain hygiene. Start the examination from the outer parts of the ear, being prepared to move on quickly if instructed by an examiner. Inspect the pinna and post-auricular area for: * Deformities or abnormal cartilaginous fragments * Scars or skin changes, including potential malignancies * Signs of inflammation Check for inflamed mastoid, which can push the pinna forward. Palpate lymph nodes and the pinna, specifically pre- and post-auricular lymph nodes, tragus, and check for tragal tenderness, a sign of otitis externa. Next, inspect the external ear canal using an otoscope as a light source. Gently straighten out the ear canal by pulling the external ear superiorly and posteriorly. Look for: * Wax or foreign bodies * Skin changes or erythema * Discharge Hold the otoscope like a pen between your thumb and index finger, resting your little finger on the patient's cheek to act as a pivot. For a normal tympanic membrane, observe: * Lateral process of malleus * Cone of light (located in the 5 o'clock position for right ears and 7 o'clock position for left ears) * Pars tensa and pars flaccida Common signs of an abnormal tympanic membrane include perforations, tympanosclerosis, red and bulging membrane, and retraction. Always check the function of the facial nerve. Assess hearing using the Rinne Test and Weber Test. * Rinne Test: Strike a tuning fork against your elbow and place it on the mastoid process (bone conduction). Once the patient stops hearing it, hold it near the external ear canal (air conduction). * Normal hearing or sensorineural hearing loss: air conduction is heard better than bone conduction (Rinne positive) * Conductive hearing loss: bone conduction is heard better than air conduction (Rinne negative) * Weber Test: Strike the tuning fork against your elbow and place it on the patient's forehead in the midline. Ask if the sound is heard in the midline or has lateralised. * Normal hearing: sound is heard in the midline * Conductive hearing loss: sound is loudest on the ipsilateral side to the hearing deficit * Sensorineural hearing loss: sound is loudest on the contralateral side to the hearing deficit To complete the examination, stand back from the patient and inform the examiner that you would like to perform a tympanogram or pure tone audiometry. Looking forward to meeting with everyone tomorrow to discuss our medical exam strategies and patient care. The Eardrum: A Critical Structure for Otoscopy _____ The eardrum, located approximately 1.5 cm inside the skull at the end of the external auditory canal, serves as a crucial boundary between the external ear and middle ear. Due to its thin and translucent nature, it is possible to visualize some of the structures within the middle ear. Normal Ear Anatomy During Otoscopy _____ During an otoscopy examination, it is essential to recognize the characteristics of a healthy eardrum to identify any deviations from normalcy. The Wispr digital otoscope provides valuable insights into the features of normal ear anatomy. Obtaining a Clear View of the Eardrum _____ The external auditory canal, lined with cerumen (ear wax), often partially or completely obstructs the view of the eardrum. To visualize the entire eardrum, either the ear wax must be removed or a digital otoscope like the Wispr is employed to guide a camera around the wax. Characteristics of a Healthy Eardrum _____ A typical healthy eardrum displays several key features, including: * A large circular area with a pearly gray color * A concave shape inwardly curved * A cone of light visible on the surface due to otoscope light reflection * Fine vasculature present on the malleus bone The malleus bone, attached to the eardrum, plays a vital role in transmitting sound vibrations to the inner ear via the chain of bones (malleus, incus, stapes). This structure is essential for distinguishing between left and right ears. The Tympanic Membrane: Structure and Function The tympanic membrane, also known as the eardrum, consists of two distinct areas: the pars tensa and the pars flaccida. The pars tensa is the larger, taut portion responsible for translating sound waves into mechanical movement. It is the primary focus of clinical attention due to perforations, effusions, and acute otitis media. The pars flaccida, on the other hand, is thinner and less taut, draping across the superior portion of the malleus. Although it plays a crucial role in providing complete coverage of the middle ear space, it does not actively participate in sound wave transcription. In clinical settings, perforations and effusions are often observed in the pars tensa. The pars flaccida may be the first indication of bulging due to increased pressure in the middle ear space. The bones of the middle ear vary in shape and visibility. The malleus and incus bones are usually visible through the transparent eardrum, while the stapes bone is rarely seen due to its deep location. Occasionally, the chorda tympani nerve can be observed behind a highly translucent tympanic membrane. The anterior-inferior part of the eardrum is a crucial area that requires equal pressure on both sides to vibrate properly from sound waves. This balance is maintained by the Eustachian tube, which connects the middle ear to the posterior nasal cavity. The Eustachian tube allows for pressure equalization, and its malfunction can lead to ear pain and symptoms of acute otitis media. When descending in an airplane, many people experience the sensation of their ears "popping," which is caused by the opening of the Eustachian tube and the equalization of pressure. However, if the Eustachian tube becomes inflamed or unable to open, it can cause ear pain due to unequal pressure. A normal eardrum should have a clear shadow of the Eustachian tube's opening visible behind it. Otoscopy is an outpatient examination that allows healthcare professionals to observe the external auditory canal, tympanic membrane, and some aspects of the middle ear. To perform otoscopy effectively, it's essential to follow a systematic method and use proper equipment. When using an otoscope, start by examining the unaffected ear to establish a baseline for what is normal for the patient. Then, insert the otoscope gently into the ear canal, making sure to look at the EAC on the way in for signs of infection or stenosis. The healthcare professional should be aware of the sensitive area medial to the hair-bearing region and avoid touching the walls of the canal. The procedure involves examining various aspects of the eardrum, including its color, bulging, retraction, fluid behind the drum, and any white patches suggestive of tympanosclerosis. By following this systematic approach, healthcare professionals can accurately diagnose ear-related issues and provide effective treatment. Undergraduates, end-of-term evaluations, clinical skills assessments, and internal medicine exams are keeping students on their toes.