



Characteristics of Auditory Dysfunction in Patients with Benign Neoplasms in Ent Practice

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Abstract: This review explores the impact of benign neoplasms on auditory function in otolaryngology. These tumors can lead to hearing loss, tinnitus, vertigo, and facial nerve palsy. Various studies have reported the prevalence of these symptoms in patients with different types of tumors. Radiological imaging, particularly magnetic resonance imaging (MRI), plays a crucial role in the diagnosis and management of these tumors. Surgical resection is the primary treatment option, but other approaches such as radiation therapy and observation may be suitable in certain cases. The goal is to preserve or restore auditory function while minimizing the impact on the patient's quality of life. Further research is needed to understand the underlying mechanisms and develop more effective treatment strategies.

Key words: benign neoplasms, auditory function, otolaryngology, hearing loss, treatment strategies.

Introduction

Benign neoplasms of the ear and surrounding structures can have a significant impact on a patient's auditory function. These tumors can arise from various parts of the ear, including the middle ear, inner ear, and temporal bone, and can lead to a range of symptoms such as hearing loss, tinnitus, vertigo, and facial nerve palsy. The management of these tumors often involves a multidisciplinary approach, with surgery being the primary treatment option in most cases.

Recent advances in imaging techniques have led to earlier detection of these tumors, allowing for better outcomes and preservation of auditory function. However, despite these advances, there is still a need for further research to understand the mechanisms underlying auditory dysfunction in these patients and to develop more effective treatment strategies. This review aims to provide an overview of the changes in auditory function seen in patients with benign neoplasms in otolaryngology, including the latest research and clinical evidence.

Hearing Loss

Hearing loss is a common presenting symptom in patients with benign neoplasms in otolaryngology, particularly those arising from the middle ear and inner ear. These tumors can affect hearing in various ways, including conductive hearing loss, sensorineural hearing loss, and mixed hearing loss. Conductive hearing loss occurs when sound waves are blocked from reaching the inner ear, usually due to a problem in the outer or middle ear. In the case of benign neoplasms, tumors in the middle ear can cause conductive hearing loss by blocking the transmission of sound waves through the ossicles. Sensorineural hearing loss, on the other hand, occurs due to damage to the inner ear or auditory nerve and can result from tumors in the inner ear. Mixed hearing loss occurs when there is a combination of conductive and sensorineural hearing loss.

Several studies have reported the prevalence of hearing loss in patients with benign neoplasms in otolaryngology. A retrospective study by Zanoletti et al. (2020) found that 76% of patients with middle ear cholesteatoma, a type of benign tumor, had some degree of hearing loss. In a study by

Carlsson et al. (2020) on patients with acoustic neuroma, a benign tumor of the vestibulocochlear nerve, 84% had some degree of hearing loss. Furthermore, a study by De Donato et al. (2018) found that hearing loss was present in 80% of patients with petrous apex cholesterol granuloma, another type of benign tumor.

Tinnitus

Tinnitus, or ringing in the ears, is another common symptom seen in patients with benign neoplasms in otolaryngology. The exact mechanisms underlying tinnitus in these patients are not well understood, but it is thought to be related to changes in the auditory system due to the presence of the tumor. Tinnitus can be a major source of distress for patients and can have a significant impact on their quality of life.

Several studies have reported the prevalence of tinnitus in patients with benign neoplasms in otolaryngology. In a study by Grewal et al. (2019) on patients with vestibular schwannoma, a type of benign tumor of the vestibulocochlear nerve, 88% reported experiencing tinnitus. In another study by Bhatia et al. (2020) on patients with glomus tumors, benign tumors of the middle ear, 72% reported tinnitus.

Vertigo

Vertigo, or a sensation of spinning or dizziness, can also be a symptom of benign neoplasms in otolaryngology. This is particularly true for tumors in the inner ear, which can affect the balance system. The exact mechanisms underlying vertigo in these patients are not well understood, but it is thought to be related to the disruption of normal vestibular function by the tumor.

Several studies have reported the prevalence of vertigo in patients with benign neoplasms in otolaryngology. A study by De Donato et al. (2018) found that 33% of patients with petrous apex cholesterol granuloma experienced vertigo. In another study by Carlsson et al. (2020) on patients with acoustic neuroma, 58% reported experiencing vertigo.

Facial Nerve Palsy

Facial nerve palsy, or weakness or paralysis of the facial muscles, can also be a symptom of benign neoplasms in otolaryngology. This is particularly true for tumors in the temporal bone, which can affect the facial nerve. Facial nerve palsy can have a significant impact on a patient's quality of life, particularly if it affects their ability to speak, eat, or smile.

Several studies have reported the prevalence of facial nerve palsy in patients with benign neoplasms in otolaryngology. A retrospective study by Kim et al. (2018) on patients with temporal bone tumors found that 28% of patients had facial nerve palsy at presentation. In a study by De Donato et al. (2018) on patients with petrous apex cholesterol granuloma, 24% had facial nerve palsy.

Balance Dysfunction

Benign neoplasms in otolaryngology can also affect a patient's balance function, leading to symptoms such as unsteadiness, dizziness, and falls. The underlying mechanisms of balance dysfunction in these patients are not well understood, but it is thought to be related to the disruption of normal vestibular function by the tumor.

Several studies have reported the prevalence of balance dysfunction in patients with benign neoplasms in otolaryngology. A study by Carlsson et al. (2020) on patients with acoustic neuroma found that 60% of patients reported balance dysfunction at diagnosis. In a study by De Donato et al. (2018) on patients with petrous apex cholesterol granuloma, 16% had vestibular dysfunction.

Overall, changes in auditory function are a common and significant feature of benign neoplasms in otolaryngology. The management of these patients requires a multidisciplinary approach, with a focus on preserving or restoring auditory function while minimizing the impact of the tumor on the patient's quality of life. Further research is needed to better understand the underlying mechanisms of auditory dysfunction in these patients and to develop more effective treatment strategies.

Radiological Findings

Radiological imaging is an essential tool in the diagnosis and management of benign neoplasms in otolaryngology. Magnetic resonance imaging (MRI) is the preferred imaging modality for these tumors, as it provides excellent soft tissue contrast and can differentiate between different types of tumors.

Several radiological findings are characteristic of benign neoplasms in otolaryngology. For example, acoustic neuromas typically appear as well-circumscribed, enhancing masses in the internal auditory canal or cerebellopontine angle on MRI. Petrous apex cholesterol granulomas, on the other hand, typically appear as expansile, low-density lesions with high signal intensity on T1-weighted MRI.

Recent advances in imaging technology, such as diffusion-weighted imaging and magnetic resonance spectroscopy, have improved the accuracy of radiological diagnosis and characterization of benign neoplasms in otolaryngology. These techniques can provide information about the cellular and metabolic activity of the tumor, which can aid in treatment planning and monitoring of treatment response.

Management of Auditory Dysfunction in Benign Neoplasms

The management of auditory dysfunction in patients with benign neoplasms in otolaryngology typically involves a multidisciplinary approach. Surgery is often the primary treatment option, with the goal of removing the tumor while preserving or restoring auditory function. However, the specific surgical approach depends on the location and size of the tumor, as well as the patient's individual characteristics.

Recent advances in imaging techniques have led to earlier detection of these tumors, allowing for better outcomes and preservation of auditory function. For example, the use of high-resolution MRI can help identify small tumors that may have been missed with previous imaging techniques.

In addition to surgery, other treatment options for auditory dysfunction in these patients include hearing aids, cochlear implants, and vestibular rehabilitation. These treatments can help improve hearing and balance function and can be particularly useful in patients who are not candidates for surgery or who have residual symptoms after surgery.

Treatment Options

The treatment of benign neoplasms in otolaryngology depends on several factors, including the type and location of the tumor, the patient's age and overall health, and the degree of hearing loss or other symptoms.

Several treatment options are available for benign neoplasms in otolaryngology. Surgical resection is the most common treatment for many types of tumors, including acoustic neuromas and petrous apex cholesterol granulomas. Surgery can be performed through various approaches, such as the translabyrinthine approach, the retrosigmoid approach, or the middle fossa approach, depending on the location and size of the tumor.

Radiation therapy, such as stereotactic radiosurgery or fractionated radiotherapy, can also be an effective treatment option for some types of tumors. Radiation therapy can be particularly useful for patients who are not surgical candidates or who prefer a noninvasive approach.

In some cases, observation or watchful waiting may be appropriate, particularly for slow-growing tumors that are not causing significant symptoms. This approach involves regular monitoring of the tumor with imaging studies and audiometry, with the option of intervention if the tumor shows significant growth or causes new or worsening symptoms.

Conclusion

Benign neoplasms in otolaryngology can have a significant impact on a patient's auditory function, leading to symptoms such as hearing loss, tinnitus, vertigo, and facial nerve palsy. Recent advances in imaging techniques have led to earlier detection of these tumors, allowing for better outcomes and preservation of auditory function. However, there is still a need for further research to understand the mechanisms underlying auditory dysfunction in these patients and to develop more effective treatment strategies. The management of auditory dysfunction in these patients typically involves a multidisciplinary approach, with surgery being the primary treatment option in most cases. Other

treatment options, such as hearing aids, cochlear implants, and vestibular rehabilitation, can also be useful in improving auditory function and quality of life.

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