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TINNITUS: A COMMON AND MANAGEABLE COMPLAINT

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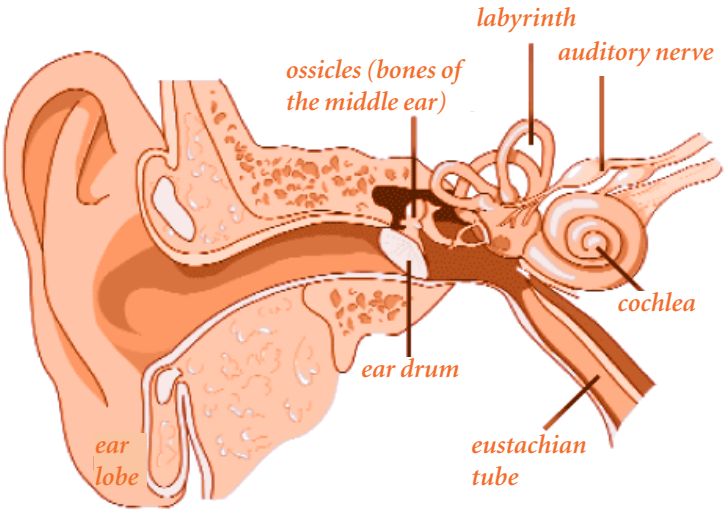
Background

Tinnitus is a common symptom with persistent tinnitus being experienced by approximately 10% of the population in the United Kingdom (UK).[1] Prevalence increases with age and hearing loss, and a significant proportion of tinnitus patients will complain of hyperacusis (reduced sound tolerance).

McFadden[2] defined tinnitus as, 'The conscious experience of sound that originates in the head'. Jastreboff [3] proposed a new definition, 'The perception of sound that results exclusively from activity within the nervous system without any corresponding mechanical, vibratory activity within the cochlea, and not related to external stimulation of any kind'.



Anatomy of the inner ear

It is important to understand that most people who experience tinnitus are not

troubled by it but, in some, the tinnitus can have a marked effect on their lives. However, the common trend is that the patient habituates to the tinnitus signal over a period of time, but the habituation process may be hindered, if there is a strong negative meaning, fear, worry or concern attached to the tinnitus.

The mechanisms of tinnitus are outside the scope of this paper but it is noteworthy that in distressful tinnitus there are usually two mechanisms: the physiological mechanism causing the tinnitus and the psychological mechanism causing the distress. Most of the distress is probably linked to the 'fight-or flight' response.

Characteristics of Tinnitus

Tinnitus is commonly described as ringing, whistling, buzzing or hissing but more complex sounds and many different noises can also be described. It can be constant, intermittent, or transient and it may be perceived in one or both ears or in the head. The tinnitus can be pulsatile in nature or continuous.

Investigation

A full medical and otological history should be taken with particular emphasis placed on the onset of the tinnitus and any associated risk factors at the time of the onset. A full noise exposure history should be taken including industrial, military and leisure noise. A full drugs history should be taken including prescribed, homeopathic and analgesic medication, as some have a side effect of tinnitus. Identify any underlying stress, anxiety or depression as these may be the triggers that induced tinnitus awareness.

The characteristics of the tinnitus should be carefully noted because both unilateral and pulsatile tinnitus require further investigation to exclude potential serious or treatable pathology, although tinnitus is generally not caused by serious pathology.

Sufficient time should be given for the patient to describe the effects that the tinnitus has on them and any worries, fears or concerns that they have about the tinnitus and the prognosis. These issues should be carefully addressed during the counselling that forms an extremely important part of the treatment. A questionnaire, such as the Newman Tinnitus Handicap Inventory (THI)[4] only takes a few minutes to complete and is very useful in assessing the impact that the tinnitus has on the individual.

The minimum investigations should include otoscopy and pure tone audiometry. Any blockage in the ears should be removed and the patient reassessed to find out whether this was causing the tinnitus.

Treatment

After the history and examination have been performed, a careful explanation of the diagnosis should be presented to the patient with a strong emphasis on the fact that the natural course of tinnitus leads to habituation. An explanation that tinnitus is a common symptom and that improvement is usual can be invaluable. It should be made clear that the aim of the treatment is to remove the distress caused by the tinnitus. Written information is useful so that the patient can read details over again which will reinforce the initial session.

Treatment options include information, counselling, sound enrichment, relaxation training with stress reduction, and cognitive behavioural therapy (CBT). Psychology services should be considered for any underlying anxiety and depression. Evidence shows that psychological processes as well as audiological processes are present when the patient does not habituate to the tinnitus signal.[5] Both of these processes need addressing when treating the patient.

Any otological or systemic conditions identified should be treated as usual. Ear protection should be strongly advised if the patient is exposed to excessive noise. If there is a hearing loss that is both acknowledged by the patient and is aidable, then hearing aids should be fitted with an emphasis on using them as devices to enrich sounds going into the auditory system and to prevent the patient from straining to hear. The earmoulds should be as open as possible to avoid the patient experiencing a blocked feeling in the ears (occlusion effect) as this may lead to an increase in tinnitus awareness. The patient should be encouraged to avoid silence and to use low level natural sounds to refocus them away from their tinnitus. It is possible to purchase specific sound enrichment devices and pillow speakers to assist with problems encountered with sleep. Advice around improving sleep and relaxation will also be extremely useful to many.

If the hearing is normal or near normal, the use of wearable sound generators may be helpful. These look like hearing aids but produce a low level wide band noise. Again, the earmoulds should be made as open as possible. The patient is encouraged to wear them for several hours each day, especially at quieter times. The patient will be required to wear them until habituation has been facilitated and this may take a year or two.

Follow-up appointments are essential to reinforce the information given at the initial session, to ensure that the patient is following the management plan and provide further advice and support. It is useful to reassess the tinnitus using the Newman THI to document improvement in tinnitus annoyance.

National support groups such as the British Tinnitus Association in the UK, together with local tinnitus support groups, can provide additional information and support to patients.

Research

Functional MRI (fMRI) scans are being used to look at changes in the brain in response to the tinnitus signal and the results of these studies should lead to a better understanding of the mechanisms of tinnitus. Several small scale studies using repetitive transcranial magnetic stimulation (rTMS) have had some promising results and research continues in this area. Recent research suggests somato-sensory neurons may play a part in the pathogenesis of tinnitus. There are drugs related to hair cell growth in the cochlea described in the article on presbyacusis (page 28) that might be useful in the treatment of tinnitus in the future.

Conclusion

Tinnitus is a common complaint that can be managed with a very good success rate. Quite often the patient only requires reassurance about the future and the prognosis is invariably good. Listen to the patient, be supportive and provide information. A tinnitus management programme that addresses both the audiological and psychological issues will probably be the most effective.

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DIZZINESS

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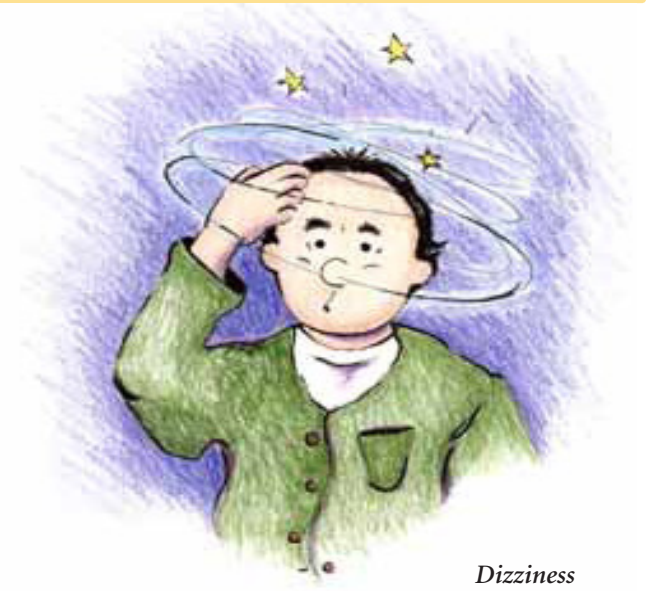
Dizziness is a common symptom, sometimes very mild, or can be incapacitating. The five end organs of balance within the labyrinth are clearly related to the end organs of hearing and, in fact, the vestibular and cochlea-end organs share the same nerve into their respective nuclei within the brain stem. Normal balance is a combination of proprioception in the feet, visual acuity in the eyes and, finally, the vestibular apparatus. The basis of balance is a normally functioning vestibular ocular reflex. If the reflex is working poorly there will be a feeling of imbalance. The clue to managing the patient who is dizzy is always in the history. A careful history must always be taken, essentially to identify what may have triggered an attack of dizziness.

Benign Paroxysmal Positional Vertigo

The most common condition presenting as dizziness is ***benign paroxysmal positional vertigo*** (BPPV). This condition is characterised by dizziness on moving the head quickly or, classically, when turning over in bed at night. This dizziness is short lived. The hearing is usually symmetrical and the Weber test (see Glossary) is central. This condition is the result of displaced otoliths within the semicircular canal. The diagnosis is confirmed using the Dix-Hallpike manoeuvre, essentially laying the patient flat with their head to one side and neck extended. Fatiguable nystagmus to the right or left will confirm the diagnosis. This condition has been shown to respond to physical therapy rather than medication.

The Epley manoeuvre is now universally used to treat this condition with remarkable success. The patient is laid flat with neck extended and then rolled over onto the side that sets off the dizziness. This technique can be repeated several times, shaking up the crystals in the semicircular canals. The nystagmus accompanying the Dix-Hallpike manoeuvre must be fatiguable. If the nystagmus is not fatiguable then a central problem may be suspected. BPPV is common and easily treated.



Dizziness

Dizziness and Medical Conditions

Common medical conditions are also responsible for dizziness. ***Diabetes*** should always be excluded as a cause of dizziness. ***Irregular heartbeat*** and ***postural hypotension*** may also be underlying causes of dizziness. Often forgotten is vision and it is important to establish that vision is satisfactory. If the hearing is asymmetrical in a dizzy patient, then the possibility of an ***acoustic neuroma*** must be considered. The dizziness is often episodic and there is often accompanying tinnitus. Most acoustic neuromas are small and very slow growing and, now, with sophisticated MR (magnetic resonance) scanning, tumours can be observed over a long period of time. Only when symptoms become overwhelming is intervention considered. The symptoms mimic another condition called ***Ménière's disease***. This is a progressive condition with long periods of respite (inactivity) and the symptoms of dizziness, tinnitus and deafness have to be treated as they become troublesome. Dizziness is often treated with medication, such as prochlorperazine, and deafness with a hearing aid. Usually one ear is affected but the other ear is often normal. Many patients nowadays are on many medications. Some drugs, such as the mycins are well recognised as causing dizziness, but many drugs are reported as having side effects of dizziness. The interaction of many drugs are just not known. All balance rehabilitation will be centred on the good ear.

Another common cause of dizziness which is often forgotten is ***migraine***, with poor perfusion of the brain and, sometimes, ***small transient ischaemic attacks*** present as dizziness. Migraine with its accpompanying vertigo often responds well to simple management, like giving up caffeine and chocolate.

Tests of Balance

There are many sophisticated tests of