CONTINUING MEDICAL EDUCATION

Hearing Impairment in the Elderly

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Summary

Hearing impairment is one of the most important health problems of the elderly above 60. Very often it leads to verbal communication difficulty and without treatment it can cause serious psychological and social complications such as depression and social isolation. Prebyscusis remains a leading cause of sensorineural deafness in the elderly. Elderly patient must be encouraged to seek proper hearing assessment if they face hearing difficulty. Active screening by health care workers and patient self-evaluation by answering a simple list of screening questions are possible for early detection and treatment of hearing loss in the elderly. Although hearing loss in the elderly may not have a cure, early rehabilitation helps to restore better quality of life if the problem is detected early.

Key Words: Elderly, Hearing impairment, Prebyscusis, Screening

Introduction

The number of persons 60 years of age and older continues to increase globally. In Malaysia, it was reported that in the year 2000, 6.2% of the population were aged 60 and above. This figure is estimated will rise to 9.5% by the year 2020[1]. Among the various health problems affecting the elderly, hearing impairment remains one of the most important issues which need to be addressed. About 30% of elderly above the age of 60 have some degree of hearing loss[2]. The worldwide prevalence of hearing loss in the geriatric population ranges from 14-46%[2].

Most elderly with hearing impairment may not admit they are having trouble hearing because this condition is asymptomatic. However, over a period of time if untreated, these problems can become worse. An elderly person who cannot hear well may develop depression[3,4]. Very often they feel frustrated of not being able to understand what is being said. Sometimes they may feel embarrassed in a gathering when they are unable to communicate well due to hearing impairment. As a result of this, social isolation is a common consequence. Some elderly with hearing impairment may also become suspicious and paranoid of relatives and friends whom them believe "mumble" or "speak on them on purpose", this again lead to unnecessary misunderstanding[4]. As for the carer or family members, the elderly person may wrongly be labelled as demented, confused, uncooperative and unresponsive, but the actual reasons for behaving such are that they can't hear well [4].

Types of hearing loss

Sensori neural hearing loss

Prebyscusis is the most common form of hearing impairment in the elderly[5]. It is a form of sensorineural deafness characterised by bilateral high-frequency hearing loss (4,000Hz) associated with difficulty in speech discrimination and central auditory processing of information[5,6]. The hearing loss is also associated with high-pitched tinnitus. This association between advanced age and high-frequency hearing loss was first

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described in 1899 by Zwaardemaker[5]. The pathology of presbyscusis typically involves multiple sites simultaneously, involving the auditory system from the hair cells of the cochlea to the auditory cortex in the temporal lobe of the brain. Sensory presbyscusis is caused by epithelial atrophy with loss of sensory hair cells and supporting cells in the organ of Corti. Neural presbyscusis is caused by atrophy of nerve cells in the cochlea and central neural pathways. Metabolic presbyscusis is the result of atrophy of the stria vascularis and mechanical presbyscusis is the results from thickening of the basilar membrane of the cochlea[5]. The exact aetiology for developing presbyscusis remain unknown but various predisposing factors have been identified. (Table I)

Meniere's disease is another cause of sensorineural hearing loss. It is associated with fluctuating hearing loss with aural fullness, tinnitus and episodic vertigo[6]. At the initial phase it is associated with low frequencies hearing loss but as the disease progress, it affects higher frequency hearing loss. The aetiology is believed to be endolymphatic hydrops[6]. Other causes of sensorineural hearing loss in the elderly include stroke, intracranial tumour, acoustic neuroma, tertiary syphilis and multiple sclerosis.

Conductive hearing loss

Conductive hearing loss occurs when the sounds that are transmitted from the tympanic membrane to the inner ear are blocked. Some example of conductive hearing loss that may occur in the older people are: ear wax in the auditory canal, fluid in the middle ear, chronic otitis media, trauma to the tympanic membrane and otosclerosis.

Mixed hearing loss

Both the conductive hearing loss and sensorineural hearing loss occur in the same ear is referred to as mixed hearing loss.

Common signs of hearing loss

An elderly is suspected of having hearing loss when he finds other people's speech hard to understand, slurred or mumbled. Occasionally a hissing or ringing sound in the background is heard[4]. He has difficulty to follow a conversation and has to strain to understand the conversation. He feels that some of the usual activities such as television shows, movie and music are getting less enjoyable because he cannot hear much. Difficulty to communicate through telephone is also another recognised common feature of hearing loss in the elderly[4,5].

Evaluating hearing loss in the elderly patient

A complete history taking and careful physical examination are important in evaluating an elderly suspected of hearing loss. Specific questions on hearing impairment (Table II) followed by hearing assessment are essential in confirming the diagnosis. Physical examination may not reveal any findings in majority of the cases, nevertheless otoscopic examination should be performed at the primary care clinic. Pathology such as abnormalities of the external auditory canal, earwax or foreign body can easily be diagnosed by direct visualisation. The anatomy of the tympanic membrane must be documented. A pneumatic bulb can assess mobility of the tympanic membrane.

In the clinic setting, performing a tuning fork test can help in determining the type of hearing loss whether it is a sensorineural, conductive or mixed. Weber, Rinne and absolute bone conduction test should be done. Any type of abnormality has to be referred to otorhinolaryngologist for formal hearing assessment[6,7]. A formal assessment by pure tone audiometry is more sensitive and specific than a tuning fork test. A tympanogram provides a measure of the tympanic membrane compliance that may indicate tympanic membrane perforation, middle ear effusion, ossicular fixation, disruption or other causes of hearing loss[7].

Elderly patients visiting the clinics for any reasons must be encouraged to tell the doctor if he is suffering from hearing loss. Self-evaluation of hearing loss by the elderly patient is possible by answering a list of simple questions (Table III) and if the results indicate that he has hearing impairment, he is advised to seek further evaluation by a doctor.

Communication tips for patients and relatives of patients with hearing loss

When an elderly person is diagnosed to be having hearing impairment, the family members must be counselled on ways to overcome the communication problems they may be facing. When talking to a person with hearing loss, the statement must be short, simple and communicate in a slow speed. The speech should be louder than normal but do not shout. It is also important to clue the person with hearing loss about the topic of conversation. Face the person when talking so that he can see your face clearly when you speak. This allows the person with hearing impairment to observe your facial expressions, gestures and lips movements, which often can provide communication clues. During the conversations, best avoid tuning on

radio and television. It is also important avoid speaking while you are eating or chewing food. In public situation such as social gathering and restaurants, try getting an area, which is away from crowds and noisy environment.

Rehabilitation

Although hearing loss in the elderly may not have a cure, but early rehabilitation can help to restore better quality of life. There are many types of hearing aids available in the market today. An audiologist will evaluate and determine the hearing level, hearing ability, the comfort and the concern for how it looks, then a suitable design and model that best suits the needs of the patient will be recommended. It is important to make sure that the hearing aids serve the functions that the patient needs. The most expensive product may not be the best suitable model for the patient. The patient must be counselled and demonstrated how to operate the device, very often the controls for the hearing aids are tiny. Sometimes the patient may need to try more than one in order to get the best suitable one, in such cases they have to look for the hearing aids provider, which gives a trial period with a few different hearing aids.

Watching a television show or listening to the radio is often an important daily event for the elderly. Use of direct audio input hearing aids or ear phone which can be plugged directly into the sound systems helps a lot and this can overcome the problem of annoying others if he turns on high volume.

Special telephone amplifying device allows the elderly with hearing impairment to listen to telephone transmission at a comfortable volume. Ability to use telephone is very important for an elderly especially if he is staying alone, this may be the only tool of communication in emergency situation to call for help.

The cochlear implants is a surgically implanted device for profoundly deaf individuals who do not benefit from hearing aids. Cochlear implants are more expensive and this facility may not be available in many centers.

Special training for lip reading or speech reading is another option for the elderly with hearing loss. They are trained to pay close attention to others by looking at how the mouth and lips move when someone is talking. However, this methods need good concentration and attention, it may not be a good choice if the elderly patient suffers from conditions with higher mental function impairment.

Table I: Predisposing factors for Presbyscusis

Arteriosclerosis
Diabetes mellitus
Long term accumulated exposure to noise
Stress
Drugs (Aminoglycosides, salicylates and chemical exposure)
Tobacco
Genetic

Table II: Specific questions on assessment of hearing loss (HSMOD)

Hearing Loss: Onset, sudden or gradual, progressive, Unilateral or bilateral
Symptoms associated: Pain, discharge, tinnitus, vertigo, and dizziness.
Medical disorder: Diabetes mellitus, hypertension
Occupation
Drugs: antibiotics, salicylates, diuretics

Table III: Self evaluation of hearing loss

Ask yourself the following questions, if you answer "yes" to 3 or more questions, you could have a hearing problem and may need to have your hearing checked by a doctor.

Yes	No	Questions
		Do I have a problem hearing on the telephone?
		Do I have trouble hearing when there is noise in the background?
		Is it hard for me to follow a conversation when two or more people talk at once?
		Do I have to strain to understand a conversation?
		Do many people I talk to seem to mumble (or not speak clearly)?
		Do I misunderstand what others are saying and respond inappropriately?
		Do I often ask people to repeat themselves?
		Do I have trouble understanding the speech of women and children?
		Do people complain that I turn the TV volume up too high?
		Do I hear a ringing, roaring, or hissing sound a lot?
		Do some sounds seem too loud?

Source: US National Institute on Deafness and Other Communication Disorders (NIDCD)[8]

Conclusion

Hearing impairment is a common disability that affects the elderly. The elderly patient may not admit they are having trouble hearing and if untreated, these problems can lead to serious consequences such as depression and social isolation. Elderly patients must be encouraged to seek proper hearing assessment if they face hearing difficulty. Active screening by health care workers and patient self-evaluation by answering a simple list of screening questions are feasible in the primary care setting for early detection of hearing loss in the elderly. Early rehabilitation can help to restore better quality of life for these patients.

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MCQs on Hearing Impairment in the Elderly

1. An elderly person may have hearing impairment if he presents with the following problems:
A. words from another person are hard to understand
B. unable to enjoy television shows
C. social isolation
D. elated mood
E. appears unresponsive

2. Predisposing factors for presbyscusis include:
A. salicylates
B. arteriosclerosis
C. diabetes mellitus
D. chronic exposure to loud noise
E. stress

3. The following statements are true about evaluation of hearing loss:
A. Tuning fork test have no role in assessing hearing loss in the older patients.
B. History of underlying chronic medical illnesses may suggest certain diagnosis.
C. Occupational history is not significant because the elderly patients are not working.
D. Bilateral high frequency sensorineural deafness is suggestive of prebyscusis.
E. Recent onset of unilateral hearing loss warrants further evaluation by otorhinolaryngologist.

4. The following are proper steps in overcoming communication difficulty associated with hearing loss in elderly patients:
A. Face the elderly person when talking.
B. Shout loudly.
C. Rephrase the statement whenever necessary.
D. Converse in short and simple statement.
E. Avoid noisy environment.

5. Complications associated with hearing loss in the elderly include:
A. Depression
B. Paranoid delusion
C. Social isolation
D. Lack of interest in daily events.
E. Low self esteem