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Original Article

An investigation into hearing loss among patients of 50 years or older

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Abstract Objects To investigate the extent of hearing loss in an elderly sample population to estimate hearing disorders among the age-equivalent population in China and to study primary clinical characteristics of presbycusis. **Methods** Clinical data from 110 hearing loss patients of both senium and pre-senium ages (95 males and 15 females, mean age = 74.4±12.1 years) were reviewed. Patients aged from 50 to 59 years were accepted as the pre-senium control group (n=15). The 95 senium patients (> 60 years of age) were divided into 4 groups according to age: 60+ group (60 to 69 years, n=25), 70+ group (70 to79 years, n=26), 80+ group (80 to 89 years, n=32) and 90+ group (90 years or older, n=12). Pure tone audiometry thresholds were measured in all 110 patients. Hearing loss severity of each tested ear was rated according to the Goodman classification criteria. Besides, audiometric configuration was examined in each ear. **Results** Audiometric testing showed normal hearing in 65 ears (29.5%), slight to moderately severe hearing loss in 131 ears (59.5%), and severe and profound loss in 24 ears (11%). Air-bone gaps were found in 12 ears (5.45%) indicating conductive hearing loss. Except the 12 ears with conductive hearing loss, audiograms showed gradually sloping loss in 99 ears (45%), sharply sloping loss in 34 ears (15.45%), flat loss in 45 ears (20.45%), notch pattern loss in 5 ears (2.27%), trough and rising pattern loss in 2 ears (0.91%), total deafness in 2 ears (0.91%), and normal hearing in 21 ears (9.55%). On average, hearing thresholds increased at a rate of approximately 10 dB per 10 year for subjects aged 60 and older. **Conclusions** Hearing thresholds tend to be stable in presbycusis patients aged from 50 to 70 years, increase significantly between 70 and 80 years of age, and reach another stable stage at high levels after 80 years of age, especially in high frequencies. Hearing loss in middle frequencies accounts for most of recession in loudness perception.

Key words elderly; presbycusis; hearing loss

Introduction

Presbycusis is the third most common chronic disease in the world, which seriously affects the quality of life in elder people. The main clinical manifestations of presbycusis include symmetrical and slowly developing sensorineural hearing loss, high pitched tinnitus and speech recognition disorders. As the result of economic growth and improved health care, China is gradually becoming an aging society. Hearing loss is one of the most impacting chronic diseases on the quality of life in the Chinese elder population. [1, 2] In clinical practice, an increasing number of older patients complain of their communication disorders induced by hearing loss. On the other hand, there is a long way to go in epidemiological data collection and analysis regarding presbycusis. In view of this, we have focused on this population and conducted systematic research. This article will report our primary results of hearing investigation in patients who are 50 years or older and complain of hearing impairment.

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Materials and Methods

Subjects

A survey was done in 110 patients (95 males and 15 females) over the age of 50 years with hearing loss as the chief complaint. The male to female ratio was 6.3 :

1. The age ranged from 50 to 96 years, with a mean age of 74.4 years and a standard deviation of 12.1 years. The subjects were divided into five groups: pre-senium control group (50 to 59 years, n=15). 60+ group(60 to 69 years, n=25), 70+ group (70 to79 years, n=26), 80+ group(80 to 89 years, n=32) and 90+ group(90 years or older, n=12). History of the following diseases was excluded from all the patients participating in this study: genetic deafness, congenital deafness, drug-induced hearing loss, sudden deafness, noise-induced hearing loss, infections and systemic disease-related hearing loss.

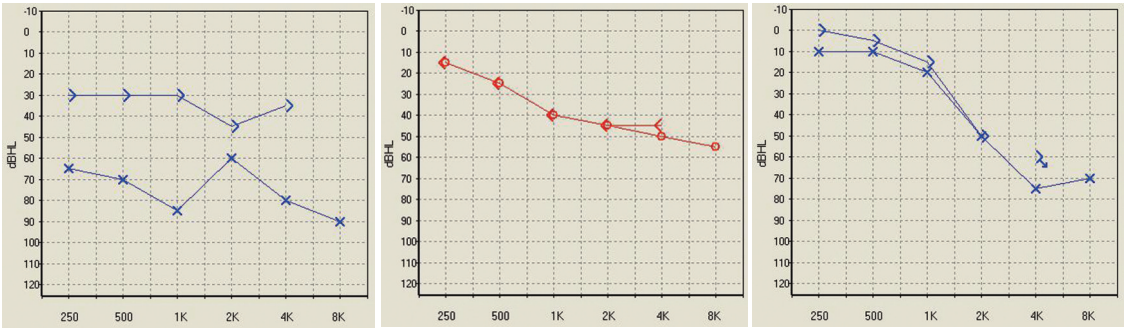
Test methods

All participants received pure tone audiometry testing with a GSI61 audiometer in sound proof booth with ambient noise level in compliance with national standard GB/T 16403 Acoustics—Audiometric test methods—Basic pure tone air and bone conduction threshold audiometry.[3] Both air and bone conduction thresholds were tested on each patient, using calibrated TDH 39 earphones and B-71 bone vibrator respectively. Test procedures followed GB/T16403. For each patient, the claimed better ear was tested first and then the other ear. Air conduction threshold was measured first using Hughson-Westlake procedure and then bone conduction. The frequencies testing sequences was 1 kHz, 2 kHz, 4 kHz, 8 kHz, 500 Hz and 250 Hz in air conduction, and 250 Hz, 500 Hz, 1 kHz, 2 kHz and 4 kHz in bone conduction. The hearing loss severity of each ear was rated according to the classification criteria by Goodman as: total deafness, profound hearing loss, severe hearing loss, moderately severe hearing loss, moderate hearing loss, slight hearing loss, and normal hearing (Table 1).[4] The audiometric configuration of all tested ears was characterized as: conductive (Figure 1-A), gradually sloping (Figure 1-B), sharply sloping (Figure 1-C), flat(Figure 1-D), notch (Figure 1-E), trough and rising (Figure 1-F), total deafness, and normal.

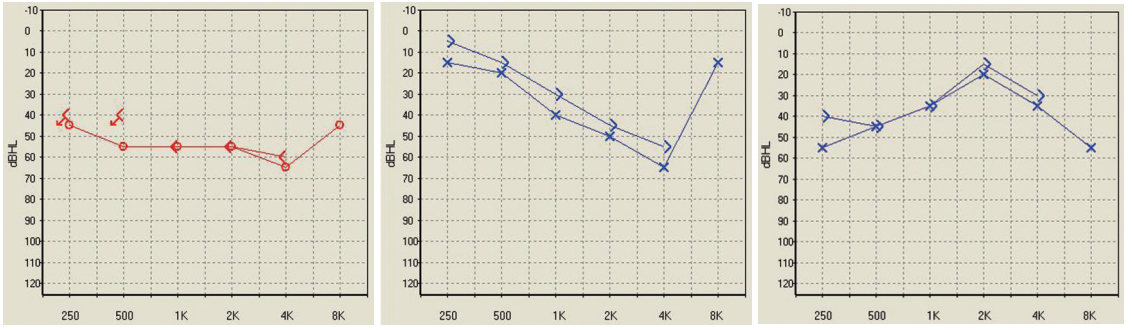
Table 1 Distribution of hearing loss severity

Classification	Criterion (average threshold at 0.5, 1, and 2 kHz)	n
Total deafness	No response	2
Profound	>91dB	1
Severe	71 ~ 90dB	21
Moderately severe	56 ~ 70dB	31
Moderate	41 ~ 55dB	65
Slight	26 ~ 40dB	35
Normal hearing	<26dB	65

Note: Classification criteria are based on those reported by Goodman (1965)



A: Conductive hearing loss　B: Gradually sloping　C: Sharply sloping



D: Flat loss　E: Notch　F: trough and rising

Figure 1 Audiometric Configurations