

Sensorineural Hearing Loss in Old Age People

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Abstract

Objectives: this study was undertaken in order to show the effect of age on the auditory system. Design: case –control study. Setting: Al-Jamhory teaching Hospital-Advisory clinic department-hearing and speech unit in Mosul during the period from first of January till the end of June 2011 A.C. Subjects and methods: twenty - four subjects aging between (18-25) years(group1) and one hundred subjects aging between (45-75) years (group 2) were subjected to a pure tone audiometric assessment. The resulting data was statistically analyzed. Results: The auditory threshold in old age subjects was higher in all the frequencies suggestive of sensorineural hearing loss. Conclusions: old age subjects have a sensorineural hearing loss when evaluated with a pure tone audiometer in all frequencies comparing with the young age subjects .

فقدان السمع الحسي العصبي لدى كبار السن

بيبين خورشيد محمد

فرح موفق عطاش

الملخص

الأهداف: أجريت هذه الدراسة لإظهار تأثير العمر على حدة السمع . تصميم الدراسة :دراسة العينة والشاهد مكان الدراسة:العيادة الاستشارية في مستشفى الجمهوري التعليمي وحدة السمع والتخاطب في الموصل خلال الفترة من الاول من كانون الاول وحتى نهاية شهر حزيران 2011م.المريض وطرق العمل: هذه الدراسة أجريت على 24 شخص تتراوح اعمارهم بين 18-25 سنة(المجموعة الاولى) و 100 شخص تتراوح اعمارهم بين 45-75 سنة (المجموعة الثانية) تم تخطيط السمع لهم في غرفة معزولة صوتيا بواسطة النغمات النقية بجهاز تخطيط يدوي وقد تم تحليل النتائج احصائيا(النتائج: اظهرت ه ذه الدراسة ارتفاع مستوى عتبة السمع لدى الاشخاص ذوي الاعمار الكبيرة ولجميع الترددات. الاستنتاج: فقدان السمع الحسي لدى كبار السن عند مقارنتهم بالاعمار المتوسطة.

Introduction

Sensorineural hearing loss includes all cases of deafness due to impairment of function of the organ of corti or its central connection. The term "sensory deafness" is sometimes used when the lesion is in the cochlea, and "neural" or "retrocochlear deafness" may be used when the lesion is in the auditory nerve⁽¹⁾. Sensorineural hearing loss is divided into congenital and acquired; there are two types of acquired sensorineural deafness: sudden and chronic. The age related changes in the auditory system that have the most significant effects on the hearing of the person occur in the cochlea with several interacting processes involved^(2,3). Different principle lesions have been described in table 1. Age-related hearing loss, also called presbycusis, is the gradual loss of the ability to hear sounds (often high-pitched sounds). This loss of ability occurs so slowly that many people are not aware that they have hearing loss.

Causes of Age-Related Hearing Loss

The most common cause of hearing loss in aging adults is a loss of tiny hair cells in the ear. These cells act as receptors – they vibrate when sounds are present. The loss of hair cells is largely thought to be due to aging itself, though the following factors may also be important in some cases:

- ❖ The combined effect of a lifetime of exposure to loud noises, such as
- ❖ traffic, construction work, noisy offices, heavy machinery, and loud music.
- ❖ Hereditary factors – people who have family members with hearing loss are more likely to have hearing loss as they age.
- ❖ Some health conditions, like heart disease, high blood pressure, and diabetes, can cause presbycusis

because they affect the blood supply available to the ear.

- ❖ Some medications, such as aspirin and certain antibiotics, have also been found to contribute to presbycusis.

Symptoms

For a person with presbycusis, sounds seem deeper and less clear. Other symptoms can include:

- Others' speech seems mumbled or slurred
- High-pitched sounds are difficult to hear
- Conversations are hard to follow
- Background noise interferes with hearing
- Men's voices are easier to hear than women's
- Ringing in the ears (tinnitus)
-

Subjects And Methods

This study included (24) subjects aged (18-25) years (Group1) and (100) subjects aged (45-75) years (Group2). The diagnosis of sensorineural hearing loss in those subjects suggested by history and confirmed by pure tone audiometry.

Exclusion criteria

1. Hypertension
2. Diabetes mellitus
3. History of consumption of ototoxic drugs .
4. History of ear surgeries performed in the past.
5. History of familial deafness.
6. History of infections in the nose, throat or ear.
7. History of trauma to the ear or head.

Pure tone audiometry (PTA); this was done to all subjects using frequency range from (250-8000 Hz) and intensity level from (0 dB - 120 dB). Both air conduction and bone conduction study were done. The degree of hearing loss was determined. Statistical analysis of the data was carried out using Statistical Package for the Social Science (SPSS, version 11.5). The following procedures was adopted:

1. Mean \pm standard deviation of all frequencies of both ears.
2. Student's t-test (unpaired) has been used to find the significance of auditory thresholds

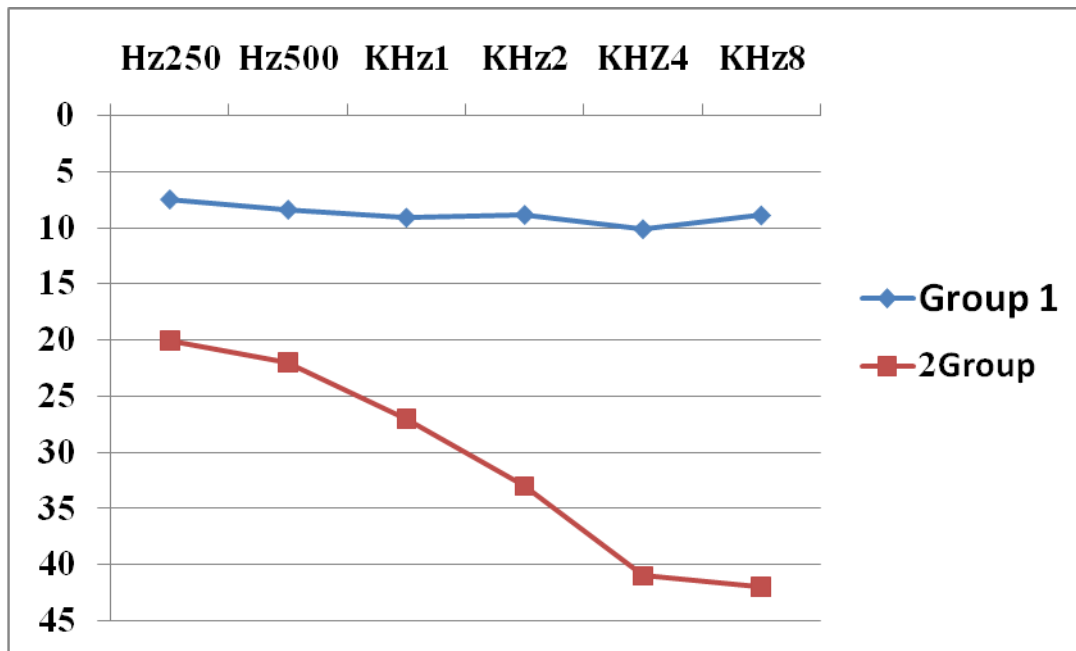
(dB) between various categories of parameters.

Results

There was a significant difference in the auditory thresholds at all frequencies from 250 Hz to 8000 Hz between group2 subjects and group1 subjects and most of the subjects of group 2 showed sensorineural hearing loss changes on audiogram. The group1 subjects, all had normal hearing thresholds, whereas the old age persons showed a gradual increase in hearing loss starting at 250 Hz and becoming pronounced as the frequency increased. This difference is highly statistically significant at 1% confidence interval.

Table (1):-The mean audiometric value (Group 1 & Group 2)

frequencies	Group1 n=24	Group2 n=100	*p-value
	Mean \pm SD	Mean \pm SD	
250Hz	7.5 \pm 5.209	20.1 \pm 10.90	0.001
500Hz	8.44 \pm 5.965	22.37 \pm 11.55	0.001
1000Hz	9.16 \pm 5.61	27.92 \pm 13.54	0.000
2000Hz	8.85 \pm 5.82	33.75 \pm 16.81	0.000
4000Hz	10.12 \pm 7.08	41.12 \pm 20.58	0.001
8000Hz	8.98 \pm 6.60	42.17 \pm 24.34	0.000



Figure(1):- mean audiometric values (Group 1 & Group 2)

Discussion

This study demonstrates a significant hearing loss in old age subjects in all the frequencies tested. This could be explained by the fact that when the person ages, their cochlear hair cells may become damaged. This results in a high-frequency hearing loss that can start as early as middle age. The adult male of the species appears to be at greater risk, particularly if he is over 40 years old⁽⁵⁾. Statistics show a large percentage of older folks develop presbycusis. As many as half over 75years may have hearing loss. According to the a Profile of Older Americans from the federal Department of Health and Human Services Administration on Aging, hearing loss was one of the most common condition experienced by mature people in a survey⁽⁵⁾. The result of this study agrees with the study of Taylor and Irwin⁽⁶⁾ whose found a correlation between hearing levels and age of the subjects in their study. Similar conclusions were drawn by Axelson⁽⁷⁾. Mark Stibich⁽⁴⁾ reported that about 30 to 35 percent of people between the ages of 65 and

75years have some form of hearing loss. This can include partial hearing loss, the inability to hear certain frequencies, or hearing loss in one ear. Almost 50 percent of people over the age of 75 years have some form of hearing loss with 30 percent of those over the age 85years having deafness in at least one ear.

Conclusion

The present study shows that there is a significant decrease in the hearing threshold of old age people especially at high frequency.

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