Sensorineural Hearing Loss in Patients with Chronic Suppurative Otitis Media

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الخلاصة:
المقدمه: العلاقة بين فقدان السمع الحسي العصبي و التهاب الأذن الوسطى المزمن المتقيح لا تزال مثيرة للجدل.واقترح ان الضرر الحاصل في القوقعة و ارتفاع وتيرة فقدان السمع الحسي العصبي في الترددات العاليه أن تنشأ من مرور المواد السامة والعلاجات من الأذن الوسطى من خلال غشاء النافذة المستديرة الى الأذن الداخليه.
الهدف من الدراسه: تقييم حالات فقدان السمع الحسي العصبي في الأذن المصابه بالتهاب الأذن الوسطى المزمن
الطريقه: هذه الدراسة مستقبليه ، تتألف من 120 مريضا .كانوا 90 ذكر و 30 إنثى،تم تقييمهم وفحصهم في شعبة الانف و الأذن والحنجره في مستشفى الديوانيه التعليمي في الديوانيه ، العراق،في الفتره من كانون الثاني الى كانون الاول 2013 اعمارالمرضى تتراوح بين 10الى 60 سنه.معايير الاشتراك في البحث تشمل سوائل خارجه من ثقب في الطبله في احدى الاذنين مستمره لمده ثلاثة اشهرمع طبله سليمه في الأذن الاخرى عند الفحص بالناظور.واجري تخطيط السمع لكل المرضى.كما استبعد المرضى الدين لديهم تاريخ في الاصابه بشده خارجيه اوصوتيه اوالتهاب السحايا او اجروا عمليه جراحيه في الأذن اولديهم تاريخ عائلي في الاصابه بفقدان السمع الحسي العصبي الولادي او المكتسب اوالصمم الناتج عن التسمم الدوائي اوتمزق في الطبله ناتج عن شده خارجيه على الأذن.واعتبرت الأذن الاخرى السليمه عند الفحص بالناظور هي النموذجيه في المقارنه.
النتائج : كان متوسط عتبة توصيل العظام في الأذن المريضة 38.33 ديسيبل، و 10.1 ديسيبل في الأذن السليمه. الفرق في عتبة توصيل العظام بين الأذنين المريضة والسليمه تتراوح من 18.96 الى35.4 ديسيبل عبر الترددات 0.5 ، 1 ، 2 ، و 4 كيلو هرتز. تميل هذه الفروق للزيادة مع زيادة الترددات و كانت جميع النتائج هامه.
الاستنتاج : في هذه الدراسة المرضى الذين يعانون من التهاب الأذن الوسطى القيحي المزمن كانو يعانون من درجة كبيرة من فقدان السمع الحسي العصبي.وبالاخص في الترددات العاليه.

Abstract
introduction: The relationship between sensorineural hearing loss and Chronic Suppurative Otitis Media remains a controversial. damage of the cochlea and high-frequency sensorineural hearing loss was suggested to arise from passage of toxic substances and the drugs from the middle ear through the round window membrane into the inner ear.
Aim of study : To evaluate the incidence of sensorineural hearing loss in ears with chronic otitis media.
Method: This is prospective a study, consisted of 120 patients. They were 90 males and 30 females . they had been assessed at Otolaryngology department in Al-Diwania Teaching Hospital , in Al-Diwania city , Iraq, between January 2013 to December 2013, the age range from 10-60 years . inclusion criteria are as follows: unilateral continuous otorrhea through a perforated tympanic membrane for at least 3 months, normal tympanic membrane in the contralateral ear based on otoscopy. We do pure tone audiometry(PTA) for every Patient Exclusion criteria are history of head trauma or meningitis, previous tympanomastoid surgery, history of noise exposure ,systemic ototoxic drug therapy, family history of congenital or acquired sensorineural hearing loss, and post-traumatic tympanic membrane perforation. The control used was the contralateral ear with normal otoscopy.
Results: The mean bone conduction threshold in the diseased ear was 38.33 dB, and 10.1 dB in the control ear. The mean bone conduction threshold differences between the diseased and control ears range from 18.96 to 35.4dB across the frequencies 0.5,

1.0, 2.0, and 4.0 kHz. These differences tended to increase with increasing frequency and were all significant ($P < 0.05$).

Conclusion: Patients with chronic suppurative otitis media had a significant degree of sensorineural hearing loss in this study. The higher frequencies were more affected

Introduction

Definition of the term "chronic otitis media" is any structural change in the middle ear system associated with a permanent defect in the
tympanic membrane. Usually, but not always, there is associated inflammatory mucosal disease in the middle ear, which may also involve the mastoid cells. The condition is considered "chronic" if the tympanic membrane defect is present for a period greater than 3 months[(1)]. The relationship between sensorineural hearing loss and Chronic Suppurative Otitis Media remains a controversial issue. Some workers have consistently reported the presence of sensorineural hearing loss in patients with this condition[(2),(3),(4),(5),(6)].
Inflammatory damage of the cochlea and high-frequency sensorineural hearing loss was suggested to arise from passage of toxic substances (bacterial products and inflammatory mediators) from the middle ear through the round window membrane into the inner ear[(7)].

Aim of study :

To evaluate the incidence of sensorineural hearing loss in ears with chronic otitis media

Subject and method :

This study is prospective in nature , consisted of 120 patients. They were 90 males and 30 females . they had been assessed at Otolaryngology department in Al-Diwania teaching hospital , in Al-Diwania city , Iraq, between January 2013 to December 2013, the age range from 10-60 years .
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Data Analysis

All the data were analyzed using the Statistical Package for Social Sciences software version 20(SPSS 20). The chi-square test was used to compare proportions and the differences between the diseased and control ears bone conduction thresholds were analyzed with the Wilcoxon test. A *P*-value of <0.05 was considered statistically significant.

Results

Our study include120 patients. They were 90 males and 30 females.
The clinical and demographic characteristics of these 120 patients are shown in Table 1.

Table 1: demographic characteristics of the study population

age	male	female	Total
10-20	10	6	16
21-30	14	10	24
31-40	28	4	32
41-50	16	8	24
51-60	22	2	24
total	90	30	120

The mean bone conduction thresholds of the disease and control ears across the frequencies (0.5, 1, 2, and 4 kHz) are shown in Table 2

Table 2: Comparison of mean bone conduction thresholds in the disease and control ears

Frequency(kHz)	The mean bone conduction thresholds of the disease ear(dB)	The mean bone conduction thresholds of the control ears(dB)
0.5	29.12	10.16
1	34.5	10.23
2	44.45	10.17
4	45.26	9.86

The mean bone conduction threshold in the diseased ear was 38.33 dB, and 10.1 dB in the control ear **($P < 0.05$).** Table 3 shows the mean bone conduction threshold differences between the diseased and control ears. these differences tended to increase with increasing frequency and were all significant ($P < 0.05$).

Table 3: Mean bone conduction threshold differences between the disease and control ears

KHZ	0.5	1	2	4
(dB)	18.96	24.27	34.28	35.4

Table 4 shows the mean air-bone gap across the test frequencies in the diseased ears. These differences in mean were not statistically significant ($P > 0.05$).

Table 4: Mean air-bone gap in the diseased ears

Frequency(khz)	the mean air-bone gap across the test frequencies in the diseased ears(dB)
0.5	39.58
1	37.13
2	28.64
4	27.89

Discussion

in Our study the mean bone conduction thresholds across the test frequencies were significantly higher in the diseased ears(38.33 dB) compared to the control ears(10.1 dB). The higher frequencies tend to be more affected. This is agree with the findings of, Cusimano F. et al.(1989) [8],MacAndie et al. (1999) [3] , Feng H. et

al.(2004) [5],Redaelli et al.(2005).[9], Da Costa SS. et al.(2009) [4], Hao XP. et al. (2010) [10], Kolo ES. et al.(2012)[11] and Khaimanova Iuv. et al.(2012) [12]. This is disagree with Dumich J. et al.(1983)[13] , Browning GG et al.(1989) [14], Noordzij JP et al.(1995) [15],and De Azevedo et al.(2007) [2] .They found no strong evidence of the effect of the disease on bone conduction thresholds at any frequency. In this study there were no significant differences in the mean air-bone gap in the diseased ears across the test frequencies. Also, there were no significant correlations between the air-bone gap and the degree of sensorineural hearing loss, this may be related to the degree of conductive deafness as it affected by many factors as the size and site of tympanic membrane perforation and ossicular damage in our study The higher frequencies tend to be more affected,this may be due to that cochlear damage in patients with chronic otitis media might be due to bacterial toxins that diffuse through the round window membrane. Sensorineural hearing loss may result from the treatment of active chronic otitis media with potentially ototoxic eardrops [16].Within the cochlea, the outer hair cells are more susceptible for dammage than the inner hair cells [17].

Subsequently, these toxins might cause damage to the hair cells especially those at the cochlear base where the hair cells are sensitive to high frequency sounds[18],[19],[20]. cochlear base more affected because of the anatomical proximity as The promontory is occupying much of the central portion of the medial wall which covers part of the basal coil of the cochlea[21].

Conclusion

Patients with chronic suppurative otitis media had a significant degree of sensorineural hearing loss in this study. The higher frequencies were more affected

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