

*Research Article***Assessment of Hearing in Obese Children****Mohammed Abd-El Motaal, Rasha A. Abd-El Monaem, Rafeek M. Abd-El Kader and Amany M. Abo Bakr**

Department of E.N.T, El-Minia Faculty of Medicine

Abstract

Introduction: Obesity is not as simple symptoms but it is a chronic disease. **Aim of the work:** 1- Hearing assessment for obese children to detect even early changes in hearing. 2- Examination for detection of any affection of obesity on cochlea. 3- Examination if obesity is a risk factor for hearing or not. **Patients and Methods:** This prospective study was conducted at Otolaryngology, Head and Neck surgery department, Minia, Egypt. No pharmaceutical companies funded the study or contributed to the study design, outcome evaluation or writing of this article. The study was approved by the Institutional Review Board at Minia University. Our patients were prospectively studied to evaluate the effect of CSOM on cochlear function and incidence of SNHL. **Results:** -A- Descriptive data: The present study comprised 39 children; 17 boys and 22 girls. **Discussion:** The current study was designed to evaluate the role and effect of obesity on the hearing in obese children. **Summary:** Childhood obesity is a condition where excess body fat negatively A child's health and wellbeing. **Recommendation:** 1-Screening of obese children by OAE and HFA., 2-Weight reduction of obese children.

Keywords: Obesity, obese children, hearing**Introduction**

Obesity is not as simple symptoms but it is a chronic disease. Obesity is not only a chronic disease but it is an epidemic raising grave affecting all the public health. Obesity has the greatest harmful effect on health even more than tobacco ⁽¹⁾

Excessive fat in the body collected to form adipose tissue. Adipose tissue is not only as simple tissue but it act like endocrine gland as it enhance secretion of offensive and inflammatory adipokines as plasminogen activator inhibitor-1& interleukine-6 and c-reactive protein, while decrease production of defensive adiponkines as adiponectin ⁽²⁾

All this changes create a state of chronic low grade inflammation, recently called meta-inflammation and impairment of immune response. All this factors make obesity as a risk factor for major chronic disease ⁽³⁾.

Otoacoustic emission (OAE) is a fascinating auditory phenomenon. OAE is a sound energy that originates in the cochlea then propagates through the middle ear and into the ear canal

where it could be measured using sensitive microphone. OAE was first described by. OAE is a preneural phenomenon; it can be measured even when eight nerve activities is chemically blocked. OAE is vulnerable to subtle changes in the cochlea which cause damage of outer hair cells or cause hearing loss ⁽⁵⁾

Ototoxicity is chemical injury to the labyrinth as a side effect of pharmacotherapy. An ototoxic insult may affect the hearing; usually the high frequencies affected early then progress to low frequencies. So the key is to monitor hearing by assessment of high frequencies by high frequency audiometry (HFA) or by otoacoustic emission. main rational of this research was to detect any subtle changes in the cochlea of obese children and to detect even minor changes in hearing of those children by OAE and HFA ⁽⁶⁾.

For the best of our knowledge the studies to examine the effect of obesity on hearing of children are quite scares. So the current work was addressed to examine the hearing of obese children, hence to determine if obesity is a risk factor for hearing in obese children or not⁽²⁾.

Aim of the work

- 1- Hearing assessment for obese children to detect even early changes in hearing.
- 2- Examination for detection of any affection of obesity on cochlea.
- 3- Examination if obesity is a risk factor for hearing or not.

Patients and Methods

This prospective study was conducted at Otolaryngology, Head and Neck surgery department, Minia, Egypt. No pharmaceutical companies funded the study or contributed to the study design, outcome evaluation or writing of this article. The study was approved by the Institutional Review Board at Minia University. Our patients were prospectively studied to evaluate the effect of CSOM on cochlear function and incidence of SNHL.

Subjects:

200 patients who attended to our outpatient clinic between October 2015 to October 2016 were enrolled in the study. We selected our patients according to the following inclusion criteria: Unilateral tubo-tympanic (Safe) CSOM with normal contralateral ear. The infected ear with safe mucosal type of CSOM was taken as study ear and the contralateral normal ear of the same patient was taken as control ear. This was done to exclude diseases like presbycusis,

ototoxic medications, hereditary or congenital causes, noise exposure and metabolic disorders which affect both ears.

Patients above 10 years and below 60 years old.

Results**A- Descriptive data:-**

The present study comprised 39 children; 17 boys and 22 girls.

The study group was further subdivided into 2 subgroups; group (A) control group and group (B) Obese children, both underwent audiological assessment and values were measured and results were analyzed.

Sex distribution of subjects:

Group (A) consists of 10 children, 4 boys representing 40% of control group and 6 girls representing 60% of control group as shown in table (1).

Group (B) consists of 29 children, 13 boys representing 44.5% of obese children and 16 girls representing 55.5% of obese children as shown in table (1).

Age distribution of subjects:

In Group A, age ranged from 6-17 years with a mean of 11.5 ± 4.05 as shown in table (1).

In Group B, age ranged from 7-17 years with a mean of 10.62 ± 2.77 as shown in table (1).

Table (1): Age (years) and gender distribution in the two study subgroups.

	Obese (n=29)	Control (n=10)	P value
Age			
Range	(7-17)	(6-17)	0.284
Mean \pm SD	10.62 ± 2.77	11.5 ± 4.05	
Sex			
Male	13 (44.5%)	4 (40%)	0.914
Female	16 (55.5%)	6 (60%)	

Discussion

The current study was designed to evaluate the role and effect of obesity on the hearing in obese children. Our data showed that there was no statistical difference between obese and non-

obese regarding hemoglobin, lipid profile, pure tone audiometry and Tympanometry. This means that laboratory profile and conventional audiometry as well as Tympanometry, will not reveal the risk factor of obesity on hearing.

Even HFA in most frequencies did not show difference between both groups. Our results showed statistical difference between both groups in HFA at frequency 20000 HZ and OAE⁽⁸⁾.

Our results revealed that the obesity not influence the conductive system of the ear, but affect the cochlea that cause sensory neural hearing impairment specially at high frequencies⁽⁸⁾.

Obesity has been hypothesized to directly impair the function of many organ systems via obesity-related oxidative stress and lipotoxicity. Obesity-induced inflammation also results in the infiltration of macrophages and the release of proinflammatory cytokines, which could exacerbate end-organ damage and cell apoptosis in the heart, kidney, pancreas, liver, and skeletal muscle via the caspase-dependent signaling pathway⁽⁹⁾.

No reports have addressed the effects of lipotoxicity and its related apoptosis signaling pathways on the peripheral auditory organ.

Recommendation

- 1- Screening of obese children by OAE and HFA.
- 2- Weight reduction of obese children.

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