

SCREENING OF AUDIOLOGICAL PROFILE FOR COVID 19 PATIENTS

Doaa Mohamed Elmoazen, Hany Mohamed Elsharawy, Alia Abdel Rahman Elkaraksy, Hanan Mohamed Abd Alal Abd Alal
Department of Otorhinolaryngology, Audiology Unit, Department of Chest Diseases, Faculty of Medicine, Alexandria University

INTRODUCTION

The Coronavirus disease 2019 (COVID-19) pandemic caused by the severe acute respiratory syndrome coronavirus was considered a global pandemic and a major public health problem worldwide. It is well established that the disease may be asymptomatic or may range from mild to very severe symptoms. While COVID-19 infections primarily affect the respiratory system, numerous biological systems are impacted by COVID-19. Studies showed that patients who test positive for COVID-19 may have auditory affection. In order to improve these patients' quality of life following COVID-19, it is imperative to assess their hearing using objective methods for early diagnosis. In the current study high frequency audiometry (HFA), distortion product otoacoustic emission (DPOAE) and transient evoked otoacoustic emission (TEOAE) were used to assess auditory status after covid 19 infection.

AIM OF THE WORK

The aim of this work was to study the effect of covid 19 on auditory system by using HFA, DPOAE & TEOAE.

SUBJECTS AND METHODS

The study was done on 75 subjects, in the Audio-vestibular medicine unit, Otorhinolaryngology department of Alexandria main university hospital, 50 patients confirmed positive covid 19 with PCR and 25 control. Their age ranged from 18- 50 years with no previous hearing complaints. High frequency audiometry was done at frequencies range (9000-20000Hz) using Interacoustics (AD629audiometry, Denmark). Distortion product otoacoustic emission & TEOAE were measured using Smart OAE (Intelligent hearing system, USA). In DPOAE, two pure-tone signals, f1 and f2 (f2/f1=1.22) were presented simultaneously as primary tone frequencies that generate 2f1-f2 DP. Distortion product-gram (DP-Gram) was collected at 3 points / octave steps. The levels of the primaries are 65 dB SPL for L1&55 dB SPL for L2.

The DP absolute amplitude was measured in dB SPL as function of the frequency of f2 (553-8837Hz). The TEOAE was recorded according to the non – linear protocol, using 75 μ s click stimulus with acoustical bandwidth (1000-4000Hz) at 80 dB peak SPL, at rate 19 clicks/s. The absolute amplitude was measured at 1000, 1500, 2000, 3000& 4000Hz.

RESULTS

Table 1: Comparison between the two studied groups according to demographic data

Demographic data	Cases (n = 50)		Control (n = 25)		Test of sig.	P
	No.	%	No.	%		
Gender						
Male	13	26.0	6	24.0	$\chi^2=$ 0.035	0.851
Female	37	74.0	19	76.0		
Age (years)						
Min. – Max.	20.0 –50.0		22.0 –34.0		t= 0.936	0.352
Mean ± SD.	27.68 ±4.85		27.68 ±2.73			

IQR: Inter quartile range
t: Student t-test

SD: Standard deviation
p: p value for comparing between the two studied groups

χ^2 : Chi square test

Table 2: Comparison between the two studied groups according to TEOAE (Amplitude)

Transient evoked otoacoustic emissions (amplitude) dB SPL		Cases (n = 100)	control (n = 50)	t	p
F(1000)Hz	Min. – Max	-16.32 – 16.04	-13.22 – 10.87	1.000	0.321
	Mean $\pm$ SD.	-7.90 $\pm$ 4.71	-6.88 $\pm$ 6.41		
F (1500) Hz	Min. – Max	-23.00 – -0.60	-19.36 – 6.29	1.563	0.120
	Mean $\pm$ SD.	-11.10 $\pm$ 4.86	-9.75 $\pm$ 5.21		
F (2000) Hz	Min. – Max	-28.43 – 17.99	-21.76 – -0.16	1.466	0.145
	Mean $\pm$ SD.	-15.96 $\pm$ 6.31	-14.40 $\pm$ 5.72		
F (3000) Hz	Min. – Max	-35.02 – 31.31	-26.78 – -4.20	2.836*	0.005*
	Mean $\pm$ SD.	-20.68 $\pm$ 7.53	-17.19 $\pm$ 6.19		
F(4000)Hz	Min. – Max	-29.93 – 20.04	-27.73 – 23.51	2.110*	0.038*
	Mean $\pm$ SD.	-21.34 $\pm$ 6.45	-18.20 $\pm$ 9.46		

*: Statistically significant at $p \leq 0.05$

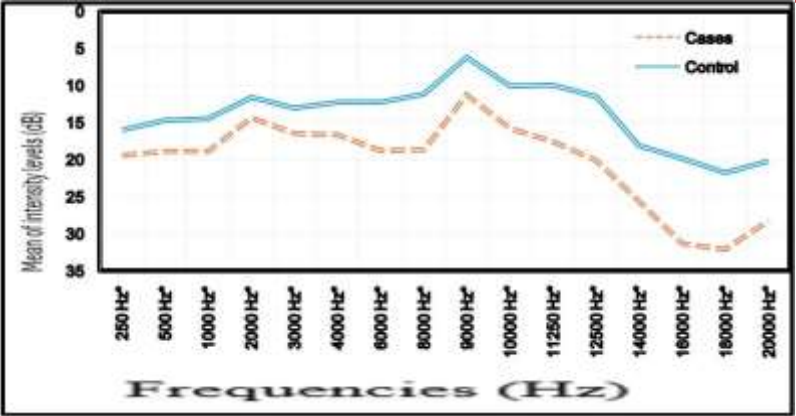


Figure1: Comparison between the two studied groups according to PTA

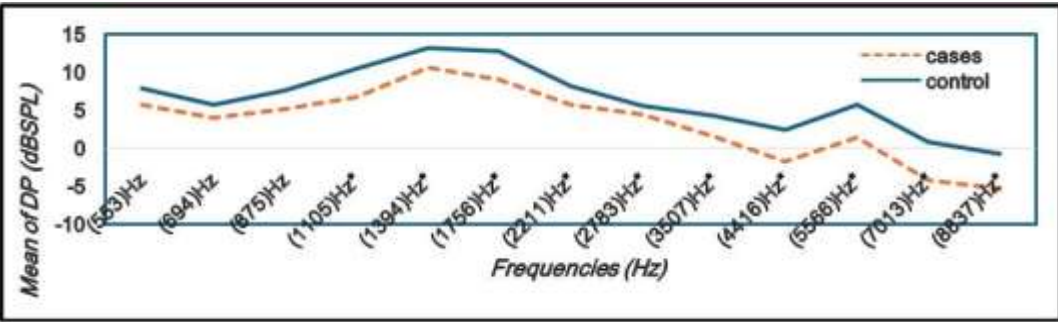


Figure2: Comparison between the two studied groups according to DPOAE(DP).

CONCLUSION

- 1-PTA thresholds were found to be significantly higher in patients group compared to controls across all frequencies.
- 2-DPOAE amplitude at frequencies above 1105Hz were significantly higher compared to control.
- 3-The mean values of TEOAE amplitude at 3000Hz and 4000Hz were significantly higher than control group.
- 3-These findings confirmed the effect of covid 19 on outer hair cells and cochlear basal turn.
- 4-Early identification with early intervention as corticosteroid therapy to promote recovery and give better outcome.