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Review Article

Behavior of Tinnitus and its Impact on Post COVID-19 Patients

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Abstract

Tinnitus has always been a frequent reason for otological consultation in the general population. Since the appearance of SAR Covid-19, recent studies report that in individuals who have suffered from Covid-19, tinnitus may appear as a sequela of the mentioned disease in some cases while in others who already suffered from it, they have worsened.

This article also shows the results of a survey carried out in my private clinic to 42 patients in January 2021 to investigate the presence of hearing loss and tinnitus in post-covid patients and if this tinnitus was aggravated or appeared as a sequel. Finally, alternatives therapies are mentioned that can be useful and at last the Tinnitus Retraining Therapy with the use of hearing aids in order to provide a better quality of life for the patient.

Keywords: Tinnitus; Pandemic; Hearing; Hearing Loss; Hearing Aids; SAR Covid-19

The world wasn't prepared to face a new pandemic, but it came and since then researchers have been studying the behavior of these new SARS-CoV-2 (COVID-19) virus that cause severe acute respiratory syndrome and the symptoms that people develop who suffer from it throughout the manifestation of this disease. Among the most commonly described symptoms are the following: fever, cough, fatigue, runny nose, diarrhea, body aches, sore throat, headache, loss of appetite, loss of taste and smell, breathing problems. Around 35 to 80 symptoms that manifest during the course of this disease have been described in various publications, among which Tinnitus stands out.

This current problem is presented below, showing the impact and evidence that it produces within a small sample group during the private consultation at the beginning of 2021 and the advice to face, reduce and relieve the patient of this such annoyance symptom.

We know that Tinnitus is always a symptom that is very frequent in the daily consultation, especially in patients who suffer from hearing loss and has a direct and harmful relationship in the presence of noisy environments that directly affects the discrimination of the spoken word.

According to ASHA (American Speech, language, hearing Association) Tinnitus is the perception of a sound, or "ringing," in one or both ears when no other sounds are present. It can be intermittent or constant, with single or multiple tones, and their volume variable.

According to World Health Organization One third of the world's population suffers tinnitus: 15% of which are observed (https://www.asha.org/siteassets/uploadedfiles/AIS-Tinnitus-Poster.pdf) [1]:

- 36%: 60 ages
- 85 - 96%: Hearing loss
- 8 - 10%: Normal hearing
- 25 - 40%: Hyperacusis.

Self-reported tinnitus in people of all ages indicate that tinnitus affect up to middle of the general population (2.6 billons of people affected worldwide).

According to previous studies the prevalence of tinnitus with or without hearing impairment in the world showed a prevalence of 5.1 to 42.7% and increased with age and exposure to noise, where hearing loss is a common and important risk factor in young patients with tinnitus associated with hidden losses in high frequencies.

Etiology of tinnitus

The conditions that can cause tinnitus include the following cases (however, the most prominent cause today is the degree of stress that this pandemic produce:

- Sudden hearing loss
- Meniere's disease
- Acoustic trauma
- Migraines
- Head injury
- Ototoxic
- Anemia
- High blood pressure
- A lot of wax in the ear
- Acoustic neurinoma
- Take a lot of caffeine
- Smoking cigars
- Stress caused by pandemic like COVID-19.

The impact of the COVID-19 virus on the inner ear is a new finding that has yet to be explored.

Currently, there is little published evidence that directly connects the new coronavirus and tinnitus.

According to the American Tinnitus Association, pre-existing behavioral conditions make patients more likely to experience tinnitus due to stress and depression associated with social isolation and avoidance of infections.

Impact of tinnitus:

- Affect the quality of life
- Affect the emotional state
- Affect the ability to concentrate
- Affect the quality of sleep.

What impact does tinnitus have from Covid-19?

The pandemic that we are experiencing has caused an increase in the number of people who suffer tinnitus, and in many cases, they perceive it with greater intensity than before.

In October 2020, the medical journal BMJ Case Reports published a case study of a 45-year-old British man who developed tinnitus and sudden hearing loss in one ear after becoming seriously ill with COVID-19. His hearing partially recovered after receiving steroid treatment for hearing loss.

Currently, there is little published evidence that directly connects the new coronavirus and tinnitus. According to the American Tinnitus Association, Patients are likely to experience tinnitus due to stress and depression associated with social isolation and avoidance of infections.

Anglia Ruskin University in Cambridge, England and Lamar University in Beaumont, Texas, conducted a study on conducted a study in a population from 31000 people after Covid -19 from 48 countries USA and United Kingdom. The results obtained from the surveys reported that 40% worsened their tinnitus.

The conclusion of the studies determined that it´ s rare to develop hearing loss or tinnitus as a complication of COVID-19 infection, meaning it is not part of the initial onset of symptoms, but rather develops later.

The findings of the previous studies highlighted the complexities associated with the tinnitus experience and how both internal factors, such as an increase, can have a significant effect on this condition.

Figure 1: Population 31000 after Covid -19 from 48 countries USA and United Kingdom.

To study the prevalence of subjective tinnitus and dizziness in a sample of COVID-19 patients using a closed 10-item online questionnaire. European archive ENT oct.2020.

From: Tinnitus and Balance Disorders in patient s with COVID-19 Preliminary Results
Part 1: Balance disorders (vertigo/dizziness) • Have you ever experienced vertigo/dizziness before being diagnosed with COVID-19? (but • Have you started experiencing dizziness or vertigo after diagnosis of COVID-19: (yes -no) • If yes, describe the characteristics of your symptoms (violent attacks of vertigo/chronic dizziness/unsteadiness) Please indicate the severity of your vertigo/dizziness (0-10) Part 2: • Have you ever experienced tinnitus before being diagnosed with COVID-19? (but) • Have you started experiencing tinnitus after being diagnosed with COVID-19? (otherwise) • If yes, specify the characteristics of your tinnitus (occasional/continuous floating/persistent pulsating/continuous) Indicate the severity of the tinnitus (0-10) Part 3: migraines...

Table 1: Questionnaire on line.

Online questionnaire, post Covid (30 - 60 days):

- Part 1: Balance disorders: vertigo, dizziness
- Part 2: Tinnitus
- Part 3: Migraines.

Study carried out on Tinnitus and balance disorders in patients with COVID-19, shows the preliminary results post Covid-19 (European archive ENT OCT 2020).

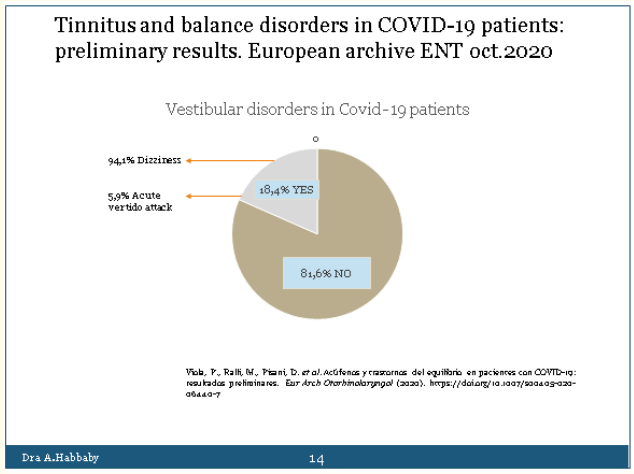

Figure 2: Source: De la Torre Diamante Daniel,Qué es el tinnitus?El nuevo síntoma de Covid. http://nailsdesigns.info/watch/qué-es-el-tinnitus-el-nuevo-síntoma-del-covid-en-hoy-nos-toca/MoidYuJdk4g.

In Argentina, according to Dr De la Torre Diamante, 40% of people with Covid-19 symptoms or positive Covid suffer a worsening of their tinnitus. The Dr associates This is also associated with stress and confinement It's Finding cases with normal hearing.

They are also closely related to bruxism in many cases generating inflammation in the TMA (temporomandibular joint) that affects the ear due to stress.

It's important to consider the differential diagnosis among types of tinnitus:

- Acute tinnitus: (It should be consulted and treated immediately vitamin complex, corticosteroids)
- Continuous

- Occasional
- Permanent (it's usually indicated with Hearing aids or cochlear implant because they disturb the quality of life and the dream).

Tinnitus assessment:

- Basic audiologic assessment: to know if tinnitus is related to hearing loss.
- Psychoacoustic tinnitus measurement: loudness matching, pitch matching, maskability.
- Auditory Evoked Potentials, which inform about the auditory pathway and how the auditory stimulus is transmitted from the ear to the brain.
- Otoacoustic emissions, reveal the state of the inner ear and the degree of damage to the hair cells.
- Brain imaging when the case requires it.
- Vestibular examination if there is a crisis of vertigo or imbalance.
- Daily life questionnaire related to tinnitus THI TRQ, THQ.
- Analogous evaluation scale/VAS (intensity and degree of discomfort American Tinnitus Association (2007).

In a survey they found that 60% of their tinnitus patients experienced at least some relief when wearing hearing aids; approximately 22% of patients found significant relief.

Hearing aids are effective for several reasons:

- Masking and attention effects
- Increase hearing stimulation
- Improve communication.

Below I will show a survey of 42 patients our clinic in January 2021.

Target:

- Observe if Covid-19 affects hearing
- If Covid-19 causes the appearance of tinnitus or increases them
- Find a better calibration parameter in hearing aids and cochlear implants to improve tinnitus.

The survey was carried out on 42 patients between 40 and 80 years of age. 50% men and 50% women in my Centro de Audiología y Audífonos during the month of June, 2021.

Figure 3

Of the observed population, 63% hadn't had Covid-19; 25% were isolated by contact and 12% suffered from Covid.

Within the audiological evaluation questionnaire, one of the questions was about having or not having tinnitus. The answers were :45 % no tinnitus,25% tinnitus no permanent and a 30% with permanent tinnitus increased.

Figure 4

On the 42 patients surveyed, basic pathologies were recorded in the audiometric studies that ranged from normal to various degrees and types of loss, how many suffer from tinnitus and use of hearing aids, prevailing sensor neural hearing loss as shown in the following graph.

Figure 5

The presence of tinnitus was recorded both in normal hearing and in hearing losses from different pathologies of origin. In most cases, bilateral pathology of the neurosensory type (85% of the cases) was treated with the presence of tinnitus at the time of the examination.

Regarding sensorineural hearing loss (SNHL), the lesion was located mainly in the high frequencies, in post covid patients as expected. The tinnitus was compared to the high frequencies 3000 and 4000 hz.

Figure 6

Audiometries in patients with sensorineural hearing loss (SNHL).

Of the 42 patients surveyed, most of the patients used hearing aids without the need for the tinnitus masker to be activated, and in a smaller percentage the tinnitus reducer if it was activated; in both cases the tinnitus may be reduced and the patients felt more relieved.

Figure 7

Use of hearing aids with and without tinnitus reducers.

The following graph shows the audiometric evaluation of the patient and the hearing device selected with tinnitus masker program in hearing aid.

Figure 8

Cochlear implants

Cochlear implants restore hearing but can also be particularly helpful in improving tinnitus symptoms. This work on the same principle as hearing aids: they increase external sound stimulation, helping to distract the brain from the perceived sounds of tinnitus.

Tinnitus retraining therapy (TRT):

Tinnitus is forming part of the symptoms that people with Covid positive present and for that it must be treated. Some of the therapies that are currently used to improve Tinnitus are mentioned below:

- Counseling + Neurophysiological therapy
- Acupuncture
- Behavioral conductive therapy
- Mindfulness
- Food and habits [4-12].

Conclusion:

- Tinnitus patients who perceive tinnitus with greater intensity are reported from having positive Covid.
- Tinnitus should be treated in the acute phase.
- In cases of permanent tinnitus, the use of hearing aids and cochlear implants can mask it.
- The impact of the COVID-19 virus on the inner ear is a new finding that has yet to be explored.
- Tinnitus rehabilitation therapy improves the patient's quality of life.

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