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What do we know about Pediatric Tinnitus?

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Editorial

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Editorial

We define tinnitus as the perception of a sound in the absence of an external source and that is inaudible to the environment [1]. It is a very frequent symptom in the practice of otolaryngologists, but how frequent is it in the pediatric population? The prevalence in children it is difficult to assess and there are few reports on it. It is estimated that between 13% and 47% of normal hearing children complain of tinnitus and in children with hearing loss, it is reported that the prevalence of tinnitus reaches 55% [2,3]. Tinnitus can cause from minor discomfort in some infants, to difficulties concentration, stress, fatigue, irritation, sleep disturbances, learning impairment, inattention, and emotional distress [4].

They are basically divided into two large groups:

- **Subjective:** there is no external stimulus that produces them and they are not perceived by others or by the examining physician, they correspond to approximately 95%, and
- **Objectives:** they are perceived by the examiner and correspond to 5% on average [5].

To date, there are no clinical guidelines for the treatment of children with tinnitus, likewise, there is a lack of methodological standards and outcome measures to assess the severity and impact of tinnitus in the pediatric population and the pathophysiology has been tried to explain based on the knowledge that exists in the adult population.

Tinnitus is the result of abnormal activity in the auditory pathway that can occur at any point in it. Since the pathophysiology of this symptom is so complex, multiple theories have been generated to try to explain it.

New studies reveal the alteration in the compensation systems of the central auditory pathways as a determining factor in the chronification after an aggression mainly peripheral, which in many cases occurs in the cochlea.

The pathophysiological theories to explain it, could be grouped into three levels: cochlear alteration, aberrant electrical activity in the central nervous system, and cortical reorganization phenomena. In relation to the cochlear alteration that could explain the origin of tinnitus, it is considered, on the one hand, that there could be an alteration between the functioning of the external and internal hair cells, where the degeneration of the external hair cells would generate a collapse of the membranes basilar and tectorial, producing a chronic depolarization of the internal ones, thus generating abnormal activity in the afferent fibers. And on the other hand, alterations in the metabolic cycle of glutamate are thought, either due to excess release or a lack of reuptake and metabolism, which would produce a state of continued depolarization of the afferent pathway, causing cell edema, release of reactive metabolites of oxygen with apoptosis.

There is a high association of tinnitus with hearing loss, which is reported in up to 50% of cases, and is justified by making a similarity with the reorganization that the somatosensory cortex undergoes after the amputation of a limb and the perception of the "limb phantom", the areas of the auditory cortex that lose their afferent innervation would undergo reorganization and would perceive anomalous auditory sensations that would be experienced as tinnitus [6].

Among the main causes of childhood tinnitus, febrile illnesses, viral infections, otic pathology (acute and serous otitis media, tympanic perforation, contraction of the ossicular chain and palate muscles, Eustachian tube dysfunction, etc.), exposure to acoustic trauma, earwax plugs,

head trauma, ototoxicity, etc. have been reported [7].

For the study, a complete clinical history must be taken, with special emphasis on the semiology of tinnitus, accompanied by an exhaustive general physical and otorhinolaryngology examination with performance of: tone audiometry, logoaudiometry, impedance-tympanometry, tinnitus measurement, and if necessary, according to clinical judgment, complement with otoacoustic emissions, evoked potentials, computed tomography and nuclear magnetic resonance [8].

The treatment is related to the etiology and includes: sound, psychological, pharmacological, physical and surgical treatment [9].

It has been documented that childhood tinnitus, in many cases, is self-limited and has a better prognosis than in adults, so it is likely that it has a greater chance of improving with counseling alone or with a combination therapy without drugs, so it should be prefer conservative management instead of medical or surgical treatment [10].

As we have documented, there are few studies and monitoring of tinnitus in children, with a large area of study still to be clarified.

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