

EDITORIAL

Induced rhinogenic vertigo, dizziness and tinnitus; is there a real pathophysiologic connection or not?

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Rhinosinusitis, as we know, is a very common disease caused by the inflammation of the mucosal lining of the sinus cavities and of the nasal fossae. Tinnitus, vertigo or dizziness are symptoms considered to usually originate from the inner ear, explained through totally other kind of pathophysiological mechanisms and pathways.

Symptoms and signs associated with rhinosinusitis are discharge from the nose or post nasal drainage, nasal obstruction, pain and tenderness in the projection area of the affected sinus, hyposmia, fever, cough, and also sore throat, bad breath, fatigue, irritability, ear pain, **nausea, dizziness or tinnitus** that may appear along the evolution of the disease.

The causes usually involved in producing rhinosinusitis include: respiratory tract infections, allergies, deviated nasal septum, other medical conditions such as gastroesophageal reflux, immune system related diseases, cystic fibrosis, HIV.

It is easily understandable why patients with rhinosinusitis have symptoms related to the modifications induced by the disease at the level of the nasal passages and the sinus cavities, but why do so many of the patients with this kind of disorders complain of symptoms usually attributed to inner ear pathology such as tinnitus, vertigo and dizziness?

Is it a real pathophysiological connection or a random association?

This is an observation that has been noticed for a long time by ENT specialists. In 1981, Dr Timothy Hain, a well-known authority in the field of oto-neurology, published a paper "Vertigo originating from inflammation of the paranasal sinuses (the so-called sinogenic vertigo)". In this article, the author evaluates patients with rhinosinusitis and associated inner ear pathology through radiological exploration of the sinuses and a thorough vestibular examination. In ad-

dition to the imagistic findings at the level of the maxillary sinuses, there were also discovered changes in the vestibular status of the examined patients. The researcher found positional nystagmus or head-shaking nystagmus with disturbed vestibular spinal reaction as a pathological vestibular condition. Most of the patients diagnosed with sinogenic dizziness were relieved of the dizziness as a result of sinus therapy, often immediately afterwards.

The interrelationship that exists between the sinuses and the labyrinth might be explained through pathologic trigeminal reflexes via the sphenopalatine ganglia. These reflexes trigger a labyrinthine irritation, explaining thus the vertigo and dizziness.

In a prospective study, conducted in Israel between 2007 and 2008 and published in 2013, Gavriel et al. studied the role of computerized dynamic posturography in evaluating sinogenic vertigo. They reported a surprising 20% prevalence of sinogenic vertigo associated with abnormal results on the computerized dynamic posturography. It seems that in a large proportion of the patients, the computerized dynamic posturography demonstrated a combined disorder, even though the vestibular signs were absent. The authors explain the sinogenic vertigo by the alteration in the proprioceptive system of the paranasal sinuses that negatively influences the somatosensory input of the vestibular system.

There are studies that report a peculiar predisposition to the inner ear pathology in patients with allergic rhinitis. The endolymphatic sac seems to be the target organ held responsible for the inner ear symptoms that appear in patients with nasal allergy. Some authors suggest that there is a possibility that Meniere's disease pathophysiology can be explained by an allergic mechanism. So, the co-existence of nasal allergy with inner ear pathology possibly with the same aller-

gic mechanism, such as Meniere's, can justify the tinnitus, dizziness and even vertigo that accompany some nasal disorders.

As for the interrelation between tinnitus and rhinosinusal pathology, this can be classically accounted for by the existence of the Eustachian tube and its well-known role in the functionality of the middle ear. There is also a possibility that the Eustachian tube obstruction produced by a rhinosinusal pathology influences negatively a preexistent tinnitus. Otherwise, it is difficult to link the modifications induced by different nasal disorders and the tinnitus.

In conclusion, it is possible that the otologic symptoms associated with nasal pathology are explained through common embryologic provenience or through trigeminal reflexes mediated by the sphenopalatine ganglia. There is a possibility that the dizziness and vertigo might be induced by an incorrect central integration of the somatosensory information

from the receptors in the rhinosinusal area. The classic theory that emphasizes the role of the Eustachian tube should not be forgotten.

There is also a possibility that ear and nasal symptoms are caused by the same etiologic mechanism, for example allergy.

Infectious diseases might also produce dizziness as a manifestation of the intoxication of the central nervous system with various metabolic by-products as results of the evolution of the illness or maybe it is confused in most of the cases with the malaise status.

In my opinion, it is complicated to demonstrate the connection between the nasal pathology and the otologic symptoms that accompany rhinosinusal disorders; however, on the other hand, we have to acknowledge the fact that this association is frequent enough. Additional research is needed in order to evaluate the significance of this connection.