

Positional vertigo afterwards maxillary dental implant surgery with bone regeneration

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ABSTRACT

Benign paroxysmal positional vertigo (BPPV) is the most common form of vertigo. It is caused by loose otoconia from the utricle which, in certain positions, displaced the cupula of the posterior semicircular canal.

BPPV most often is a result of aging. It also can occur after a blow to the head. Less common causes include a prolonged positioning on the back (supine) during some surgical procedures.

Additionally one can include in this etiopathogenesis the positioning required during the maxillary dental implant surgery with bone regeneration related to a forced head positioning and inner ear trauma induced by dental turbine noise working in the maxillary bone.

Two cases of patients who suffered BPPV after undergoing maxillary dental implant with bone regeneration procedures are reported. Diagnosis and treatment are also described.

Key words: *Positional vertigo, maxillary dental implant, bone regeneration.*

RESUMEN

El vértigo paroxístico benigno es el síndrome vertiginoso más frecuente, considerado como idiopático durante muchos años, desde hace algún tiempo se cree debido a la estimulación anómala del conducto semicircular posterior inducido por un fragmento de otolito que se desprende de la macula del utrículo, ocurriendo esto muy frecuentemente por traumatismos cráneo-faciales.

Dentro de esta etiopatogenia, podría estar el vértigo posicional que aparece después de la colocación de un implante dental, cuando al paciente se le somete a una intervención larga, como es la regeneración ósea, que además tiene que tener una posición cefálica forzada, con el ruido de la turbina en el maxilar superior, provocando todo ello un desprendimiento de partículas de laberinto del oído.

Presentamos dos casos a los que después de haber sido sometido a este tipo de intervención les aparece un cuadro de vértigo posicional que se le diagnostica y trata satisfactoriamente mediante maniobras de movimientos cefálicos.

Palabras clave: *Vertigo posicional, implante dental en el maxilar superior con regeneración ósea.*

INTRODUCTION

Implantation of dental prosthesis in maxillary bones is an old technique, very developed at the current time, which can present some difficulties like a bone mass lack. In order to overcome such trouble, different procedures for increasing the alveolar crest are proposed, from maxillary sinus augmentation until guided bone regeneration (1,2).

Using this additional techniques the number of cases that can be treated increase, but the operation time becomes longer and thus the maxilla and inner ear trauma and head hyperextension could elicit a vertigo.

The BPPV was first described in 1921 by Bárány (3). He recognized several of the cardinal manifestations including vertical and torsional components of the nystagmus, its brief duration, and the fatigability of the nystagmus and vertigo. In 1952, Dix and Hallpike reported this entity in a large group of patients and described the maneuver for eliciting the classical pattern of nystagmus and its associated symptoms.

Two physiopathologic mechanisms can explain the BPPV: the cupulolithiasis mechanism by the deposition of otoconia on the cupula of the posterior canal, and the canalithiasis mechanism by the motion of free-floating material within the lumen of the posterior semicircular canal (4).

BPPV is probably the most common type of vertigo seen by the otolaryngologist. The etiology remains unknown, while idiopathic, viral, ischemic and traumatic are the most acknowledged theories. About traumatic causes, traffic and occupational injuries are been reported, otherwise odontologist surgical causes aren't to date.

Current therapy for BPPV is organized around repositioning maneuvers that, in cases of canalithiasis, use gravity to move canalith debris out of the affected semicircular canal and into the vestibule. For posterior canal BPPV, the maneuver developed by Epley is particularly effective in more than 88% of cases in eliminating BPPV (5,6).

METHODS

Two clinical cases are reported. In both patients tests of vestibular function were performed: positional testing and videonystagmography. Other neurological studies and audiological tests were also done (7).

Inspection for spontaneous nystagmus and assessment:

- Romberg testing
- Segmentary tests
- Babinski's test
- Inspection for spontaneous and positional nystagmus using Frenzel lenses

Videonystagmography (VNG):

VNG is an electrophysiological test for assessing nystagmus. This recording technique is based on the corneoretinal potential (difference in electrical charge potential between the cornea and the retina). The eye acts as an electrical dipole oriented along its long axis. Movement of this dipole relative to the surface electrodes produces an electrical signal corresponding to eye position.

By the use of this technique one can obtain recording of spontaneous and gaze-evoked nystagmus, positional, saccade and caloric testings.

Caloric testing remains the most useful laboratory test in determining the responsiveness of a labyrinth. It is one of the few tests that allows one labyrinth to be studied independently of the other. The stimulus can be applied relatively easily with techniques that are commonly available.

CLINICAL CASES STUDY

Case 1

31 years old woman, no relevant previous medical records, who was advised for maxillary dental implanting. Bone regeneration technique was proposed because increased maxillary sinus size, consequent decreased alveolar crest and bone mass lack.

After the operation the patient complained of vertigo and nausea lasting one minute and a nystagmus was observed. Next day symptoms repeated related to hyperextension head movements.

ENT exam was normal. Spontaneous vestibulometry tests, pure tone threshold and supraliminal audiometry tests all were right.

Videonystagmography:

- Saccades: normal pattern
- Smooth pursuit: normal pattern
- Dix-Hallpike's manoeuver (positional testing): positive response to the right side.
- Caloric testing : left directional preponderance.

The result suggested canalithiasis and cupulolithiasis from right posterior semicircular canal.

The patient was diagnosed of BPPV and undergone Epley's manoeuver, then the symptoms disappeared. There was no recurrence.

Case 2

62 years old man, who was advised for doing nine implants on the maxilla. Because of bone mass lack at the alveolar crest, a maxillary sinus augmentation was performed. The operation time became longer due to this additional technique and the head position forced by the neck hyperextension required.

After surgery ending, the patient had a sudden vertigo, nystagmus and its associated symptoms, for a few seconds. These symptoms repeated twice, eliciting with head movements, returning to normality in minutes, but remaining some kind of dizziness.

Neurological studies and audiological tests performed were right.

Videonystagmography:

- Saccades: normal pattern
- Smooth pursuit: normal pattern
- Dix-Hallpike's manoeuver (positional testing): right hanging head position induced binocular nystagmus to the left.
- Caloric testing : right unilateral weakness.

Left posterior semicircular canal BPPV was diagnosed. Epley's manoeuver was done and repeated for two days, then the symptoms disappeared.

DISCUSSION

BPPV is characterized by vertiginous episodes with nystagmus remaining seconds, elicited by a particular head position (7).

There are some conditions in the presented cases: supine position (lying on the back) and head and neck hyperextension, prolonged time on that position during the operation, inner ear trauma induced by dental turbine noise working in the maxillary bone.

The referred conditions can induce loose otoconia from the utricle to the posterior semicircular canal. The movement for returning head to its regular position can bring those otoconia on the cupula of the posterior canal, eliciting the vertigo (8). Hypofunction and directional preponderance of the affected side were confirmed by spontaneous vestibulometry and videonystagmography tests.

We conclude that BPPV may be a complication of the maxillary implants surgery, specially when a bone regeneration technique is required because of the prolonged time of forced position that patient has to maintain.

In the described cases, the onset of vertigo happened immediately after the implant surgery, so we think there can be a cause related to, based on the clinic exams and responsiveness to treatment (Epley's manoeuver) (9,10).

There are a lot of articles in the medical literature (11,12) that confirm the role of several sorts of traumatism causing BPPV, but we did not find any reporting positional vertigo after maxillary dental implant surgery with bone regeneration.

We propose that the dental surgeon should consider that possibility in some cases like the referred in this article to avoid this complication shortening the time of the operation or doing it in two separated phases.

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