

Nasopalatine cyst excision and bone regeneration

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Abstract

Introduction: The nasopalatine cyst is a non-odontogenic cyst, located within the nasopalatine duct of the maxilla, its diagnosis in most cases is by routine radiological finding and in other cases by the presence of symptomatology; coming to generate pain, paresthesia and visible signs such as facial deformities.

Case description: The objective of this article is to make a literature review and presentation of the case of a 38-year-old male patient, who comes to the consultation for presenting an increase in volume in the anterior maxilla, of two years of evolution that presented favorable results after excision and placement of bone graft.

Final considerations: Nasopalatine cyst represents less than 5% of the cysts at maxillary level and its recurrence is low. When it is a large cyst with destruction of the surrounding bone tissue, the best option is the use of a bone graft depending on biocompatibility, the affected site and costs. Demineralized bone matrix (DBX) is considered the gold standard due to its capacity for osteoinduction, osteoconduction and osteogenesis.

Key words: Non-odontogenic cyst; Nasopalatine cyst; Bone regeneration; Bone graft; DBX

1. Introduction

'A cyst is defined as a pathological cavity, which is lined with epithelium and presents liquid or semi-liquid contents, originating from odontogenic epithelial components or cellular debris trapped within bone or soft tissues [1,2].'

'Among the cysts of non-odontogenic origin, the Nasopalatine Cyst or also called Incisal Duct Cyst [3]' is the most common cyst in the oral cavity, originating from the embryonic remains of the nasopalatine duct, usually asymptomatic, 'most prevalent in older adults between 40 to 60 years of age, male and without racial predominance [2].'

A study carried out at the Faculty of Dentistry of the University of Costa Rica, evidenced the low incidence of non-odontogenic cysts (2.6%) in relation to odontogenic cysts (42.9%), coinciding with studies carried out in the United Kingdom, Chile, Brazil, Spain and India.

'Another study conducted in Turkey gives a prevalence of 3.2% for non-odontogenic cysts and 77.2% for odontogenic cysts, with the nasopalatine duct cyst being the most recurrent and represented by 73% of the cases [4].'

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'Clinically, there is an increase in volume at the level of the upper lip, elevation of the ala of the nose and an increase in the thickness of the mucosa in the nasal vestibule, which can commonly generate facial deformity [1].' 'Radiographically, there are well-circumscribed radiolucent images of oval shape, located in the midline of the upper jaw, between the roots of the anterior teeth [2].' 'Radiographically, there are well circumscribed radiolucent images of oval shape, located in the midline of the upper jaw, between the roots of the anterior teeth [2].'

'Histologically, they are lined by a layer of cuboidal or flat stratified ciliated cylindrical epithelium (respiratory), or even by a mixture of both. The cyst capsule also presents blood vessels and peripheral nerves [3].' 'Treatment consists of complete removal of the cyst, peripheral osteotomy and removal of teeth involved in the lesion depending on the case [2].' 'Exodontia of teeth with a poor prognosis due to their involvement with adjacent anatomical and nerve structures is performed, as well as removal of teeth that do not fulfill a normal occlusal function [1].'

'Radiologically, the gold standard for the study of the cyst is the use of cone beam computed tomography that allows us to perform surgical planning and measurements through a three-dimensional reconstruction of the duct and evaluate the relationship with neighboring anatomical structures [5].'

'Currently, multiple types of bone grafts have been used to replace the loss of bone tissue, among these we have allografts that correspond to another individual of the same species, xenografts that come from another animal species and alloplasts that are inorganic or synthetic [5].'

'Within the alloplast bone graft substitutes we have DBX, which is composed of a demineralized matrix from donors; rich in collagen and morphogenetic bone proteins that together are responsible for the osteoinductive power thus stimulating bone formation and regeneration. DBX is manufactured by MTF (Musculoskeletal Transplant Foundation) in the United States and marketed by Synthes [6].'

For these reasons, the objective was to describe a clinical case and review the literature on nasopalatine duct cyst and the use of DBX as a bone graft.

2. Description of the case

A 38-year-old male patient, a driver by profession, with no history of systemic diseases, reports that 1 year ago he presented an increase in volume at the level of the vestibular sulcus, so he went to see his dentist, who performed a drainage procedure. After 6 months he presented the same symptoms again and the drainage procedure was repeated, the clinical picture persisted and was accompanied by paresthesia of the lip and for this reason he was referred to the surgeon for evaluation and treatment.

The patient comes to the office with a periapical radiograph showing the presence of a mesiodent.



Figure 1 Periapical radiograph obtained in radiovisiograph

When performing the extraoral clinical examination we collected the following data:

Increased volume at the level of the right side nose wing and lip, along with increased volume at the level of the sulcus fundus.

Pulp sensitivity tests were performed, among which we opted for the cold test which consisted of relative isolation, drying the surface and using a small cotton swab sprayed with endo ice (ethyl chloride) we tested the normal response of the nerve fibers, performing the test first on the control tooth and later on the affected piece.

The second test performed was the heat test, using a heated gutta-percha bar applied to the middle third of the vestibular side of the tooth to be examined, previously isolated and dry.

In the evaluation of the CBCT in slices of 0.3 mm to 0.15 mm intervals, a hypodense image was observed delimited in its interior-crown, upper and middle third of the root of the included tooth. Expansion of the corticals with involvement towards the left nostril.

In cross section, a hyperdense mass delimited by intact corticals of dimensions 14.9 in mesio-distal direction and 7.5 in vestibulo-palatine direction is observed.



Figure 2 A, cross-sectional view

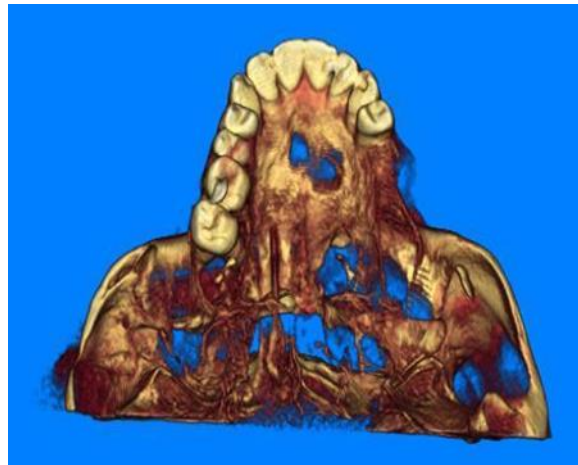


Figure 2B, 3D rendering of a cross-sectional view.

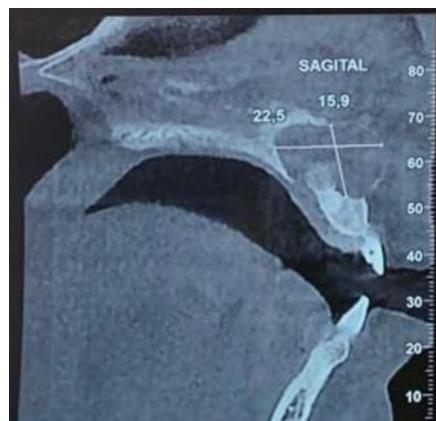


Figure 2-2C, sagittal view.

The sagittal view shows a hyperdense mass with dimensions 22.5 in the anteroposterior direction and 15.9 in the vertical direction.

The procedure is performed under general anesthesia, with the help of a #15 scalpel a sulcular incision is made to design a partial Newman mucoperiosteal flap with discharge at the level of the papilla of the 2.4 piece, the flap is lifted, the cyst is enucleated and the supernumerary tooth is extracted, a peripheral osteotomy is performed in order to eliminate all the tissue and have intact corticals in the cavity. Hemostasis is performed to finally place the bone graft substitute (DBX). The tissue is replaced with simple transpapillary stitches.

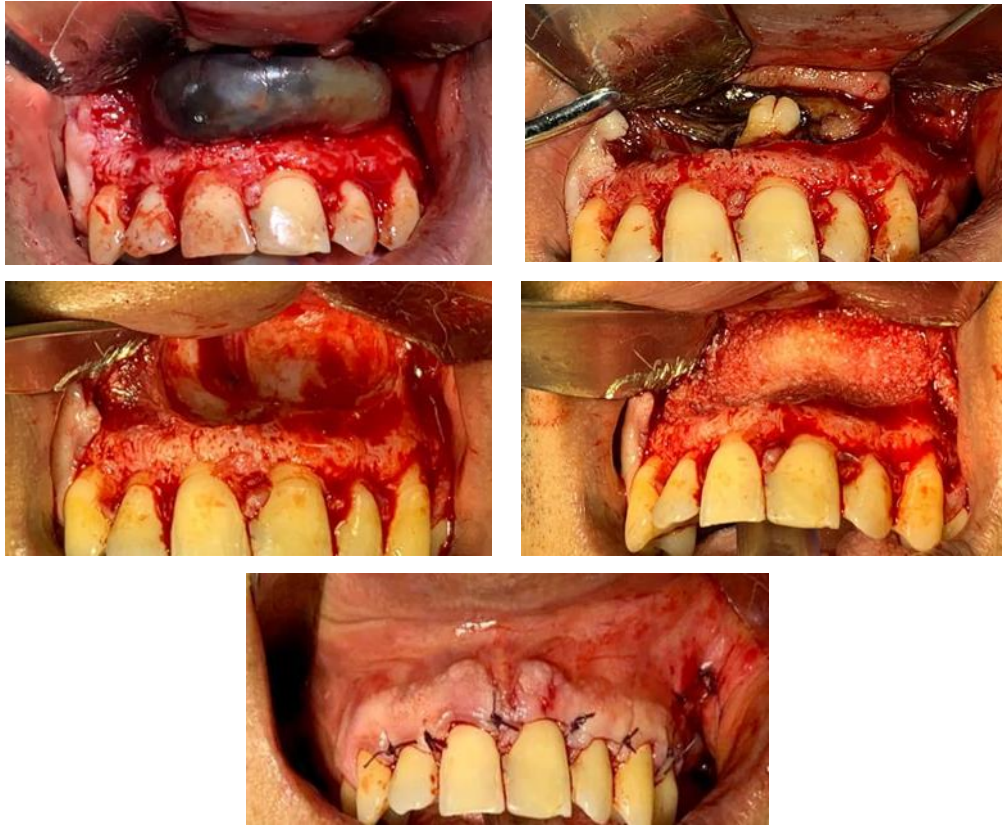


Figure 3 3A, enucleation of the cyst; 3B, extraction of the supernumerary tooth; 3C, cavity with intact cortices; 3D, placement of DBX; 3E, tissue replacement by means of simple transpapillary stitches.

At the end of the surgical procedure, a single dose of dexamethasone 8 mg, ketorolac 60 mg and 1 g of cephalexin were administered intravenously.

Amoxicillin + Clavulanic Acid (Augmentin 625 mg) was given orally every 8 hours for 7 days together with ibuprofen (Motrin 600 mg) for 3 days.

The sample was sent for histopathological analysis.

Macroscopic examination showed a soft tissue fragment, triangular shape, from the nasopalatine area, blackish-brown color, firm consistency, smooth surface; measuring 2.3*1.6*0.5 cm.



Figure 4 Macroscopic specimen

Microscopic examination reveals an anfractuous cavity containing extravasated erythrocytes. Ciliated stratified cuboidal epithelial tissue approximately two layers thick border this cavity. In other sections, this epithelium becomes stratified squamous, fibrovascular connective tissue that corresponds to the lesion capsule that contains nervous tissue and areas of intense inflammatory infiltrate, predominantly chronic (plasmocytes). Also, presence of cholesterol needles (extracellular cholesterol) and hemosiderin pigments.

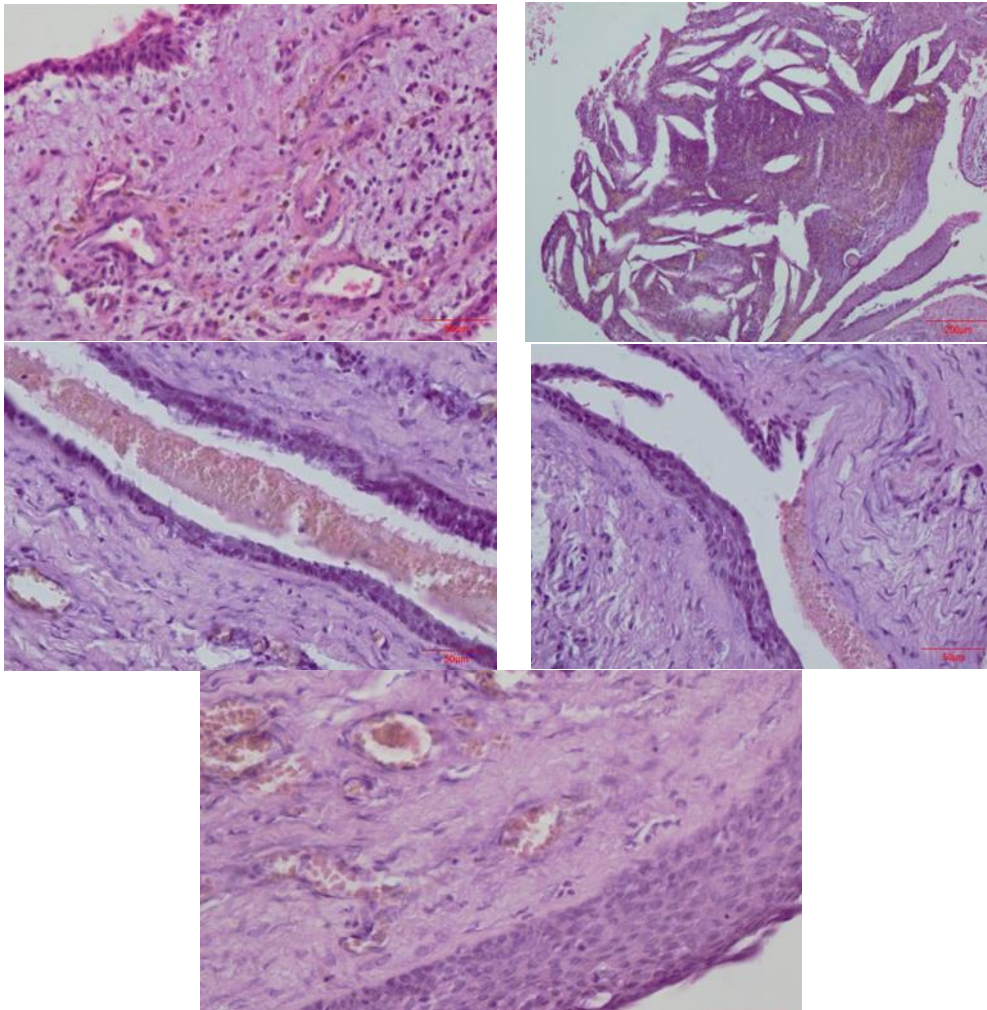


Figure 5 5A, Chronic inflammatory infiltrate (plasmocytes) and hemosiderin pigments; 5B, cholesterol crystals; 5C, ciliated stratified cuboidal epithelium; 5D, fibrovascular connective tissue; 5E, extravasated erythrocytes. (H&E)



Figure 6 A; postoperative control at 6 months

Histological diagnosis compatible with Nasopalatine Cyst associated with an inflammatory process.

A control is carried out at 6 months in which a complete replacement of the tissue at the vestibular level is evidenced without presenting complications.

3. Discussion

'When we have a cystic lesion, we must address all its possible diagnoses, establishing its clinical characteristics to avoid misdiagnosis and therefore adequate treatment. Within the differential diagnoses of the nasopalatine cyst we have: odontogenic cysts and tumors such as the Dentigerous Cyst, Lateral Periodontal Cyst, Unicystic Ameloblastoma, Keratocyst odontogenic tumors and Periapical Granuloma [7].'

'When having a cystic lesion in relation to a supernumerary and/or non-erupted mesiodens tooth, it can be confused with a Dentigerous Cyst; which has a greater predilection for the mandibular 3rd molars, followed by the maxillary canines, maxillary third molars, and rarely associated with maxillary incisors and with supernumeraries [8].' In addition, soft tissue is not attached to the supernumerary's neck.

In order to reach an accurate diagnosis, we must base ourselves on clinical, imaging and histological characteristics.

'Clinically the two types of cysts are similar, the symptoms can be: inflammation, displacement of neighboring teeth, mobility of adjacent teeth and increased dental sensitivity [8].'

'Histologically, when it is a nasopalatine cyst, we find a stratified cuboidal epithelium with areas of intense inflammatory infiltrate, predominantly chronic; it differs from the rest of the non-odontogenic cysts by the presence of the nasopalatine vascular-nervous package [9], while the Dentigerous Cyst has a fine and regular stratified squamous epithelium, which is inserted in the adamantine cementum limit, characterized by the presence of cuboidal or flattened cells resting on a thin basal lamina, and the surrounding fibrous capsule has little or no chronic inflammatory infiltrate [8].'

'In radiographic imaging, the nasopalatine cyst appears as a well-defined radiolucency in the midline of the anterior palate. It is mentioned in the literature that a radiolucency of 7 to 20 mm in diameter in the nasopalatine canal makes us suspect the presence of this pathology; while the Dentigerous Cyst may or may not be found at the level of the midline and when a widening of the pericorony space exceeding 2.5 mm is observed, it will indicate the presence of a dentigerous cyst [8].'

'The maxillary bones can suffer bone loss, whether of congenital or acquired origin, within these we have neoplasms, intraosseous lesions generated by trauma, post-surgical defect and edentulism. When this tissue deficit occurs, it is necessary to rehabilitate with surgical techniques, bone grafts being the most current alternative [10].'

'Bone grafts, depending on their nature, are classified into: Autografts (from the same individual), Allografts (from another individual of the same species), Xenograft (from another animal species) or alloplast (Inorganic or synthetic), being the material of choice the one that has greater biocompatibility, better biological and biomechanical properties and an affordable cost to the patient. 'According to Diego Correa et al., they consider autograft as the gold standard, due to its great biocompatibility, biomechanics, ability to provide osteoinduction, osteoconduction and osteogenesis [10].'

In this case, a synthetic bone substitute (DBX) made with demineralized bone matrix (DBM) was used, which is obtained by removing the mineral phase of the cortical bone that replaces the host bone in a period of four to six months. 'DBX contains active bone growth factors responsible for osteoinductive properties, which actively stimulate bone formation and regeneration [6].'

'DBX fills the defects or bone spaces giving stability to the structure, elaborated in aseptic conditions without being subjected to irradiation or heat treatments to preserve its osteoinductivity [6].'

'Among its benefits we have: staying in the place of its implantation, not adhering to gloves during handling, moldable to any size and shape, storage at room temperature, ability to combine with autograft, blood or bone marrow, it is also biocompatible and has a physiological pH [6].'

Currently, various techniques and types of anesthesia are used for the excision of a nasopalatine cyst, but this depends on: the size of the cyst, attached tissues involved with it, the systemic assessment of the patient, among others.

'Dr. Pablo Emilio Molano Valencia et al; mention in a case report that they used infiltrative anesthesia by means of 2 capsules of 2% lidocaine with a vasoconstrictor both in the vestibular and palatal area as an anesthetic technique for the excision of the 3-mm diameter nasopalatine cyst [4].'

'In addition, Miguel Angel Coz et al; used in their case report local anesthesia with 3% mepivacaine hydrochloride, using an infiltrative technique. In addition, intrasulcular incisions were made in all the teeth and the mucoperiosteal flap was detached both in the vestibular and palatal areas until exposing the 10 mm x 10 mm nasopalatine cyst, with corticalized edges and compromise of the palatal bone table [11].'

On the other hand, 'Carlos Juan Liceaga, boss of the Maxillofacial Surgery Service of Juarez Hospital in Mexico et al; in his bibliographic review and case presentation, he used general anesthesia with nasotracheal intubation to later perform a contouring incision of the upper anterior dental organs with two discharge incisions. The lesion had a size of 5x4 cm, carrying out the complete excision of it, corroborating that its surface is intact [9].'

In this report, we used general anesthesia, due to the dimension of the lesion 2.3 x 1.6 x 0.5 cm; the involvement with attached structures; the duration of the surgery, which consisted in the extraction of the cyst together with the mesiodent, and regeneration with a bone graft substitute (DBX).

4. Conclusion

The different cysts represent a danger to the integrity of the maxillofacial component, causing functional and aesthetic disorders, this condition being of variable intensity related to the degree of evolution of the cyst. Each cyst presents characteristics that differentiate them and are particular to recognize and assign them a name.

The radiological and histopathological examination are essential to make a correct diagnosis, the CBCT is the gold standard, since it has shown us a more accurate evaluation of the dental pieces that apparently may be causing the lesion, it also allows us to carefully evaluate the continuity of the periodontal space of these teeth to give them a future prognosis and generate a treatment plan in the event that their prognosis is unfavorable, in addition the image given by the CBCT allows us to visualize the adjacent anatomical pieces and at the same time gives us different cuts in multiple blueprints.

The Nasopalatine Cyst represents less than 5% of the cysts at the maxillary level, the majority are asymptomatic, the recurrence is low, however, there are cases linked to an incomplete removal process which generate a recurrence, to avoid these complications it must be performed always a complete enucleation of the cyst and inspection of the walls.

In the removal of a cyst we must evaluate several parameters to use an adequate anesthetic technique, among these we have: the systemic state of the patient, the size of the cyst, the presence of allergies, the duration of the surgery and in this way opt for an infiltrative technique or general anesthesia.

When dealing with a large cyst with destruction of surrounding bone tissue, the use of bone grafts is a key option for the long-term success of surgery. The best option depending on the biocompatibility, the affected site and the costs. DBX is considered the gold standard due to its osteoinduction, osteoconduction and osteogenesis capacity.

Compliance with ethical standards

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Disclosure of conflict of interest

there is no conflict of interest for the publication of the manuscript, with the institution and with the products mentioned in this manuscript.

Statement of ethical approval

This work is based on a surgery performed on a human being, which I authorize the use and publication of your information and photographs.

Statement of informed consent

Informed consent was obtained from the patient who participated in the study.

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