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Clinical Case

Surgical Enucleation of the Nasopalatine Duct Cyst: Clinical Case Report

Enucleação Cirúrgica de Cisto do Ducto Nasopalatino: Relato de Caso Clínico

Enucleación Quirúrgica del Quiste del Conducto Nasopalatino: Caso Clínico

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Abstract
The nasopalatine duct cyst (NPDC) is classified as a non-odontogenic cyst of the oral cavity, whose pathogenesis is not yet fully understood. Clinically, the patient may present with swelling in the anterior region of the maxilla and palatal mucosa or elevation of the upper lip; however, in many cases, the lesion is asymptomatic, and the adjacent teeth remain vital. The treatment of choice consists of complete enucleation of the lesion associated with curettage, especially when the cyst is not large. The aim of this study is to report a clinical case of NPDC treated surgically, in which complete enucleation was performed after a clinical and tomographic diagnosis compatible with the lesion. The case involves a 30-year-old male patient with no systemic comorbidities who reported pain and slight edema in the anterior region of the palate. During the clinical examination, a fluctuating mass was observed on palpation near the incisive papilla. The teeth adjacent to the lesion showed preserved pulp vitality. The tomographic examination showed a well-defined hypodense image in the nasopalatine duct region, associated with bone fenestration, corroborating the suspected diagnosis. Given these findings, surgical intervention was performed for complete enucleation and subsequent histopathological analysis, which confirmed the diagnosis of NPDC. The patient progressed favorably, receiving appropriate postoperative care and clinical follow-up. It is concluded that, for the present clinical case, surgical enucleation of the NPDC proved to be an effective treatment, avoiding further complications for the patient.
Descriptors: Nonodontogenic Cysts; Palate, Hard; Surgery, Oral; Cone-Beam Computed Tomography; Case Reports.

Resumo
O cisto do ducto nasopalatino (CDN) é classificado como um cisto não odontogênico da cavidade oral, cuja patogênese ainda não está completamente esclarecida. Clinicamente, o paciente pode apresentar tumefação na região anterior da maxila e mucosa palatina ou elevação do lábio superior, entretanto, em muitos casos, a lesão é assintomática, e os dentes adjacentes permanecem vitais. O tratamento de escolha consiste na enucleação completa da lesão associada à curetagem, especialmente quando o cisto não apresenta dimensões extensas. O objetivo deste estudo é relatar um caso clínico de CDN tratado cirurgicamente, no qual foi realizada enucleação completa após hipótese diagnóstica clínica e tomográfica compatível com a lesão. O caso envolve um paciente do sexo masculino, 30 anos de idade, sem comorbidades sistêmicas, que relatava dor e discreto edema em região anterior de palato duro. Durante o exame clínico, observou-se aumento de volume flutuante à palpação, próximo à papila incisiva. Os dentes adjacentes à lesão apresentavam vitalidade pulpar preservada. O exame tomográfico evidenciou imagem hipodensa bem delimitada na região de ducto nasopalatino, associada a fenestração óssea, corroborando para a suspeita diagnóstica. Diante desses achados, foi feita a intervenção cirúrgica para enucleação completa e posterior análise histopatológica, que confirmou o diagnóstico de CDN. O paciente evoluiu de forma favorável, recebendo os devidos cuidados pós-operatórios e acompanhamento clínico adequado. Conclui-se que, para o presente caso clínico, a enucleação cirúrgica do CDN se mostrou um tratamento eficaz, evitando maiores intercorrências ao paciente.
Descritores: Cistos não Odontogênicos; Palato Duro; Cirurgia Bucal; Tomografia Computadorizada de Feixe Cônico;

Resumen
El quiste del conducto nasopalatino (QN) se clasifica como un quiste no odontogénico de la cavidad oral, cuya patogénesis aún no se comprende completamente. Clínicamente, el paciente puede presentar inflamación en la región anterior del maxilar y la mucosa palatina o elevación del labio superior; sin embargo, en muchos casos, la lesión es asintomática y los dientes adyacentes permanecen vitales. El tratamiento de elección consiste en la enucleación completa de la lesión asociada al curetaje, especialmente cuando el quiste no es grande. El objetivo de este estudio es presentar un caso clínico de QN tratado quirúrgicamente, en el que se realizó una enucleación completa tras un diagnóstico clínico y tomográfico compatible con la lesión. El caso se refiere a un paciente varón de 30 años sin comorbilidades sistémicas que refería dolor y ligero edema en la región anterior del paladar. Durante la exploración clínica, se observó una masa fluctuante a la palpación cerca de la papila incisiva. Los dientes adyacentes a la lesión mostraban vitalidad pulpar conservada. El examen tomográfico mostró una imagen hipodensa bien definida en la región del conducto nasopalatino, asociada a una fenestración ósea, lo que corroboraba el diagnóstico sospechado. Ante estos hallazgos, se realizó una intervención quirúrgica para la enucleación completa y el posterior análisis histopatológico, que confirmó el diagnóstico de QN. El paciente evolucionó favorablemente, recibiendo los cuidados postoperatorios y el seguimiento clínico adecuados. Se concluye que, para el presente caso clínico, la enucleación quirúrgica del QN resultó ser un tratamiento eficaz, evitando complicaciones adicionales para el paciente.
Descriptores: Quistes no Odontogénicos; Paladar Duro; Cirugía Bucal; Tomografía Computarizada de Haz Cónico; Informes de Casos.

INTRODUCTION

Nasopalatine duct cyst (NPDC), also known as incisive canal cyst, is the most common non-odontogenic cyst of the oral cavity, accounting for approximately 73% of non-odontogenic cyst cases[1,2]. Its pathogenesis is uncertain, however, it is believed that its origin is through the proliferation of epithelial remnants of the nasopalatine duct, an embryonic structure that connects the oral cavity to the nasal cavity in the incisive canal region. Thus, when this structure does not degenerate spontaneously, epithelial remnants of this duct may remain in adulthood, giving rise to this type of cyst[2-4].

Although the embryonic cause is the most likely etiological factor, other factors such as poorly fitted prostheses, masticatory trauma, bacterial infections, and retention of mucus from adjacent minor salivary glands should also be investigated[2,4,5]. Although NPDC can occur in both sexes, it is more common in men between the fourth and sixth decades of life[1,3,6,7]. Clinically, the lesion presents as an increase in the anterior region of the lip and/or palate, with slow growth, and tooth loss in more severe and rare cases[5,8].

Commonly, the lesion is asymptomatic and detected on routine radiographs, however, there are cases in which patients present some signs or symptoms, such as swelling in the anterior vestibular region of the maxilla, with possible elevation of the upper lip, swelling in the anterior palatal region, or even burning and the presence of fistula or suppuration in the anterior region of the maxilla[1,7]. The vitality of the adjacent teeth is not compromised, as it is a cyst of non-odontogenic origin[3].

Radiographically, it presents a radiolucent, unilocular, well-defined area with radiopaque edges and shapes that can vary between a “heart” or “inverted pear” appearance, ranging in size from millimeters to centimeters between the upper central incisors[3,5-7]. As a differential diagnosis, it is often confused with periapical cysts, keratocysts, or lateral periodontal cysts. Therefore, pulp vitality testing is crucial for differentiating periapical cysts from NPDC[3,9].

Histopathologically, it is characterized by the presence of a cystic capsule of dense connective tissue lined by an epithelium that can vary between: pseudostratified, non-keratinized stratified squamous, simple columnar, and cuboidal[6,9]. The cystic capsule may also present some histological findings, such as chronic inflammatory infiltrate[6].

As a form of treatment, surgical enucleation can be performed in most cases, with low recurrence rates, as well as marsupialization associated with enucleation of the lesion, only for rare cases in which the lesion reaches larger proportions[1,2,3,6]. For the correct planning and surgical treatment of the lesion, in order to avoid pre- and postoperative complications, a biopsy is necessary for the definitive diagnosis of the lesion[1,6]. In cases of smaller NPDC, immediate surgical enucleation is the most appropriate technique. Therefore, the best surgical access to the lesion is through a palatal flap, after intrasulcular incision, on the palatal surface around the upper incisors[6].

Total removal is indicated to revent the development of acute infectious-inflammatory processes, the development of fistulas, and cortical perforation. It should be noted that if the lesion is not treated, the chances of bone resorption increase, which may increase the chances of tooth movement[2]. The present manuscript aims to present a clinical case of NPDC, which was treated surgically, so that it was possible to simultaneously eliminate and obtain histopathological diagnostic confirmation of the lesion, highlighting the importance of correct diagnosis and treatment for cystic lesions to obtain a favorable prognosis.

MATERIAL AND METHOD

This work consists of a qualitative and descriptive clinical case report that presents relevant information from the literature on the clinical, radiographic, and histopathological characteristics of NPDC, contributing to its understanding and appropriate therapeutic management. Ethical and legal aspects were respected, and the patient signed the Free and Informed Consent Form (FICF) provided by the Araçatuba School of Dentistry – FOA/UNESP, authorizing the diagnosis, treatment, and use of images for scientific purposes and publication in specialized journals.

CASE REPORT

A 35-year-old male patient with leukoderma attended the Araçatuba School of Dentistry (FOA/UNESP) reporting that approximately 30 days earlier, he had begun to experience pain in the anterior region of the maxilla, associated with a slight increase in volume in the anterior region of the palate near the incisive papilla. During the anamnesis, the patient denied systemic comorbidities, allergies, continuous medication use, and addictions. A detailed clinical examination revealed a slight increase in volume in the palatal region near elements 11 and 21, with a color similar to the mucosa and softened on palpation. The teeth adjacent to the lesion responded positively to pulp vitality tests, showing no displacement or pathological mobility. Due to these clinical findings, a cone beam computed tomography scan of the maxilla was performed (Figure 1A, Figure 1B, and Figure 1C), which revealed a hypodense image over the maxilla, with well-defined boundaries and

hyperdense margins, located in the incisive canal path in close contact with the roots of teeth 11 and 21. In the axial (Figure 1A), coronal (Figure 1B), and sagittal (Figure 1C) tomographic sections, it is possible to observe the expansion in the incisive canal region and fenestration of the palatal bone plate.

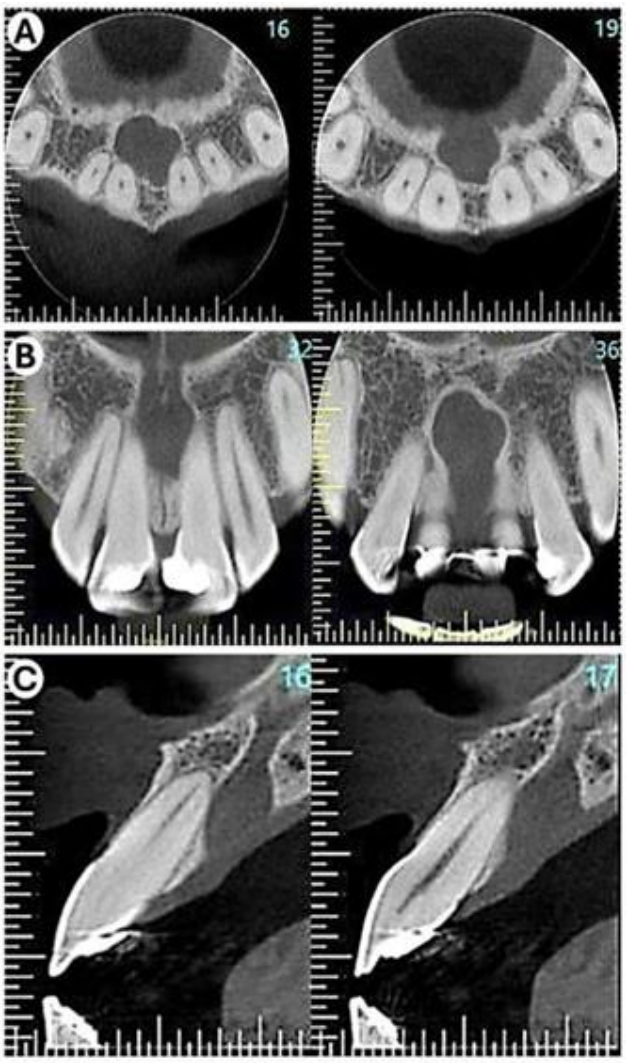

Figure 1: Cone Beam computed tomography of the maxilla for preoperative evaluation. A: Axial section; B: Coronal section; C: Sagittal section (Source: Authors).

By correlating clinical and tomographic findings, surgical intervention for enucleation of the lesion was decided upon. The procedure began with antisepsis of the surgical field and terminal infiltrative anesthesia was performed for the bilateral anterior superior alveolar nerves and nasopalatine nerve, using a solution of 2% mepivacaine hydrochloride with adrenaline 1:100,000, promoting desensitization of the anterior maxilla region. Next, an intrasulcular incision was made through the palate, and the flap was retracted with the aid of elevators (Figure 2A and Figure 2B). The lesion was then completely enucleated with the aid of curettes and specific retractors (Figure 2C), and the cystic cavity was explored, curetted, and irrigated so that no remnants of the lesion could be found (Figure 2D). The enucleated lesion from the cystic cavity was fixed in 10% buffered formaldehyde and sent for histopathological analysis (Figure 2E). Clot formation was stimulated, and the flap was repositioned with interrupted simple sutures using 4-0 nylon thread (Figure 2F). After the surgical procedure, the patient received instructions on postoperative care and was prescribed antibiotic therapy (amoxicillin 500mg) every 8 hours for 7 days, anti-inflammatory (nimesulide 100mg) every 12 hours for 3 days, and analgesic (dipyrone 500mg) every 6 hours in case of pain. Seven days after the surgical procedure, the sutures were well positioned and presented a good scar appearance, with no signs of infection or dehiscence.

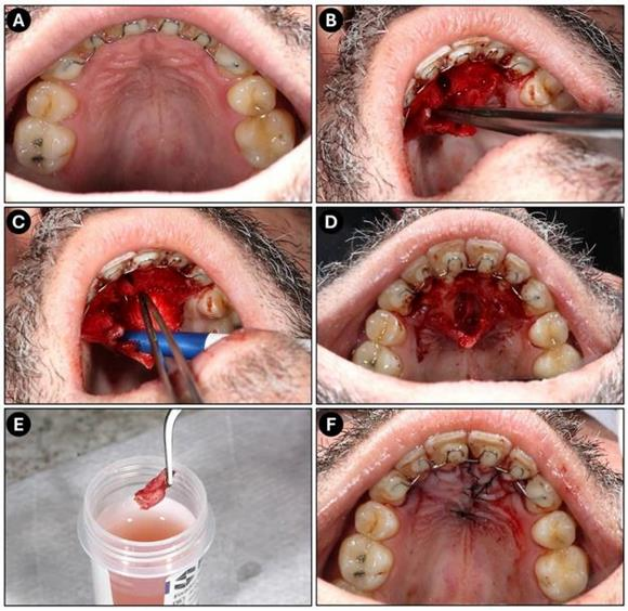

Figure 2: Surgical procedure for cystic enucleation. A: Initial appearance; B: Retraction of the flap; C: Cystic enucleation; D: Cystic cavity; E: Specimen sent for histopathological examination; F: Repositioning of the flap (Source: Authors).

The material sent for histopathological analysis showed fragments of fibrous connective tissue focally covered by non-keratinized Malpighian epithelium, exhibiting fibrosis, interstitial edema, and diffuse lymphoplasmacytic inflammatory infiltrate (Figure 3A and Figure 3B). These findings allowed for a definitive diagnosis of NPDC, confirming the clinical and tomographic diagnostic hypothesis.

Two months after surgery, clinical follow-up was performed and a new cone beam computed tomography scan of the maxilla was requested for follow-up (Figure 4A, Figure 4B, and Figure 4C), where bone neoformation was visualized in coronal (Figure 4A) and axial (Figure 4B) sections, identified by slight hyperdensity in the cystic cavity. Clinically, the patient presented complete soft tissue repair, normochromic mucosa, firm to palpation, and absence of edema in the anterior third of the maxilla

(Figure 4C), reporting only slight paresthesia in the anterior third of the hard palate. The patient remained under follow-up for another two months with no complaints or noteworthy clinical signs, indicating that the surgical procedure was effective in the treatment and complete resolution of the case in question.

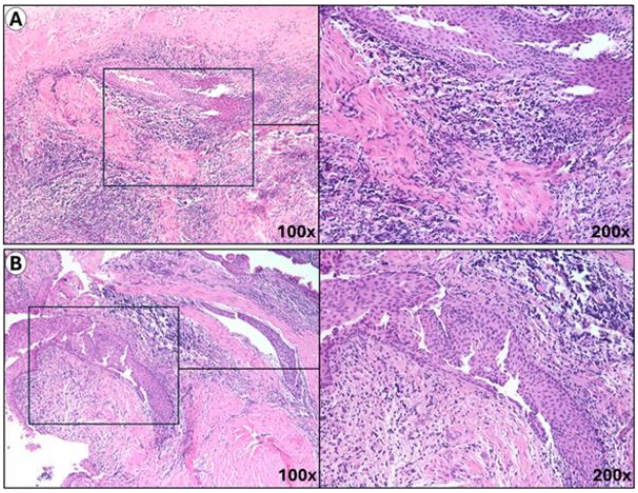

Figure 3: Histological appearance of NPDC. A and B: Photomicrographs of different regions at 100x and 200x magnification (Source: Authors).

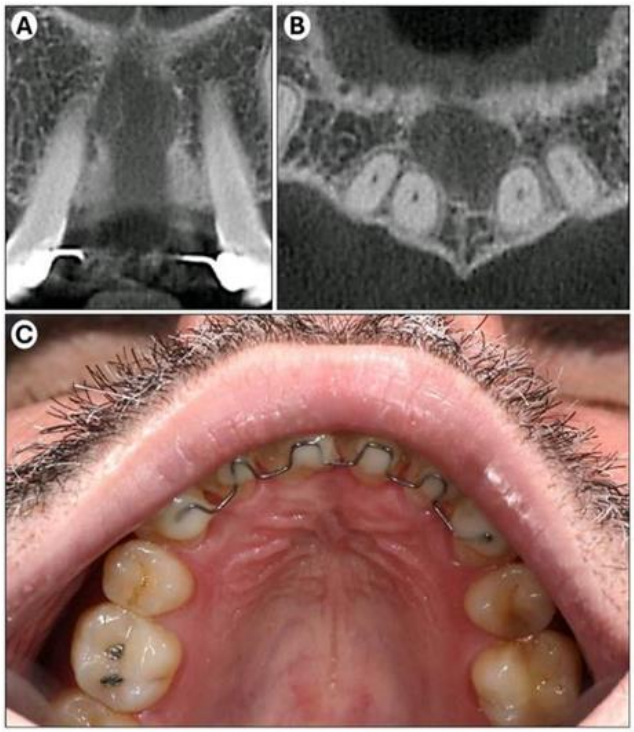

Figure 4: Postoperative evaluation performed after two months. A: Coronal section; B: Axial section; C: Clinical appearance of the region of interest (Source: Authors).

DISCUSSION

NPDC is the most prevalent non-odontogenic benign lesion of the oral cavity, affecting approximately 1% of the global population[10,11]. Although NPDC is most commonly asymptomatic, in the case described, painful symptoms are present, highlighting the possibility of clinical manifestations, such as fistula and suppuration in the incisive canal region, especially when the lesion is associated with inflammatory processes, trauma, or reaches large dimensions[5,9]. Therefore, early treatment of the lesion is necessary to avoid future complications and improve prognosis, preventing recurrence and ensuring a less invasive surgical procedure[9].

Among imaging tests, computed tomography is the most highly regarded and preferred method for the case in question, which obtained an image of hypodensity, with cortical loss and bone expansion, consistent with the typical presentation of NPDC, which often manifests as a well-defined, unilocular lesion between the upper central incisors[6,12]. The presence of bone expansion and fistula, although uncommon, can be identified by computed tomography, associated with a thorough clinical examination, for an accurate and reliable diagnosis of NPDC. To make a differential diagnosis of NPDC, a pulp vitality test is necessary, since it is a non-odontogenic lesion and therefore does not compromise the adjacent dental tissues[10]. In the present case, the maintenance of pulp vitality in the anterior teeth was confirmed, which helped to rule out endodontic pathologies or odontogenic cysts, contributing to the diagnostic confirmation of the lesion[13].

The treatment performed consisted of complete surgical enucleation of the lesion, in accordance with the procedures established in the literature, which is the recommended method for small lesions, as evidenced by Torres et al.[6] and Elliott et al.[14]. Surgical enucleation is widely indicated for non-odontogenic lesions, such as nasopalatine duct cysts, due to its effectiveness in completely removing the lesion and preventing recurrence. The choice of a palatal flap with intrasulcular incision was appropriate to provide good surgical access, minimizing postoperative morbidity and ensuring favorable results in terms of healing and recovery[14]. Thus, the access allowed curettage and abundant irrigation of the cavity, with the aim of removing any remnants of the lesion and exponentially reducing the chance of recurrence, in addition to promoting bone neoformation at the site[15].

The decision not to perform marsupialization was based on the absence of characteristics that would justify such a procedure, such as large lesions or infectious complications[16] Enucleation is not recommended for extensive lesions, whose surgical removal may compromise adjacent anatomical structures, as well as compromise vessels and nerves related to the region[17]. In such cases, decompression or marsupialization of the lesion is usually chosen, followed by surgical enucleation, so that the lesion

is reduced before a more invasive approach that could cause harm to the patient[18].

From a histopathological point of view, confirmation of the diagnosis of NPDC after biopsy proved essential in the clinical case in question, with the analysis result consistent with that described in the literature, with fibrous connective tissue surrounded by non-keratinized epithelial tissue and diffuse inflammatory infiltrate, thus forming a cystic capsule[6,9,19]. The success of the treatment and the absence of recurrence reinforce that, when correctly diagnosed and managed, NPDC has an excellent prognosis. However, it should be noted that ignorance of its characteristics and the absence of histopathological analysis can lead to diagnostic errors, resulting in unnecessary endodontic treatments or even neglect of the lesion, favoring its growth and associated complications, such as infection or exacerbated bone loss[20-23].

Therefore, this case reinforces that the correct diagnosis and management of this pathology was only possible thanks to a multidisciplinary approach involving clinical, radiographic, and histopathological analyses, thus demonstrating the importance of the correct diagnosis and conduct adopted by the dental surgeon in the treatment of oral lesions, with surgical enucleation proving to be an effective approach in the treatment of NPDC, as it is a safe therapeutic option with low recurrence rates, in addition to enabling histopathological examination and subsequent diagnostic confirmation of the lesion.

CONCLUSION

The correlation between clinical, tomographic, and histopathological findings was fundamental for the diagnosis of NPDC. Treatment with surgical enucleation proved effective, with adequate healing and no recurrence over time.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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