Nasopalatine Duct Cyst Treated by Transnasal Endoscopic Marsupialization: A Case Report

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Introduction: Nasopalatine duct cyst (NDC) is the most prevalent non-odontogenic cyst emerging from the epithelial remnants in the maxillary incisive canal. A sublabial or transpalatal approach is performed to enucleate NDC completely. More recently, transnasal endoscopic marsupialization has been used gradually.

Case Presentation: A 24-year-old male patient with a large nasopalatine duct cyst with a diameter of 51 mm was managed by transnasal endoscopic marsupialization under general anesthesia. The presentation involves painless swelling around the left side of the anterior maxilla and bulging of the hard palate. No postoperative complications were observed after a 3-month follow-up. Transnasal endoscopic marsupialization is a minimally invasive surgery for large NDC.

Clinical discussion: Approximately 1% of the population has a nasopalatine duct cyst. Surgical treatment was carried out under general anesthesia; the cyst was dissected and removed using a typically transnasal endoscopic marsupialization technique.

Conclusion: The cause of the NDC is unclear. Simple surgical resection and clinical and radiological control are recommended to ensure the case is resolved correctly.

Keywords: endoscopic marsupialization, maxilla, nasopalatine duct cyst, non-odontogenic cysts

Introduction

The nasopalatine duct cyst (NDC) was first discovered by Meyer in 1914. Nasopalatine duct cyst, which are also known as incisive canal cyst, is formed from remnants of the nasopalatine duct that are present in the developing fetus. This duct connects the nasal cavity and anterior maxilla. Most of these cysts develop near the incisive foramen in the midline of the anterior maxilla. Although NDCs account for only a small number of lesions in the oral and maxillofacial complex, they are the most common non-odontogenic developmental cysts in this region. Nasopalatine duct cysts (NDCs) can develop at any age but usually appear during the fourth and sixth decades of life. Men are more likely to experience NDCs than women, with a ratio of 2.5:1 according to most studies. The potential causes of NDCs include duct trauma or infection, as well as mucous retention in minor salivary glands located nearby. The exact pathophysiology of this lesion is still unknown, but it is believed that the remnants of the nasopalatine duct degenerate spontaneously into cysts. While some researchers have proposed that NDCs originate from the spontaneous growth of epithelial tissue, the causes of these cysts are still unclear. A central giant cell granuloma, a root cyst associated with the upper central incisors, a supernumerary tooth follicular cyst (usually mesiodens), a primordial cyst, a naso-alveolar cyst, osteitis with palatal fistulization, and bucco-nasal and/or bucco-sinusal communication are considered to be the differential diagnosis of NPCs. Treatment of a nasopalatine duct cyst involves complete removal of the lesion by a palatal or labial approach or a combination of both palatal and labial approaches. We present a case report of a patient with a huge nasopalatine duct cyst measuring 51mm in diameter treated by transnasal endoscopic marsupialization.
Case Presentation
A 24-year-old male patient was admitted to the Otorhinolaryngology Department at Welcare Specialty Hospital. He had a painless swelling in the anterior region of the hard palate that had gradually increased in size over the past five years. The patient reported no history of trauma and infection. During the examination, it was observed that the swelling was well-defined, firm, and non-tender. It was located on the left side of the anterior maxillary wall and had extended to the floor of the left nasal cavity, pushing the nasal septum to the right side. Intra-orally, the mass bulged on the anterior hard palate and there were no pulsation or signs of infection were visible (Figure 1). During a nasal endoscopy, it was observed that there was swelling in the floor of the left nasal cavity, and the septum was deviated towards the right nasal cavity (Figure 2). A computed tomography (CT) scan showed an oval-shaped radiolucent lesion in the midline of the maxilla and bony remodeling, 51mm in size (Figure 3). A vitality test revealed positive for all anterior teeth and FNAC was done to exclude malignancy. Based on clinical and radiological findings, the patient was diagnosed with a nasopalatine duct cyst. All necessary preoperative tests were conducted and the results were found to be within the normal range. The patient underwent a transnasal endoscopic marsupialization procedure under general anesthesia to treat the cystic swelling in the left nasal cavity. Initially, a greenish fluid was drained, followed by an incision made on the roof of NDC (floor of the left Nasal cavity). The incision was then enlarged and the roof of NDC was removed and sent for histopathology (Figure 4). Following a postsurgical nasal endoscopic evaluation, no signs of recurrence were observed.

Histopathological Examination
Microscopic examinations revealed the presence of fragments of cystic tissue. These fragments are partly lined by stratified squamous epithelium and partly by pseudostratified columnar epithelium which contain variable goblet cells and cilia. The cyst wall is composed of fibrous tissue that has mucinous glands, cartilaginous rests, arteries and veins, and mixed inflammatory cells (Figure 5).
Discussion

Nasopalatine duct cysts (NDCs) are typically unilateral or central, presenting as a well-defined radiolucent round or oval lesion in the midline of the palate. Some lesions may have a heart-shaped appearance. The cause of this lesion is uncertain, but some factors like prior trauma, poorly fitting dentures, local infection, genetic and racial factors have been suggested as possible causes. Another theory is that these lesions arise from the spontaneous growth of embryonic tissue remnants. Most of these cysts are discovered accidentally and do not cause any symptoms.

Clinical signs that may appear are caused by inflammation. Symptoms such as pain, itching, ulceration, local infection, and/or fistulization are observed in such cases. NDCs are almost three times more prevalent in men than in women.
Figure 4 Intraoperative nasal endoscopy. An incision is made in the floor of the left nasal cavity as indicated by the yellow arrow (roof of the NPC), and yellowish, cloudy discharge is drained.

Figure 5 Histopathological examination revealed a cystic lesion lined partially by stratified squamous epithelium (green arrow) and partially by pseudostratified columnar epithelium (black arrow), the cyst wall is composed of fibrous tissue, mucinous glands (grey arrow), cartilaginous tissue (blue arrow), and mixed inflammatory cells (H&E, 4x).
women, and Caucasians are more likely to develop NDCs. Histologically, stratified squamous epithelium alone or in conjunction with respiratory-type epithelium lines the NDC. In lesions that are close to the nasal cavity, a respiratory-type epithelium can be seen.

The nasopalatine duct is a duct that has a Y-shape and opens up into the incisive foramen of the palate. It then divides into two branches on the nasal side, one for the left and one for the right. This means that NDCs can occur bilaterally or unilaterally and are usually found in the midline of the maxilla.

Odontogenic cysts such as the lateral radicular cyst, lateral periodontal cyst and odontogenic keratocyst; Odontogenic tumors including ameloblastoma and odontogenic myxoma; non-odontogenic tumors like the central giant tumor; and central hemangioma should be considered for the differential diagnosis of Nasopalatine duct cyst.

Traditional treatment of nasopalatine duct cysts (NDCs) typically involves complete removal of the lesion through a transoral palatal or vestibular approach, due to the potential risk of malignant tumor development. However, total resection can be challenging, particularly in cases where the NDC is large. Unfortunately, postoperative complications such as tooth root injury, paresthesia of the anterior palate, and oronasal fistula formation are possible. Recently, there have been a few reported cases of NDCs being treated with transnasal endoscopic marsupialization. This method of treatment is highly beneficial in preventing a decrease in quality of life caused by the formation of an oronasal fistula.

It may be difficult to avoid damage to the nasopalatine nerve when dealing with nasopalatine duct cysts (NDCs). It is important to assess the risk of nerve damage before determining the extent of resection, as NDCs can vary in size and location. In this case, the NPC has a diameter of 51 mm. The largest NPC reported in the literature was 58 mm and treated by transnasal endoscopic marsupialization.

In another case report, total enucleation was performed on a 60-mm NDC using a sublabial approach, but the bone graft used to fill the dead space caused a subsequent infection. Such a large NDC may have postoperative complications after being enucleated.

Conclusion
Here, we present a case of a very large nasopalatine duct cyst (NDC) with a diameter of 51 mm that was successfully managed with unilateral transnasal endoscopic marsupialization. Endoscopic marsupialization may be a successful treatment option due to its ability to decrease the chance of an oronasal fistula forming.

Recommendation
i. Regular oral cavity examinations and appropriate imaging techniques such as Panoramic X-ray and Cone Beam Computed tomography are essential for early detection of NPDCs.

ii. The patient should be discussed with the various treatment options available such as enucleation, endoscopic marsupialization, and provide recommendations based on the characteristics of the cyst. Consideration should also be given to the patient’s age, overall health, and potential risks associated with each treatment modality.

iii. We encourage further research into the etiology, pathogenesis, and management of nasopalatine duct cysts to improve diagnostic accuracy and treatment outcomes.

Ethics Statement
Based on the regulations of the review board of the Welcare Specialty Hospital, institutional review board approval is not required for case reports.

Informed Consent Statement
Written informed consent was obtained from the patient for the publication of any potentially identifiable images or data included in this article.

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