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Case Report

Diagnosis and management of incisive canal cyst- a case report with literature review

Supreeda.S[1], Priya Ramani[2], Mohamed Afradh[3], Sushmitha[4], Sahithi Varshini. B[5], Sangeetha Narasimhan[6]

[1,5]Post Graduate, Professor & Head of the Department, Department of Oral Medicine and Radiology, Thai Moogambigai Dental College and Hospital, Golden George Nagar, Mogappair, Chennai, India;
[3]Professor, [4]Post Graduate, Department of Oral and Maxillofacial Surgery, Thai Moogambigai Dental College and Hospital, Golden George Nagar, Mogappair, Chennai, India;
[6]Department of Cranial Health Sciences, College of Dental Medicine, University of Sharjah, United Arab Emirates

ABSTRACT:
The incisive canal cyst, also termed the nasopalatine duct cyst (NPDC) or median palatine cyst, is recognized as the most prevalent non-odontogenic cyst in the maxilla. It develops from remnants of the embryonic nasopalatine duct and commonly manifests in the midline anterior maxilla, near the incisive foramen. While often asymptomatic and incidentally detected via radiographic imaging, it can occasionally present with localized swelling, discomfort, or discharge. Radiographically, it appears as a clearly defined radiolucency and may resemble odontogenic lesions, complicating diagnosis. Cone beam computed tomography (CBCT) plays a key role in assessing lesion dimensions and proximity to nearby anatomical structures. Definitive diagnosis is established through histopathological evaluation, revealing characteristic epithelial features. Surgical enucleation remains the standard treatment, generally yielding excellent outcomes and low recurrence rates. This article presents a clinical case and highlights the critical role of clinical, radiographic, and histological correlation in ensuring proper diagnosis and management of such lesions.
Keywords: Non-odontogenic cyst, Nasopalatine duct cyst, Incisive canal cyst, CBCT, Maxillary radiolucency.

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Corresponding author: Supreeda.S, Department of Oral Medicine and Radiology, Thai Moogambigai Dental College and Hospital, Golden George Nagar, Mogappair, Chennai, India

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INTRODUCTION

Jaw cysts are commonly classified into three broad groups: odontogenic, non-odontogenic, and pseudocysts.[1] Odontogenic cysts originate from tissues associated with tooth development, whereas non-odontogenic cysts develop from remnants of embryonic epithelial tissues.[2] Pseudocysts, in contrast, lack an epithelial lining and hence do not qualify as true cysts.[1]

The nasopalatine duct cyst (NPDC), also referred to as the incisive canal cyst, was first described by Meyer in 1914.[3] Initially known by other names such as the anterior middle cyst or incisor duct cyst, the lesion has long been studied for its unique pathogenesis.[1] It is now believed to arise from oronasal epithelial remnants located within the incisive canal.[4]

As per the World Health Organization's classification (Figure1), NPDC is grouped under developmental, epithelial, non-odontogenic cysts of the maxilla, along with nasolabial cysts (Figure.2).[3] The reported prevalence of NPDC ranges from 1% to 11.6% of all jaw cysts, with a higher incidence in males, predominantly affecting individuals in their fourth to sixth decades of life.[5] Treatment typically involves surgical excision soon after diagnosis to prevent complications and recurrence.[1]

CASE REPORT

A 23-year-old female reported a one-year history of occasional swelling and pus discharge in the upper front tooth region (Figure.3). The swelling would subside spontaneously following discharge, without any medications. Clinical examination revealed tooth

11 was labially displaced with Grade I mobility. Dental caries was evident in teeth 17, 18, 27, 28, 36, 37, 46, and 47. Additionally, attrition was noted in teeth 21, 31, 32, 41, and 42. Pulp vitality testing using endo-frost showed a delayed response in teeth 11 and 21.

Intraoral periapical (IOPA) (Figure.4) and occlusal radiographs (Figure.5) revealed a well-defined, rounded radiolucent lesion approximately 1.5 × 1.5 cm in size located between the roots of teeth 11 and 21. The lamina dura remained intact, suggestive of a benign non-odontogenic origin. Further evaluation with CBCT demonstrated a unilocular, well-circumscribed radiolucency involving the nasopalatine canal, measuring approximately 10.5 × 8.5 × 6.0 mm (Figure.6). The lesion extended from 3 mm below the nasal floor to 4 mm above the alveolar crest, laterally spanning from the distal root of 11 to that of 21. It was corticated and showed soft tissue thickening on the palatal side, with its center within the nasopalatine nerve canal, in close contact with the apical third of the central incisors—confirming the diagnosis of a nasopalatine duct cyst.

Surgical enucleation was carried out under local anesthesia (Figure.7). A crevicular incision extending from teeth 13 to 23 was placed on the palatal side, and a full-thickness mucoperiosteal flap was elevated. The cyst was meticulously separated from the surrounding bone, and the associated nasopalatine vessels were carefully detached prior to removal. Hemostasis was achieved and the site was sutured using 3-0 silk (Figure.8). Postoperative reviews were conducted on Days 1, 3, 5, and 7, followed by monthly follow-ups over a six-month period, all of which revealed satisfactory healing (Figure.9).

Histopathological analysis of the excised specimen (Figure.10) revealed a cystic lining composed of pseudostratified ciliated columnar epithelium. The fibrous capsule included mucous salivary glands, adipose tissue, nerve bundles, and numerous extravasated erythrocytes. A dense infiltration of chronic inflammatory cells confirmed the lesion's inflammatory component (Figure.11).

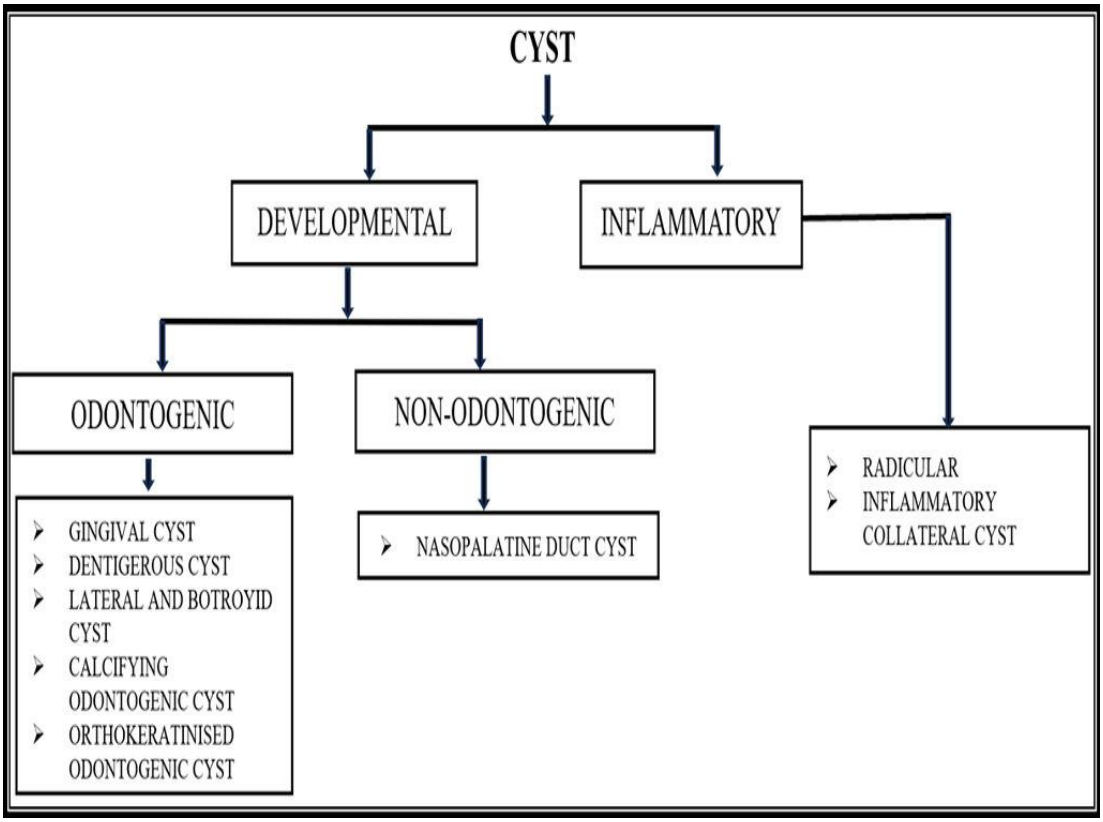

Figure 1: WHO Classification- 2017

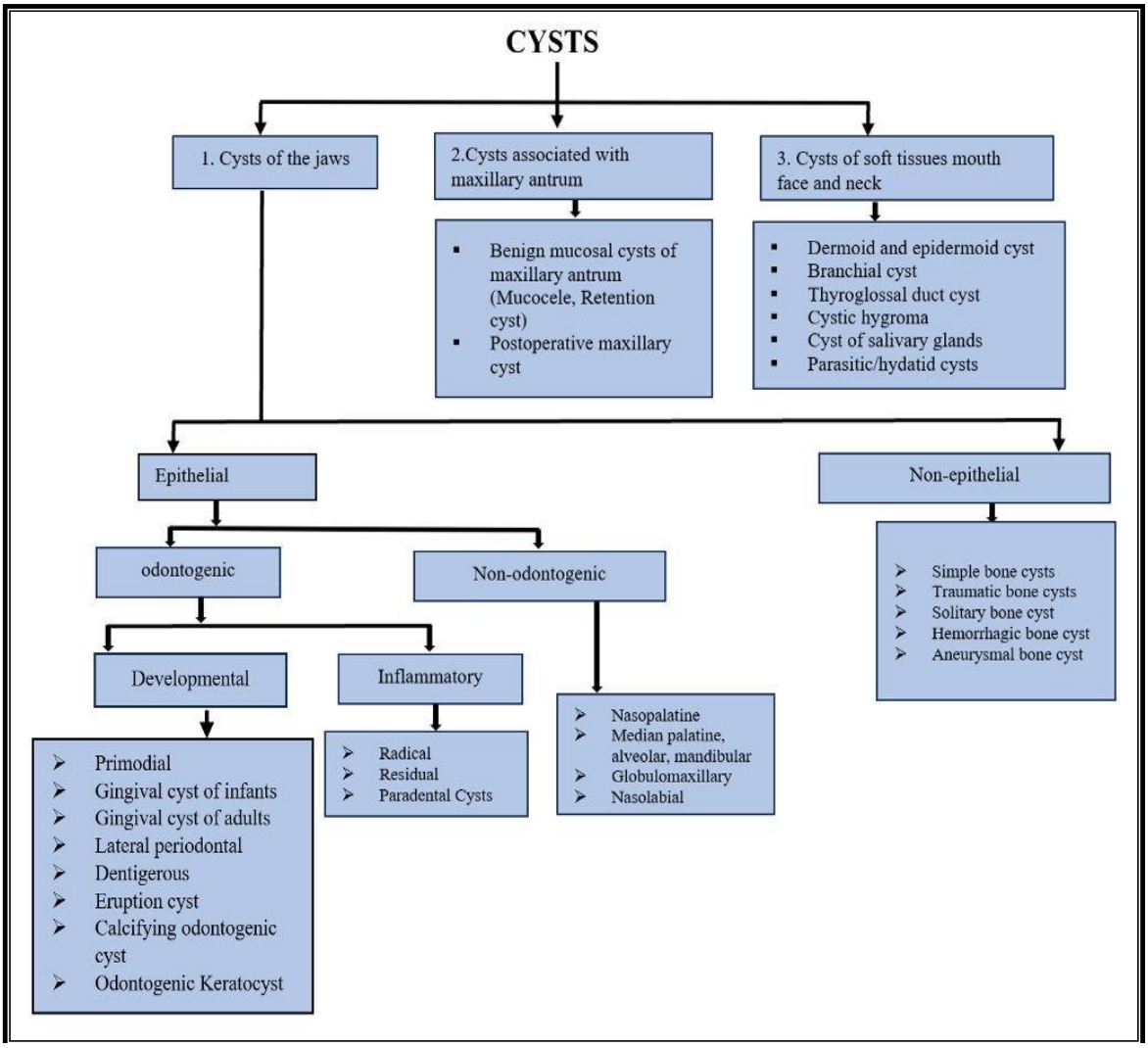

Figure 2: Shear classification of cysts

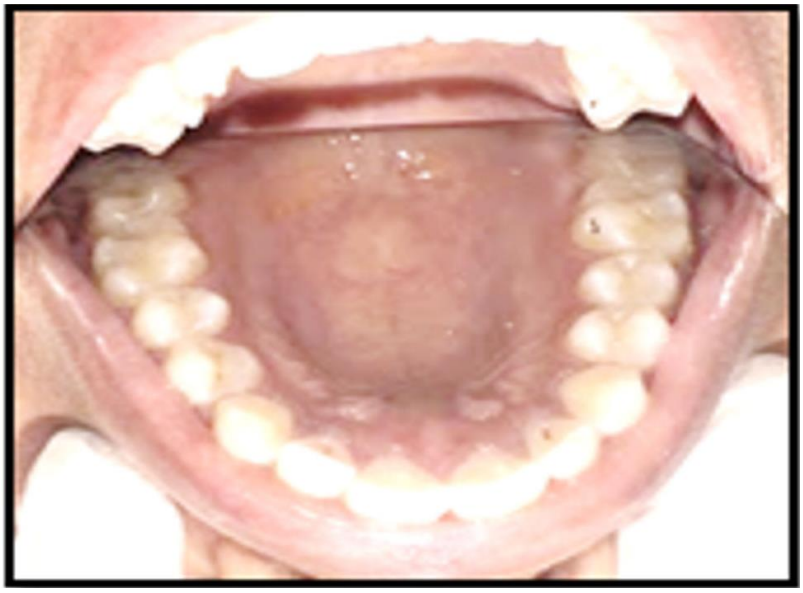

Figure 3: Mild swelling in the palate between 11 and 21

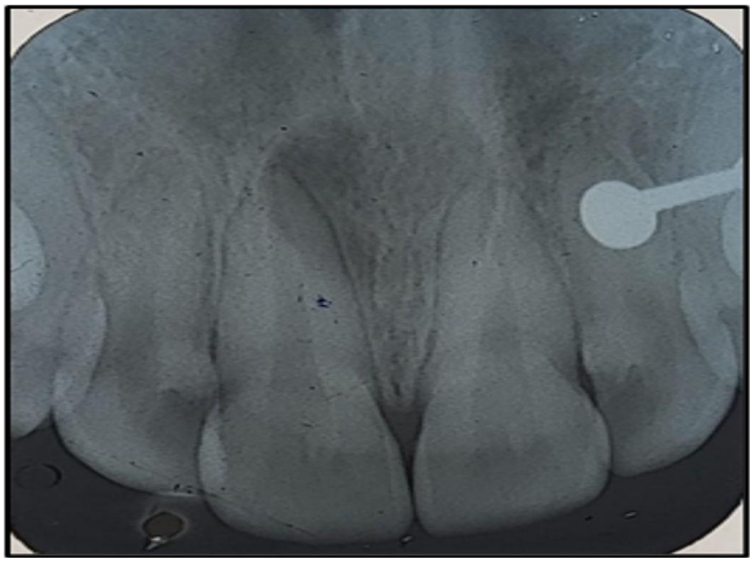

Figure 4: Intraoral periapical radiograph of 11,21

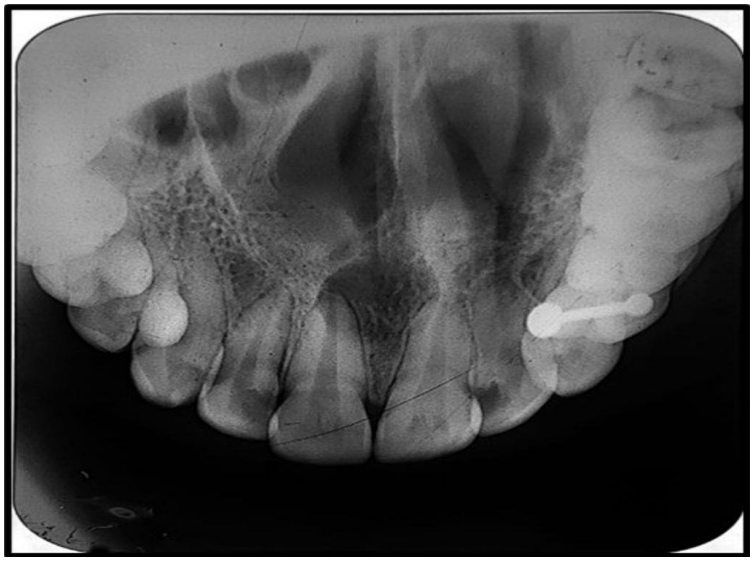

Figure 5: Occlusal radiograph revealing well-defined round radiolucencybetween the roots of 11 and 21

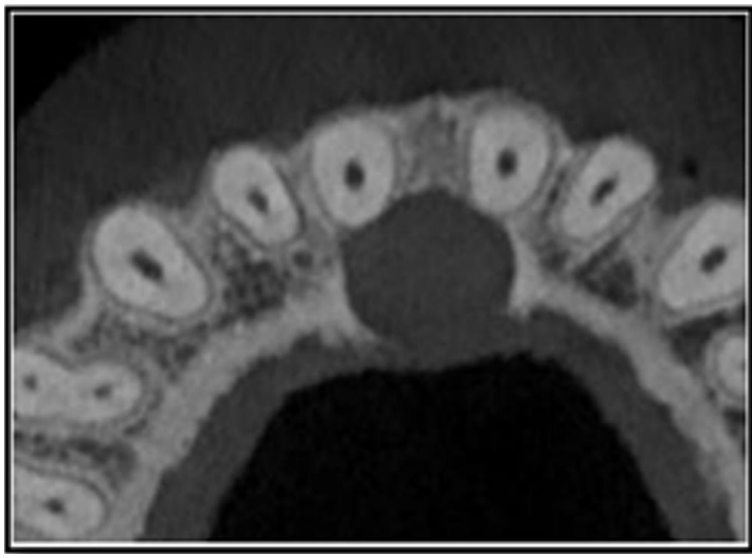

Figure 6a:

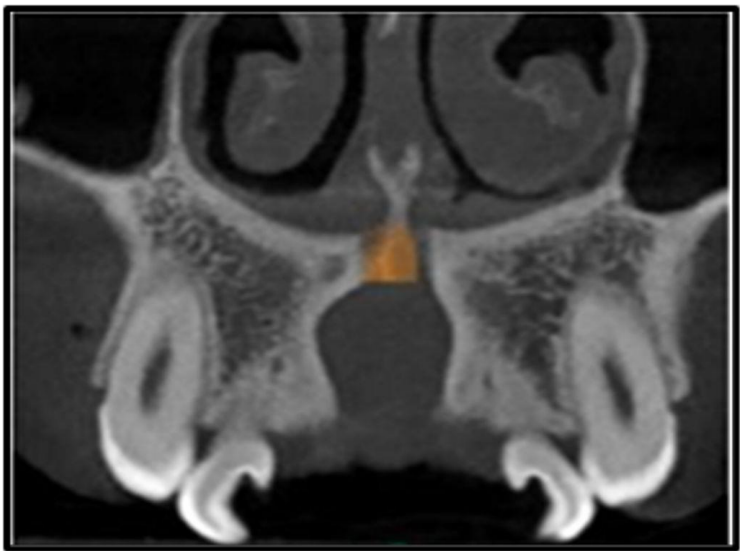

Figure 6b:

Figure 6: Cone beam computed tomography images (6a) oblique coronal slice revealing Nasopalatine nerve canal noted, (6b) axial slice demonstrating extend of lesion involving nasopalatine nerve canal

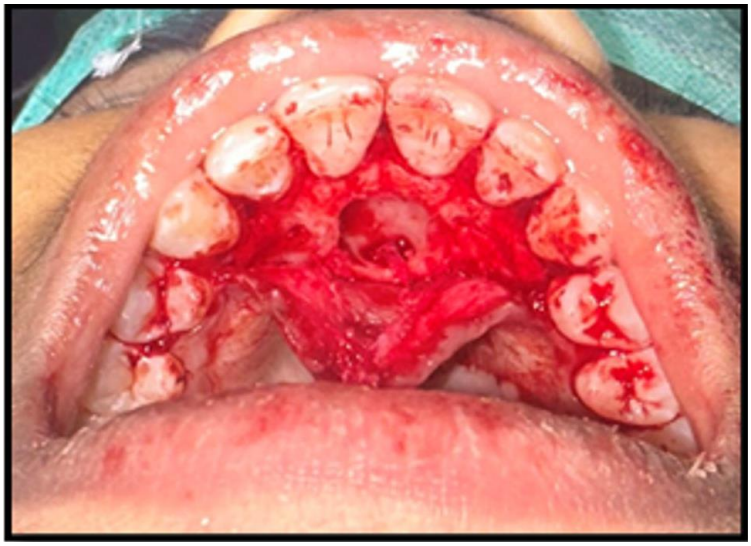

Figure 7: Surgical enucleation of cyst by raising mucoperiosteal flap

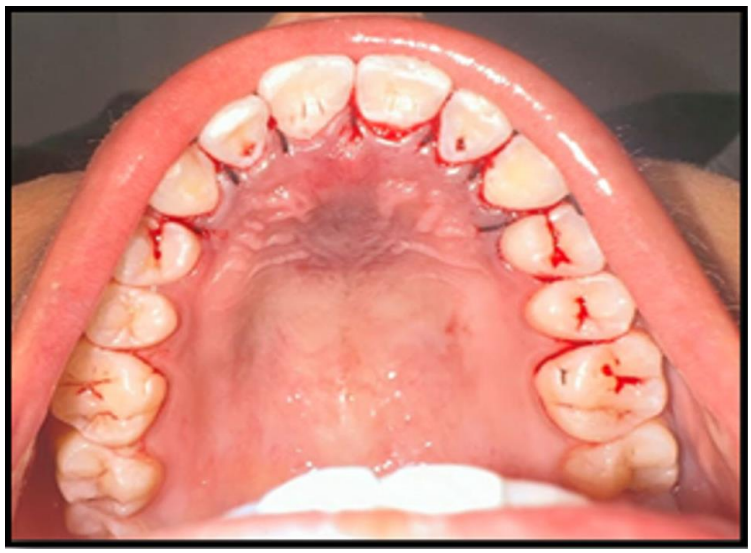

Figure 8: surgical site was closed using 3-0 silk sutures

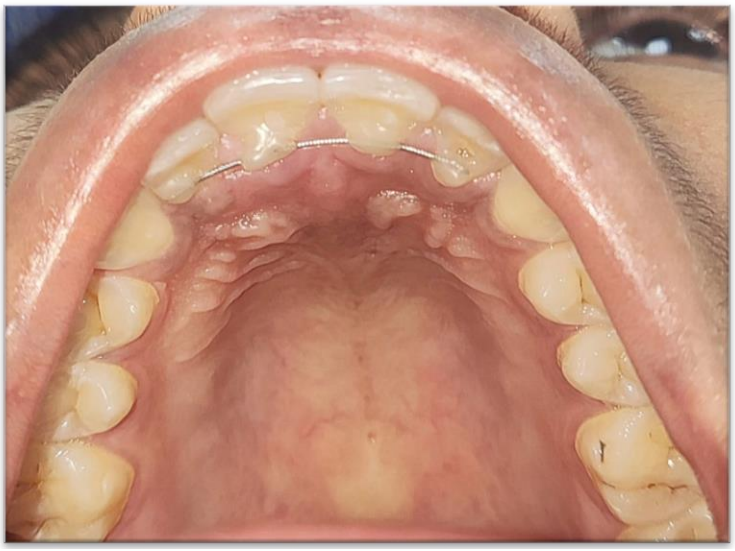

Figure 9: Follow up after 3 months

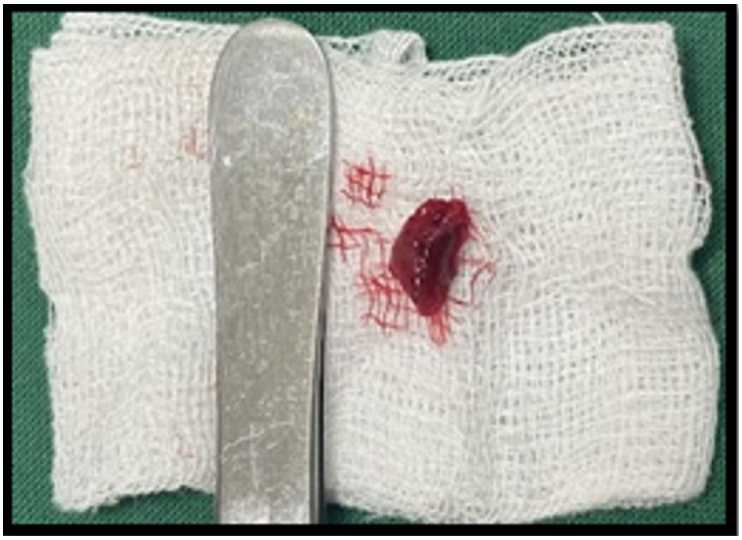

Figure 10: Excised tissue

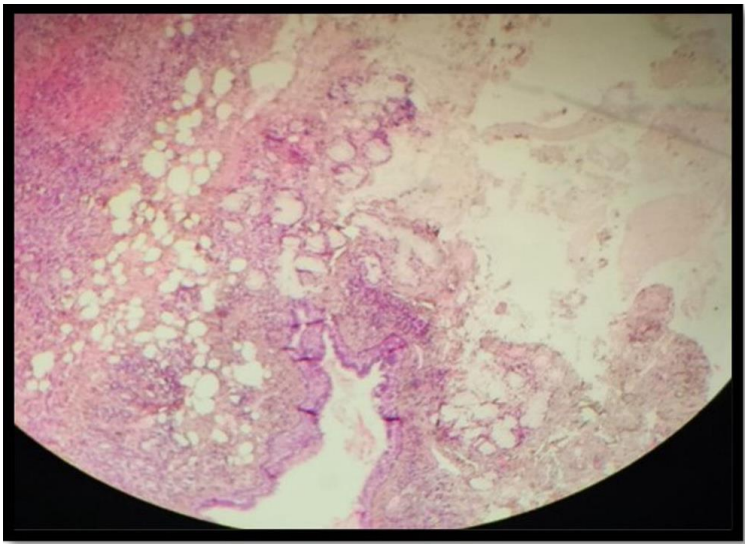

Figure 11: H&E-stained sections revealed a cystic cavity lined by pseudostratified ciliated columnar epithelium

DISCUSSION

Nasopalatine duct cysts (NPDCs), or incisive canal cysts, are typically diagnosed based on a combination of clinical presentation, radiographic imaging, and histological features. They represent roughly 5% of all jaw cysts.[6] Various etiological factors such as trauma, bacterial infection, glandular duct obstruction, or spontaneous epithelial proliferation have been proposed in the literature.[5]

Although many NPDCs are asymptomatic, this patient experienced intermittent swelling and discharge, which had persisted for approximately one year. To prevent unnecessary root canal treatment, pulp vitality testing and percussion tests are essential. It's important to distinguish NPDCs from a prominent incisive canal, which may appear similar on radiographs. Most authors recommend considering a diagnosis of NPDC when the radiolucent area in the anterior midline maxilla exceeds 6 mm in diameter.[3] In our case the cyst was 10 mm in diameter.

Common imaging techniques for evaluating anterior maxillary lesions include intraoral periapical radiographs (IOPA), occlusal views, orthopantomograms (OPGs), and increasingly, cone beam computed tomography (CBCT). CBCT offers high-resolution, three-dimensional views, enabling precise localization and dimensional analysis of lesions.[5] Typically, NPDCs appear as round or ovoid radiolucencies between the central incisors. Their shape may resemble a heart due to superimposition of the nasal septum or anterior nasal spine. Some lesions may exhibit an inverted pear shape if constrained by adjacent roots.[7]

Surgical removal remains the gold standard for NPDC treatment, performed either via a sublabial or palatal approach. Larger lesions may require marsupialization.[3,6] A common intraoperative concern is the potential injury to the nasopalatine neurovascular bundle, which may result in profuse bleeding—electrocautery may be necessary in such situations. Modern techniques such as piezosurgery are gaining traction due to their precision and soft tissue preservation. Possible postoperative complications include nasal floor perforation, oronasal fistulas, infection, hemorrhage, damage to nearby teeth, and transient or permanent paraesthesia.[8] In fact, anterior palatal paraesthesia is reported in roughly 10% of cases when nerve fibers are removed along with the cyst wall.

Histopathologically, NPDCs exhibit four types of epithelial linings:

- Stratified squamous epithelium
- Pseudostratified columnar epithelium
- Simple columnar epithelium
- Simple cuboidal epithelium

Among these, stratified squamous and pseudostratified columnar types are most frequently encountered. The specific lining often corresponds with the vertical location of the cyst. Cysts located closer to the nasal cavity tend to show respiratory-type epithelium, while those near the oral cavity may be lined by squamous epithelium.

In the present case, the cyst was lined with pseudostratified ciliated columnar epithelium, consistent with respiratory-type tissue.[9] Additionally, mucous glands may be seen in the cyst wall, along with prominent vascular and neural elements, adipose tissue, and inflammatory cells.[2] The fibrous capsule in this case showed salivary gland acini, adipocytes, nerve fibers, and red blood cell extravasation—features that support an inflammatory etiology, possibly due to secondary infection or trauma.[8]

A distinctive histological hallmark of NPDC is the presence of small nerve fibers within the fibrous capsule—this feature helps distinguish it from other cyst types such as odontogenic keratocysts (OKCs) or lateral periodontal cysts (LPCs), where this is typically absent.

CONCLUSION

The incisive canal cyst, or nasopalatine duct cyst (NPDC), affects approximately 1% of the population. Clinically, it may remain asymptomatic or present with symptoms such as swelling, discomfort, or discharge in the anterior palate. Radiographically, NPDCs typically appear as well-demarcated, unilocular radiolucent lesions situated at the midline of the anterior maxilla and may cross it.

A multidisciplinary approach involving clinical evaluation, advanced imaging such as CBCT, and histopathological examination is essential for accurate diagnosis. Prompt surgical management not only alleviates symptoms but also prevents recurrence and complications. Awareness of the cyst's variable presentations and potential pitfalls in diagnosis ensures improved outcomes in clinical practice.

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