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Case Report

Odontogenic cyst in a 45-year-old female: a case of enucleation under general anaesthesia

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ABSTRACT

In a 45-year-old female presented with a recurrent swelling in the right mandibular region, reporting a history of marsupialization for an odontogenic cyst 12 years prior, though no medical records were available. Clinical examination revealed a significant swelling in the right mandibular ramus, accompanied by mild tenderness, discomfort, pain, and intraoral pus discharge. Radiographic imaging, including X-ray and cone beam computed tomography (CBCT) scans, identified a well-defined, expansile, osteolytic lesion in the right mandibular ramus, consistent with a dentigerous cyst. Given the lesion's recurrence and the lack of prior treatment records, surgical enucleation under general anesthesia was performed. Histopathological analysis confirmed the diagnosis of a pus-filled odontogenic cyst. The patient's postoperative recovery was uneventful, and she was scheduled for regular follow-up to monitor for any further recurrence. This case underscores the importance of long-term follow-up in patients with odontogenic cysts and highlights the potential for recurrence even after initial treatment.

Keywords: Odontogenic cyst, Dentigerous cyst, Mandibular ramus lesion, Surgical enucleation, CBCT imaging, Histopathological diagnosis

INTRODUCTION

According to the World Health Organization (WHO) classification (4th edition, 2017), odontogenic cysts of inflammatory origin are categorized as radicular cysts, which include residual cysts or inflammatory collateral cysts. The latter group is further divided into paradental cysts and mandibular buccal bifurcation cysts.[1]

A study by Asgary et al investigated the effectiveness of surgical endodontics versus regenerative periodontal surgery in managing large periradicular lesions. It highlighted the importance of addressing both endodontic and periodontal aspects for successful treatment. The research suggested that a combination of both approaches, or a tailored strategy considering the specific lesion and its origin (endodontic or periodontal), may be necessary for optimal outcomes.[2]

A diverse range of lesions, both intraosseous and extraosseous, can affect the maxillary and mandibular regions of the jaw. Among these, odontogenic tumors are unique in that they are exclusive to the oral cavity and do not occur elsewhere in the body. These tumors arise from the tissues involved in odontogenesis—the process of tooth development—and encompass a broad spectrum of pathologies. They range from hamartomatous growths and non-neoplastic tissue proliferations to benign and malignant neoplasms.[3]

Among the most frequently encountered odontogenic cysts are dentigerous cysts, keratocystic odontogenic tumors (KCOT), and lateral periodontal cysts. The standard

treatment for these cysts usually requires surgical procedures such as enucleation, marsupialization, or resection, depending on factors like the cyst's size, location, and potential for recurrence.

From a histological perspective, the central lumen of the cyst is surrounded by a fibrous connective tissue wall and is lined by non-keratinized stratified squamous epithelium. The lumen often contains inflammatory cell infiltrates, which can range from mild to severe, and may also include fluid or cellular debris.[4]

In endodontics, precise diagnosis is essential to choosing the right and effective treatment. Many non-endodontic conditions occurring around the tooth root can mimic inflammatory lesions of endodontic origin, potentially influencing treatment decisions.[5]

The study by Al-Manei (2018) compared the radiographic quality of single-visit versus multiple-visit root canal treatments performed by dental students. The study found no statistically significant difference in obturation length, density, or taper between the two approaches. While the incidence of procedural errors was slightly lower in single-visit treatments, this difference was also not statistically significant.[6]

In uncommon cases, young children—including those with both baby and adult teeth—can experience intense periodontal tissue loss known as prepubertal periodontitis. This condition is typically linked to severe impairments in neutrophil or monocyte function, or both, and is frequently accompanied by additional infections like otitis media.

A different, widespread form of aggressive periodontal disease occurs in individuals in their 20s to early 30s. This rapidly progressing periodontitis is often tied to phagocyte dysfunction and is commonly called rapidly progressive or aggressive periodontitis.[7]

In extremely rare instances, a condition known as cervical enamel extension or enamel pearl can develop on the surface of dental roots, especially in molars. This may occasionally be a rare cause of inflammatory cysts.[8,9]

The overall success rate and incidence of post-treatment pain are statistically the same whether root canals are done in one appointment or multiple sessions, while single-visit treatments require significantly less in-chair time.[10]

The case described in this report involves a 45-year-old female patient who had a history of an odontogenic cyst, previously treated by marsupialization 12 years earlier. However, due to the absence of records from the original procedure, the cyst recurred, leading to its enucleation under general anaesthesia. This case highlights the management and recurrence of odontogenic cysts, as well as the challenges posed by the lack of documented medical history.

CASE REPORT

A 45-year-old female patient presented to our hospital with a complaint of a recurrent swelling in the mandibular region. She had a previous history of marsupialization of an odontogenic cyst performed 12 years ago, but no medical documentation of the procedure was available. Upon clinical examination, a significant swelling was noted in the right side ramus of mandible, with mild tenderness to palpation. The swelling was associated with slight discomfort and significant pain and intraoral pus discharge.

Radiographic imaging (X-ray and CBCT scan) revealed a well-defined, expansile, osteolytic lesionnoted in right mandibular ramus region. consistent with a diagnosis of a dentigerous cyst. Given the recurrence of the lesion and the absence of prior treatment documentation, enucleation of the cyst was recommended. The patient underwent the enucleation procedure under general anaesthesia. An intraoral vertical incision was planned just over the ascending ramus of mandible and A mucoperiosteal flap was raised anteriorly and posteriorly plane was dissected out upon the cystic swelling cyst was dissected out from the ascending ramus of mandible and delivered intoto, and the cyst was carefully enucleated. Histopathological examination confirmed the diagnosis of a pus-filled odontogenic cyst. Postoperative recovery was uneventful, and the patient was advised regular follow-up to monitor for any recurrence.

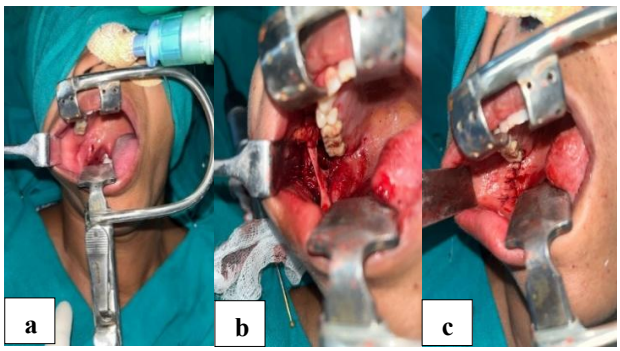

Figure 1 (a-c): Intraoperative and post-operative images.

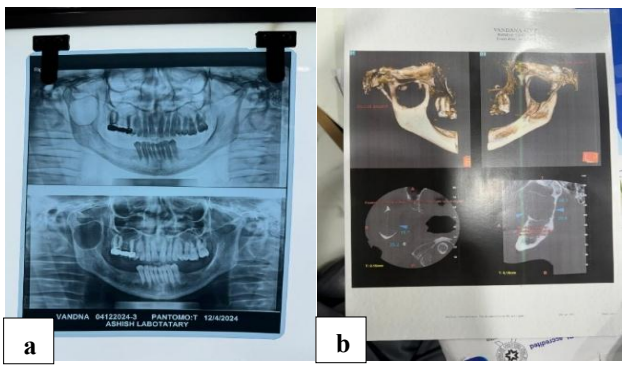

Figure 2 (a and b): Radiological images.

Literature review on odontogenic cysts and associated pathologies

Odontogenic cysts have garnered significant interest in the field of oral and maxillofacial pathology due to their clinical importance. These cysts result from developmental anomalies involving the tissues of the dental apparatus and can exhibit a wide array of clinical and histopathological features. A solid understanding of these conditions is essential for accurate diagnosis, effective treatment, and proper management planning.

WHO classification of head and neck tumours (2017)

A key reference in the study of odontogenic cysts is the WHO classification of head and neck tumours.[1] This classification provides a detailed and comprehensive system for categorizing head and neck lesions, including odontogenic cysts. It helps clinicians and pathologists distinguish between different types of cysts and tumors based on their histological characteristics, thus enhancing diagnostic accuracy and guiding therapeutic decisions.

When diagnosing periradicular lesions (problems around the tip of a tooth's root), most cases are caused by issues with the tooth itself (endodontic origin). However, doctors should also think about other possible causes, like changes in tooth structure, cysts or tumors that come from tooth development, and problems that involve both the tooth and the surrounding gums. Each of these causes requires a different treatment and has its own expected outcome.[2]

Histopathology and diagnosis

Histopathology plays a crucial role in diagnosing odontogenic cysts, as these lesions display unique cellular and structural features. Martin and Speight offered a thorough review of the diagnostic characteristics of various odontogenic cysts, highlighting the differences in histopathological presentation that help with diagnosis.[3] Their work emphasizes the importance of identifying subtle histological variations in order to distinguish odontogenic cysts from other oral lesions that may appear similar during clinical and radiographic assessments.

Several studies have looked at how surgery affects the chances of an OKC coming back and found that recurrence mostly happens because of surgical factors. OKCs may return due to reasons like not fully removing the cyst, growth of new cysts from leftover tissue, or new cysts forming nearby and being mistaken as a recurrence. While resection (removal of tissue) has the lowest recurrence rates, enucleation (cyst removal) is still the most common treatment for OKCs. This is because resection can lead to more complications, and patients often prefer a less aggressive treatment for a benign condition. However, to lower the chances of recurrence, additional treatments like curettage, chemical cauterization with Carnoy's solution, liquid nitrogen cryotherapy, or peripheral ostectomy are recommended after enucleation.[4]

Non-odontogenic lesions and differential diagnosis

A critical aspect of diagnosing odontogenic cysts is differentiating them from other conditions that present similarly, such as non-odontogenic or endodontic lesions. Carvalho et al provided a thorough review of the clinical differential diagnosis between non-odontogenic and endodontic radiolucent lesions in periapical areas.[5] Their work is particularly helpful for clinicians in distinguishing odontogenic cysts from lesions that share overlapping radiographic features, ensuring a correct diagnosis and avoiding unnecessary treatments.

Study conducted by Kholod K. Al-Maneiat the College of Dentistry, Girls University Campus (GUC), KSU aimed to compare the quality of root canal treatments performed by dental students in single versus multiple visits. Root canal treatments of 77 dental students were analyzed, comparing one tooth treated in a single visit with one treated in multiple visits. The quality was assessed based on obturation length, density, taper, and procedural errors. Results showed no significant difference in obturation length, density, or taper between the two treatment methods, and while procedural errors were more common in multiple-visit treatments, the difference was not statistically significant. Preoperative conditions did not significantly affect the treatment method. The study concluded that multiple-visit root canal treatments did not result in higher quality outcomes compared to single-visit treatments.[6]

Textbooks and comprehensive reviews

Comprehensive textbooks on oral pathology, such as Cawson's Essentials of Oral Pathology and Oral Medicine, and Oral and Maxillofacial Pathology by Neville et al, provide foundational knowledge on odontogenic cysts and related conditions.[7,8] These references offer a broader perspective on the pathogenesis, clinical features, and treatment of odontogenic cysts and tumours, making them essential resources for both students and professionals in the field.

Cervical enamel projections

An interesting related topic in the literature is cervical enamel projections (CEP) and their association with periodontal diseases. Askenas et al reported a case of cervical enamel projection with gingival fenestration, which can complicate the management of adjacent odontogenic cysts.[9]

A randomized clinical trial conducted by Wong et al compared the outcomes of single-visit versus multiple-visit non-surgical endodontic treatments.[10] The study found no significant difference in success rates (88.9% for single-visit and 87.4% for multiple-visit treatments) or the prevalence of postoperative pain. However, single-visit treatments had a shorter chairside time (62.0 minutes) compared to multiple-visit treatments (92.9 minutes).

Factors such as maxillary teeth and absence of preoperative apical periodontitis were associated with higher success rates. Overall, both treatment approaches showed similar clinical outcomes, but single-visit treatment was more time-efficient.[10]

DISCUSSION

Odontogenic cysts are among the most common jaw pathologies encountered in oral and maxillofacial practice, typically arising from the remnants of the dental lamina or the reduced enamel epithelium. Dentigerous cysts, in particular, are developmental cysts that envelop the crown of an unerupted or developing tooth, most frequently affecting the mandibular third molars. While these lesions are generally benign, they can demonstrate aggressive behavior, significant bone destruction, and, as in this case, potential recurrence, especially when inadequately treated or incompletely documented.

The recurrence of the cyst in our 45-year-old female patient highlights several critical clinical issues. Firstly, the patient had undergone marsupialization 12 years earlier for what was presumed to be an odontogenic cyst. Marsupialization is often chosen for large cystic lesions to reduce intracystic pressure and preserve vital anatomical structures. However, it may not always ensure complete resolution of the lesion, especially when residual cystic epithelium remains. Without histopathological confirmation or complete medical documentation from the initial procedure, assessing the efficacy and completeness of the original intervention becomes challenging. This gap in records underscores the importance of proper case documentation and long-term follow-up for odontogenic cysts.

Radiographic evaluation using CBCT proved invaluable in this case. CBCT enabled detailed visualization of the lesion's size, its well-defined osteolytic borders, and its proximity to the mandibular canal and adjacent anatomical structures. Such imaging modalities provide three-dimensional insights that significantly improve preoperative planning and surgical outcomes compared to conventional radiographs alone.

Surgical enucleation under general anesthesia was chosen as the definitive treatment due to the lesion's recurrent nature and the need for thorough removal. This approach allowed for complete excision of the cystic lining and surrounding tissues, minimizing the risk of further recurrence. Enucleation is considered a gold-standard treatment for many odontogenic cysts, particularly when recurrence is suspected or when the lesion shows evidence of expansion and secondary infection, as indicated by the presence of intraoral pus discharge in this case.

Histopathological analysis played a central role in confirming the diagnosis of a pus-filled dentigerous cyst. Microscopically, dentigerous cysts are lined by non-keratinized stratified squamous epithelium and surrounded by fibrous connective tissue. Inflammatory infiltration and purulent contents, as noted in this case, are suggestive of secondary infection, which further supports the decision for complete surgical intervention.

The literature reinforces the importance of differentiating odontogenic cysts from other radiolucent jaw lesions, including OKC, ameloblastomas, and non-odontogenic entities. OKCs, in particular, are notorious for their high recurrence rates and aggressive behavior. Although this case did not show histopathological features of an OKC, the clinical overlap necessitates careful pathological evaluation.

Postoperative recovery was uneventful, which reflects meticulous surgical technique and appropriate case selection. The patient was advised regular follow-up, which is essential for detecting any early signs of recurrence. Literature suggests that even with complete enucleation, odontogenic cysts can recur if satellite cysts or residual epithelial remnants persist.

In summary, this case underscores several key clinical lessons: the potential for recurrence in odontogenic cysts, particularly after marsupialization without adequate follow-up; the diagnostic and surgical planning value of CBCT imaging; the critical role of histopathology in guiding diagnosis and ensuring accurate treatment; and the need for comprehensive documentation and long-term surveillance following surgical intervention.

Future management protocols should emphasize standardized treatment planning, histological confirmation, and patient compliance with follow-up schedules, especially in cases with a prior history of incomplete treatment or recurrence.

CONCLUSION

The management of odontogenic cysts involves careful consideration of the size, location, and potential for recurrence. While marsupialization can be effective for large cysts, enucleation remains a reliable option for definitive treatment. This case underscores the importance of accurate documentation of previous treatments, which can aid in determining the best approach for managing recurrent cysts.

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