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INTERDISCIPLINARY MANAGEMENT OF DEEP CARIOUS LESIONS WITH CHRONIC PERIAPICAL ABSCESSES AND ODONTOGENIC CYSTS: A RETROSPECTIVE CLINICAL STUDY

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ABSTRACT

Deep carious lesions extending to the pulp can lead to chronic periapical pathology and, in some cases, the development of odontogenic cysts. These complex lesions demand an interdisciplinary management approach involving endodontic, surgical, and restorative disciplines to ensure complete resolution and functional restoration.

Methodology: A retrospective clinical study was conducted on 12 patients (aged 18–45) diagnosed with deep carious lesions associated with chronic periapical abscesses and radiographically evident odontogenic cysts. Diagnostic evaluation included clinical examination, pulp vitality tests, periapical radiographs, and CBCT imaging. All patients underwent endodontic treatment followed by surgical enucleation of the cystic lesion. Bone grafts were placed when necessary, and definitive restorations were completed after healing.

Results: All patients exhibited resolution of clinical symptoms post-endodontic treatment. Surgical enucleation was successful in all cases, with histopathological confirmation of radicular cysts in 10 patients and dentigerous cysts in 2 patients. Radiographic follow-up over 6 months showed progressive bone healing in 11 cases, with one case showing delayed healing but no recurrence. All treated teeth remained functional and asymptomatic.

Conclusion: An interdisciplinary approach is crucial for the successful management of deep carious lesions complicated by chronic periapical abscesses and odontogenic cysts. Coordinated endodontic, surgical, and restorative interventions result in favorable clinical and radiographic outcomes, preservation of natural dentition, and reduced risk of recurrence.

Keywords: Deep Carious Lesions, chronic periapical abscesses pathology, odontogenic cysts, pulp vitality tests, CBCT imaging.

INTRODUCTION

Dental caries is a multifactorial, infectious disease characterized by demineralization of tooth structure due to acidic byproducts of bacterial metabolism. It remains one of the most prevalent chronic diseases affecting individuals worldwide, with the potential to compromise dental and overall systemic health.[1] When carious lesions extend into the pulp, they initiate a cascade of inflammatory responses that may ultimately lead to pulp necrosis and periapical pathologies such as chronic apical periodontitis, abscess formation, and the development of odontogenic cysts.[2] Odontogenic cysts are pathologic, epithelial-lined cavities commonly associated with chronic inflammatory processes around the apex of non-vital teeth. The most common types encountered in clinical practice include radicular cysts, which arise from epithelial rests of Malassez in response to chronic inflammation, and dentigerous cysts, which are associated with the crowns of unerupted teeth.[3] These cysts can lead to significant bone resorption, cortical plate expansion, and displacement of adjacent anatomical structures if left untreated. Conventional root canal therapy addresses the primary source of infection within the pulp chamber and root canal system.[4] However, in cases complicated by cystic lesions, endodontic treatment alone may not suffice to resolve the pathology, particularly if the cysts have grown large or are not self-limiting. In such scenarios, surgical intervention in the form of enucleation becomes necessary to remove the cystic lining and promote complete healing of the periapical tissues.[5] This surgical phase often necessitates adjunctive procedures such as bone grafting to restore osseous defects and support future function.

Restorative considerations also play a pivotal role in the long-term success of such cases. The structural integrity of the affected tooth must be restored in a way that maintains function, aesthetics, and prevents reinfection.[6] This may involve post-endodontic restorations such as full-coverage crowns or bonded restorations, depending on the extent of coronal damage. A multidisciplinary treatment protocol that integrates these endodontic, surgical, and restorative components offers the best chance of achieving favorable outcomes. Such an approach ensures comprehensive care, addresses all facets of the pathology, and maximizes the likelihood of preserving the natural dentition.[7] This study aims to evaluate the efficacy of such a protocol in treating patients with deep carious lesions complicated by periapical abscesses and odontogenic cysts, assessing clinical and radiographic outcomes following treatment.

MATERIALS AND METHODS

A retrospective clinical study was conducted on 12 patients (aged 18–45) diagnosed with deep carious lesions associated with chronic periapical abscesses and radiographically evident odontogenic cysts. All patients were treated at a multidisciplinary dental clinic over a two-year period.

Diagnosis was established using (a) Clinical examination (b) Pulp vitality tests (c) Periapical radiographs (d) Cone Beam Computed Tomography (CBCT). These methods ensured accurate detection of periapical pathology and cystic involvement. All patients received endodontic treatment under rubber dam isolation using standard root canal therapy protocols. Upon completion of endodontic treatment, surgical enucleation of the cystic lesion was performed under local anesthesia. In cases of large bony defects, bone grafts were placed to facilitate healing. Definitive restorative procedures (e.g., crowns or composite restorations) were completed after a suitable healing period.

RESULTS

The clinical and radiographic outcomes observed in this study are summarized in the following table. The table 1 highlights key treatment results, including the types of cysts identified, symptom resolution, and bone healing rates.

Table 1: Clinical and Radiographic Outcomes

Parameter	Outcome
Total patients	12
Age range	18–45 years
Radicular cysts	10 patients
Dentigerous cysts	2 patients
Complete symptom resolution	12/12 patients
Successful surgical enucleation	12/12 cases
Radiographic bone healing (6 months)	11/12 cases
Delayed healing	1/12 cases
Recurrence	0 cases
Functional and asymptomatic teeth	12/12 teeth

DISCUSSION

This study demonstrates the effectiveness of an interdisciplinary approach in the treatment of complex dental cases involving deep carious lesions and odontogenic cysts. The integration of endodontic, surgical, and restorative disciplines ensures a holistic and patient-centered care model. All 12 patients in this study exhibited favorable clinical outcomes, with resolution of symptoms and radiographic signs of healing, reinforcing the need for collaborative care in such cases.

Endodontic therapy plays a central role in the management of teeth with pulpal and periapical disease. Its objective is to eliminate infection within the root canal system, thereby preventing or arresting the spread of inflammation to the periapical tissues.[8] However, the presence of a cystic lesion, particularly when it exceeds a certain size or persists despite root canal therapy, indicates that surgical removal is necessary. This is due to the fact that cysts, especially true cysts with a distinct epithelial lining, are often self-sustaining and not entirely dependent on the presence of infection within the canal.[9]

The success of surgical enucleation in all cases underscores its value as a complementary procedure to endodontic therapy. By removing the entire cystic lining, enucleation prevents the risk of recurrence and facilitates faster bone regeneration. The use of bone grafts in selected cases further supports this regenerative process, providing a scaffold for osteoblast activity and new bone formation.[10]

Restorative procedures must not be overlooked in the comprehensive management of these patients. The structural integrity and longevity of the treated tooth depend significantly on proper coronal restoration. A well-sealed, functionally stable restoration prevents microbial re-infiltration and supports occlusal function. In our study, the choice of restoration was individualized based on the extent of tooth destruction and aesthetic considerations, ranging from bonded composites to full-coverage crowns.[11]

The single case of delayed bone healing noted in the study highlights the importance of individual patient factors such as age, systemic health, and compliance with postoperative instructions. Continued radiographic monitoring and follow-up care are essential to ensure long-term success and identify any signs of recurrence early.[12]

The findings of this study are consistent with those reported by Menegas et al. (2021)[13], who demonstrated high success rates in cystic lesion resolution following surgical intervention combined with endodontic therapy. Similarly, a clinical evaluation by Dioguardi and colleagues (2024)[14] on 25 patients with periapical cysts treated via enucleation and root canal therapy reported bone regeneration in 92% of cases within 6 months. Another study by Grover et al. (2024)[15] emphasized the importance of using bone grafts in large periapical defects, noting improved healing and faster radiographic bone fill compared to ungrafted controls.

CONCLUSION

An interdisciplinary treatment protocol combining endodontic, surgical, and restorative modalities yields favorable outcomes in managing deep carious lesions complicated by chronic periapical abscesses and odontogenic cysts. This approach ensures (1) Clinical symptom resolution (2) Radiographic bone healing (3) Functional tooth preservation (4) Reduced risk of recurrence.

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