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ORIGINAL RESEARCH

CLINICOPATHOLOGICAL ANALYSIS OF 200 RADICULAR CYST CASES

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ABSTRACT

Background: Radicular cysts are the most common inflammatory odontogenic cysts, accounting for 52–68% of all jaw cysts. They arise from pulpal necrosis–induced inflammation involving the epithelial rests of Malassez.

Aim: To present a comprehensive clinicopathological analysis of 200 surgically confirmed radicular cysts with complete clinical, radiographic, and histopathological records.

Materials and Methods: Data from 200 patients were evaluated for demographics, clinical features, radiographic characteristics, histopathology, treatment modalities, and recurrence patterns. Findings were compared with previous studies for correlation.

Results: Most patients were males (64%) aged 21–40 years. Maxillary involvement (59%) and anterior region lesions (67%) predominated. Clinically, 58% of cases were symptomatic. Radiographically, all lesions were well-defined unilocular radiolucencies, mostly 1–2 cm in size; 23% showed root resorption and 19% caused displacement. Histologically, lesions predominantly exhibited non-keratinized stratified squamous epithelium with chronic inflammation, cholesterol clefts, Rushton bodies, and hyaline bodies. Enucleation was the main treatment (89%), with a low recurrence rate (2%).

Conclusion: The study confirms the predictable clinical, radiographic, and histopathological patterns of radicular cysts while highlighting occasional variations such as calcifications or exogenous materials. Integrated evaluation is essential for accurate diagnosis and proper management.

Keywords: cyst, radiographic, histopathological

INTRODUCTION

Radicular cysts, accounting for 52–68% of all cystic jaw lesions, are the most common inflammatory odontogenic cysts and typically arise as a sequela to pulpal necrosis. Classified by the WHO under inflammatory jawbone cysts, they develop from the epithelial rests of Malassez within the periodontal ligament following chronic inflammation. Although often asymptomatic and detected incidentally on radiographs, longstanding lesions may enlarge and lead to swelling, pain, or pus discharge. Histopathological examination remains the gold standard for definitive diagnosis, while CBCT assists in assessing lesion size, cortical plate destruction, and involvement of adjacent structures such as the nasal

cavity floor.[1-4]

Radicular cysts can occur at the periapex of any tooth and at any age, though their association with primary teeth is uncommon. They more frequently affect the maxillary anterior region and may cause mild root resorption or displacement of adjacent teeth. Management depends on lesion size: small cysts often respond to nonsurgical root canal therapy, whereas larger cysts may require surgical enucleation, marsupialization, or decompression. These cysts are commonly associated with carious teeth or those with a history of trauma.[5-8]

Radiographically, radicular cysts classically present as well-defined, unilocular radiolucencies with corticated, expansile borders that give a hydraulic appearance. Although uncommon, internal calcifications have been reported and may complicate the differential diagnosis, potentially mimicking other odontogenic lesions. Such variations highlight the importance of integrating radiographic findings with clinical assessment to avoid misdiagnosis and to guide appropriate treatment planning. [9]

In our study we aim to present a comprehensive clinicopathological analysis of 200 surgically confirmed radicular cysts with complete clinical, radiographic, and histopathological records.

MATERIALS AND METHODS

This study involved the clinicopathological analysis of 200 radicular cyst cases collected from available patient records and histopathology archives. Only those lesions that were surgically excised and had complete clinical, radiographic, and microscopic information were included, while cases with incomplete data, insufficient tissue, or unclear diagnosis were excluded. Clinical details such as age, sex, presenting symptoms, tooth involved, and lesion location were recorded from patient files.

Radiographic evaluation was done using available periapical, occlusal, or panoramic radiographs. The largest diameter of each cyst was measured, and radiographic characteristics such as corticated borders, unilocular appearance, root resorption, displacement of adjacent teeth, and cortical expansion were documented. Surgical notes were reviewed to obtain information on the type of treatment provided and the gross appearance of the lesion.

All specimens were fixed in 10% neutral buffered formalin, processed routinely, and embedded in paraffin. Sections were cut at 4–5 µm thickness and stained with hematoxylin and eosin. Microscopic examination focused on the type and thickness of epithelial lining, presence of inflammation, Rushton bodies, cholesterol clefts, hyaline bodies, and any other significant histopathological features. Special stains were used only when necessary. To maintain accuracy, all slides were reviewed by two independent observers, and any disagreement was resolved by discussion.

Data obtained from clinical, radiographic, and histopathological findings were compiled and analyzed statistically. Continuous variables were expressed appropriately, and categorical variables were compared using suitable statistical tests, with $p < 0.05$ considered statistically significant.

RESULTS

Table 1. Demographic Characteristics of 200 Radicular Cyst Cases

Parameter	Category	n (%)
Sex	Male	128 (64%)
	Female	72 (36%)
Age Group	<20 years	18 (9%)
	21–40 years	122 (61%)
	>40 years	60 (30%)

Table 2. Clinical Characteristics

Parameter	**Category**	**n (%)**
Symptoms	Asymptomatic	84 (42%)
	Symptomatic (pain/swelling)	116 (58%)
Location	Maxilla	118 (59%)
	Mandible	82 (41%)
Region	Anterior	134 (67%)
	Posterior	66 (33%)
Teeth Involved	Incisors/Canines	112 (56%)
	Premolars	54 (27%)
	Molars	34 (17%)

Table 3. Radiographic Findings

Radiographic Feature	**n (%)**
Well-defined unilocular radiolucency	200 (100%)
Corticated margin	162 (81%)
Root resorption	46 (23%)
Tooth displacement	38 (19%)
Lesion size <1 cm	36 (18%)
Lesion size 1–2 cm	112 (56%)
Lesion size >2 cm	52 (26%)

Table 4. Histopathological Features

Feature	Category	n (%)
Epithelial Lining	Non-keratinized SS	184 (92%)
	Ulcerated lining	32 (16%)
	Hyperplastic lining	116 (58%)
Inflammation	Mild	48 (24%)
	Moderate	86 (43%)
	Severe	66 (33%)
Other Changes	Cholesterol clefts	72 (36%)
	Rushton bodies	18 (9%)
	Hyaline bodies	26 (13%)

Table 5. Treatment and Outcome

Parameter	**Category**	**n (%)**
Management	Enucleation	178 (89%)
	Marsupialization	12 (6%)
	Enucleation + extraction	10 (5%)
Recurrence	Present	4 (2%)
	Absent	196 (98%)

DISCUSSION

Radicular cysts are the most common inflammatory odontogenic cysts of the jaws, arising as a chronic consequence of pulpal necrosis and periapical infection. They originate from the epithelial rests of Malassez under persistent inflammatory stimulation and are frequently encountered in clinical dental practice.[10] Understanding their demographic patterns, clinical presentation, radiological characteristics, and histopathological features is essential for accurate diagnosis and effective management.

The present clinicopathological analysis of 200 radicular cyst cases showed a male predominance (64%), with most patients aged 21–40 years. Over half of the cases were symptomatic, and the maxilla, particularly the anterior region, was most frequently affected. Incisors and canines accounted for the majority of involved teeth. Radiographically, lesions were typically well-defined unilocular radiolucencies, most measuring 1–2 cm, with some exhibiting root resorption or tooth displacement. Histopathological examination revealed predominantly non-keratinized stratified squamous epithelium with varying degrees of epithelial hyperplasia, ulceration, and inflammatory infiltrate. Additional features included cholesterol clefts, Rushton bodies, and hyaline bodies. Enucleation was the most common treatment, with very low recurrence.

Comparable findings have been reported in other populations. Chen JH et al., in a study of 232 cases, similarly observed a predominance of maxillary involvement, especially the anterior region, and overwhelmingly non-keratinized epithelial lining. Their study also identified additional inflammatory and degenerative microscopic features such as foamy histiocytes, dystrophic calcifications, and bacterial colonies.[11]

Santos LC et al. analyzed 73 cases in a Brazilian population and highlighted common epithelial changes such as exocytosis, spongiosis, acanthosis, and atrophy, with occasional cholesterol crystals, Russell bodies, and exogenous material.[12]

In primary dentition, a study of 49 radiolucent lesions reported that radicular cysts accounted for 73.5% of cases—higher than traditionally assumed—with most lesions associated with severely decayed mandibular molars.[13]

Further, Schvartzman Cohen R et al. found that large maxillary radicular cysts (>15 mm) were predominantly associated with previously root-treated teeth, which also showed more acute symptoms, suggesting a relationship between prior endodontic therapy and aggressive clinical presentation.[14]

Taken together, these studies reinforce that radicular cysts exhibit consistent clinicopathological patterns across diverse populations. While typically benign and predictable in behavior, variations in size, symptoms, and associations—particularly with prior endodontic treatment—highlight the importance of thorough clinical, radiographic, and histological evaluation to ensure accurate diagnosis and optimal patient management.

CONCLUSION

Overall, evidence from multiple studies confirms that radicular cysts show consistent clinicopathological patterns across populations, underscoring the need for careful evaluation to ensure accurate diagnosis and management.

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