

ETIOLOGICAL FACTORS AND PATTERNS OF PRESENTATION OF RADICULAR CYST — A STUDY

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ABSTRACT

Radicular cysts are the most common odontogenic cysts of inflammatory origin affecting the human jaws. Radicular cysts are usually asymptomatic but can result in slow growth tumefaction and involve many adjacent sound teeth endangering their vitality and prognosis. The objectives of this study were to enumerate and evaluate the etiological factors and the pattern of presentation of radicular cysts in a tertiary care centre in Pakistan. A total of 58 patients were included in this case series study after taking history, clinical examination, radiological findings, aspiration test and histological diagnosis of lesion by biopsy report. It was carried out at the Oral and Maxillofacial Surgery Department, Lahore Medical and Dental College, Lahore from April 2012 to August 2014. The patients in the study included 30 male (51.72%) and 28 female (48.28%). Most cases were diagnosed in the second decade of life (50.00%) which declined in the later age groups. The most affected region was the anterior maxilla (65.52%, n=38), followed by anterior mandible (18.96%, n=11). The main etiological factor was dental trauma followed by unrestored nonvital carious teeth. Radicular cyst is the most commonly occurring odontogenic cyst which affects the maxillofacial skeleton with varying frequency. A proper early screening of dental trauma can significantly reduce the incidence of some of these cystic lesions. In addition, patient education with regards to improved oral health and regular dental check ups is important for reducing the caries prevalence in the population.

Key Words: Radicular cyst, Histopathology, Dental trauma, Dental caries.

INTRODUCTION

Radicular cyst is the most commonly occurring odontogenic cyst.¹ Relative occurrence of radicular cyst is variable. It ranges from as low as 38.8% reported by Ledesma-Montes et al.² to as high as 59% reported by Koseoglu et al.³ It is an inflammatory cyst, which results from proliferation of epithelial rest of Malassez because of inflammation. Maxilla is the favored site of occurrence for radicular cyst.⁴ Different studies show that radicular cyst commonly occurs in the third

and fifth decade of life.⁵ This cyst might also occur on the lateral aspect of the root and they are then best termed as lateral radicular cyst.⁶ Periapical cysts can also involve deciduous teeth and are most frequently associated with deciduous molar.⁷

In the absence of acute inflammation radicular cyst is usually asymptomatic. Swelling and mild sensitivity may be present in cases where the cyst attains a large size. Movement and mobility of the adjacent teeth are possible in such cases. Radicular cysts can grow to significant size and lesions occupying entire quadrant have been noted.^{4,8} The tooth from which the cyst originates is non-vital and does not respond to the thermal and electrical pulp testing.

The radiographic presentation is well defined round or pear shaped radiolucency surrounding the offending tooth with the loss of its lamina dura. The radiographic size cannot be used for definitive diagnosis as cysts may develop even in small periapical radiolucencies.⁹ Root resorption is common.

Histopathology usually shows a cystic cavity with a fibrous connective tissue wall lined by stratified

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squamous epithelium. The lining epithelium may demonstrate linear Rushton bodies, dystrophic calcification, and cholesterol clefts with multinucleated giant cells, red blood cells, and areas of hemosiderin pigmentation.^{10,11} Radicular cysts are usually treated with enucleation with apicectomy of the involved tooth.^{12,13}

The pathogenesis of radicular cyst is attributed to chronic periapical inflammation resulting from either dentofacial trauma or unrestored nonvital carious teeth. It is established that teeth can become non vital as a result of dentofacial trauma, and if poorly managed, may be complicated by different types of periapical pathologies including periapical (radicular) cysts. Long-standing carious teeth are another main etiological factor in the development of such periapical pathologies.^{14,15}

The aim of this study was to enumerate and evaluate the main etiological factors in the development of radicular cyst and their pattern of presentation in a tertiary care centre in Pakistan. This study will help the dental professionals to understand the hazards of untreated dental trauma and caries as well as their

consequences. It will also help in early diagnosis and management of radicular cyst to reduce its morbidity.

METHODOLOGY

The current study consisted of 58 patients and was carried out at Oral and Maxillofacial Surgery Unit of Lahore Medical and Dental College, Lahore, Punjab, Pakistan from April 2012 to August 2014. The study involved only confirmed patients of radicular cysts with histopathological diagnosis irrespective of their age and gender. The patients having provisional diagnosis of radicular cysts but not confirmed by histopathology were excluded.

All the patients presented with clinical and radiological evidence of lesions related to the roots of teeth in the Department of Oral & Maxillofacial Surgery were thoroughly assessed by the team of this study. The provisional diagnosis of the radicular cyst was made on the basis of proper history, clinical examination, radiological findings and aspiration test. The radiographs (OPG, Periapical/Occlusal view) were taken to determine the site, size, extent of the lesion and its effect on the adjacent teeth (Fig 1, 2). The vitality of involved

TABLE 1: AGE AND GENDER DISTRIBUTION OF RADICULAR CYST

Age group (years)	Gender		Number of patients (n)	Percentage
	Male	Female		
11-20	16	13	29	50.00
21-30	07	08	15	25.86
31-40	04	04	08	13.80
51-50	03	02	05	08.62
51-60	00	01	01	01.72
Total	30	28	58	100.00

TABLE 2: SITE DISTRIBUTION OF RADICULAR CYST

Site of Involvement	Number of cases (n)	Percentage of Radicular Cyst
Anterior Maxilla	38	65.52
Posterior Maxilla	07	12.07
Anterior Mandible	11	18.96
Posterior Mandible	02	03.45
Total	58	100.00

TABLE 3: ETIOLOGICAL FACTORS OF RADICULAR CYST IN MAXILLA AND MANDIBLE

Etiological factor	Site of Involvement		Number of patients (n)	Percentage
	Maxilla	Mandible		
Trauma	29	07	36	62.07
Caries	13	05	18	31.03
Unknown	03	01	04	06.90
Total	45	13	58	100.00



Fig 1: Swelling on right maxillary labio-buccal region.

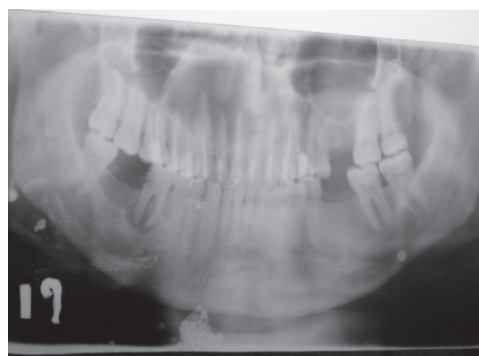


Fig 2: Radiolucency in right maxilla crossing mid-line involving multiple teeth.



Fig 3: Labial bone defect during cyst enucleation.

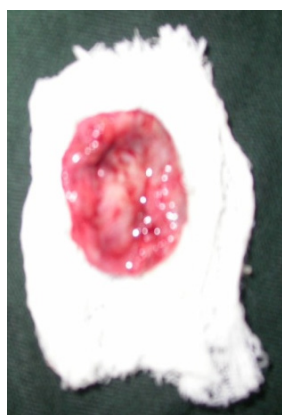


Fig 4: Removed cyst lining for hispatopathological examination.

teeth was also checked. The patients were counseled about their lesion and a written informed consent was taken for the surgical procedure to obtain the specimen under local anesthesia (Fig 3, 4). For histopathological examination, the specimen was sent to Department of Oral Pathology and a definitive diagnosis of radicular cyst was made only after histopathological report.

For each patient with histopathological diagnosis of radicular cysts, a number of variables were recorded in a specially designed proforma including their demographic data, site of occurrence, presenting complaint and clinical presentations including presence or absence of swelling, fluctuance, discharge and presence of fluid in the cystic lesion. Data was analyzed using SPSS version 17. The qualitative variables in the demographic data like gender, site of lesion and etiologies were presented as proportions and percentages and quantitative variables like age were presented as mean with standard deviation. No inferential test was applied due to descriptive nature of the study.

RESULTS

The total number of cases included in this study were 58, with thirty males (51.72%) and twenty eight females (48.28%). The age interval at diagnosis with the greatest number of cases (50%) was the one ranging from 11 to 20 years old (Table 1). The mean age was 26.18 years (SD +/- 10.17), the youngest being 12 years and the eldest 55 years old.

Regarding the location of the cysts, 77.59% (n=45) of all these cysts were in the maxilla and 22.41% (n=13) were in the mandible. The most affected region was the anterior maxilla (65.52%, n=38), followed by anterior mandible (18.96%, n=11) (Table 2). Left side (n=28) was affected more than the right side (n=18). Twenty percent of the cases were present in the midline (n=12).

The main etiological factor was dental trauma followed by unrestored nonvital carious teeth (Table 3). The most common presenting complaint was swelling that was present in 48.27% of cases (n=28). Other symptoms, by decreasing order of appearance were caries in 27.58% (n=16), pain in 18.96% (n=11), spontaneous drainage of fluids in 8.62% (n=5) and teeth mobility in 3.44% (n=2) of the patients. In a large number of patients these complaints were associated. Tenderness on palpation and percussion was the main clinical manifestation which was present in 75% (n=44) and fluctuation of the swelling was present only in 17% (n=10) of the cases. Fluid could be aspirated in 93% (n=54) of the patients.

Out of 58 patients, 52% (n=30) had poor oral hygiene, 29% (n=17) had average and only 19% (n=11) had good hygiene. Radiographically radicular cysts presented as well demarcated periapical radiolucency. Cyst size

ranged from 1.4 to 4.8 centimeters with a mean value of 2.28cm. The radicular cysts were treated with the root canal treatment of the involved non vital teeth followed by enucleation and apicectomy of the root treated teeth.

DISCUSSION

Lahore Medical and Dental College, Lahore is a tertiary care centre situated in the northeast of Lahore. The patients attending the department of Oral and Maxillofacial Surgery, Lahore Medical and Dental College, Lahore represent a diverse population. In addition to the local community, patients are referred by general dental practitioners and primary care centers, not only from Lahore but also from the entire province of Punjab. Despite the enormous body of literature available on odontogenic cysts worldwide^{2,3}, little if any studies have been done in this regard on any Pakistani population.

Radicular cysts are benign pathological entities and usually respond well to conservative surgical treatment. However, a delay in their diagnosis unnecessarily complicates treatment due to extensive involvement of local tissue and early diagnosis and treatment are in the best interest of the patient.¹⁵

Slight male predominance was noted which is in accord with the published studies.⁵ The maximum incidence was in the second decade which declined gradually in third decade onwards. Shear¹⁶ and Kreidler et al¹⁷ observed a different pattern with a sharp increase until the third decade and then a decline from fourth decade onwards. This could be explained by the reason that a major group of patients in the third decade onwards in this population get their teeth extracted rather than conservation of their dentition, and histopathology is not carried out for all the periapical lesions resulting in a decreased reported incidence.

The most common site of presentation for the radicular cyst was anterior maxilla (65.51%, n=38). This is in accord with studies reported by Montero et al. and Nakamura et al.^{4,18} A.V. Jones et al.¹ in their study on the range and demographics of odontogenic cysts conducted in a UK population also concluded that anterior maxilla is the most common site of presentation for radicular cyst but they observed an equal distribution in the rest of the sites which differs in this study. Anterior mandible was the second most common site of occurrence in this study. This increased incidence can be accredited to the increased prevalence of dental trauma in the population. It is established that teeth can become non vital as a result of dentofacial trauma, and if poorly managed, may be complicated by different types of periapical pathologies including periapical (radicular) cysts.

This can be correlated with the fact that there was a positive history of previous trauma in more than half of the patients diagnosed as radicular cyst and 85% (n=49) of the cases were diagnosed in the anterior region; the region most affected by trauma. Dentoalveolar fracture is common sequela of interpersonal violence and road traffic accidents. The high incidence of dentofacial trauma in this population is well documented.¹⁹ In spite of the improved legislations and traffic regulations by the governing authorities the prevalence of trauma is still on the high and there is a need to improve their implementation. In addition, awareness about the importance of preliminary clinical and radiographic examination after minor injuries should be highlighted to save the patient from considerable morbidity, caused by such lesions in advanced stages.

Long standing carious teeth are another main etiological factor in the development of such periapical pathologies. There was an increase incidence of caries in the patients with radicular cysts as shown by increased number of cavities, restored and missing teeth. The oral hygiene of patients with radicular cysts was also poor when compared with other cyst groups. This signifies the need of educating the patients about the importance of improved oral hygiene care and regular dental checkups to keep the caries incidence well under control as has been done successfully in certain Scandinavian countries.^{14,20} Another reason of not visiting the dental office is lack of awareness about dental problems and a fear of pain implicated with the treatment of dental diseases. It is very important on part of our dental community to educate the patients about the early intervention, which can surely save them from extensive management of the disease process in advanced stages.

The most common presenting complaint for radicular cyst was swelling (48.27%) followed by caries in (27.58%), pain in (18.96%), drainage of fluids in 8.62% and teeth mobility in (3.44%) of patients. Fluctuance of the swelling was not common in this cyst group. This can be explained by the fact that uninfected radicular cyst is a slow growing lesion and other symptoms like pain become a concern for the patient and a reason for dental consultation. This is evident by the high frequency of tenderness (75%) present on palpation and percussion of the involved teeth in radicular cyst patients.

Radiographic size of radicular cysts in the study population varied from a minimum value 1.4cm to a maximum value of 4.8 cm. The shape of the radiolucent area varied between round to teardrop radiolucency around the teeth apex with well demarcated margins. Root resorption was observed in 10% and divergence of adjacent teeth root in 5% of radicular cysts. This is essentially similar to that reported by Kreidler et al.¹⁷

The importance of histopathology has been highlighted in the literature. It is worth mentioning at this stage that a number of cases are misdiagnosed histopathologically.¹¹ This again signifies the importance of liaison between the surgeon and the pathologist. It will help in making a correct initial diagnosis and save the patients from waste of time, money and the morbidity caused by additional surgical procedures. It is also recommended that oral histopathological services should be set up as there is a lack of such facilities in this population.

CONCLUSION

Radicular cyst is a commonly occurring established pathology which affects the maxillofacial skeleton with varying frequency. An early accurate diagnosis can save the patients from significant morbidity and psychological trauma due to cancer phobia of advance stage cystic lesions. A proper early screening of dental trauma can significantly reduce the incidence of some of these cystic lesions. In addition, patient education with regards to improved oral health and regular dental checkups is important for reducing the caries prevalence in the population. There is also need of establishing oral histopathology services in the community.

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CONTRIBUTION BY AUTHORS

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|---------------------------------|--|
| 1 Muhammad Faisal Munir: | Made substantial contribution in title selection, design planning, abstract & introduction, data collection, analysis and discussion |
| 2 Muhammad Asif Shahzad: | References writing. |
| 3 Momin Ayub Marath: | Participation in writing introduction, data collection, conclusion. |
| 4 M Rafique Chatha: | Supervision, final review. |