

Observational Study of the Radicular Cyst from Small to Giant Size

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Abstract

Objective

The main objective of this study is to find out the nature of radicular cyst in different age group and reasons for the same on patients visiting to the Department of oral and maxillofacial surgery at Kantipur Dental College Teaching Hospital and Research Centre from 2015 January 1st to 2017 December 31st.

Materials and Methods

52 patients age ranging 10 years to 60 years were selected retrospectively whose radicular cyst was operated under local anaesthesia and general anaesthesia depending upon the size and patient's pain tolerance capacity and lesions size and nature. Patient's distribution is shown in table number 1.

Result

Out of 52 patients 32(61.5 %) were males' patients and 20(38.46%) were female patients. Out 52 cases 2 cases were giant in nature and marsupialization (3.84%) was done and rest of 50 cases were treated by enucleation (96.15%)'shown in table number 2. In our case most people were suffered from caries leading to radicular cyst i.e (71.53%) and trauma causing radicular cyst is(28.84%).

Conclusion

In our study most people were suffering from caries due to negligence and later resulted to radicular cyst and few people had trauma in their life which later resulted to non-vital teeth resulting into radicular cyst. A proper care can control the incidence of radicular cyst in future.

Introduction

Among different varieties of odontogenic and non-odontogenic cysts of the jaws exhibit a biologically aggressive course and sometimes difficult to diagnose. Radicular cysts are inflammatory or infected cysts developing from the epithelial deposits in the periodontal space or following pulpal necrosis. The lesion is not clinically detectable when it is small but most

often is discovered as incidental finding on radiographic examination. Though radicular cysts are one of the most common lesions of the mouths, manifold radicular lesions are rather exceptional. Their incidence is highest in third and fourth decade of lifespan with male dominance. Anatomically the periapical cysts transpire in all tooth bearing positions of the jaws, however, are more repeated in the maxillary than the mandibular region [1]. Three cases in our study are giant in nature and rest 49 cases of small to medium in nature.

Method and Materials

With the permission from Hospital and through consent of patients we collected the records of patients, who had undergone treatment for cystic lesions at the department of oral and maxillofacial surgery in Kantipur Dental College Teaching Hospital and Research Center between 2015 January 1st to 2017 December 31st. It is in central part of city where patients come from all over the country.

Patients aged 10 to 60 years were included who went cystic enucleation and marsupialisation. Patient's age, gender, year of presentation, presenting complaint, area of involvement and reason for hospital visit were documented. Reasons for lesion is determined as follows

1. Trauma
2. Caries

Shown in table number 3.

Age group	No. of patients by gender			
	Gender		Gender%	
	Male	Female	Male	Female
20-30	1		1.92%	
21-30	5	3	9.60%	5.76%
31-40	7	10	13.46%	19.23%
41-50	15	5	28.84%	9.61%
51-60	4	2	7.69%	3.84%
Total	32	20	61.90%	38.44%
Total	52		100%	

Table 1 : Distribution of patients by age group

	Marsupialisation	Enucleation	%
	2		3.84
		50	96.15
Total	52		100%

Table 2 : Surgical Method Used to Treat the cyst

Patients		%
Trauma	15	28.84
Caries	37	71.53
Total	52	100

Table 3 : Etiology of Cyst

Discussion

Radicular cysts are the most common cystic lesion of inflammatory origin comprising a group of odontogenic lesions [3]. Death and necrosis of the dental pulp remains as residues resulting into radicular cyst which is common sequelae of dental caries [4]. Clinically it is difficult to diagnose when it is small and most of the time it is diagnose during routine check up of radiographic examinations or following their acute exacerbation [5].

Maxillary anterior region is the most common site to occur which comprises of 60% as compared with mandible, and is associated with buccal or palatal enlargement [2]. The cases in our study also had buccal and palatal swelling mostly and few cases were seen in the mandible where buccal swelling was prevalent.

Most of the time patient comes to dentist only when the cyst becomes infected and painful and patients become aware of the problem [6]. It grows slowly and leads to mobility, root resorption and displacement of teeth. In our cases mobility, root resorption or displacement of teeth was seen in some of the cases and no mobility, root resorption or displacement was seen despite the presence of a large chronic infected cystic lesion [7]. Among all 52 cases only one 15years patient had cystic lesion in the left anterior region which was giant radicular cyst of maxilla involving maxillary sinus. He had history of trauma 6 years back and slowly swelling developed and later on painful and huge in size.

Asymptomatic evolution with crepitations followed by erosion and fluctuation of the overlying soft tissue is the main pathogonamic features of radicular cyst. In due course of time surrounding bone becomes thin producing egg shell cracking leading to cortical plate expansion and most of time creating total destruction of bone in the particular site. The alveolar process exhibits a paper-like texture on palpation [3], as seen in our many cases both buccally and palatally.

Radiographically, the radicular cyst appears as round or pear-shaped unilocular radiolucency at the apex of a non-vital tooth. The margin of a radicular cyst is radiopaque with hyperostotic borders, which continues with the lamina dura. However, in infected or rapidly enlarging cysts,

the radiopaque margin may not be present and be diffuse in nature predicting the nature of abscess. The chronic radicular cyst may result in the resorption of offending tooth roots [3]. Despite being infected the present some of the cases had a clear radiopaque border and no root resorption was evident, which was helpful in the provisional diagnosis of radicular cysts. Other odontogenic cysts like dentigerous cysts, odontogenic keratocysts and odontogenic tumours such as ameloblastoma, Pindborg tumour, odontogenic fibroma and cementoma may share the same radiological features as radicular cysts. Hence histopathological evaluation is necessary most of the time to diagnose these types of giant lesions. In extensive cases, radiographs alone may not be sufficient to show the full extent of the lesions, and advanced imaging may be needed [3,7].

Radicular cysts are generally associated with the root apex of a carious or fractured tooth due to the presence of dead and necrotic pulp. Massive dental cysts sometimes may extend into the sinus away from the original epicentre [3] and sometimes present as a large multilocular radicular cyst [1]. Among 52 cases in our study 5 cases were massive in nature involving maxillary sinus invasion. Both clinically and radio graphically these 5 cases were large involving maxillary sinuses.

Simon [8] described two types of the radicular cysts. One form is a true radicular cyst which contains a closed cavity entirely lined by the epithelium and the other form of a radicular cyst is a periapical pocket cyst also known as bay cyst. The epithelium is attached at the margins of the apical foramen in such a way that the cystic lumen is open to the affected root canal. Nair [9] found that 61% were true cysts, and 39% were pocket cysts.

Histopathologically, radicular cysts are lined completely or in part by stratified squamous epithelium. These linings may be discontinuous in part and range in thickness from 1 to 50 cell layers. The lumen of a cyst contains fluid with low concentration of protein and collection of cholesterol clefts (Rushton bodies) with multinucleated giant cells. Different intensities of acute and chronic inflammatory infiltrate are present subepithelially [10]. Few cases are reported with hyaline bodies which represent a secretory product of the odontogenic epithelium in radicular cyst. The deposits of cholesterol crystals arise from the disintegration of red blood cells, lymphocytes, plasma cells and macrophages [11]. In our few cases, histopathological finding revealed acute and chronic inflammatory infiltrate without any Rushton bodies and in some cases showed above features along with Ruston bodies.

Occasionally metaplastic changes, in the form of mucous cells or ciliated cells, are frequently found in the epithelial linings of radicular cysts due to migration of these cells from maxillary sinus or nasal cavity.

A few well-documented cases [12,13] indicate that squamous carcinoma occasionally arises from the metaplastic changes in the epithelial lining of the radicular cysts. Long-standing cases of radicular cysts have shown histopathological evidence of transition from a cystic lining to epithelial dysplasia and further progressing as infiltrating squamous carcinomas. At present, there is no concrete evidence that cyst epithelium is at particular risk of carcinomatous transformation and no justification regarding cysts as precancerous lesions. However, clinicians should be aware of the remote chances of radicular cyst converting into squamous carcinoma.

The recommended treatment option available for radicular cyst is the conventional endodontic approach combined with decompression [14] or surgical enucleation of a cyst with extraction of the offending tooth. Some authors are of the view that suspected radicular cysts must be

totally enucleated surgically to remove all epithelial remnants [15]. The treatment of these cysts is still under discussion and many professionals opt for a conservative treatment by means of endodontic technique. However, in large lesions the endodontic treatment alone is not efficient and it should be associated with a decompression or a marsupialisation or even with enucleation [16,17]. When the lesion is small with approximately 1 cm in diameter, most clinicians opt for conventional endodontic treatment but a surgical option for massive lesion is either marsupialisation or enucleation. Endodontic treatment of radicular cysts eradicates microbes or substantially reduces the microbial load from the root canal and prevents reinfection by orthograde filling [18]. Once periapical inflammation is reduced, there will be a decrease in inflammatory mediators and cytokines released by innate and adaptive immune cells and the epithelial cells of a cyst's lining epithelium will die of apoptosis [19]. Lesions that fail to resolve with such therapy may be successfully managed by extraction of the associated non-vital teeth and curettage of the epithelium in the apical zone [18]. The other options suggested are surgical decompression to reduce the size of the lesion before marsupialisation or complete enucleation is planned, to reduce the chances of damage to other teeth or anatomic structures [20]. Conservative treatment approaches have proved to be effective for the treatment of radicular cysts in primary teeth [18]. However, surgical decompression and marsupialisation requires 3–12 weeks of prolonged follow-up and uncomfortable healing period [21]. Nair [4,9] considered that the type of cyst was important, and the true cyst is self-sustaining and may persist even after endodontic treatment. In contrast, the lumen of a pocket cyst is continuous with the root canal and thus dependent on the pulpal infection for its growth and persistence. Pocket cysts, therefore, resolve and heal after conventional endodontic treatment, and true cysts require surgical excision. As the present case represented true cyst, surgical enucleation was considered.

Enucleation of large cysts in the jaws is an invasive method that may lead to complications such as damage of the adjacent teeth or anatomic structures, but contemporaneous and less invasive surgical techniques for treating large radicular cysts have been developed [21]. Endoscopically assisted enucleation is an innovative alternative method that can be as conservative as marsupialisation, allowing preservation of important surrounding structures, with the greater advantage of one step treatment, reduced healing period and very low morbidity. The endoscopic approach provides good visualisation of the whole cystic cavity allowing the removal of any pathological tissue and preservation of integrity of the vital anatomical structures involved [21]. The current case was of a giant infected true cyst, and the patient had consulted many dentists for the persistent problem. Thus, one step conventional surgical enucleation and extraction of offended tooth was performed, as this technique is more used in treating massive lesions [22]. Despite using the conventional surgical technique, vitality of the adjacent teeth and integrity of vital anatomical structures were not violated. Recently, much attention has been paid to the regeneration of destroyed periapical tissues after surgical elimination of the periapical pathology. In order to aid reparation process, after surgical enucleation, guided bone generation methods are in use. However, there are considerable controversies regarding the use of guided bone regeneration techniques in periapical defects [23]. Few studies are of the opinion that regenerative techniques are not superior, either about the speed or quality of healing [24]. In contrast, other studies [23,25] stated that conventional treatment results were less predictable in comparison with cases in which regeneration methods were used. We observed complete regeneration of bone without employing any guided tissue regenerative techniques.

Conclusion

In our study most people were suffering from caries due to negligence and later on resulted to radicular cyst and few people had trauma in their life which later on resulted to non-vital teeth resulting into radicular cyst. A proper care can control the incidence of radicular cyst in future.

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