Abstract

The aim of this case report is to describe a case of 24-year-old female patient who was presented with a large periapical lesion associated with maxillary anterior teeth and was subsequently diagnosed, treated, and followed up for one year with the assistance of cone beam computed tomography (CBCT) examination.

Key words: Radicular cyst, CBCT guided surgery, periapical cyst

Introduction

Radicular cyst is an odontogenic cyst of inflammatory origin. It usually arises from the epithelial residues of the periodontal ligament as a result of inflammation and often preceded by chronic periapical granuloma. Pulpal infection, following dental caries, generally results in formation of radicular cyst. Epidemiological studies have revealed that it is the most common jaw cyst comprising about 52-68 percent of all cysts affecting the human jaw and is higher among men than women. CBCT, which was initially developed as an imaging aid for performing angiography, has subsequently found its application in guided radiotherapy, mammography and is now an evolving technology in three-dimensional digital imaging and is finding application in all branches of dentistry. Radiographic evaluation is an important diagnostic procedure to detect the extent of large lesions, to identify anatomical relationships and to assess the margins of the lesion to ascertain the presence of infiltrative growth suggestive of development of an aggressive lesion.

The present case report reviews a case of radicular cyst which was diagnosed and managed with the assistance of CBCT imaging.

Case report

A 24-year-old female presented with the complaint of painless swelling in the upper front anterior region of jaw. On eliciting the history of present illness, patient reported that she had met with an accident 6 months back, which had an impact on her lower third of the face. On examining the site of complaint, it was observed that the swelling associated tooth i.e., 21 was discolored and a presence of sinus tract was seen over the attached gingiva of 21. However, there was no associated tooth mobility. A pre-operative Intra oral radiograph (IOPA) was
advised (Table 1[Figure 4]), which revealed a large round periapical radiolucency with apical tooth resorption. Root canal treatment of 21 was carried out with calcium hydroxide dressing. A CBCT image (sironaorthophos X3GD, Germany) was then advised as the size and extent of the radiolucency was large.

On CBCT a large, partially well-defined alveolar osteolytic radiolucent lesion was noted, extending from the mesial periapical area of 11, across the midline till the distal periapical region of 21 and supero-inferiorly from the level of cervical thirds of roots till overlying anterior nasal fossa floor.

Medio-lateral, cranial, and caudal margins of the lesion were distinct and largely corticated; however, the labial (anterior) margin was partially indistinct due to expansion-thinning and intermittent effacement of adjoining labial cortical plate.

![Figure 1: Axial and coronal sectional view showing periapical lesion w.r.t tooth 21](image1)

![Figure 2: Cross Sectional view showing the extent of periapical lesion associated with tooth 21](image2)
The lesion measured approx. 1.2 cm x 1.8 mm x 1.5 cm in greatest antero-posterior, transverse and supero-inferior dimensions.

The internal structure was largely radiolucent without obvious calcifications or septae; however, focal ovoid air inclusion density was also seen suggestive of secondary infection.

Associated tooth 21 revealed apical blunting and resorption of root with endodontic restoration in-situ, showing obvious periapical extension, while tooth 11 showed slight mesio-apical root resorption (Figures 1, 2, and 3).

Based on radiographic findings, it was suggested that the lesion was either an infected periapical radicular cyst or periapical abscess.

Table 1

<table>
<thead>
<tr>
<th>Figure 4: Pre operative radiograph</th>
<th>Figure 5: Full thickness mucoperiosteal flap was reflected and the defect was exposed</th>
<th>Figure 6: Cyst was removed using Ellis forcep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 7: Enucleated cyst</td>
<td>Figure 8: Cyst removed and the defect was thoroughly debrided</td>
<td>Figure 9: Bone graft (DFDBA) placed and covered using collagen membrane</td>
</tr>
<tr>
<td>Figure 10: Interrupted Sutures were given using 3-0 Silk suture</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Patient was then put on an antibiotic regimen of Amoxicillin, 500 mg for five days. Access opening and Biomechanical preparation and irrigation (with saline and 1 percent sodium hypochlorite alternatively) of the root canal of involved teeth was done with tooth 21, followed by Calcium hydroxide intracanal medication for a period of one week. Subsequently, the root canals were obturated with guttapercha apicoectomy, and retrograde root end filling was done with mineral trioxide aggregate (MTA) to obtain apical seal.

Figure 11: Axial and Coronal view showing bone fill periapically w.r.t tooth 21

Figure 12: Cross Sectional view showing bone fill around the buccal surface of tooth 21
Surgical method (Table 1): Prior to the surgery, an informed consent was taken and the procedure was thoroughly explained to the patient. Surgical enucleation of the cyst was planned as per the cyst extension guided by the CBCT, under local anesthesia after root canal therapy of the involved teeth 21. The surgical procedure is as explained in the figures (5-10) in Table 1.

The patient was followed up for over a year and was asymptomatic and showed no sign of recurrence at the end of it.

The CBCT examination post-operative one year as shown in Figures 11, 12, and 13 showed normal uptake of the osseous inlay graft in site, with the evidence of resorptive remodelling noted along anterior/labial aspect of graft and in periapical regions of teeth 21 and 22.

Discussion
Radicular cysts are one of the most common cystic lesions affecting the human jaw. They are formed as a result of periapical inflammation, which leads to the proliferation of epithelial residues into the periodontal ligament. Persistent periapical inflammation causes the host cells to release cytokines, the growth factors which induce the proliferation of epithelial cells to form a three-dimensional mass. As this mass grows, the central cells move away and is devoid of their nutrition to undergo necrosis, liquefaction degeneration and forms the cystic cavity lined by epithelial cells. Once formed, the cyst enlarges by causing bone resorption that is mediated by cytokines and prostaglandins. However, there is no time-lapse study showing that the size of apical cysts gradually increases as periapical bone destruction increases.

Endodontic treatment of the involved teeth removes the irritants in the canals and as the canals are sealed, there is a resolution in the inflammatory reaction. The resolutions are brought about by apoptosis of the inflammatory and epithelial cells as well as fibroblasts.

Presence of unusually large periapical lesions often lead to a diagnostic dilemma and a thorough evaluation of such cases is necessary to diagnose them. IOPA are usually sufficient to diagnose periapical cysts; however larger cysts require extensive imaging like CBCT to know the location, extent, and size of the lesion. With CBCT, not only can the periapical lesion be identified, but the specific root that it is associated with can be confirmed which influences the treatment planning. Thus, CBCT can be used to accurately diagnose large periapical lesions based on the gray scale value.

In the present case too, with the help of CBCT interpretations, the treatment of radicular cyst was possible.

Conclusion
This case report revealed that CBCT scan may provide a better, more accurate and faster method to differentially diagnose a large periapical lesion or cavity, as compared to conventional IOPA radiographs and can be used to plan treatment of periapical or radicular cyst.

References


