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RESEARCH ARTICLE

SURGICAL MANAGEMENT OF GIANT RADICULAR CYST OF MAXILLARY CENTRAL AND LATERAL INCISOR FOLLOWED BY APICOECTOMY- A CASE REPORT

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Abstract

Radicular cysts are inflammatory odontogenic cysts of tooth bearing areas of the jaws. Most of these lesions involve the apex of offending tooth and appear as well-defined radiolucencies. Owing to its clinical characteristics similar to other more commonly occurring lesions in the oral cavity, differential diagnosis should include dentigerous cyst, ameloblastoma, odontogenic keratocyst, periapical cementoma and Pindborgtumour. Majority of these lesions engross the whole apex and appear as precise radiolucencies. The cystic lesion lined with the epithelium, which filled with fluid; therefore, they are generally referred to as a true cyst. Based on clinical, radiographical and histopathological findings, the present case was diagnosed as an infected radicular cyst. The clinical characteristics of this cyst could be considered as an interesting and unusual due to its giant nature. The lesion was surgically enucleated without any postoperative complications and satisfactory healing, was achieved. Various mode of treatment available for radicular cyst management including surgical and non-surgical procedures, the present case report discuss the surgical management of radicular cyst of maxillary central and lateral incisors.

Introduction:-

Radicular cysts are the most common (52–68%) cystic lesions affecting the jaws. They are most commonly found at the apices of the involved teeth; however, they may also be found on the lateral aspects of the roots in relation to lateral accessory root canals.[1] Radicular Cysts are thought to be formed from epithelial cell rests of Malassez (ERM), which are remnants of Hertwig's epithelial root sheath, present within the periodontal ligament. Proliferation of these epithelial cell rests is frequently associated with stimuli from periapical periodontal inflammation secondary to pulpitis.[2]

Smaller periapical cysts can often be treated conservatively by nonsurgical endodontic therapy. Proper endodontic therapy of the involved teeth removes irritants in the canals by chemomechanical instrumentation. As the root canal is completely sealed, all cell components participating in inflammatory reaction gradually resolve.[3]

Radicular cysts are a sequel of a chronically inflamed granulation tissue (the periapical granuloma) located adjacent to the apex of either endodontically or non-endodontically treated teeth with an infected root canal system

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.[4]However, radicular cysts are found to be lined, partially or predominantly, by columnar ciliated epithelium or mucosecretory cells, which may be due to the migration of these cells from either the maxillary sinus or the nasal cavity, the metaplasia of the stratified squamous epithelium, or to the differentiation of pluripotent cells within the jaw.[5] It has been reported that radicular cysts are more frequently found in the maxilla [8], occurring almost ten times more frequently than in the mandible.[6,7] Patients often complain of slowly enlarging swellings. Radiographically, most radicular cyst appears as round or pear-shaped unilocular radiolucent lesion in the periapical region.[1,8] The treatment options for radicular cyst can be conventional nonsurgical root canal therapy when lesion is localized or surgical treatment, like enucleation, marsupialization, or decompression, when lesion is large.[9]Non-surgical endodontic therapy is the first line treatment for the management of these lesions. Oztan and Kalaskar et al., have confirmed that large periapical lesions including cysts can respond favourably to nonsurgical treatment using calcium hydroxide paste. But when root canal treatment is either not possible or fails, periapical surgery can be considered as a predictable option. Hyun-Kyung et al.,[10] in their retrospective observational study found that the most frequent management method for the radicular cyst was enucleation with apicectomy[11]. This case report presents a successful surgical management of giant radicular cyst of maxillary anterior teeth.

Case Report

A 21 year old female patient reported with a chief complaint of pain and swelling, approximately 3 cm in diameter in the maxillary anterior region in the palatal aspect (Fig.1) since 2 months. There was a history of trauma to maxillary right central & lateral incisor 8 years back due to fall while playing, following which root canal therapy

Fig.1:- Pre- operative labial and palatal view.

was done for the maxillary right central incisor followed by a prosthetic rehabilitation done later. On radiological examination, there was large periapical radiolucency in relation to 11, 12 and 13(Fig.2). Vitality testing by cold test with an ice stick and electric pulp testing revealed no response in the tooth with respect to 12 and tooth in relation to 13 and 21 responded at 25 units and 23 units respectively.Intraoral examination revealed there was a well-defined, localized swelling obliterating the palatal aspect of hard palate of maxillary right lateral incisor. The shape of the swelling was that of a dome, soft, and fluctuant and was nontender on palpation. The overlying buccal mucosa was smooth, little bit elevated, with no sign of clinical inflammation. Extraoral examination revealed no swelling. Facial asymmetry was evident. The medical history was non-contributory. After obtaining informed consent from the patient non-surgical endodontic treatment was initiated and root canal treatment was performed in 12(maxillary right lateral incisor).

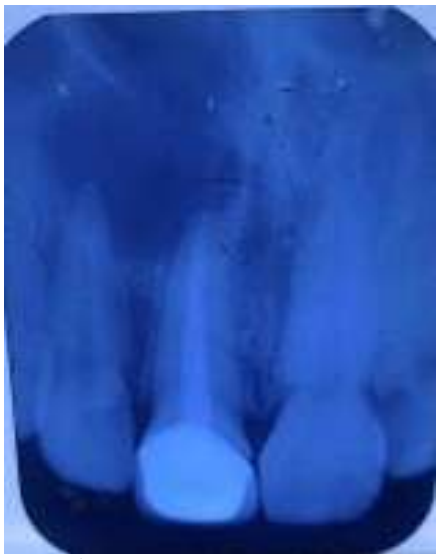

Fig.2:- Pre- Operative IOPA.

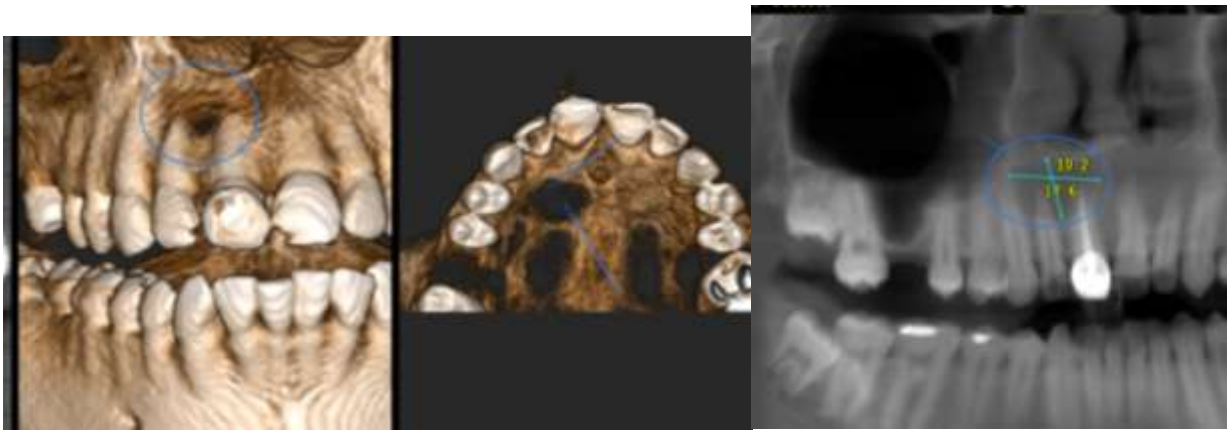

Fig.3:- Pre –operative CBCT images.

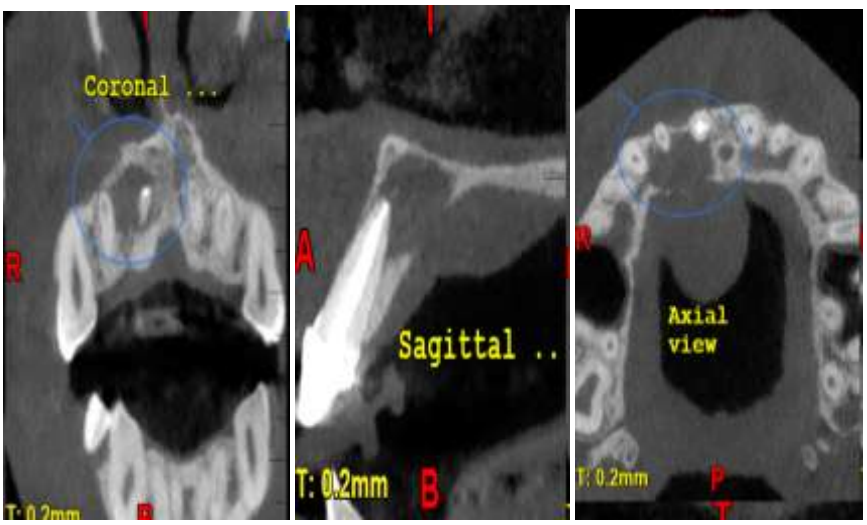

Fig .4:- Axial view ,sagittal view and coronal view.

After detailed analysis of history and clinical findings, a provisional diagnosis of a radicular cyst was made.An intraoral periapical radiographic examination was done. Radiographically, there was an unilocular radiolucency extending from the incisor to canine region of maxillary right anterior teeth. CBCT(cone beam computed tomography) was adviced and revealed well defined radiolucency seen extending from periapical region of 11 to 13, size approximately 1.5 cm in diameter (Fig.3 and Fig.4).In the same visit, incision and drainage (Fig.5) followed by endodontic treatment was started for the tooth with respect to 12, followed by working length determination measured 22.5 mm(Fig.6). After complete biomechanical preparation, Master apical cone of size 45 gutta-percha was placed(Fig.7), obturation was done by lateral condensation(Fig. 8) followed by surgical enucleation of cyst,andapiceoctomy of involved teeth (teeth with respect to11 and 12).

Fig.5:- Incision and drainage.

Fig.6:- Working length determination.

Fig.7:- Master apical cone .

Fig.8:- Obturation.

Fig.9:- Flap elevation.

Fig.10:- Enucleated specimen.

Fig.11:- Root resection with respect to tooth 11 and 12.

Fig.12:-Apical seal with MTA.

Fig.13:- Suture placement.

Fig. 14:- Post-operative IOPA.

Fig.15:- 1 month follow up.

Fig.16:- 6 months follow up.

Fig.17:- 1 year follow up.

After administration of local anesthesia crevicular incision was given in buccal region, for apiceoctomy trapezoidal flap which extends from 11 to 12 region and site was exposed (Fig.9). A full thickness flap was raised to expose the wall of the cystic lesion.The cystic lesion was then enucleated completely using blunt-ended elevators.Lavage with sterile saline was performed.Complete curettage done and granulation tissue was removed. The specimen obtained from the bony cavity was sent for histopathological analysis (Fig.10) . The diagnosis of an established radicular cyst was confirmed when features of atrophic, metaplastic, nonkeratinized, stratified squamous epithelium with minimal inflammation were observed.Root end of involved teeth in relation to 11 and 12 were resectedby 3mm (Fig.11) and gutta percha at the exposed root apex was burnished. Careful clinical examination of the area was done to ensure no residual lesion tissue was left behind. Mineral trioxide aggregate was placed as the retrograde filling (Fig.12).Autologous platelet rich plasma gel placed inside cystic cavity followed by suturing (Fig.13).Post operative instructions given to the patient and the patient was kept under routine Antibiotics, Analgesics & mouthwash. Post-operative intraoral periapical radiograph was taken immediately (Fig.14) and at 1 month (Fig.15), 6 months (Fig.16) and 1 year interval (Fig. 17).Healing of the lesion together with bone regeneration was observed.

Discussion:-

Radicular cyst is an odontogenic cyst of inflammatory origin preceded by a chronic periapical granuloma and stimulation of cell rests of Malassez.[11] Radicular cysts are diagnosed either during routine radiographic examination or following their acute exacerbation.[12] Radicular cysts grow slowly and lead to mobility, root resorption and

displacement of teeth. Once infected they may lead to pain and swelling and patients become aware of the problem. Radiographically, the radicular cyst appears as round or pearshaped 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. The chronic radicular cyst may result in the resorption of offending tooth roots.[13]

In most cases of radicular cysts of the maxilla, the involved tooth had been previously treated endodontically; however, from the results of the present study, it is impossible to determine the role of the root canal treatment on the etiology of the radicular cyst. Radicular cysts are formed in association with a tooth with infected root canal system [14,15]. These root canal infections may be divided into primary and secondary infections (Primary infections develop after an initial bacterial invasion into the pulp of non-endodontically treated teeth, while secondary infections occur following a previous root canal treatment (i.e., in endodontically treated teeth) [16].

Microscopically, all radicular cysts are lined completely or partly by nonkeratinized stratified squamous epithelium. These linings may or may not be discontinuous and are 1 to 50 cell layers thick. The inflammatory cell infiltrate in the proliferating epithelial linings consists predominantly of polymorphonuclear leucocytes, whereas the adjacent fibrous capsule is infiltrated mainly by chronic inflammatory cells.Approximately 10% of periapical cysts contain hyaline bodies in the epithelial linings and these bodies have a glassy pink (hyalinized) appearance. The origin of such bodies is believed to be related to previous hemorrhage within the inflamed cyst wall.[1]

The pathogenesis of radicular cysts has been described as comprising three distinct phases: The phase of initiation, the phase of cyst formation, and the phase of enlargement.[17]

The treatment of radicular cyst, as a disease of root canal infection, consists of eradicating microbes or substantially reducing the microbial load from the root canal and preventing reinfection by orthograde root filling.In the present case, as the patient was apprehended regarding the presence of a swelling and also the lesions size and extent, a surgical procedure was carried out[1]. After endodontic therapy, complete enucleation of cyst and apicoectomy with retrograde filling with mineral trioxide aggregate was done. Postsurgical period was uneventful. The cystic lesion was taken for histopathological examination. Histopathological features confirmed the clinical diagnosis of infected radicular cyst. The cystic cavity was lined by nonkeratinized stratified squamous epithelium and a mixed inflammatory infiltration was present. The choice of treatment was decided by factors like extension of the lesion, adjacent anatomic structures, evolution, origin, clinical characteristic of the lesion, cooperation, and systemic condition of the patient.

Conclusion:-

This present case was managed successfully by endodontic therapy followed by apicoectomy and retrograde filling with Mineral trioxide aggregate. The treatment of the radicular cysts should be decided according to the clinical and radiographic evaluations according to each case. In the present case due to the presence of a swelling and also the lesions size and extent a surgical procedure was introduced.

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