

Case Report

Management of a Large Periapical Cyst – Report of a Case and Review of Literature

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Abstract: Radicular cysts are one of the most common pathology of oral cavity that oral and maxillofacial surgeons come across in daily practice. It has different treatment options and an operating surgeon should be aware of them and tailor them for individual patients. Aim of this case was to successfully treat a large periapical lesion of maxilla. 44 year old patient came with a swelling of palate with associated pain and was planned for surgical management of the swelling following thorough investigations. Surgical management of the lesion included enucleation of lesion into to, followed by apicectomy and retrograde filling with Mineral Trioxide Aggregate. Periapical lesions being one of the common entity has to be treated meticulously by a good team approach and newer materials need to be evaluated to provide a cost effective treatment.

Keywords: Periapical cyst, Mineral trioxide aggregate, Apicectomy, Enucleation

INTRODUCTION

A radicular cyst is defined as a cyst arising from epithelial residues (cell rests of Malassez) in the periodontal ligament as a sequelae of inflammation, usually after necrosis of the dental pulp [1]. Radicular cysts form the most common odontogenic cystic entity of inflammatory origin affecting the jaws and it comprise about 52% to 68% of all the cysts which affect the human jaw [2]. They are commonly found near the apices of the involved teeth. They are also found on the lateral aspects of the roots related to accessory root canals. Most radicular cysts are symptom free and are identified when radiographs are taken. They are associated with non vital pulps and a pulp testing will reveal the non-vitality. Chair side diagnosis of periapical cyst can be made based on the following: (i) the periapical lesion involves one or more teeth with non-vital pulps, (ii) the lesion has size >200 mm², (iii) radiographically lesion is circumscribed, well-defined radiolucent area bound by thin radiopaque line and (iv) produces a straw-coloured fluid on aspiration or as drainage through an accessed root canal [3]. Over the years, the cyst might regress, remain static or increase in size. The cysts are either managed nonsurgically or surgically, surgical being either marsupialization or enucleation [4]. The treatment options depends on the size and location of the cyst, the integrity of the cystic wall and its proximity to vital structures. Mineral trioxide aggregate (MTA) was introduced in the 1990s, as a root-end filling material. It is used primarily to seal

root perforations and as a root-end filling material [5]. MTA has been advocated as root end filling material, because of minimal cytotoxicity, promotion of hard tissue formation in the periodontal tissues, stimulation of dentin bridge formation and superior sealing capability [6].

CASE REPORT

A 44 year old male patient presented with complaints of pain and swelling in the upper front tooth region since 1 month. Initially reported of pain which was gradual in onset, dull aching in character, intermittent in nature and localised to the region. Pain aggravated on intake of cold water and was relieved on medication. It was followed by a swelling i.r.t to the anterior palatal region of 3 weeks duration. He also reported a history of trauma to the upper anterior tooth region 30 years back. Systemic and extra oral examination was within normal limits. Intra oral examination revealed a 4x4 cm roughly ovoidal well defined swelling in the palatal rugae region predominantly in the right side crossing the midline and antero-posteriorly extending from the palatal aspect of anteriors to 15,25 region (Fig 1). Electric Pulp testing revealed 13,12,11,21,22,23 to be non vital. On radiographic examination, IOPA revealed a diffuse radiolucency in the periapical region of 12,11,21,22. OPG showed a lytic lesion in the maxillary anterior teeth region. Resorption of the roots and involvement of the nasal floor with deviation of the

anterior nasal spine (Fig 2). Skull PA view revealed a well-defined roughly ovoid radiolucency in 12-22 region (Fig 3). CT scan was advised and it revealed a well-defined lobulated soft tissue density lytic lesion of size 3.5x2.0x2.5 cm involving maxilla in midline with adjacent bony erosion which was suggestive of an aggressive lesion, probably an incisive canal cyst or a schwannoma (Fig 4, 5). Aspiration of the lesion revealed pus and a differential diagnosis of infected periapical cyst was added in to the radiographic differential diagnosis. Hence an RCT of associated teeth followed by enucleation of the lesion and apicectomy with a retrograde filling of teeth with MTA was planned and was performed under general anesthesia (Fig 6,7,8). Histopathologic evaluation confirmed it to be an infected periapical cyst (Fig 9). Patient was followed up regularly following the procedure and radiographic evaluation was performed. 3 month postoperative radiograph shows considerable decrease in the size of the lesion with signs of bone deposition indicating a satisfactory healing process (Fig 10).



Fig-1: Clinical photograph of swelling



Fig-2: Orthopantomogram

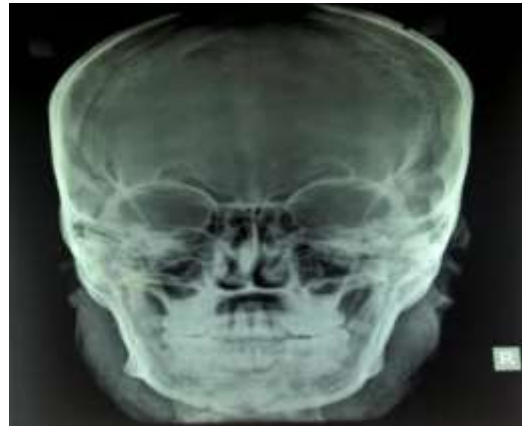


Fig-3: Xray Skull PA view

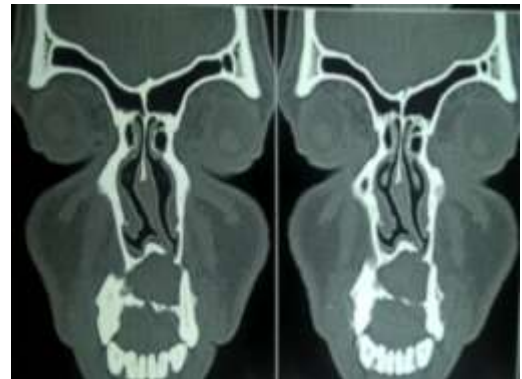


Fig-4: CT coronal sections showing the lesion

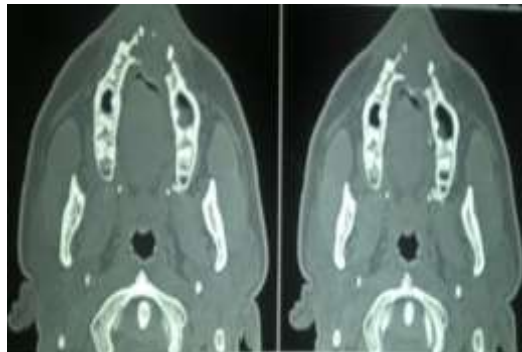


Fig-5: CT axial sections showing the lesion



Fig-6: lesion in situ



Fig-7: lesion enucleated intoto



Fig-8: MTA used as retrograde filling material

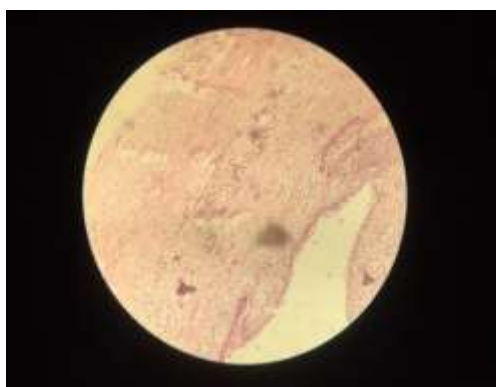


Fig-9 : Photomicrograph

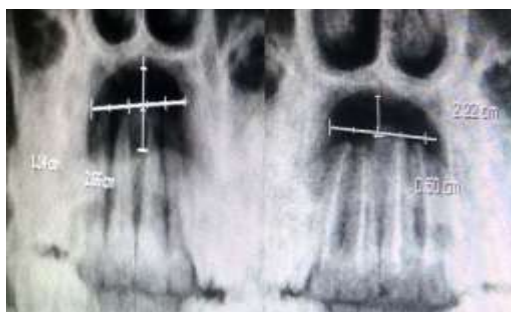


Fig-10: Xray PA view (cropped) taken 3 months post operatively showing reduction in size of the lesion

MINERAL TRIOXIDE AGGREGATE (MTA)

Mineral trioxide aggregate (MTA) was developed in the early 1990s at Loma Linda University, as a root-end filling material by Torabinejad and

colleagues. It consists of 50-75% calcium oxide and 15-25% silicon dioxide which together constitute 70-95% of the cement. When these raw materials are mixed they form Tricalcium silicate, Dicalcium silicate, Tricalcium aluminate, and Tetra calcium aluminoferrite. On adding water, the cement forms silicate hydrate gel. Bismuth oxide is added to enhance the radio-opacity. MTA is a good material for root-end filling, repair of perforations, vital pulp therapy, and apical barrier formation. Parirokh and Torabinejad have described five classical characteristics of MTA which are (a) It releases calcium ions for cell attachment and proliferation, (b)Creates an antibacterial environment by virtue of its alkaline pH (12.5), (c)Modulates cytokine production, (d)Encourages differentiation and migration of hard tissue producing cells and (e)Forms Hydroxy apatite and provides a biologic seal [7]. The advantages of MTA include being non-resorbable and non-toxic. It possesses bacteriostatic properties and ensures a good hermetic apical seal. Being a hydrophilic material it needs moisture for its setting and hence isolation is not that critical. But MTA too possess several drawbacks like long setting time of around two and half hours, it is very expensive and once the material sets there is no known solvent to remove or dissolve it.

REVIEW OF LITERATURE

Periapical cyst is the most common cyst of the oral cavity, constituting around 52 – 70 % of all odontogenic cysts [8]. The choice of treatment is determined by factors such as the extent of the lesion, relationship with anatomical structures, clinical characteristics, cooperation and systemic status of the patient. In conditions like large periapical lesions, improper obturations, calcified canals and dilacerated roots surgical intervention becomes necessary.

Large periapical lesions, often do not heal by nonsurgical therapy and requires surgical intervention [9]. The surgical intervention removes pathological tissue around the infected root-end and seals from remaining bacteria at the periradicular region [10]. Disruption of the cortical plate and presence of sinus tract results in poor prognosis of the involved tooth [11].

In our patient, a root canal treatment was first performed followed by complete surgical removal of the cystic lesion in toto. The root end was resected and prepared for retrograde restoration with MTA material.

MTA is a bioactive cement and has an osteoinductive and cementogenic action that stimulates immune cells to release lymphokines that are needed for repair and regeneration of cementum and stimulates factors necessary for remineralization of osseous periapical defects. Several studies have shown that MTA as a root-end filling material promotes regeneration of the periodontal ligament. It has also been found that the cement brings about the closure of

accessory foramina [12]. MTA treated teeth have significantly better healing than teeth treated by Gutta Percha root filling only [11].

CONCLUSION

MTA is surely a promising material in the endodontic and surgical perspective with good long term results in otherwise compromised cases. But being an expensive material the use of MTA for large lesions is controversial and the use of cost effective materials needs to be studied and evaluated. The combined team approach of maxillofacial surgery, endodontics, oral pathology and radiology is required to provide the patient an effective treatment.

CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

AUTHORS' CONTRIBUTIONS

All the authors have contributed equally for publishing of this article

COMPETING INTERESTS

The authors declare that they have no competing interests.

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REFERENCES

1. Shear, M., & Seward, G. R. (1992). Cysts of the oral regions. John Wright. *Radicular and residual cysts*; pp. 136–62.
2. Riachi, F., & Tabarani, C. (2010). Effective management of large radicular cysts using surgical enucleation vs marsupialisation. *International Arab Journal of Dentistry*, 1(1), 44-51.
3. Eversole, L. R. (2001). Clinical outline of oral pathology: diagnosis and treatment. *PMPH-USA.*, pp. 203–59.
4. Bodner, L. (2002). Cystic lesions of the jaws in children. *International journal of pediatric otorhinolaryngology*, 62(1), 25-29.
5. Torabinejad, M., Hong, C. U., Lee, S. J., Monsef, M., & Ford, T. R. P. (1995). Investigation of mineral trioxide aggregate for root-end filling in dogs. *Journal of Endodontics*, 21(12), 603-608.
6. Camilleri, J., & Pitt Ford, T. R. (2006). Mineral trioxide aggregate: a review of the constituents and biological properties of the material. *International Endodontic Journal*, 39(10), 747-754.
7. Parirokh, M., & Torabinejad, M. (2010). Mineral trioxide aggregate: a comprehensive literature review—part III: clinical applications, drawbacks, and mechanism of action. *Journal of endodontics*, 36(3), 400-413.
8. Ali, M., & Baughman, R. A. (2003). Maxillary odontogenic keratocyst: a common and serious clinical misdiagnosis. *The Journal of the American Dental Association*, 134(7), 877-883.
9. Morse, D. R., & Bhambhani, S. M. (1990). A dentist's dilemma: nonsurgical endodontic therapy or periapical surgery for teeth with apparent pulpal pathosis and an associated periapical radiolucent lesion. *Oral surgery, oral medicine, oral pathology*, 70(3), 333-340.
10. Christiansen, R., Kirkevang, L. L., Hørsted-Bindslev, P., & Wenzel, A. (2009). Randomized clinical trial of root-end resection followed by root-end filling with mineral trioxide aggregate or smoothing of the orthograde gutta-percha root filling—1-year follow-up. *International endodontic journal*, 42(2), 105-114.
11. Chaturvedy, V., & Chaturvedy, S. (2012). Regenerative Therapy as an Adjunct to Periapical Surgery: A Case Report. *International journal of clinical pediatric dentistry*, 5(1), 75-77.
12. Bogen, G., & Kuttler, S. (2009). Mineral trioxide aggregate obturation: a review and case series. *Journal of endodontics*, 35(6), 777-790.