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CONVENTIONAL ENDODONTIC THERAPY OF UPPER CENTRAL AND LATERAL INCISORS COMBINED WITH CYST DECOMPRESSION: A CASE REPORT

Mihaela Salceanu[1], Cristian Levente Giuroiu[2], Tudor Petru Hamburda[3], Gabriel Melian[4], Elena Cristina Guzu5, Anca Melian[6]

Membru corespondent: Cristian Levente Giuroiu giuroiu.cristian@yahoo.com

[1,6] Lecturer PhD, [2,3] Univ. Assistant PhD, [5] Endodontic resident — "Gr. T. Popa" U.M.Ph. - Iași, Romania, Faculty of Dentistry, Department of Odontology, Periodontology, and Fixed Prosthesis
[4] Maxillofacial surgeon PhD, private practice, Iasi, Romania

Abstract

Radicular cysts are found in 15% of periapical lesions. Current practice accredited cyst surgery as therapeutic approach of choice leading in some cases to important bone loss and teeth loss, difficult to recover. Radicular cyst has a membrane and a content, recent studies demonstrating that cystic lesions are maintained due to the presence of irritants in cystic cavity. Based on literature research studies, removal of irritants from cystic cavity through a conservative treatment, conventional root treatment combined with surgical decompression, should lead to periapical wound healing by triggering apoptosis and regression of the lining epithelium of the apical cyst.

Key words: radicular cyst, conservative treatment, surgical decompression, apoptosis.

Radicular cyst (RC), the most common odontogenic cyst is a form of apical periodontitis, a chronic inflammatory disorder of peri radicular tissues caused by etiological agents of endodontic origin, microorganisms and their products and it occurs as a sequence of various insults to the dental pulp, including infection, physical and iatrogenic trauma. Two types of inflammatory apical cysts have been histologically described. The pocket cyst and the true cyst. The pocket cyst has its cavity opened to the root canal. The true cyst is completely enclosed by lining epithelium and may be attached to the root apex by a cord of epithelium. The reported incidence of apical cysts among periapical lesions varies considerably from 6% to 55%. However Nair et al. found that only 15% of AP are cysts, while 9% of them were apical true cysts and 6% were apical pocket cysts (1).

It is widely accepted that after proper nonsurgical endodontic therapy, most peri radicular lesions, excepting apical true cysts heal (2), but it was not very clear how the epithelium of apical cysts regress after conservative treatment. Recently, the correlation between apoptosis and the regress of lining epithelium of apical cysts after nonsurgical endodontic therapy was immunohistochemically demonstrated. Apoptosis will not cause inflammation because apoptotic cells do not become lysed and release proinflammatory intracellular contents into the tissue (3, 4, 5).

Based on literature research studies it is supposed that the removal of irritants from cystic cavity, through conventional root therapy combined with surgical decompression, can lead to periapical wound healing by triggering apoptosis and regression of the lining epithelium of the pocket or true apical cyst.

Case description

A 16 years-old male patient was referred to the U.M.Ph. "Grigore T. Popa" Dental Clinic in Iasi, Romania for mobility of upper anterior incisors #11-12. He was otherwise healthy with a noncontributory medical history and no past dental history. He mentioned a dental traumatism at 7 years old, but never attended dental office nor followed any monitoring

treatment until he noticed the sinus tract (6, 7). Intraoral clinical examination revealed a fracture of incisal margin, discoloration of 11 and 12, mobility grade I and a straw-colored fluid through vestibular sinus tract corresponding to the right maxillary incisors. Heat testing with plasticized Gutta-percha and cold testing with ice stick was negative in tooth no # 11 and 12, positive in tooth #13 (8 8).

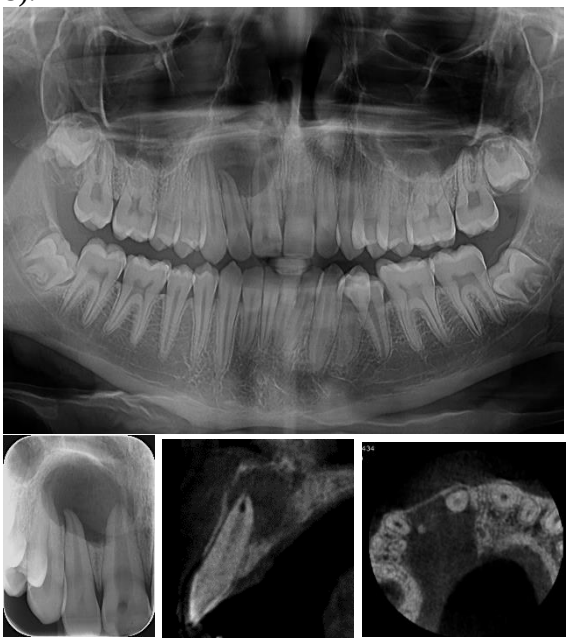

Fig.1. Periapical radiolucency: initial orthopantomography (a), intraoral radiography (b), sagittal CBCT (c), axial CBCT (d).

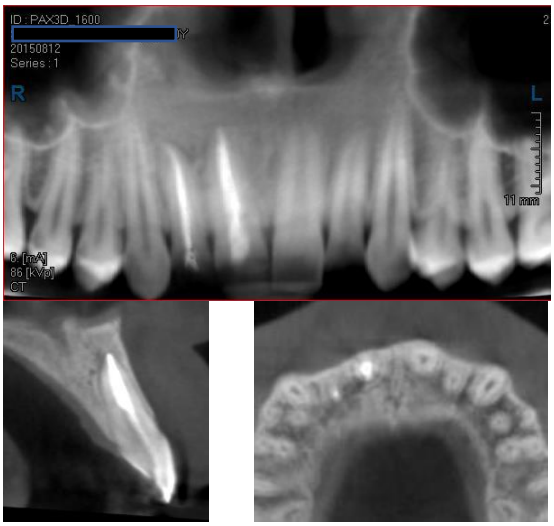

Fig.2. CBCT after 4 years: coronal view (a), sagittal view (b) and axial view (c).

A diagnostic orthopantomography (Fig 1a) showed an extensive radiolucency including the periapical region of teeth no# 11,12 and 13. The extent of periapical radiolucency was 20 mm x 16 mm as established by orthopantomography and CBCT (fig. 1 b, c).
A preliminary clinical diagnosis of a periapical cyst was made as follows: the periapical lesion involves two teeth with necrotic pulps, the lesion is 200 mm^2 in size, and a straw-colored fluid is produced on drainage through sinus tract. Cholesterol crystals were not likely to be found because drainage through the sinus tract was ensured. Following rubber dam isolation, the working length was established using the ROOT ZX II (Morita) apex locator. The root canals were large and were minimally instrumented with K-files #25-40 and generously irrigated with passive ultrasonic activation using 2.5% NaOCl followed by irrigation with sterile physiological saline and drying it with paper points. A non-setting calcium hydroxide paste was placed into the canal and the access cavity was closed temporary with a glass ionomer cement (GC Fuji IX GP). The intracanal dressing was changed every 2 weeks two months and after these two months the canal was obturated in cold lateral compaction using TotalFill BC sealer and TotalFill BC Points (FKG Dentaire) coated and impregnated with bioceramic nanoparticles. Access cavity was sealed with *Ceram X Mono (Dentsply Sirona).*

The surgical decompression was performed at the beginning of the treatment, and followed the next steps: loco regional anesthesia with articaine 4%; a mucoperiosteal flap over cyst was raised and a window is opened in the buccal bone to give adequate, minimal access for a cannula of 2-3 cm in length inserted into the depth of the cavity cyst and fixed with sutures. The irrigation was made through the cannula with saline and chlorhexidine gluconate 0.12%(CHX) for 1 week every 48

hours, two times per week for the next weeks and was removed the day after root canal obturation simultaneously with one more irrigation through it.

Results.

Clinical and radiological results were recorded across the treatment and annually, four years after the treatment in order to establish the correlations with the cyst evolution.

Clinical the incisors are asymptomatic and the canine preserved his vitality. The radiographs and CBCT scan taken two months later and annually across 4 years show significant bony healing that does not require surgery.

Discussions

The lining epithelium of cavity cyst is related to epithelial cell rests of Malassez (ERM) which may be the source of apical cyst formation (9, 10). The proliferation of epithelial cells ERM may be stimulated by endodontic factors exotoxins and endotoxins, but also by other extra radicular factors able to induce a foreign body reaction at the periapex: cholesterol crystal, foreign materials trapped in periapical tissue during and after non-surgical endodontic treatment, fine particles of gutta-percha or gutta-percha cones contaminated with tissue irritating materials, cellulose-containing materials used in endodontic treatment or vegetable food particles, particularly leguminous seeds (pulses). Besides root canal infection and foreign bodies, it has been showed that over instrumentation and overfilling (beyond the tooth apex) could also stimulate epithelial cell rests to proliferate in the periapical tissues (11, 12, 13,14).

The lining epithelium of apical cysts may be considered as a defense measure of the periapical tissues in response to irritants inside the root canal because it may act as a physical barrier to confine irritants inside the root canal or in the lumen of a cyst and prevents spread of intracanal infection into the surrounding alveolar bone. In the same time an inflammatory apical cyst may resist conventional root canal therapy because it cannot be achieved cavity drainage and the disinfectants do not reach the cyst cavity. Unfortunately, the scientific literature does not contain studies that demonstrate clearly enough if whether or not periapical cysts heal after non-surgical root canal treatment. The rich volume of clinical information has enabled the use of a variety of techniques which are different in method of treatment of radicular cysts.

Oral surgeons consider that cysts do not heal and should be removed by surgery. However the cystectomy is more complicate than endodontic treatment, perhaps even with limits imposed by different general diseases. Surgical enucleation of the cyst needs the extraction of causative tooth and sometimes the extraction of adjacent teeth and consequently with large bone defect that could it may require additional techniques for bone augmentation. The time for healing is not very short and the tooth loss makes necessary the prosthetic therapy, sometimes very expensive (15, 16).

Many endodontists, on the other hand, hold the view that majority of pocket cysts heal after endodontic treatment because it is possible to eliminate the irritants from the cavity cyst through the canal, the goal of the treatment (17, 18, 19). But how can we be so sure that it is a pocket cyst and not true cyst because a correct histopathological diagnosis of periapical cysts is possible only through serial sectioning or step-serial sectioning of the lesions removed *in toto?*

For a true cyst the lining epithelium cavity is like a wall between two spaces and makes impossible the drainage from periapex. If it is supposed from beginning that all cysts are true cysts it is possible achieve the goal by a simultaneously different therapeutic approach of these two spaces: orthograde root canal treatment and surgical decompression of cyst cavity. Surgical decompression is a more conservative surgical approach for the treatment of large cyst, minimally invasive and cost-effective (20, 21). The surgical

decompression makes possible the elimination of the irritating agents from cyst cavity and the irrigation with antiseptic solutions. It can be supposed that if all the irritants have been removed, the apoptosis of the epithelial cells could occur followed by the healing of the lesion.

Conclusions

Successful resolution of a radicular cyst is possible with conventional root therapy in combination with surgical decompression and must be the first treatment option in these cases. Surgical treatment (cystectomy) can be done if the lesion persists, but with the advantage of a smaller bone loss and the preservation of more teeth.

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