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Case Report

Radicular Cyst with Epithelial Metaplastic Changes: A Case Report

Usha Hegde[1], Alekya Akasapu[2]

[1]Prof & Head, [2]Post-Graduate Student,
Department of Oral Pathology and Microbiology, JSS Dental College and Hospital, Mysuru.

Corresponding Author: Alekya Akasapu

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ABSTRACT

Radicular cyst is the most common cystic lesion in the jaws, which is always associated with non-vital tooth. It arises from the epithelial residues within the periodontal ligament as a result of inflammation. The occurrence of ciliated, vacuolated, or mucous cells in odontogenic lesions is rare, but a well-recognised phenomenon. They are more commonly seen in maxillary lesions (21%) than mandibular lesions (14%). Metaplastic changes into these forms are found in the epithelial lining of radicular cysts, commonly on the surface layer. The pathological basis for this transition is poorly understood. We hereby present a case of radicular cyst with unusual changes in the epithelial lining, in a 29 year old female patient.

Key words: Radicular Cyst, Vacuolated Cell, Metaplasia, Mucous Cell.

INTRODUCTION

The term cyst is derived from Greek word 'kystis' meaning sac or bladder. It is defined as "A pathological cavity having fluid, semi fluid or gaseous content and which is not created by the accumulation of pus. It is frequently, but not always lined by epithelium." Radicular cysts are the most common inflammatory cysts and comprise about 52-68% of all the cysts affecting the human jaw. [1] They arise from the epithelial residues in the periodontal ligament and are always associated with a non- vital tooth. High frequency of occurrence in the 3rd decade with a slight male predilection is reported. They occur in all the teeth bearing areas of the jaws, being more common in the maxilla. They are the most common cause of swellings in the jaws, 60% in maxilla and 40% in mandible with high frequency in maxillary anterior region, reason being that the maxillary anterior teeth are more prone to traumatic injuries. [2] Most of the radicular cysts present as asymptomatic slow growing swellings of the jaws. [1-3]

Radiographically, they present as round to ovoid well-defined radiolucency with corticated borders. Large lesions can resorb or displace roots of adjacent teeth. [1,2]

A Histomorphological change in the epithelial lining of a cyst includes metaplasia, degeneration, dysplasia and malignant transformation. Metaplastic changes in the form of mucous cells or ciliated cells are frequently found in the epithelial linings of both maxillary and mandibular lesions, with the incidence of mucous metaplasia being more common in maxillary cysts. [1,2] It is reported that mucous cells are present in 39.6% of odontogenic cysts. They may be present on the surface layer of stratified squamous epithelium lining, either as a continuous row or as scattered cells, and may also be found

associated with ciliated and vacuolated cells. [3] We present one such case of radicular cyst showing metaplastic changes in a 29 year old female patient, with a history of trauma to her upper front teeth region.

CASE REPORT

A 29 year old female patient was referred from a private dental practitioner, for management of broken upper front teeth. There was reported history of trauma to the upper front teeth with attempted RCT 5 years back. Patient gives history of pus discharge from the same region 2 months back, for which refilling of the root canals were done elsewhere. Presently patient reported with continued pus discharge from the same region.

Intraoral examination revealed vestibular obliteration i.r.t 11, 12 & 21. These teeth were also discoloured. 21 showed Ellis class III fracture and a sinus opening on the labial vestibule. All the teeth were non vital, non- tender and RC treated. Intraoral periapical radiograph (IOPAR) confirmed the root canal treatment done. Well defined periapical radiolucencies measuring about 0.5 x 0.5 cm i.r.t 21 & 2.5 x 2 cm i.r.t 11, 12 were noted (Fig 1). A provisional diagnosis of chronic periapical lesion was made and the biopsied tissue was sent for histopathological examination.

Microscopic examination of specimen from 11 and 12 regions, stained in hematoxylin and eosin (H&E) showed a cystic lining of stratified squamous non keratinized epithelium with clear cell changes in the superficial layer. The connective tissue showed dense collagen bundles with plenty of inflammatory cells and blood vessels (Fig 2a). The sections were stained with periodic acid Schiff reagent (PAS) which revealed few vacuolated cells (Fig 2b). Few of the vacuolated cells showed positive PAS reaction, suggesting the presence of mucous (Fig 3). A diagnosis of radicular cyst with mucous metaplasia was given.

Specimen from 21 regions revealed a non- specific inflammatory lesion.

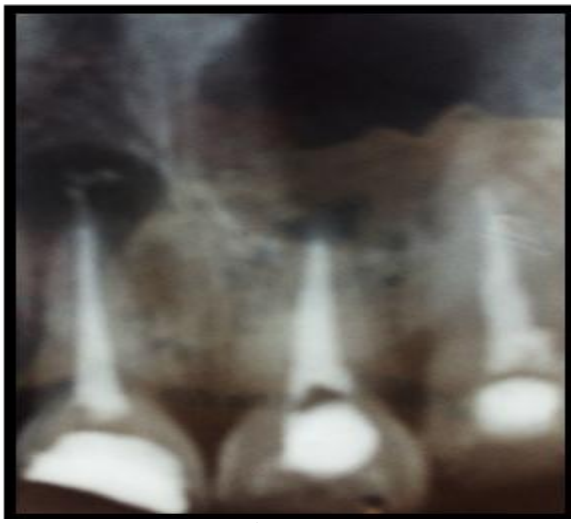

Fig 1: IOPAR shows well defined periapical radiolucencies i.r.t 11 and 21, 22.

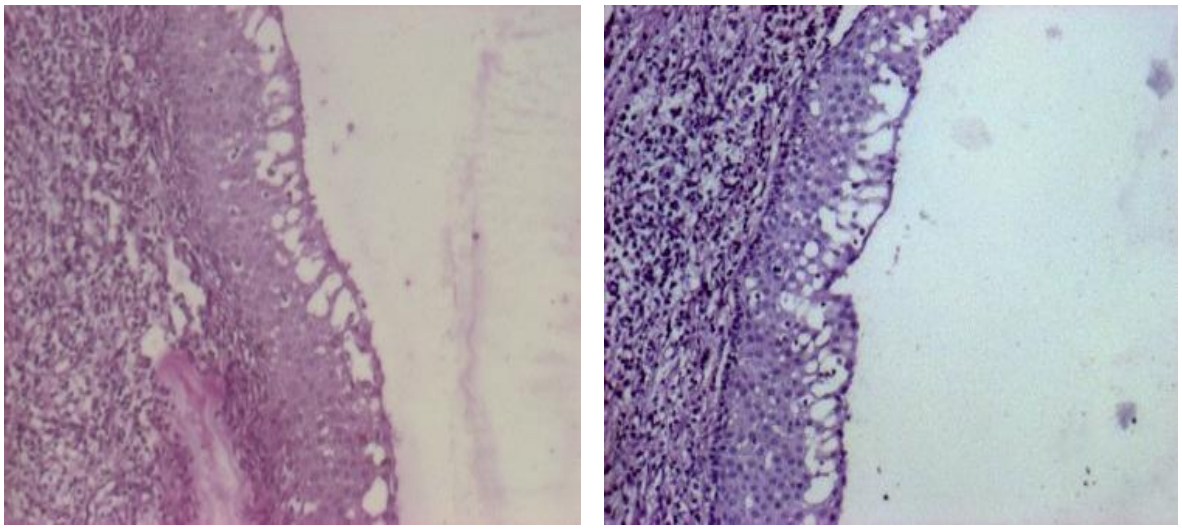

Fig 2: Microscopic section reveals cystic lumen, epithelial lining with vacuolated connective tissue capsule. (a) H & E stain, (b) PAS stain. (Magnification x 100)

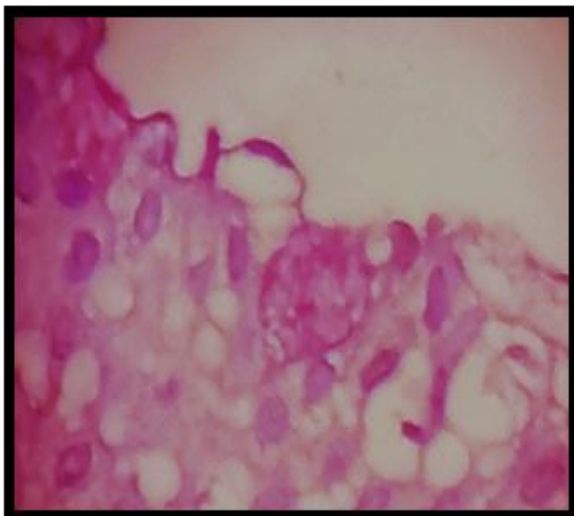

Fig 3: PAS stained section revealing PAS positive superficial epithelial cells. (Magnification x 400)

DISCUSSION

Radicular cysts are well established, most common inflammatory cysts of the jaws accounting for 62% of the odontogenic cysts. Histopathologically, they consist of a lumen, stratified squamous epithelial lining and connective tissue capsule. [1] The lining epithelium may be proliferative and show arcading pattern in early stages. As the cyst enlarges, it becomes fairly regular with certain degree of differentiation and resembles a simple stratified epithelium. About 2% of radicular cysts show keratin formation. Hyaline bodies/ Rushton bodies are often found in large numbers within the epithelium. [1,4] The connective tissue which makes up the wall of the radicular cyst is composed of bundles of collagen fibres with fibroblasts and small blood vessels. Inflammatory infiltrate in the connective tissue adjacent to the epithelium is a characteristic feature. Cholesterol clefts with multinucleated giant cells may be found in the wall of the lesion. The lumen of the cyst usually contains fluid with low concentration of proteins. [1,5]

Mucous cells or ciliated cells are frequently found in the epithelial linings of both maxillary and mandibular cysts, suggestive of metaplasia. Mucous cells are round to flat cells; vary in size, shape and position in the epithelium. They occur singly or in groups, mostly in the superficial layers of the epithelium. [4-6] They may be present in the surface of the lining epithelium as a continuous row or as scattered cells and stain positive with PAS. [1,5] Mucous cells are seen in epithelial linings of 18% of radicular cysts. [4] Here, in our case we found a cystic cavity lined by stratified squamous non keratinized epithelium and having scattered vacuolated and mucous cells in the surface epithelial lining of the cyst, supported by an inflamed connective tissue capsule.

The word Metaplasia is derived from the Greek word ‘metaplasia’ which means “change in form” or ‘trans differentiation.’ Metaplasia by definition is a reversible change in which one adult cell type is replaced by another adult cell type. It is a type of cellular adaptation which takes place, so that the cells which are sensitive to particular stress will be replaced by another cell type and can withstand adverse environment. It occurs due to genetic reprogramming of stem cells. The differentiation of stem cells into a particular lineage is because of the signals generated by cytokines, growth factors, and extracellular matrix components. It is thought that, if the metaplastic transformation is persistent, it may lead to malignant transformation. The causes for metaplasia are direct stimulation of cells (as in chronic irritation), vitamin A deficiency or mutation. [7] In the present case, stimulation caused by chronic infection could be the cause for metaplasia.

The mechanism of mucous metaplasia in odontogenic cysts is not clearly known. Vacuolated cells and mucous cells are observed in the surface epithelial lining. [4,8] A vacuolated cell represents a stage of histogenesis of mucous metaplasia. In the process of metaplasia, the keratinocytes become vacuolated, and these vacuoles get accumulated with mucin granules, leading to formation mucous cells. [3,4,8] In our case too we found few empty vacuolated cells and few cells which stained positively with PAS reagent, thus reinforcing this mechanism.

The significance of mucous metaplasia is that it accounts for the viscous/mucinous consistency of the cystic fluid which partly accounts for the cyst expansion. [4] Here in our case, the mucous metaplasia may be the reason for the increased size of the lesion.

Conventional non-surgical RCT is the treatment of choice in management of periapical lesions. When this treatment fails in resolving the periradicular pathosis alternate approach like non-surgical retreatment or periapical surgery with apicoectomy should be considered. [9] In case of very extensive lesion, as there is a chance for inadvertent undesirable consequences when surgical curettage is done, the procedures like marsupialization or tube decompression is indicated. Choice of treatment is dependent on the size and localization of the lesion, integrity of the cyst wall and its proximity to vital structures. Treatment should always be as conservative as possible. [10] In our case, initially RCT was performed which was followed by reinfection 5years later. A non-surgical retreatment was tried, which also resulted in non-eradication of the periapical lesion. Therefore finally apicoectomy followed by RCT was resorted to. The follow up of 1year duration after this has been uneventful.

CONCLUSION

Radicular cyst is the most common inflammatory cyst occurring in the jaws. The histomorphological change it exhibits has an impact on the pathogenesis and partly accounts for cyst expansion. One such change is the metaplasia of the superficial epithelial cells into mucous cells. Hence when such a change is seen, we generally encounter a large and persisting cyst which needs proper treatment planning and regular follow up.

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