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HISTOPATHOLOGICAL EXAMINATION IS MANDATORY TO CONFIRM DIAGNOSIS OF PERIAPICAL LESIONS: A REVIEW

Dental Science

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ABSTRACT

Periapical lesions are the lesions pertaining to the tissues around the apex of a tooth root, including the periodontal membrane and the alveolar bone. These are often diagnosed on clinical and radiological basis that may be different from the histological finding. The lesions most commonly found at the apices of non-vital teeth are the periapical granuloma and radicular cyst. A variety of lesions can mimic the pulpo-periapical lesions radiographically for example odontogenic keratocyst, periapical cementosseous dysplasia, benign tumors and locally aggressive or malignant neoplasms.

KEYWORDS

Cysts, Granuloma, Neoplasms, Non – vital teeth, Periapical lesions.

INTRODUCTION

A periapical lesion is a lesion involving the apical area of the tooth. Periapical lesions are not caused by microbial infection alone but also by other primary and independent factors, such as necrotic pulp, stagnant tissue fluid or root canal fillings.[1] A wide variety of periapical lesions has been documented which, in the absence of histopathological examination were clinically suggestive of inflammatory sequelae of pulpal necrosis (SPN).[2] Periapical lesions often present differently on the radiograph resulting in a dilemma in the mind of dentists to arrive at a final diagnosis. In general, tissue removed from the apices of nonvital teeth when examined microscopically, represent periapical granuloma and periapical cyst. Although rare, clinically confusing periapical lesions estimated to be between 0.7 to 5% have been extensively documented in numerous case reports.[3] These lesions represent wide range of pathosis including various developmental cysts, infections, benign but locally aggressive lesions and malignancies.[3,4,5] Therefore,histopathological examination is gold standard for establishing accurate diagnosis and differentiating among various periapical pathosis. This review discusses histopathologic diagnosis of periapical lesions, with an emphasis on cases showing unusual findings. There have been numerous reports documenting clinically distinguishable periapical lesions. Various developmental cysts, benign and malignant lesions, fibro-osseous lesions, infections, granulomatous inflammatory conditions, anatomical structures have been described.[5]

Cysts

Cysts that resembles endodontically mediated periapical lesions include odontogenic keratocysts, lateral periodontal cysts and nasopalatine duct cysts. Within this group, the odontogenic keratocyst (OKC) is the most important because of its recurrence and aggressive behaviour.[6]

Odontogenic keratocyst (OKC) is the developmental odontogenic cyst arise from and arise from rests of dental lamina. Microscopic features shows cystic lining composed of a relatively uniform layer of parakeratinized stratified squamous epithelium with 6 to 10 cell thickness without rete ridge formation and with corrugated surface. The basal cell layer of cuboidal to columnar cells with hyperchromatic and palisaded nuclei is observed. The connective tissue wall may be containing epithelial islands or daughter cyst.[7] Radiographic features consist of a unilocular or multilocular well-defined radiolucency with or without root resorption. This lesion has an aggressive behaviour and high rates of recurrence.According to performed studies about 0.7% of periapical cysts represent OKCs. Treatment of OKC is enucleation and curettage. The patient with this lesion should be followed up after five years of treatment, due to high rates of recurrence.[8]

Lateral periodontal cyst (LPC) is one of the developmental odontogenic cysts with dental lamina rest origin.[7] Histopathologic evaluation shows that the cystic cavity is lined by thin stratified squamous epithelium and in some area, by focal nodular thickening. Most of the lesions are asymptomatic.[7] This lesion can be misdiagnosed as a lateral radicular cyst, because of the similar radiographic features including radiolucency along lateral root surface.[9] Treatment of this lesion includes conservative enucleation without root canal therapy.[7]

Nasopalatine duct cyst is the most common developmental nonodontogenic cyst which is asymptomatic, but sometimes show pain, swelling of the anterior palate and pus drainage.[7,10] Histopathologic examination shows cystic lesion, which is lined by ciliated stratified squamous epithelium with fibrous connective tissue wall, and inflammatory cells.[7]In radiographic view, well-defined radiolucency can be usually seen in the maxillary midline or between the apexes of central incisor roots.This cyst can be misdiagnose as an inflammatory periapical lesion when radiographs show a superimposition of the incisor canal or foramen over the apex of maxillary central incisors.[7]

Benign Lesions include locally destructive lesion that has been mistaken for periapical disease is the central giant-cell granuloma.[11]Other reported lesion is central ossifying fibroma.[12]

Central giant cell granuloma (CGCG) is more common in anterior segments of the jaws and usually crosses through the midline. Radiographic features shows a well-defined unilocular or multilocular radiolucency and a behaviour ranging from nonaggressive to aggressive.[7]Nonaggressive type has slow growth and low recurrence rate. In aggressive type, the rapid growth, high rate of recurrence, cortical bone perforation, root resorption, and tooth displacement has been observed. In histopathologic examination, this lesion consists of proliferating endothelial cells, fibroblasts and myofibroblasts, small blood vessels, and multinucleated giant cells in a connective tissue. Treatment is curettage, but radical surgery may be needed for aggressive type.[7, 11, 13]If this lesion is observed in periapical area, it can be misdiagnosed as endodontic inflammatory lesions, and as a result,

root canal therapy would not be effective. Therefore, the lesion will grow again after treatment and lead to more bone destruction.[13]

Ossifying fibroma (OF) is a rare benign jaw neoplasm, which is constructed by connective tissue of variable cellularity with mineral component in the form of trabecular or woven bones. Based on the amount of calcified material, radiographic view could be mixed radiolucent and radiopaque.[7,14]

Periapical Cemental Dysplasia (Cementoma) is a fibrosseous lesion affecting the periapical region of the anterior mandible. This lesion is usually asymptomatic which shows multiple lesions but solitary lesions are also observed.[7] Histopathologic feature shows the cellular mesenchymal tissue and collagen fibers with small blood vessels, a mixture of woven or lamellar bones, and cementum-like particles. Radiographic features shows well-defined unilocular radiolucency feature rounding the root apex, and there is loss of lamina dura in early stages.[7,15]This lesion is similar to some endodontic inflammatory lesion such as dental granuloma or radicular cyst. To distinguish these lesions from endodontic lesions radiographs and histopathologic analysis is mandatory.

Infection Disease - Diseases such as actinomycosis, histoplasmosis, and aspergillosis have been observed in periapical areas. Histopathologic examination of actinomycosis demonstrates a band of fibrous connective tissue with chronic inflammatory cells infiltration and colonies of organisms.Treatment plan for these are endodontic treatment, antibiotic therapy and some times apical surgery.[7]

Malignant Jaw Lesions Some periapical lesions of nonendodontic origin might mimic lesions of endodontic origin. Several malignant lesions are observed in periapical area such as lymphoma, leukemia, multiple myeloma, squamous cell carcinoma, adenocarcinoma, chondrosarcoma, osteosarcoma, and metastatic lesions. Insufficient knowledge about this lesion may lead to delay in diagnosis and poor prognosis.[16]

Anatomic Superimpositions The most common presentation is the superimposition of the mental foramen.An unusual case involving a median mandibular salivarygland inclusion has been described as a confounding radiographic presentation that suggests periapical disease.[17]

CONCLUSION –

Routine submission of periapical biopsies is required to establish a specific diagnosis any time a recoverable amount of tissue can be removed from a periapical surgical site to rule out uncommon potentially destructive and life threatening conditions. To avoid endodontic mistreatment, the dentist should know all odontogenic and nonodontogenic lesions that may present in periapical areas.

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