PERIAPICAL ABSCESS – A REVIEW

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ABSTRACT

A periodontal abscess is a localized, purulent infection involving a greater dimension of the gum tissue, extending apically and adjacent to a periodontal pocket. The periodontal abscess is the third most common dental emergency, representing 6-14% of all dental emergencies. The periodontal abscess can be classified depending on their course, number, location and etiological criteria. Etiology of the periodontal abscess have been either directly associated to periodontitis or to sites without prior existence of periodontitis. Local and systemic predisposing factors make patient prone to the periodontal abscess.

Microorganisms that colonize the periodontal abscess have been reported to be primarily gram-negative anaerobic rods. Common clinical features of the periodontal abscess are presence of generalized periodontal disease with pocketing and bone loss, usually associated with a vital tooth, overlying gingival erythematous, tender and swollen, pus discharge via periodontal pocket or sinus opening. The periodontal abscess should differentiated/ ruled out from similar conditions and lesions as gingival abscess, periapical abscess, perio-endo lesion, endo-perio lesion, cracked tooth syndrome and root fracture. Diagnosis of a periodontal abscess is usually based on the chief complaint and the history of the presenting illness, clinical findings and investigations. The management of the periodontal abscess can divided into three stages: immediate management, initial management and definitive therapy. Early diagnosis and prompt treatment are extremely important for the management of a periodontal abscess.
abscess, since this can lead to loss of involved tooth. In this review article, all aspects of the periodontal abscess were described.

KEYWORDS: Abscess, antibiotics, drainage, microorganisms, periodontal abscess.

INTRODUCTION

Periapical abscess and focal inflammation of the root of the tooth occurs due to penetration of bacteria into the pulp, because of preceding dental caries and plaque formation, which facilitates the entry of bacteria into the soft tissues of the tooth.[1] Once the bacteria penetrate through enamel and dentin, they reach the pulp, which contains blood vessels and nerves; then, they cause an inflammatory reaction, as well as the formation of pus, leading to the development of abscesses[2], which can occur both in the tooth itself, or in the surrounding structures, such as the gums. The term "periapical abscess" implies the formation of this collection of pus at the apex of the root of the tooth.

Periapical abscess occurs as a result of bacterial infection of the tooth and the surrounding structures, most commonly on the grounds of dental caries and tooth decay. Focal inflammation and abscesses can produce intense pain and the diagnosis can be achieved through physical examination. Treatment includes antibiotics, root canal procedure, and sometimes resection of the gums to allow for pus drainage.[3]

ETIOLOGY

Periapical abscess is a bacterial infection and pathogens that have been associated with this infection include Bacteroides spp., Fusobacterium, Actinomyces, Peptostreptococcus, Prevotella oralis and Prevotella melaninogenica, as well as Streptococcus viridans.[3] Most of these organisms are commensal hosts of the oral flora and enter the pulp, leading to the formation of abscesses when the structure of the tooth is breached, which is the case in dental caries, tooth decay, or mechanical trauma. Recent advances in microbiological testing have resulted in the discovery of other pathogens as causative agents of this type of infection, including Treponema spp., Atopobium, Bulleidia extructa and Mogibacterium species, as well as Cryptobacterium curtum.[4] Up to a third of the microorganisms isolated in these cases produce beta-lactamases, which significantly reduces treatment options.
EPIDEMIOLOGY
This form of abscess is most commonly observed in young children and associated factors include a thinner enamel because of ongoing tooth development, but also poor hygiene, which is still an issue linked to socioeconomic factors, as well as failure to seek dental care. In addition, several developmental and acquired conditions have been linked with periapical abscesses, including abnormal development of the enamel (such as dens invaginatus, or dens evaginatus), as well as dentin malformations, which can be observed in dentine dysplasia, dentinogenesis imperfecta, osteogenesis imperfecta and familial hypophosphatemia. Acquired conditions may include buccal cysts which become infected.[5]

PATHOPHYSIOLOGY
The pathogenesis of periapical abscess starts with the formation of dental plaques and erosion of the outer layers of the tooth - the enamel and dentin layers. These two structures protect the tooth pulp from harmful pathogens and once their structure is breached (as seen in the cases of dental caries or tooth decay), bacteria may enter the pulp, which is supplied with blood vessels and nerves. Once the bacteria reach the local circulatory system, the immune system recognizes the presence of bacteria, and produces an inflammatory reaction, leading to the migration of leukocytes, and production of pre-inflammatory cytokines. All these events lead to pus accumulation and abscesses, which are in this case formed at the apex of the root of the tooth.

PRESENTATION
A periapical abscess may initially be asymptomatic, but in most cases, patients present with intense, throbbing or sharp-shooting pain at the site of the abscess formation. The affected tooth is tender when pressure is applied and chewing on the side where the abscess is formed is usually avoided by the patient because of pain. Intraoral swelling is usually observed on physical examination[6], commonly accompanied with redness of the gums and swelling. In most severe cases, facial asymmetry may be observed because of intense swelling.

Constitutional symptoms, such as fever, malaise and proximal lymphadenopathy rarely appear and occur in cases of severe inflammation of the tooth and the surrounding structures.

Although very rarely, a periapical abscess may transform into a chronic infection, due to the development of sinus tracts, which serve as channels through which pus is partly drained and can potentially cause complications, such as dissemination of infection to other sites.
DIAGNOSIS

The diagnosis of periapical abscess can be made on physical examination, by inspection of the oral cavity and examination of the site where the patient reports pain and swelling. However, the original periapical lesion may not be easy to identify right away, because of possible tissue destruction created by inflammation and infection.

Nevertheless, the diagnosis of periapical abscess should include the following diagnostic steps:

- Evaluate possible underlying risk factor - numerous conditions, as mentioned, predispose patients to development of periapical abscesses and should be investigated, but primary causes include dental caries and tooth decay.
- Perform a complete blood count, to evaluate the presence of leukocytosis in the blood. Usually, when leukocyte levels are high, the predominant cell type will be neutrophilic.
- Perform blood culture in severe cases with signs of systemic infection - both aerobic and anaerobic cultures should be obtained if the patient reports fever.
- Radiography can help to exclude other localization - it is important to distinguish periapical abscesses from other forms, such as periodontal abscesses and X rays may initially help in identifying the exact site of lesion.

TREATMENT

Treatment principles include several approaches:

- Root canal procedure - smaller lesions, as well as localized and uncomplicated periapical abscesses result in infection of the pulp and damage of proximal blood vessels and nerves, which mandates their removal and cleaning. This procedure comprises the removal of the pulp, as well as of infected and damaged structures, abscess drainage and resolution of infection, with appropriate replacement and filling of removed structures. After the procedure, subsequent irrigation with disinfectant material is performed to prevent recurrences.
- Surgical care - in the setting of accumulated pus in the gums and tooth surroundings, surgical incision and drainage is recommended, in order to drain the abscess and pus. In more severe cases, tooth removal may be recommended.[7]
- Symptomatic therapy - since patients often present with severe pain, non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and diclofenac are prescribed to reduce pain, but also because of their anti-inflammatory properties.
Antibiotic therapy - Treatment of periapical abscesses with antibiotics is usually reserved for larger abscesses\textsuperscript{[8]}, and therapeutic choices include metronidazole, clindamycin and amoxicillin.\textsuperscript{[9]}

**PROGNOSIS**

In most cases, periapical abscesses occur in the setting of a localized infections and bacteria rarely spread to adjacent structures and distant sites. However, spread of infection to the adjacent bone and sinuses have been observed, as well as dissemination to the central nervous system and other sites through circulation, but these occurrences are quite rare. In terms of the periapical abscesses themselves, those that have extended to the floor of the mouth or to the neck may result in partial airway obstruction, and necessitate prompt treatment, usually through surgical incision, to allow for the pus to be drained.

**PREVENTION**

Prevention of periapical abscesses can be achieved through proper dental hygiene, as well as regular dental examinations. Regular teeth cleaning, according to instructions given by the dentist in terms of technique and frequency, as well as other steps involved in dental hygiene should be implemented and these steps may effectively reduce the risk of any dental disease.

Fluoridation of communal drinking water has been implicated as the most effective large-scale preventive measure against dental caries\textsuperscript{[10]} and the development of other dental diseases including periapical abscesses, while fluoride supplementation is recommended in fluoride-deficient areas.

**CONCLUSION**

Early diagnosis and prompt treatment are extremely important for the management of a periodontal abscess, since this can lead to loss of involved tooth.

**REFERENCES**


