REVIEW ARTICLE

REASSESSING THE PERIODONTAL ABSCESS: THE STORY SO FAR

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INTRODUCTION

An abscess is a combat mechanism of the human body to prevent the spread of infectious materials from one part of the body to another. By definition an abscess is the localized collection of pus formed by the disintegration of tissues. An abscess is so called because there is an abscessus (Latin word means "a going away or departure") of portions of the tissue from each other to make room for the suppurated matter lodged between them. Empyema is the accumulation of pus in a pre-existing rather than a newly formed cavity.The process of abscess formation is known as suppuration and the bacteria which cause suppuration is known as pyogenic bacteria.

Periodontal abscesses are quite a common feature amongst all the pathologies affecting the oral cavity. Alternatively, it is referred to as lateral or parietal abscess. Abscess of the periodontium invade the periodontal tissues and leads to formation and collection of pus. The covering gingiva then looks to be oedematous red and shiny and has a dome shaped or may come to a pin point. It is imperative to diagnose the type of periodontal abscess and differentiate it from other pathologies that appear to be similar in presentation. Consequently, the appropriate treatment should be performed in order to retain the tooth in the oral cavity.

PREVALENCE

The prevalence of periodontal abscess is relatively high, which is often the reason why a person seeks dental care. Periodontal abscess accounts for 6% - 14% of all dental emergencies. It is the third most common dental emergency [1st is Pulpal infection (14%- 25%), followed by pericoronitis (10%- 11%)]. Amongst all emergency dental conditions, periodontal abscesses represent approximately 8% of all dental emergencies in the world, and up to 14% in the USA.

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MICROBIOLOGY

There are many microorganisms that are associated with a periodontal abscess many of which are similar to the ones found in a periodontal pocket. Streptococcus viridans is the most common isolate in the exudate of periodontal abscesses when aerobic techniques are used. It has been reported that the microorganisms that colonize the periodontal abscesses are primarily Gram negative anaerobic rods. Although not found in all cases of periodontal abscesses, high frequencies of Porphyromonas gingivalis, Prevotella intermedia, Fusobacterium nucleatum, Campylobacter rectus, and Capnocytophaga spp have been reported. Actinobacillus actinomycetemcomitans is not usually detected. The disappearance of Porphyromonas gingivalis from abscessed sites after treatment suggests a close association of this microorganism with abscess formation. When assessed with dark microscopy Spirochetes have been found as the predominant cell type in a periodontal abscess. Strains of Peptostreptococcus, Streptococcus milleri (S. anginosus and S. intermedius), Bacteroides capillosus, Veillonella, B. fragilis, and Eikenella corrodens have also been isolated.

ETIOLOGY OF THE PERIODONTAL ABSCESS

Etiology of periodontal abscess has been either directly associated to periodontitis or to sites without prior existence of periodontitis.

The causes of the periodontal abscess associated with periodontitis: extension of infection or inflammation from pocket, presence of tortuous pocket with cul-de-sac, after scaling and or after routine oral prophylaxis, inadequate scaling, marginal closure of pocket, pocket lumen insufficient to drain, treatment with systemic antibiotics without subgingival debridement, nifedipine therapy and treatment with GTR membrane both resorbable and nonresorbable.

The periodontal abscess in periodontitis may occur at various stages: acute exacerbation of untreated periodontitis, during periodontal treatment, refractory periodontitis and during periodontal maintenance. The causes of the periodontal abscess in absence of periodontitis: infected lateral cyst, perforation of tooth

by endodontics instrument, dislodged calculus fragment deep into tissue and impaction of foreign body as toothbrush bristle, food (such as fish bone) and piece of floss. Periodontal abscess caused by foreign body related to oral hygiene aids have been termed oral hygiene abscess.

Local predisposing factors for the periodontal abscess formation: external root resorption, invaginated tooth, cracked tooth, furcation involvement and cemental tears which affect morphology of roots. Diabetes is the systemic predisposing factor which makes patient prone to acute periodontal abscess.

CLASSIFICATION OF PERIODONTAL ABSCESS

Periodontal abscess can be classified as follows:

Depending on course

a. Acute periodontal abscess: The abscess develops in short period of time and lasts for a few days or week. An acute abscess often presents as a sudden onset of pain on biting and a deep throbbing pain in a tooth in which the patient has been tending to clinch. The gingiva becomes red, swollen and tender. In the early stages, there is no fluctuation or pus discharge, but as the disease progresses, the pus and discharge from the gingival crevice become evident. Associated lymph node enlargement may be present.

b. Chronic periodontal abscess: The abscess develops slowly and lasts for a long time. In the chronic stages, a nasty taste and spontaneously bleeding may accompany discomfort. The adjacent tooth is tender to bite on and is sometimes mobile. Pus may be present or may discharge from the gingival crevice or from a sinus in the mucosa overlying the affected root. Pain is usually of low intensity.

Depending on number

a. Single periodontal abscess: The abscess confined to a single tooth

b. Multiple periodontal abscesses: The abscess confined to more than one tooth

Depending on location

a. The periodontal abscess in the supporting periodontal tissues along the lateral aspect of root

b. The periodontal abscess in the soft tissue wall of a deep periodontal pocket

Depending on etiological criteria

a. Periodontitis related periodontal abscess: When acute infection originates from a biofilm in the deepened periodontal pocket.

b. Non-periodontitis related periodontal abscess: When acute infection originates from another local source, e.g. foreign body impaction, alternation in root integrity etc.

COMMON TYPES OF PERIODONTAL ABSCESSES

Abscesses of the periodontium have been classified primarily, based on their anatomical locations into three types: gingival abscess, pericoronal abscess and periodontal abscess.

GINGIVAL ABSCESS

It is a localized, painful, rapidly expanding lesion involving the marginal gingiva or interdental papilla sometimes in a previously disease-free area. Usually an acute inflammatory response to foreign substances forced into the gingiva In its early stages appears as a red swelling with a smooth, shiny surface. Within 24 to 48 hours, the lesion is usually fluctuant and pointed, with a surface orifice from which a purulent exudate may be expressed. If permitted to progress, the lesion generally ruptures spontaneously. Symptoms may include pulpal hypersensitivity.

PERICORONAL ABSCESS

It is a localized accumulation of pus within the overlying gingival flap surrounding the crown of an incompletely erupted tooth, usually occurring in the mandibular third molar area. The gingival flap appears red and swollen.

The infection may spread posteriorly into the oropharyngeal area and medially to the base of the tongue and involve the regional lymph nodes.

Patients usually have a history of pericoronitis and may experience difficulty in swallowing. The severity of pericoronitis and development of abscess formation have been associated with increasing proportions of Gram-negative anaerobic pathogens.

Some patients may also have systemic symptoms such as fever, leukocytosis, or malaise.

PERIODONTAL ABSCESS

It is a localized accumulation of pus within the gingival wall of a periodontal pocket resulting in the destruction of the collagen fiber attachment and the loss of nearby alveolar bone.

It is usually associated with more advanced involvement of periodontal structures, including tortuous periodontal

pockets, furcation involvement, and intrabony defects.

CALCULUS IS OFTEN DETECTED ON THE ROOT SURFACE.

The lesions may be acute or chronic. A localized acute abscess may progress to a chronic abscess if its purulent contents drain through a fistula into the outer gingival surface or into the periodontal pocket.

a. Acute periodontal abscess appears as an ovoid elevation of the gingiva along the lateral aspect of the root. The gingiva is edematous and red, with a smooth, shiny surface. In most cases, pus maybe expressed from the gingival margin by gentle digital pressure. The symptoms of an acute periodontal abscess vary from slight discomfort to severe pain and swelling. As an abscess develops, a feeling of "pressure in the gums" is common. Inflammation involving the supporting structures may be accompanied by increased tooth mobility, elevation of the tooth in its socket, and tenderness to percussion or on mastication. Regional lymphadenopathy can be detected in some patients. If an acute periodontal abscess is left untreated; it may become a chronic lesion.

b. Chronic periodontal abscess may exist for an extended period and have a history of intermittent exudation for which patients seek treatment. It usually presents as a fistulous tract that originates from deep supporting tissues and opens onto the gingival mucosa along the length of the root. The orifice of the fistula may appear as a difficult-to detect pinpoint opening and be covered by a small, pink mass of granulation tissue. A chronic periodontal abscess is usually asymptomatic. However, some patients may feel dull or gnawing pain, slight elevation of the tooth, and a desire to bite tightly and grind. Chronic lesions may become acute abscesses if the orifice of the sinus tract becomes occluded.

DIAGNOSIS OF PERIODONTAL ABSCESS

Diagnosis of a periodontal abscess is usually based on the chief complaint, history of the presenting illness, clinical findings and investigations. Usually, the severity of pain and distress will differentiate an acute from a chronic abscess. The relevant medical and dental history is mandatory for the proper diagnosis of such cases.

INVESTIGATIONS

Radiographs

There are several dental radiographical techniques which are available (periapicals, bitewings and OPG) that may reveal either a normal appearance of the interdental bone or evident bone loss, ranging from just a widening of the periodontal ligament space to pronounced bone loss involving most of the affected cases. A gutta percha point which is placed through the sinus might locate the source of the abscess.

Pulp vitality test

The Pulp vitality test, like thermal or electrical tests, could be used to assess the vitality of the tooth and the subsequent ruling out of the concomitant pulpal infections.

Microbial tests

Samples of pus from the sinus/ abscess or that which is expressed from the gingival sulcus could be sent for culture and for sensitivity tests. Microbial tests can also help in implementing the specific antibiotic courses.

Lab findings

The elevated numbers of the blood leukocytes and an increase in the blood neutrophils and monocytes may be suggestive of an inflammatory response of the body to bacterial toxins in the periodontal abscess.

DIFFERENTIAL DIAGNOSIS

Gingival abscess has history of recent gingival trauma, localized to the gingiva and no periodontal pocketing. Perio-endo lesion is associated with non- vital tooth which is sound or minimally restored and has severe periodontal disease which may involve the furcation with severe bone loss close to apex causing pulpal infection. Endo-perio lesion has pulp infection spreading via lateral canals into periodontal pockets, causing localized deep pocketing. Tooth is usually non-vital with periapical radiolucency. Cracked tooth syndrome is associated with crack line on the crown of a vital tooth and has history of pain on mastication, pain upon release after biting on cotton roll, rubber disc or tooth sleuth. There is no relief of pain after endodontic treatment. Root fracture have fracture line and halo radiolucency around the root in a periapical radiograph of non- vital tooth with heavily restored, mobility, localized deep pocketing normally one site only which might need an open flap exploration to confirm diagnosis.

PULPAL ABSCESS V/S PERIODONTAL ABSCESS

Pulpal abscess Periodontal abscess

Offending tooth may have large restoration Associated with pre-existing periodontal Pocket May have narrow pocket, or if present, probes as narrow defect

radiographs show periodontal angular bone loss and furcation radiolucency. Tests show non vital pulp Tests show vital pulp Swelling often localised to apex, with a fistulous tract Swelling includes gingival tissue, with occasional fistula. Pain often severe and difficult to localise Pain usually dull and localised Sensitivity to percussion Sensitivity to percussion may or may not be present.

TREATMENT APPROACHES

The management of periodontal abscess can be divided into three stages: immediate management, initial management and definitive therapy.

Immediate management

Immediate management is usually advocated in life-threatening infections which lead to space infections of the orofacial regions or to diffuse spreadinginfections (facial cellulitis). Hospitalization with supportive therapy, together with intravenous antibiotic therapy, is usually recommended. However, depending on the severity of the infection and the local signs /symptoms, the clinical examination and the investigations and the initial therapy can be delayed to some extent. In non-life threatening conditions, systemic measures such as oral analgesics and antimicrobial chemotherapy will be sufficient to eliminate the systemic symptoms and severe trismus, if present.

Antibiotics are prescribed empirically before the microbiological analysis and before the antibiotic sensitivity tests of the pus and tissue specimens. The empirical regimens are dependent on the severity of the infection. The common antibiotics which are used are:

1. Phenoxymethylepenicillin 250 -500 mg qid 5/7 days
2. Amoxycillin 250 - 500 mg tds 5-7 days
3. Metronidazole 200 - 400 mg tds 5-7 days

If allergic to penicillin, these antibiotics are used:

1. Erythromycin 250 –500 mg qid 5-7 days
2. Doxycyline 100 mg bd 7-14 days
3. Clindamycin 150-300 mg qid 5-7 days Initial therapy

The initial therapy is usually prescribed for the management of acute abscesses without systemic toxicity or for the residual lesion after the treatment of the systemic toxicity and the chronic periodontal abscess.

Basically, the initial therapy comprises of:

The irrigation of the abscessed pocket with saline or antiseptics

When present the removal of foreign bodies

Drainage through the sulcus with a probe or light scaling of the tooth surface

Compression and debridement of the soft tissue wall

Oral hygiene instructions

Review after 24-48 hours; a week later, the definitive treatment should be carried out.

The treatment options for periodontal abscess under initial therapy

1. Drainage through pocket retraction or incision: Drainage through the pocket is the treatment of choice if the abscess is not complicated by other factors. However, if the lesion is sufficiently large, pin-pointed and fluctuating, an external incision can be made to drain the abscess.
2. Scaling and root planning.
3. Periodontal surgery: Treatment by flap operation is done by reflecting a full- thickness flap. Sorrin's operation is a type of flap approach in the treatment of a periodontal abscess, especially suitable when the marginal gingiva appears well adapted and gives no access to the abscess area. A semilunar incision is made below the involved area in the attached gingiva, leaving gingival margin undisturbed. A flap is raised, allowing access to the abscessed areafor curettage.
4. Systemic antibiotics: Antibiotics are the preferred mode of treatment. However, the local drainage of the abscess is mandatory to eliminate the aetiologic factors.
5. Tooth removal: Extraction of tooth is done in case of poor/ hopeless prognosis which includes: horizontal mobility > 1 mm, class II-III furcation involvement of a molar, probing depth >8 mm, poor response to therapy, alveolar bone loss > 40 %.

DEFINITIVE TREATMENT

The treatment following reassessment after the initial therapy is to restore the function and aesthetics and to enable the patient to maintain the health of the periodontium. Definitive periodontal treatment is done according to the treatment needs of the patient.

COMPLICATIONS

The periodontal abscess has possibility to spread microbes to other parts of body which can result into bacteremia, Ludwig's angina, space infection of orofacial region, pulmonary actinomycosis or brain abscess. The risk of bacteremia during drainage of an abscess can be

reduced if, before incision, a needle aspiration of content of abscess is done. Tooth loss is seen in cases of advanced to moderate periodontitis. Tooth with history of repeated abscesses is considered with other findings, a tooth with hopeless prognosis.

CONCLUSION

Periodontal abscess is the most significant amongst all the other forms of abscesses affecting the periodontal tissues. It is essentially a destructive form of disease that results in the accumulation and purulent exudate from the periodontal tissues without having any pulpal origin. While diagnosing the abscess, a periodontal abscess must be differentiated from a gingival and a periapical abscess. If the abscess is limited to marginal gingiva or interdental papilla with no previous disease, and a foreign material or trauma exists, the lesion is likely to be a gingival abscess. If the abscessed tooth is non vital, the lesion is most likely a periapical abscess. Early diagnosis and prompt treatment measures are imperative to avoid the probable complications of a periodontal abscess and ultimately help in saving the tooth.

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