

Dental Abscess Literature Review on Diagnosis and Management of Dental Abscess

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Abstract

Odontogenic infections can result from several conditions, such as pulp necrosis, periodontal disease, pericoronitis, trauma, or surgery. The three types of odontogenic or dental abscesses are endodontal or periapical, periodontal, and pericoronal, depending on where the infection first developed. Periodontal abscesses, which are particularly common in people with untreated periodontal disease and in periodontal patients during maintenance, are the third most frequent dental emergency. There are two main types of etiologies that can be distinguished based on how they relate to periodontal pockets. Studies involving people who had non-alcoholic fatty liver disease were looked for in the Medline, Pubmed, Embase, NCBI, and Cochrane databases. Incidence, etiology, and management options were analyzed. An easily treatable and frequently preventable condition is a dental abscess. Dental treatment will be necessary if an abscess extends beyond the tooth because antibiotics by themselves are ineffective in treating it. The airway may become compromised, or the infection may spread to the brain if it invades the neck or faces fascial planes. At tertiary hospitals, appropriate management protocols have been established, but morbidity and mortality still exist.

Keywords: Periodontal abscess, Microbiology, Etiology, Prevalence, Therapy

INTRODUCTION

Odontogenic infections can result from several conditions, such as pulp necrosis, periodontal disease, pericoronitis, trauma, or surgery. The three types of odontogenic or dental abscesses are endodontal or periapical, periodontal, and pericoronal, depending on where the infection first developed [1, 2]. However, because abscesses of pulp necrosis origin have also been referred to as dental, periapical, or dentoalveolar abscesses, this nomenclature is somewhat ambiguous [3]. A lesion with an expressed periodontal breakdown that develops over a short period of time has clear clinical symptoms, and has a localized pus collection inside the gingival wall of the periodontal pocket is referred to as a "periodontitis abscess" [4].

Dental infections can be challenging to treat acutely; however, they are relatively easy to diagnose and access [5]. Dental caries (tooth decay brought on by poor oral hygiene), trauma, or unsuccessful root canal therapy are the usual secondary causes of dental abscesses or periapical infections. These infections carry a high danger of becoming highly painful and rising to the cerebral sinuses or into the deep neck area if left untreated. Patients with significant discomfort, poor dental hygiene, inadequate dental follow-up, unrepaired

dental injuries, palpable localized pain, facial erythema, trismus, dysphagia, fever, and lymphadenopathy should all be suspected of having a dental abscess.

Changes in mental status and dyspnea are warning signs that should immediately raise suspicion. When looking inside the mouth, the suspected infected tooth or teeth may be discolored, have visible enamel cracks, or be surrounded by erythematous and swollen gingiva. In addition to providing symptomatic relief, recognizing, treating, and educating

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patients about a dental abscess can help them avoid potentially severe complications [6].

Epidemiology

The majority of Americans have dental caries and poor oral health. Ninety-one percent of adults between the ages of 20 and 64 have dental caries, according to data on dental caries and tooth loss from the National Center for Health Statistics' National Health and Nutrition Examination Survey from 2011 to 2012. For Hispanic, non-Hispanic black Americans, and non-Hispanic Asian adults, these rates were lower than those for non-Hispanic white adults [7]. About 27% of adults between the ages of 20 and 64 have untreated tooth decay. Hispanics had a 36% untreated dental decay rate, whereas non-Hispanic Black Americans had a rate of 42%. About 19% of persons over 65 had untreated dental caries [7]. Visits to the hospital emergency room (ER) for dental-related issues and abscesses are typical. According to one study, the population of the United States experienced one tooth infection admission every 2600 people [8]. Dental abscesses have much higher rates of pediatric ER visits (47%), which is concerning.

In addition to pointing to the high frequency of poor dental health, a crucial risk factor for developing a tooth abscess, this data suggests that racial and possibly socioeconomic variables are also at work. The community's population, racial makeup, and socioeconomic demographics could induce changes in providers' behavior [8].

MATERIALS AND METHODS

PubMed database was used for articles selection, and the following keys were used in the Mesh ("Dental abscess" [Mesh]) AND ("signs and symptoms" [Mesh]) OR ("Management" [Mesh]).

In regards to the inclusion criteria, the articles were selected based on the inclusion of one of the following topics: Dental abscess Features and treatment of dental abscesses. All other articles that did not use one of these subjects as their main conclusion were subject to exclusion criteria.

Out of 1,202 articles indexed in the previous two decades, about 90 publications were selected as the most clinically pertinent, and their full texts were assessed. After careful review, 31 of the 90 were decided to be included. Using the reference lists from the acknowledged and linked studies, additional studies and publications were located. To assist practicing physicians in the most straightforward and practical way possible when assessing dental abscesses, expert consensus recommendations and commentary were added where appropriate.

Risk Factors

Some elements that may raise the risk of dental abscess are the ones listed below [9]:

- Poor oral hygiene

- Bruxism (grinding or clenching teeth)
- Consuming a sugar-heavy diet
- Regular snacking and eating in between meals
- Consuming aerated drinks and other sweet liquids
- Experiencing dry mouth; This is because saliva clears microorganisms and food particles away.
- Additional tooth or dental damage

An abscess is typically caused by bacteria getting inside the tooth or gums. The following are the causes of abscesses, depending on the type [10]:

1. Periapical abscess - Bacteria enter the tooth via decay or fracture and reach the pulp. The infection spreads from the pulp and exits through the apex or tip of the tooth root.
2. Gingival abscess - Bacteria on the tooth surface (plaque) and gums can enter the gums if an injury occurs.
3. Periodontal abscess - Gum abscess can spread to surrounding tissue and bone.
4. Peicoronal abscess - Bacteria multiply in the space between the erupting tooth and the surrounding gums due to poor oral hygiene and food impaction, resulting in an abscess.

Symptoms and Signs

A dental abscess should be suspected when patients report severe pain, confess to poor dental hygiene and inadequate dental follow-up, confess to dental trauma that was left unrepaired, have localized pain that is reproducible with palpation, facial erythema, trismus, dysphagia, fever, and lymphadenopathy. Alterations in mental status and dyspnea are indicators that need immediate attention. The suspected infected tooth or teeth may be discolored, have obvious enamel breaks, or be surrounded by gingival erythema and swelling when the oral cavity is examined [11].

Diagnosis

A periodontal abscess is diagnosed based on the patient's symptoms and the signs found during the oral examination. A thorough medical and dental history and a radiographic examination and CT scan can provide additional information. An ovoid elevation of the gingiva along the lateral part of the root is the current sign, according to an examination. On the other hand, periodontal abscesses might not be as obvious. Mild discomfort to severe discomfort, gingival tenderness, swelling, tooth mobility, tooth elevation, and palpable tooth sensitivity are all possible symptoms [12].

A typical appearance or some degree of bone loss, ranging from enlarging the periodontal space to dramatic radiographic bone loss, may be seen on the radiographic examination.

In some severe cases, systemic involvement has been reported, including fever, malaise, leukocytosis, and regional lymphadenopathy [12]. Previous periodontal treatments, root canal therapy, and abscesses can all be revealed by the dental history. A careful anamnesis is used to diagnose abscesses caused by foreign objects (gingival abscesses, oral hygiene abscesses) [13]. It was suggested that positron emission

tomography and a flurine-18-fluoromisonidazole marker be used to detect periodontal abscesses and other anaerobic infections in the mouth [14].

Treatment

Draining the abscess, giving antibiotics, reducing pain, and removing the infected tooth source are all parts of the treatment. Most of the time, oral antibiotics and a prompt dentist appointment are enough to treat dental problems. A hospital stay or the administration of intravenous (IV) antibiotics may not be necessary in cases of dental abscesses unless the patient displays alarming signs like fever, dyspnea, or an airway compromise from swelling. Most dental abscesses can be treated with gram-negative, facultative, and strict anaerobe-covering antibiotics [5]. Odontogenic infections can be treated with penicillins and cephalosporins, but the production of B-lactamases is leading to an increase in antimicrobial resistance.

Given the rise in antibiotic resistance, it would be preferable to combine penicillins with other antimicrobials like metronidazole or an antibiotic with a broad spectrum, such as ampicillin-sulbactam and ampicillin-clavulanate [5]. While ineffective against aerobic gram-positive organisms, metronidazole is effective against anaerobic organisms. To extend antimicrobial protection to include aerobic gram-positive organisms, metronidazole should be taken in addition to penicillin. For patients with penicillin and cephalosporin allergies, clindamycin is a great option. Excellent protection against gram-positive organisms, anaerobes, and B-lactam-resistant organisms is provided by clindamycin, which also has good bone penetration. It has been demonstrated that Clindamycin is equally effective as Penicillin V at treating severe odontogenic infections.

For severe infections or in patients with compromised immune systems, extended-spectrum penicillins like piperacillin-tazobactam or anti-pseudomonal antibiotics like fourth-generation or higher cephalosporins should be taken into consideration. Only very serious infections should be treated with carbapenems like meropenem. Meropenem is effective against resistant bacteria as well as gram-positive and gram-negative bacteria [5]. The treatment for a dental abscess may involve a root canal or tooth extraction. An incision and drainage may be required for a periapical dental abscess. Although incision and drainage can be performed in a clinic or emergency room, a dentist must still monitor them.

The dental procedure known as a root canal exposes the infected tooth roots by removing the tooth crown. These passages are first opened with surgical tools, then cleaned with a solution. The tooth crown is then put back on, and the tooth root is filled. Complications include cracked teeth, surgical instruments breaking off inside the tooth root canal, and inadequate bacterial removal. These complications may necessitate a second root canal or tooth extraction [15].

An easily treatable and frequently preventable condition is a dental abscess. Dental treatment will be necessary if an abscess extends beyond the tooth because antibiotics by themselves are ineffective in treating it. The airway may become compromised, or the infection may spread to the brain if it invades the neck or faces fascial planes. At tertiary hospitals, appropriate management protocols have been established, but morbidity and mortality still exist. Dental abscesses can be prevented, but all healthcare professionals must practice careful antibiotic stewardship and provide better access to dental care [16].

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CONCLUSION