

Review

Etiology, Evaluation, and Treatment of Pericoronitis

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Abstract

Pericoronitis is the medical term for an oral inflammatory condition brought on by an infection of the soft tissues in proximity to the crown of an immature tooth, including gingiva and dental follicle. It is believed that microbial entry into the follicular area begins the infection once the tooth's follicle establishes contact with the oral cavity. Pericoronitis's microbiota primarily consists of anaerobes. It is commonly accepted that the build-up of food particles close to the opercula and the occlusal injuries caused by the opposing tooth to the tissues present pericoronally both accelerate this process. Third molars that are oriented vertically are more frequently affected by pericoronitis than those that are oriented horizontally, which had a lower incidence of the condition. Pericoronitis may be more likely to develop in patients with impaired immune systems, such as those with uncontrolled diabetes or immunodeficiency diseases. Patients with acute pericoronitis exhibit regional erythema, edema, purulence, and intense throbbing pain radiating to the ear, throat, floor of the mouth, temporomandibular joint, and posterior submandibular region during intraoral physical examination. Advanced cases including those developing into cellulitis, Ludwig's angina and peritonsillar abscesses may necessitate immediate attention including surgical intervention. It is advised to utilize only localized treatment measures for patients with localized pain and edema involving the pericoronal tissues and are free of local or systemic symptoms. Antimicrobial therapy is advised if the patient is displaying regional or systemic manifestations in as well as local pain and edema. Surgery is advised only when there have been two or more incidences of pericoronitis or other pathological conditions which maybe potentially be complicated by the presence of partially erupted tooth.

Keywords: pericoronitis, impacted teeth, impaction

Introduction

Pericoronitis is the medical term for an oral inflammatory condition brought on by an infection of the soft tissues in proximity to the crown of an immature tooth, including gingiva and dental follicle (1, 2). It most frequently affects the mandibular third molar and typically does not occur in teeth that erupt normally; instead, it is generally observed in teeth that erupt very gradually or undergo impaction. It is believed that microbial entry into the follicular area begins the infection once the tooth's follicle establishes contact with the oral cavity. Pericoronitis's microbiota primarily consists of anaerobes (3-8). It is commonly accepted that the buildup of food particles close to the opercula and the occlusal injuries caused by the opposing tooth to the tissues present pericoronally both accelerate this process. There are limited reports on the occurrence of pericoronitis, and the findings are inconsistent. Incidence data from a survey of military personnel revealed a 4.92% frequency among patients between the ages of 20 and 25. According to statistics, the lower third molars were the source of 95% of the cases (9). Because third molar eruption is mostly connected with pericoronitis, this condition is most frequently observed in adults between the ages of 20 and 29, which is also when third molar usually erupts (10). There doesn't appear to be a sex preference for pericoronitis. One study found pericoronitis to be most frequently associated with an affected tooth in 67% cases of vertically impaction, 12% of mesioangular impaction, 14% of distoangular impaction, and 7% of cases in other orientations (11). There is a strong link between a person's dental hygiene habits and how serious their illness is. One would anticipate a significant incidence of pericoronitis during the eruption of both the primary and secondary dentitions given its relationship with erupting teeth. The disease does not typically appear at these times, with third molar eruption in late adolescence and early adulthood being the sole time when it becomes more common (12-14). While pericoronitis is rarely identified and discussed as a distinct entity, there is a wealth of literature on the microbiologic components of the host-parasite connection in the context of periodontal disease as a whole (15-17). Depending on the severity, Ruben et al. placed it between gingivitis and periodontal abscesses. But unlike periodontal pockets, pericoronal pockets only appear under a very narrow set of circumstances (18). Their distinct developmental paths, different ecological milieu, and varied clinical traits all contribute to the variations in their natures. Pericoronitis occurrence bilaterally is a rare incident. It might indicate an

underlying case of infectious mononucleosis (19). Pericoronitis has two different classifications under the International Classification of Diseases: acute and chronic. Acute pericoronitis has a sudden onset, is transient, and manifests with notable symptoms such as different degrees of pericoronal flap inflammation (19). Additionally, there is evidence of systemic involvement. Patients with moderate to poor dental hygiene frequently exhibit the acute type of pericoronitis (19). Pericoronitis can also be categorized as recurrent or chronic. This group is characterized by periodic recurrent episodes of acute pericoronitis. Even although it may not generate many symptoms, an intraoral examination can reveal some signs. The chronic form is typically present when dental hygiene is good or fair.

Methodology

This study is based on a comprehensive literature search conducted on October 10, 2022, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the information about etiology, evaluation, and treatment of pericoronitis. There were no restrictions on date, language, participant age, or type of publication.

Discussion

Etiology

Some of the causes of pericoronitis appear to be widely known. The condition has been linked to the accumulation of food particles in the comparatively large region beneath the operculum that covers an erupted or partially erupted tooth, and biomechanical trauma from the opposing teeth may exacerbate the manifestations (2, 12, 13, 20-22). Maxillary third molars may occlude onto the operculum that is overlying the third molars undergoing eruption in the mandible. Such frequent trauma might aggravate the symptoms and lead to ulcerations. Other factors that have been suggested as being important in the development of this inflammatory illness include sex predisposition, age, location, systemic and local contributing circumstances, and microbial infection (12, 21). Age-wise, however, there was a clear preference for adolescents and young adults, which has been documented by other researchers (12, 13). The

development of an operculum in association to an erupting tooth happens at a very young age, hence it is interesting that pericoronitis has a significant affinity for people in the 20–29 age bracket and is almost non-existent before that. Interestingly, the mandibular third molar, which is most commonly afflicted, typically erupts around the third decade of life. The fact that the third molar's full emergence is frequently prevented by the reduced growth of the mandible, resulting in the formation of an operculum (12, 20, 23, 24) only partially explains why this tooth is specifically affected by pericoronitis. According to research, third molars that are oriented vertically are more frequently affected by pericoronitis than those that are oriented horizontally, which had a lower incidence of the condition (25). Pericoronitis can be exacerbated or encouraged by systemic causes. Pericoronitis may be more likely to develop in patients with impaired immune systems, such as those with uncontrolled diabetes or immunodeficiency diseases. Additionally, various systemic diseases that momentarily impair the immune system's response may cause or make pericoronitis worse. These include psychological or physical strain, an upper respiratory tract infection (URTI) or the menstruation in females (26). A URTI may affect the natural equilibrium of the oral microbiota directly, or indirectly by limiting passive self-cleansing and preventing the individual from practicing effective dental hygiene. Numerous oral lesions have been linked to emotional stress on multiple occasions (27–31). Either directly or indirectly, it affects and impairs the oral mucosa's inherent local defences. By indirect means, stress may result in peripheral vasoconstriction with changes in blood supply to the gingival tissues in addition to causing changes in humoral antibodies through changes in the autonomic nervous and endocrine systems. Directly, stress may have its effects as a result of subpar dental hygiene, unregulated nutrition, higher smoking, and insufficient sleep (27, 28, 32, 33). Reduced saliva output could be another unintended side effect of abrupt stress (13, 30). All of these physical responses to stress may affect the ecosystem in the oral cavity, creating a favorable environment for the growth of particular microbial strains that may play a role in the onset of pericoronitis (26, 34). Pericoronitis has a varied microbiota that is distinct from the germs that cause periodontitis. *Actinomyces oris*, *Eikenella corrodens*, *Eubacterium nodatum*, *Fusobacterium nucleatum*, *Treponema denticola*, and *Eubacterium saburreum* were shown to be highly prevalent in a study of the microbiota of pericoronitis (35). Pericoronitis, to put it briefly, is

caused by bacterial proliferation in an area that is difficult to clean.

Evaluation

Patients with acute pericoronitis exhibit regional erythema, edema, purulence, and intense throbbing pain radiating to the ear, throat, floor of the mouth, temporomandibular joint, and posterior submandibular region during intraoral physical examination. Additionally, the posterior jaw, where the third molars are erupting, may feel sensitive to touch. Pericoronitis at more severe stages, lymphadenopathy, fever, facial asymmetry, reduced mouth opening, problem in mastication and deglutition, halitosis, a bad taste in the mouth, an alteration in voice, or even breathing issues can be observed (1, 19). The latter symptoms call for immediate attention since they can point to an impending airway blockage (19). 6 Along with trismus, cheek swelling along the angle of the jaw is a common symptom. Pain might occasionally make it difficult to sleep. Periodontal discomfort from food impaction beneath the pericoronal flap and pulpitis arising due to dental caries, are other potential reasons of pain in a third molar. Based on the location of the erupting tooth that is connected to the illness, pericoronitis can be classified as either transient or non-transient (36). The soft tissue irritation, or pericoronitis, will go away as the operculum over the tooth recedes if it is erupting into a healthy, cleanable, and functional position. The afflicted operculum may remain covering the tooth that has not erupted appropriately, leading to non-transient pericoronitis, if the tooth cannot emerge into a stable position. In these circumstances, the opercula may exhibit signs of injury such as ulcers or indentations of the maxillary teeth's cusps. In order to diagnose pericoronitis, radiographic evaluation is crucial because it might show the locations of erupted third molars if present. The most accurate way to determine whether third molars are present and where they are located is with a panoramic radiograph. According to research, as was covered in the etiology section (25), third molars that are positioned vertically have a greater incidence of pericoronitis. Dental practitioners must take into account all influencing factors, such as dental hygiene, the orientation of the opposing dentition, and the duration and intensity of clinical manifestations, while examining pericoronitis. A day or two of mild discomfort and a dull pain are the features of chronic pericoronitis, which then remits for several months. A persistent pericoronitis-related region of ulceration may mimic necrotizing ulcerative gingivitis. An unpleasant

taste may also be mentioned by the patient. An higher risk of pericoronitis is linked to exertion and pregnancy (19). Chronic pericoronitis can cause the local bone to appear more radiopaque on radiographs.

Pericoronitis is a distressing condition that, if left untreated, can develop into more critical issues. A pericoronal abscess may develop if the condition is confined. The individual may experience problems with deglutition if it spreads in the medial direction to the basal region of the tongue and in the posterior direction into the oropharynx. The lymph nodes may be affected, based on the extent of the illness. It's possible for a persistent pericoronal infection to enter soft tissue gaps. Cellulitis, Ludwig's angina, and the development of peritonsillar abscesses are the effects of acute pericoronitis (1). It could be a life-threatening circumstance that necessitates hospitalization. Fever, malaise, elevation of the tongue and floor of the mouth, trouble swallowing, slurred speech, and board-like bilateral enlargement of the submandibular area involving the anterior neck eventually are the hallmarks of Ludwig's angina (19). Fever and malaise are symptoms of parapharyngeal abscess, along with severe swallowing pain, dyspnea, and laryngeal displacement to one side (37). Occurrence of these conditions would necessitate surgical intervention.

Treatment

The essential factor for successfully managing pericoronitis is early diagnosis and treatment to treat the signs and symptoms. Pericoronitis can be treated in a number of different ways. Based on their clinical expertise, and the clinical situation at hand, dental practitioners may provide various treatment strategies for pericoronitis. It is advised to utilize only local measures for patients who arrive with localized pain and edema involving the pericoronal tissues and are free of local or systemic symptoms. Among them include removing occlusal injury, draining abscess, irrigating with sterile saline, chlorhexidine, or hydrogen peroxide, and debriding plaque and food debris (36). There is currently no evidence to support the use of ozone as a local antibacterial that could be a helpful addition in the management of pericoronitis. Antimicrobial therapy is advised if the patient is displaying regional or systemic manifestations in as well as local pain and edema; it should be stressed, however, that this is as an adjuvant rather than a first-line therapy (19). Increasing heart rate, lowering blood pressure levels, and fever are examples of systemic symptoms. The recommended antimicrobial is either phenoxymethylpenicillin 500mg four times a

day for five days or metronidazole 400mg three times a day for five days. Erythromycin 500 mg four times day for five days is appropriate for people who are allergic to penicillin (11). These are the first-choice antibiotics because they are all effective against anaerobic bacteria, which make up the majority of the cultivable microflora in pericoronitis. Operculectomy has been employed as a prophylactic strategy once the acute stage of this ailment has gone, but there is no study to either back or refute this course of action (38). Only individuals who do have evident pathology should have their third molars surgically removed. This type of pathology encompasses unrestorable carious lesions, untreatable pulpal and/or periapical pathology, cellulitis, abscess, and osteomyelitis, resorbing tooth or adjacent teeth, tooth fracture, follicular condition such as cyst/tumor, tooth/teeth hindering surgery, or facial reconstruction, and when a tooth is associated with the tumor field to be resected (39). Plaque development and its relation with the pericoronitis has to be noted (40). Although plaque formation is a determinant, it is not a surgical indication on its own. Uncertainty exists over the extent to which the degree or likelihood of recurrence of pericoronitis should affect the choice to surgically remove a third molar. According to the data, a first incidence of pericoronitis should not be regarded as a surgical indication unless it is extremely serious (19). Surgery should only be performed if there have been two or more incidents (19). If the tooth is left in place, there is frequently a risk of developing a significant infection that may necessitate hospitalization and even pose a threat to one's life, such as when the infection spreads to the parapharyngeal region or the submandibular and sublingual areas (Ludwig's angina) These circumstances need for immediate operative procedure to open the airway, evacuate the afflicted tissue compartments, and decompress them (11). There is a chance that the tooth extraction will have significant long-term consequences, particularly if the patient develops lower lip or tongue paresthesia, dysesthesia, or lifelong anesthesia.

Conclusion

Despite the fact that pericoronitis around the third molar appears to be a minor illness, its possible implications cannot be ignored. If left unmanaged, this minor infection can extend into nearby soft tissue areas or develop into a localized abscess, both of which can result in fatal complications. On the basis of a complete case history, physical assessment, and imaging, an accurate diagnosis should be determined. The best course of action should be started at once, based on the assessment.

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There is no conflict of interest

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Ethical consideration

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Data availability

Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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