

Systematic Review of Dry Socket

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Summary

Dry socket, also termed fibrinolytic osteitis or alveolar osteitis, most common postsurgical complication following extraction of impacted molar teeth. A dry socket lesion is a post-extraction socket that exhibits exposed bone that is not covered by a blood clot or healing epithelium and exists inside or around the perimeter of the socket or alveolus for days after the extraction procedure. A great body of literature is devoted to alveolar osteitis addressing the etiology and pathophysiology of this condition. In addition, numerous studies are available discussing methods and techniques to prevent this condition. This is a systematic review, which shows a compendious review about the etiology, prevention and management of Alveolar Osteitis. The risk factors are smoking, surgical trauma, flap design, single extractions, age, medical history, systemic disorder, extraction site, difficulty of the surgery and the previous surgical site infection. The prevention methods include avoiding smoking before and after surgery and a traumatic surgery, the use of antibiotics, such as, azithromycin, can be considered, the other preventive measures such as chlorhexidine rinse or gel can be effective in the reduction of dry socket incidence. Over the years little progress has been made in establishing firm conclusions as to how best dry socket should be managed.

Keywords: Dry Socket, Risk Factors, Management.

Introduction

One of the most important and common complications following surgical removal of impacted teeth is dry socket (DS) (alveolar osteitis). This phenomenon is due to resolution of blood clot and exposure of alveolar bone. Pain, halitosis, activity reduction, and additional returns to visit surgeon are of costs patient will pay [1]. It is mostly prevalent in surgical extraction of mandibular third molar [23]. It has been reported that prevalence of dry socket varies from 0% to more

than 35.5% [4]. Although DS is a self-limited complication [5], systematic and locally application of antibacterial, anti-inflammatory, antifibrinolytic, and clot support agents had been proposed for treatment [6]. Throughout the literature the onset of AO is considered to occur 1–3 day after tooth extraction [7]. 95–100% of all cases of AO have been reported within a week [8].

Etiology

The exact etiology of dry socket has not yet been defined. However, several local and systemic factors are known to contribute and have been described in published studies. Real dry socket is characterized by the partial or total premature loss of the blood clot that forms in the interior of the alveolus after extraction. This must be distinguished from other conditions, such as hypovascularization of the alveolar bone, caused by vascular and hematologic impairment; osteonecrosis induced by radiotherapy; osteopetrosis [9]. Etiology of dry socket has been presented by several theories. Trauma, bacterial infection and biochemical agents [10] are the main components of these theories. Dry socket is a condition [11] in which there is elevation in the activation of plasminogen and fibrinolytic activity to plasma in the presence of tissue activators [12].

Risk Factors

Surgical Trauma:

surgical trauma and difficulty of surgery play a significant role in the development of AO. This could be due to more liberation of direct tissue activators secondary to bone marrow inflammation following the more difficult, hence, more traumatic extractions [13–14]. Surgical extractions, in comparison to nonsurgical extractions, result in a 10-fold increase incidence of AO [15].

Flap Design:

It has been reported that the altered triangular flap [16] reduces the chance of alveolar osteitis occurrence more than the buccal envelope flap. Patients with extraction of a bilateral impacted mandibular third molar with the same difficulty have been examined, a buccal envelope flap was placed on one side and an altered triangular flap was placed on the other side, at day 3 and day 7 after surgery Alveolar Osteitis and healing was assessed [17].

Mandibular Third Molars:

It has been shown that alveolar osteitis is more common following the extraction of mandibular

third molars. Some authors believe that increased bone density, decreased vascularity, and a reduced capacity of producing granulation tissue are responsible for the site specificity [18-19].

Age:

Age has a direct impact on the incidence of dry socket, studies have shown and supports that incidence of dry socket occurs generally in childhood [20] and dry socket occurrence is increased with the increase in age [21]. The severity and intensity of the disease varies from people to people and at different stages of life, the onset of this disease is at its peak in 3rd and 4th decade of life [22].

Systemic Disease:

Some researchers have suggested that systemic disease could be associated with alveolar osteitis. One article proposed immunocompromised or diabetic patients being prone to development of alveolar osteitis due to altered healing. But no scientific evidence exists to prove a relationship between systemic diseases and AO [14].

Smoking:

Smoking has been the key factor in the reduction of phagocytosis and neutrophil chemotaxis [23] along with the disruption in immunoglobulin production [24]. There was high incidence of dry socket occurrence in heavy smokers as compared to the non-users of smoking because smoking significantly contributes in efficiently lowering the immediate post extraction filling of sockets with blood. Sockets with reduced ability to fill them with the blood are more viable to the incidence of dry socket occurrence [25].

Bacterial Infection:

Most studies support the claim that bacterial infections are a major risk for the development of AO. It has been shown that the frequency of AO increases in patients with poor OH, preexisting local infection such as pericoronitis and advanced periodontal disease. Attempts have been made to isolate specific causative organisms [26-27].

Prevention

As there is still uncertainty surrounding the aetio-pathogenesis of dry socket, this condition is difficult to prevent. The dentist should ask preoperatively whether or not the patient has had a dry socket previously as some patients appear to be more susceptible than others. The patient should also be advised not to smoke for at least 48 hours post extraction [28]. It was postulated that the use of gauze soaked in Whitehead's varnish sutured into the socket post-surgery would

reduce the incidence of postoperative discomfort, hemorrhage and swelling, this is then removed one week postoperatively [29]. There is also evidence to support the use of a 0.12% chlorhexidine rinse prior to the extraction and one-week post extraction to prevent the occurrence of dry socket following tooth extraction. In a prospective, randomized, double-blind placebo-controlled study, this regime was associated with a 50% reduction in alveolar osteitis compared to the control group. [30]. The use of both systemic and topical antibiotics has been shown to reduce the incidence of dry socket [9]. Systemic penicillin, clindamycin and metronidazole, and topical tetracycline powder have all been shown to be effective. Preoperative administration of antibiotics is more effective in reducing the incidence of dry socket than when given postoperatively [31-32].

Management

The management of AO is less controversial than its etiology and prevention. A few authors have referred to the "treatment" of AO. Recommending "treatment" appears to be misleading as the condition cannot be treated as long as the etiology has not been firmly established. Most agree that the primary aim of dry socket management, as indicated by Fazakerley [9], is pain control until commencement of normal healing, and in the majority of cases local measures are satisfactory. In some instances, systemic analgesics or antibiotics may be necessary or indicated. The use of intra-alveolar dressing materials is widely suggested in the literature [33]. Different medicaments and carrier systems are commercially available with little scientific evidence to guide a selection process as demonstrated above. As the various formulations are reviewed, it becomes apparent that all of them are simply varying combinations. Alvogyl contains butamben (anesthetic), eugenol (analgesic), and iodophorm (antimicrobial). Some authors [34-35] noted retardation of healing and inflammation when the sockets were packed with Alvogyl. They did not recommend its use in extraction sockets.

Discussion

Dry socket is an important clinical complication. It is characterized by severe pain starting after two or three days of extraction. The etiology of this complication is an increased local fibrinolysis leading to breakdown of the clot. Some antifibrinolytic agents, when placed topically in the

extraction site, have been shown to reduce the occurrence of dry socket. Surgical trauma and bacterial infections remain the acceptable initiating factors of this fibrinolytic activity [14].

Conclusions

Dry socket is a self-limiting condition, the cause of which remains elusive. Management is aimed at relieving the patient's pain until healing of the socket occurs. Healing is facilitated and accelerated through reducing the insult to the wound by food debris and microorganisms, by irrigation of the socket with chlorhexidine, followed by placement of Alvogyl dressing or, if unavailable, instructing the patient in home use of a syringe for irrigation of the socket until the socket no longer collects debris, and the prescription of potent oral analgesics. The patient should be kept under regular review to ensure that the socket is healing, especially if a dressing has been placed.

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