



Published: September 30, 2023

Citation: Tirandas RM, CNV Akhila, et al., 2023. A Case Report of Pulpitis Leading to Septic Shock, along with a Series of Cases, Medical Research Archives, [online] 11(9).

<https://doi.org/10.18103/mra.v11i9.4397>

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DOI

<https://doi.org/10.18103/mra.v11i9.4397>

ISSN: 2375-1924

CASE REPORT

A Case Report of Pulpitis Leading to Septic Shock, along with a Series of Cases

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ABSTRACT

Among the diseases of oral cavity, dental caries is the most common microbial diseases affecting the individual's teeth globally along with the periodontal disease. There could be various reasons for the delay of the treatment for dental caries which includes socioeconomic status, lack of awareness about dental diseases and dental treatments. Life style habits also play a prominent role. Delay of dental caries treatment would lead to pulpitis. Here we present a case report of a 62-year-old male patient with chronic irreversible pulpitis in relation to 36. Patient had a history of smoking and chewing paan. After a month patient died due to septic shock. We also present a few case reports of pulpitis progressing to space infections. It has been documented in the literature that, individuals with systemic diseases such as diabetes mellitus, hypertension, cardiovascular disease etc are having highest morbidity and mortality due to dental sepsis. Along with case reports in this article, we are going to make a sincere effort to provide complications of pulpitis. Thus, it would help in educating general public, budding dentists and clinicians in spreading the awareness about pulpitis and its sequelae.

Keywords: Pulpitis, Dentoalveolar abscess, Sepsis or Septic shock and Systemic diseases.

Introduction

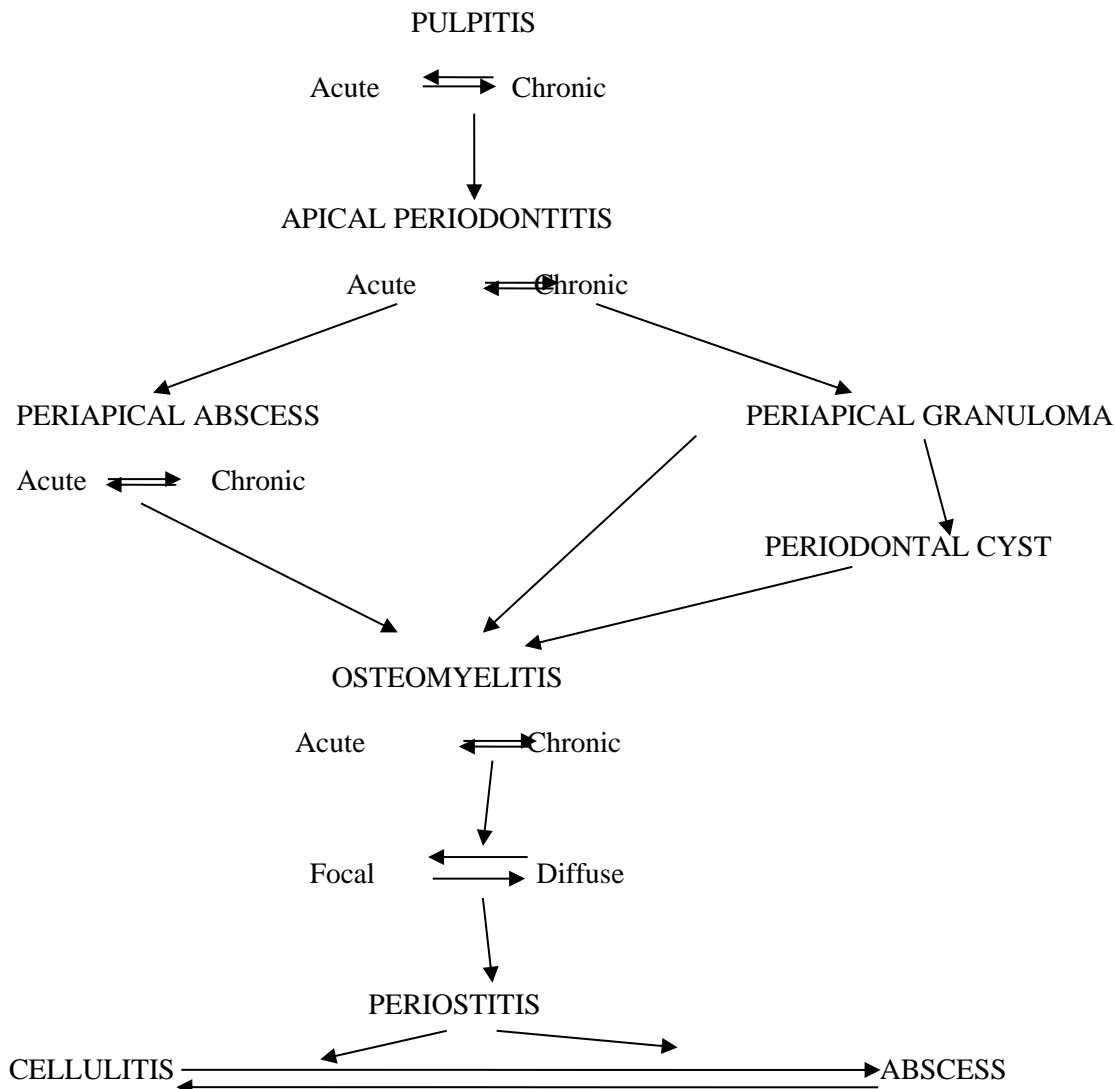
Understanding the complications of pulpitis is important to treat it. We know that untreated dental caries leads to pulpitis. Irreversible pulpitis (acute or chronic) requires root canal treatment and if not treated, would lead to osteomyelitis or periostitis or cellulitis and finally abscess, which are the final phases of the sequelae of pulpitis. The sequelae are illustrated in the flowchart form, in Shafer's textbook¹. But there are also a few case reports in the literature where squamous cell carcinoma developed from a single tooth abscess or even from a dental sepsis in an uncontrolled diabetic patient that led to a life-threatening complication. Sepsis is caused when the endotoxins are released into the blood stream triggering an inflammatory response which can spread to other parts of the body and can damage them. Sometimes, the patient may die due to the severe form of dental sepsis i.e., septic shock causing specific organ failure due to high inflammatory body response.^{1, 2, 3, 4}

So, concluding the sequel of pulpitis present in the flowchart is undoubtedly important. There is a famous quote i.e. what you hear, you forget; what you see, you remember and what you do, you understand. We hear that pulpitis may lead to osteomyelitis and we forget, when we see the case history where pulpitis turned to osteomyelitis we remember. Finally, when we treat a simple case of pulpitis with the understanding that it may lead to septic shock, it definitely marks the perfection.

The aim of present article is to elucidate in detail the importance of dental health. Pulpitis has the potential to cause septic shock and ultimately death. This article presents a case report of deferred pulpitis causing septic shock. Thereby we also present cases of pulpitis leading to space infection. So, this article, is an attempt to bring awareness, among the budding dentists, clinicians and also educating patients regarding the integrity between dental and medical health.

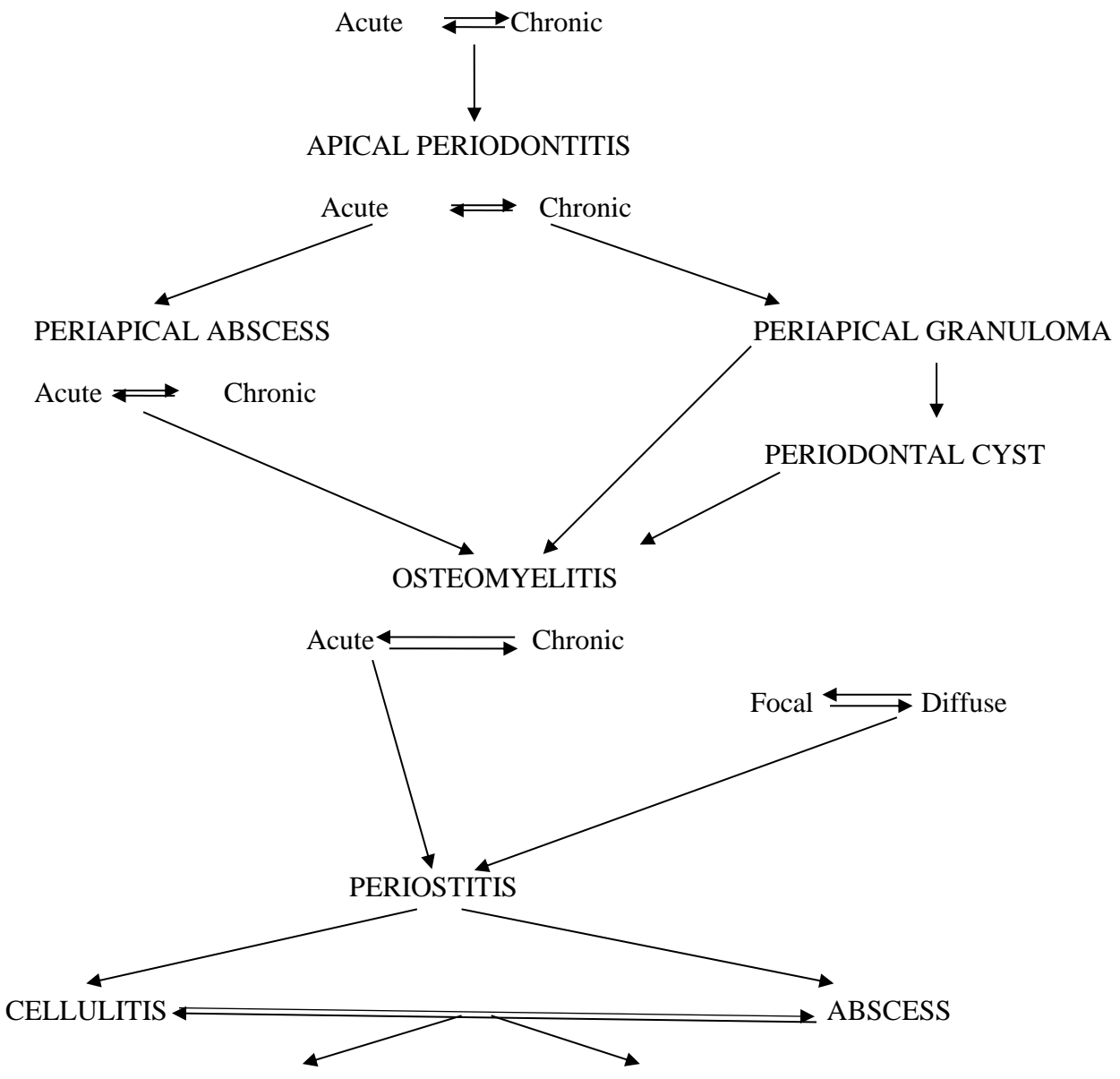
We present the complete sequelae of pulpitis below:

SEQUELAE OF PULPITIS¹



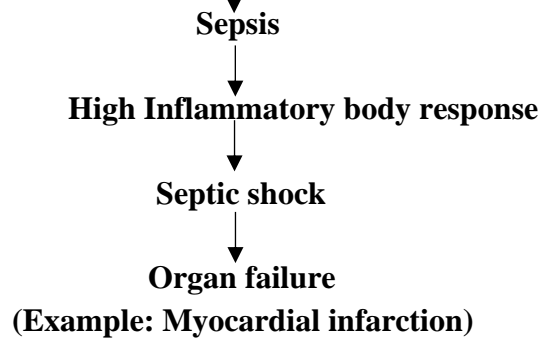
(Adapted from Rajendran R. Sivapathasundharam B. & Shafer W. G. (2009). *Shafer's textbook of oral pathology* (6th ed.). Elsevier/Reed Elsevier)

PROPOSED SEQUELAE OF PULPITIS
PULPITIS



- In relation to the lower jaw***
1. Submental space
 2. Submandibular space
 3. Sublingual space
 4. Buccal space
 5. Submasseteric interval
 6. Parotid space
 7. Pterygomandibular space
 8. Pharyngeal space
 9. Peritonsillar space

- In relation to the upper jaw***
1. Within the lip
 2. Within the canine fossa
 3. Palatal subperiosteal interval
 4. Buccal space
 5. Maxillary antrum
 6. Infratemporal space
 7. Subtemporalis muscle interval



Dental treatments are often neglected by patients; it might be due to lack of awareness about sequelae of the odontogenic infection/dentoalveolar infection (from clinician's point of view) or might be due to the affordability (from patient's point of view). Early intervention of this infection would help in preventing morbidity and mortality of the patients. Globally, there are only few published cases of sepsis turning into life-threatening organ impairment due to uncontrolled body response to an infection. Similar to it, there are only few documented cases of septic shock/sepsis secondarily to dentoalveolar/odontogenic infection.⁶ Presented is a case of sequelae, from sepsis/septic shock to myocardial infarction in a 62 yr old patient with the history of pan chewing and cigarette smoking. The patient had following signs and symptoms of chronic periapical abscess, hypotension, diabetes (DM), hyperthermia, facial asymmetry, pedal edema, coronary artery disease (CAD), tachycardia, unstable angina pectoris, lactic acidosis, leukocytosis.

Case Report of the Patient:

Presented here is the case of a, 62 year old male patient, who came to the dental hospital with the chief complaint of pain in the left lower back tooth region since five days on 24-7-2021. Patient gave a history of diabetes mellitus from the past five years and he was on medication since then. He also mentioned about the habit of smokeless tobacco i.e. pan chewing and smoking cigarettes four times a day since 30 years. Vital signs were checked and they were normal. On intraoral examination, there was generalized severe tobacco stains (+++), generalized periodontal pockets and moderate calculus (++). Tenderness on percussion was seen in relation to 36 and 37 teeth. Immediately, OPG was suggested to know the 36 and 37 tooth in particular. On radiographic examination, it was noted that there was an ill-defined radiolucency surrounding 36 and 37 teeth periapically. Root

canal was already performed with respect to 36. Patient was educated and motivated about the root canal treatment in relation to 37. And also, he was explained about the choice of re root canal treatment or extraction in relation to 36, as previous RCT was failed due to over filing. He was kept under antibiotics and analgesics (premedication) for five days as part of antibiotic prophylaxis before the dental treatment to prevent the infective endocarditis. After five days, patient didn't turn up for the root canal treatment or extraction. Even after repeated follow ups (phone calls) patient didn't turn up to the dental office. A year later, his daughter visited the dental office for her dental checkup. On reminding about her father's dental treatment, it was informed that her father suffered from septic shock and myocardial infarction. On request she and her family agreed to give complete medical/dental history for the purpose of awareness to the general public.

Case Reports on Space Infections:

Case 1: The following is a case of 63 year old male patient. The patient came to the dental hospital with the chief complaint of pain and swelling in left lower back teeth region since one week. He had smoking habit since ten years. Patient had no prominent medical history. Past dental history revealed root canal treatment in relation to 36. Extraorally, facial asymmetry was seen with respect to left submandibular region. On intraoral examination generalized tobacco stains were present in both upper and lower teeth involving entire teeth surface (+++) (Figure 1). Metal ceramic crowns were present in relation to 36, 45, 46 and 47 (Figure 2). Upon examination 37 was non vital and gingiva associated with 36 and 37 was inflamed. Provisionally a diagnosis of chronic periapical abscess was made. An OPG was suggested and it revealed under obturation in relation to mesial and distal root canals of 36 along with ill-defined periapical radiolucency, for which a re-root canal was considered. Also, loss of lamina dura and

furcation involvement is seen in relation to 37 (Figure 3). On confirming the diagnosis patient was referred to a private hospital for treatment. In the private hospital abscess drainage was done under general anesthesia. The patient visited for teeth

pain earlier. Re root canal was suggested for 36. But he was not interested for treatment. Due to lack of patient motivation in considering re root canal treatment it led to space infection.



Figure 1: Intraoral image showing generalized tobacco stains



Figure 2: and Metal ceramic crowns in relation 36, 46 and 47 respectively.



Figure 3: OPG Showing radiolucency in relation to 36

Case 2: Here we present space infection case where patient came with dental caries in relation to 24 and 25 (Figure 4). Both the teeth showed tenderness on percussion. Root canal was suggested for the teeth. Patient did not show up for six months and the same patient came to the dental OP with the chief complaint of swelling in relation to 24 and 25. Dental caries progressed to periapical abscess. Abscess drainage and dressing was done, followed

by root canal for 24 and 25 (Figure 5 and 6).

Case 3: We present another similar case of space infection. The patient had swelling with respect to 36 and 37 region (Figure 7). Chronic periapical abscess was seen in relation to 37. Upon examining the case the patient was suggested root canal for 36 and extraction in relation to 37. Abscess drainage and dressing was done (Figure 8).



Figure 4: facial asymmetry in relation to 24 and 25



Figure 6: Image of the patient after follow up



Figure 5: Abscess drainage in relation to 24 and 25



Figure 7: Abscess in relation to 36 and 37



Figure 8: Image of patient after follow up

Discussion:

ANALYZING THE REASON FOR DEATH OF THE PATIENT

Patient visited dental office on 24-7-2021 and expired on 06-02-2022. The main reason for the death of the patient could be due to the chronic periapical abscess in relation 36 37 tooth region. Since the patient had the habit of chewing tobacco and cigarette smoking the infection could have been aggravated. As per Eoghan M. Smyth, et al. cigarette tobacco harbors diverse bacterial microbiota. Several studies have already showed that Actinomycetes species are present in the tobacco products. The rate of spread of infection is high in patients suffering from uncontrolled diabetes mellitus. Patient gave a history of unstable angia pectoris the day before 06-02-2022 and was admitted in a private hospital. The lab investigations conducted in the private hospital showed diabetes (DM), hyperthermia, coronary artery disease, tachycardia, lactic acidosis and also leukocytosis on blood investigation. Clinically patient showed signs of facial asymmetry and pedal edema.^{7, 8, 9, 10}

Septic shock has a set of classic set of symptoms. They are increased inflammatory response, lactic acidosis and multiple organ failure. Septic shock is a result of uncontrolled sepsis. In the present case

the cause of sepsis can be chronic periapical abscess, as patient had no other infection apart from severe tooth abscess. Existing literature shows that the cause of dental abscess is enough to cause sepsis and septic shock.^{6,7,8,10,11}

Oral cavity is the gateway for many microorganisms. Breach in the lining of the gingiva, palate and buccal mucosa or as well the mucogingival junction serve as the portals for the entry of bacteria. Generally, dental caries of the tooth can potentially take several months to develop into an abscess. The abscess is usually noticed by the patient as pain and swelling around the affected tooth. When the abscess goes unnoticed or untreated the infection will spread within weeks or months to other tissues and causes complications.⁹

Conclusion

Dental treatments should not be neglected as untreated pulpitis could cause periapical abscess and associated complications. Treatment at the early stage, cessations of bad oral habits and maintenance of healthy life style can be helpful to reduce mortality and morbidity in this present-day scenario. This article emphasizes not to neglect dento-alveolar infections as they can lead to mortality.

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