

Published: December 31, 2022

Citation: Rawal SY, Lim X, et al., 2022. An Atypical Case of Necrotizing Periodontal Disease: A Case Report, Medical Research Archives, [online] 10(12).
<https://doi.org/10.18103/mra.v10i12.3468>

Copyright: © 2022 European Society of Medicine. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI
<https://doi.org/10.18103/mra.v10i12.3468>

ISSN: 2375-1924

CASE REPORT

An Atypical Case of Necrotizing Periodontal Disease: A Case Report

Swati Y. Rawal BDS, MDS, MS¹; Xin-Yan Lim, BDS²; Suan-Phaik Khoo, BDS, MSc. (London), FFDRCSI, FDSRCS (Edin), PhD (Singapore)³; Vrisiis Kofina, DDS, MS¹

¹ Marquette University School of Dentistry

²Private practice, Selangor, Malaysia

³International Medical University, Kuala Lumpur, Malaysia

* swati.rawal@marquette.edu

ABSTRACT:

Necrotizing periodontal disease and necrotizing stomatitis are a group of necrotizing diseases involving different structures of the oral cavity. Necrotizing periodontal disease includes necrotizing periodontitis and necrotizing gingivitis. It involves destruction of the supporting periodontium leading to premature tooth loss. Necrotizing stomatitis destroys soft tissue in the oral cavity and its underlying connective tissue, leaving behind a raw area which predisposes it to infection. This case report presents a case of necrotizing stomatitis preceded by necrotizing periodontitis in a well-nourished individual whose only concern was psychological stress and lack of sleep. These diseases are commonly seen in HIV-seropositive or immune-compromised individuals. They are uncommon in well-nourished individuals who are systemically healthy. In this case, the complex role of psychological stress and sleep deprivation may have played a role in poor healing. The patient made an uneventful recovery as stress levels declined over time.

Keywords : Necrotizing periodontal disease, Necrotizing stomatitis, Psychological stress, Necrotizing periodontitis

INTRODUCTION :

Necrotizing periodontitis (NP) is characterized by necrosis of periodontal attachment apparatus leading to exposure of alveolar bone, severe bone loss and ultimately tooth mobility. Certain situations of acute psychological stress or stressing situations like insufficient sleep, and some personality traits or the ability to cope with a stressful situation may predispose individuals to necrotizing periodontal diseases (NPD). During stress periods, the immune response is altered, and the subject's behavior is changed. The biological plausibility of this assumption is based on the reduction of gingival microcirculation and salivary flow; increase in serum and urine levels of 17 hydroxy- corticosteroid (17-OHCS); change in the function of PMN and lymphocytes, and increase in periodontal pathogen levels.¹ Besides pain and tooth mobility, NP can be accompanied by oral malodor, lymphadenopathy, fever and malaise.² NP is commonly seen in HIV-seropositive individuals and less often in HIV-seronegative but immune-compromised individuals who are undergoing psychological stress.³ The management of NP includes extraction of teeth with hopeless prognosis, mechanical debridement, analgesics for pain control and oral antibiotics in the presence of signs of systemic involvement.⁴ Necrotizing stomatitis (NS), an extension of NP to the adjacent mucosa is often seen in poorly developed or developing countries where malnutrition and HIV infection is rampant.⁵ Here a case is presented where stress and sleep deprivation were probable causes resulting in NPD and NS in an otherwise healthy individual.

CASE REPORT:

A 55-year-old Chinese lady presented with a chief concern of having extreme pain in the gingiva in the lower anterior region and that her teeth in that region were mobile. The pain which started three days prior was described as a constant burning ache over the gingiva area which was exacerbated by mastication and speech during movement of lower lip. Pain was rated as 9 on a scale of 0-10. She had a history of insomnia and psychological stress and had been treated with zaleplon for the past 4 months. However, she had stopped the medication as she felt that her condition had improved. She was otherwise medically healthy and had no surgeries or hospitalization in the past.

On general examination, she had a thin built and appeared anxious. Bilateral painless cervical lymphadenopathy was noted. Intraoral examination revealed necrosis of the marginal and attached gingiva at buccal and lingual aspects of teeth # 23, 24, 25 and 26. Roots of all four teeth were visible with exposed alveolar bone evident around adjacent teeth. All four teeth exhibited Grade III mobility (Fig. 1 a and 1 b). Periapical radiographs revealed severe bone loss (Fig. 2). A swab was taken of the necrotic region for aerobic and anaerobic culture and drug sensitivity. Extraction of the teeth with hopeless prognosis (23, 24, 25 and 26) was carried out. Curettage of the extraction socket and necrotic tissue was performed. She was placed on systemic oral antibiotic therapy consisting of amoxicillin 500 mg three times a day and metronidazole 250 mg three times daily for 7 days. She was also prescribed a chlorhexidine mouthwash to be used twice daily. She was reviewed 10 days post-operatively where the extraction sockets had healed uneventfully. She remained pain free throughout this time.



Fig. 1 a



Fig. 1 b

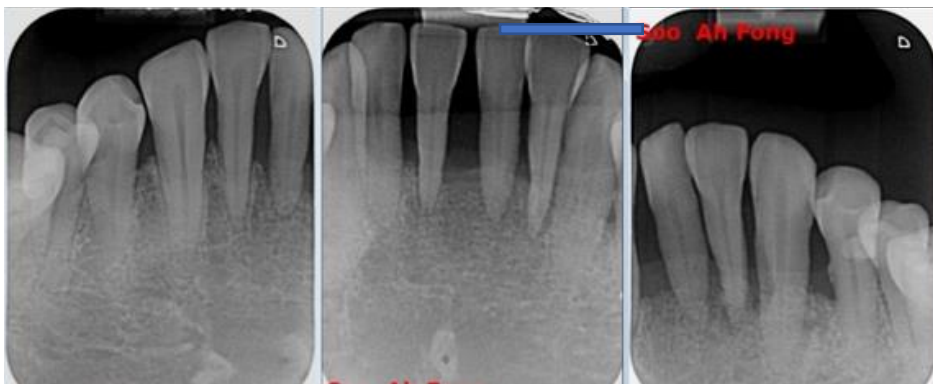


Fig.2

The patient was referred to her physician for evaluation of her general health, stress, and sleep deprivation. The physician prescribed an evaluation of her urine metanephrine. The 24-hour urine metanephrine excretion was 1.8 μmol , the normal being less than 1.3 μmol . The patient was reported to be otherwise healthy.

The swab report for culture and sensitivity was negative for anaerobic bacteria. No growth was noted after 2 days of incubation.

Two months after the last appointment, she presented again to the clinic with a concern of pain in the lower anterior region for the past one week. History revealed that extraction of #22 was carried out by a general dental practitioner a few days prior to her visit as the tooth was extremely painful. Following the extraction, she experienced severe pain and her oral function was affected.

Clinical examination revealed a solitary slit-like ulcer measuring 10mm in length by 10mm depth in the labial sulcus anterior to the mandibular edentulous ridge (Fig. 3a and 3b). She also had soft tissue necrosis and exposure of bone on a lingual torus on the right side (Fig. 4). The ulcer had exposed alveolar bone at the base and periphery. The ulcer was debrided with removal of necrotic tissue until fresh bleeding was visible clinically. Primary closure of the ulcer was achieved. She was placed on systemic oral antibiotic therapy consisting of amoxicillin 500 mg three times a day and metronidazole 250 mg three times a day for two weeks. The necrotic soft tissue was lightly curetted from the torus. She was reviewed two weeks post-operatively. She had made a good and uneventful recovery (Fig.5).



Fig. 3 a



Fig. 3 b



Fig. 4



Fig. 5

DISCUSSION:

Horning and Cohen presented a clinical staging which elucidate the stages of necrotizing gingivostomatitis. According to the Horning and Cohen staging, the presentation of disease in this case falls into stage 4, where there is mucosal necrosis and bone exposure⁶. Predisposing factors for development of NP includes history of NP, poor oral hygiene, unusual psychological stress, malnutrition, smoking, immunodeficiency and HIV. All these factors alone are not enough to establish NP except for HIV.⁶⁻⁷ The prevalence of necrotizing periodontal diseases in systemically healthy populations has not been adequately established because most studies have focused on a specific group of patients with clear predisposing factors, such as military personnel, students, patients positive for HIV or subjects with severe malnutrition⁸. In this case, the patient admitted that she had been undergoing a higher than normal amounts of emotional stress for the past few weeks prior to the onset of the disease and sleeplessness. Further history-taking did not reveal any other known risk factors. Also, discontinuation of zaleplon caused sleep deprivation.

Being subjected to an unusual amount of emotional or psychological stress and lack of sleep have been known to contribute to the reduced resistance of periodontium, by causing a considerable elevation in the level of 17-hydroxycorticosteroid levels which in turn causes a significant decline in the flow of saliva and impaired gingival blood flow, allowing opportunistic infection to expedite due to an alteration in the function of polymorphonuclear leukocytes and lymphocytes⁸. Urinary concentrations of catecholamine metabolites like metanephrine which is increased during stress has

been correlated with severe periodontitis⁹. In this patient urinary metanephrine was raised which could indicate stress.

High counts of *Treponema denticola*, *Eikenella corrodens*, *Dialister pneumosintes*, *Enterococcus faecalis*, *Streptococcus intermedius*, *Aggregatibacter actinomycetemcomitans*, and *Campylobacter rectus* have been found in necrotizing periodontal lesions seen in HIV-positive individuals. However, very few studies have been done to determine the types of microorganisms seen in necrotizing lesions in systemically healthy adults.¹⁰ In this patient no anerobic organisms were detected in the necrotic region during the culture and sensitivity test.

According to the location of the tissue affected by the acute disease process, necrotizing periodontal diseases can be classified as, necrotizing gingivitis, when only the gingival tissues are affected. Necrotizing periodontitis, when the necrosis progresses into the periodontal ligament and the alveolar bone, leading to attachment loss. Necrotizing stomatitis: when the necrosis progresses to deeper tissues beyond the mucogingival line, including the lip or cheek mucosa, the tongue, etc⁸. Necrotizing periodontitis progressing beyond the muco-gingival junction into the mucosal or palatal tissues leading to the exposure of the underlying supporting is known as necrotizing stomatitis (NS) which is known to be prevalent in those who are HIV positive, malnourished or those who have defects in leukocytes and immune function.^{11,12} In this patient the necrosis had progressed beyond the mucogingival junction exposing alveolar bone apical to the edentulous ridge.

Stress is associated with periodontal disease (periodontitis) through multiple complex underlying pathways, including activation of the

hypothalamic–pituitary–adrenal (HPA) axis, autonomic nervous system, and inflammatory cascades. Many of these pathways result in pathological responses to psychological stress, particularly in the absence of adequate coping skills and resilience, leading to the hyperactivation of the HPA-axis and autonomic nervous system. Mediators involved in these signaling cascades, such as cortisol, cytokines, and catecholamines, also exhibit the potential to influence the oral and gut microbiome and bacterial pathogenicity. Mental illness and sleep disorders appear to further exacerbate stress and periodontal disease through common pathways.¹³ Stress may also lead to sleep deprivation, and poor eating habits. Systemic illnesses significantly associated with stress include metabolic disorders such as diabetes, cardiovascular disease, infectious diseases, autoimmune diseases, and periodontal disease.^{14,15} In the absence of any modifiable pre-disposing risk factors in this case, the psychological stress undergone by this patient may have impacted the healing in an otherwise systemically healthy and HIV sero-negative adult. Studies have shown that psychological stress substantially impacts the ability for wound to heal normally.¹⁶ Retardation of the

initial inflammatory phase which is essential for the promotion of healing, reduces the expression of pro-inflammatory cytokines, decreases cellular infiltration at wound site and down-regulates the matrix metalloproteinase enzymes. This has been shown in individuals who experienced greater stress as compared to those who did not.¹⁷⁻¹⁹

CONCLUSION:

In conclusion, this report described the occurrence of NP followed by NS in a systemically healthy adult who had no known pre-disposing risk factors to developing NP or NS other than psychological stress and insufficient sleep. This case provided insight into the importance of keeping stress at a manageable level in order for normal healing to take place.

Declarations of interest: none

Marquette University IRB Exemption number - HR-4088

marquette.kuali.co/protocols/protocols/6217a3778a3a18003550f6b5

REFERENCES:

1. Herrera D, Retamal-Valdes B, Alonso B, Feres M. Acute periodontal lesions (periodontal abscesses and necrotizing periodontal diseases) and endo-periodontal lesions. *J Periodontol* 2018;89 Suppl 1: S85-S102
2. Watanabe K. Prepubertal periodontitis: a review of diagnostic criteria, pathogenesis, and differential diagnosis. *J Periodontol Res* 1990; 25:31–34
3. EC-Clearinghouse on oral problems related to HIV infection and WHO collaborating center on oral manifestations of the immunodeficiency virus: classification and diagnostic criteria for oral lesions in HIV-infection. *J Oral Pathol Med* 1993; 22:289-291.
4. Todescan S, Nizar R. Managing patients with necrotizing ulcerative periodontitis. *Journal Canadian Dental Association*. 2013;79: d44.
5. Ranganathan, K.; Hemalatha, R. (2006). Oral lesions in HIV infection in developing countries: an overview. *Adv. Dent. Res.*, 19 (1), 63-68.
6. Horning GM, Cohen ME. Necrotizing ulcerative gingivitis, periodontitis, and stomatitis: clinical staging and predisposing factors. *J Periodontol*. 1995 Nov;66(11):990-998.
7. Tiitta O, Luomanen M, Hietanen J, Virtanen I. Tenascin expression in mucocutaneous diseases and related lesions of human oral mucosa. *Archives of oral biology*. 1995 Nov 1;40(11):1039-1045.
8. Herrera D, Alonso B, de Arriba L, Santa Cruz I, Serrano C, Sanz M. Acute periodontal lesions. *Periodontol 2000* 2014; 65:149-177.
- 9 Mesa et al. Catecholamine metabolites in urine, as chronic stress biomarkers, are associated with higher risk of chronic periodontitis in adults. *J Periodontol* 2014;85:1755-1762.
10. Gaetti-Jardim Júnior E, Nakano V, Wahasugui TC, Cabral FC, Gamba R, Avila-Campos MJ. Occurrence of yeasts, enterococci and other enteric bacteria in subgingival biofilm of HIV-positive patients with chronic gingivitis and necrotizing periodontitis. *Brazilian Journal of Microbiology*. 2008 Jun;39(2):257-261.
11. Chidzonga MM, Mahomva L. Noma (cancrum oris) in human immunodeficiency virus infection and acquired immunodeficiency syndrome (HIV and AIDS): clinical experience in Zimbabwe. *J Oral Maxillofac Surg*. 2008; 66:475-485.
12. Enwonwu CO, Falkler WA Jr, Phillips RS. Noma (cancrum oris). *Lancet*. 2006; 368:147-156.
13. Spector, A.M., Postolache, T.T., Akram, F. et al. Psychological Stress: A Predisposing and Exacerbating Factor in Periodontitis. *Curr Oral Health Rep*.2020; 7, 208–215. <https://doi.org/10.1007/s40496-020-00282-2>.
14. McEwen BS. Central effects of stress hormones in health and disease: understanding the protective and damaging effects of stress and stress mediators. *Eur J Pharmacol*. 2008;583(2–3):174–85. <https://doi.org/10.1016/j.ejphar.2007.11.071>
15. Decker A., Askar, H., Tattan, M. et al. The assessment of stress, depression, and inflammation as a collective risk factor for periodontal diseases: a systematic review. *Clin Oral Invest*. 2020; 24, 1–12. <https://doi.org/10.1007/s00784-019-03089-3>
16. Glaser R Kiecolt-Glaser JK. Stress-induced immune dysfunction: Implications for health. *Nature Reviews Immunology* 2005; 5:243–251.
17. Kiecolt-Glaser JK, Loving TJ, Stowell JR, et al. Hostile marital interactions, proinflammatory cytokine production, and wound healing. *Arch Gen Psychiatry* 2005; 62:1377–1384.
18. Broadbent E, Petrie KJ, Alley PG, et al. Psychological stress impairs early wound repair following surgery. *Psychosom Med* 2003;65(5):865–869.
19. Padgett DA, Marucha PT, Sheridan JF. Restraint stress slows cutaneous wound healing in mice. *Brain Behav Immun* 1998; 12:64–73.