

Oral medicine case book 65: Necrotising stomatitis

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ABSTRACT

Necrotising stomatitis is a fulminating anaerobic poly-bacterial infection affecting predominantly the oral mucosa of debilitated malnourished children or immunosuppressed HIV-seropositive subjects. It starts as necrotising gingivitis which progresses to necrotising periodontitis and subsequently to necrotising stomatitis.

In order to prevent the progression of necrotising stomatitis to noma (cancrum oris), affected patients should be vigorously treated and may require admission to hospital.

Healthcare personnel should therefore be familiar with the signs and symptoms of necrotising gingivitis/necrotising periodontitis, of their potential sequelae and of the need for immediate therapeutic intervention.

INTRODUCTION

Necrotising gingivitis is a mixed anaerobic bacterial infection characterised by marginal gingival necrosis, bleeding and pain (Figure 1).¹ The term "necrotising gingivitis" should be used in preference to the term "necrotising ulcerative gingivitis" because in necrotising gingivitis ulceration is not a primary feature, but is

in fact a manifestation of the necrosis.² It usually starts at the tips of the interdental papillae, where the attenuated blood supply makes the papillae vulnerable to bacterial-induced ischaemic tissue necrosis.^{1,3} Untreated necrotising gingivitis may progress, extending into the marginal periodontal attachment apparatus, when it is called necrotising periodontitis. Necrotising gingivitis and necrotising periodontitis are collectively termed necrotising periodontal disease.⁴

Necrotising periodontal disease may extend beyond the mucogingival junction to become necrotising stomatitis (Figure 1 and 2), which in a debilitated, malnourished or immunosuppressed host may rapidly spread centripetally with progressive destruction, ultimately resulting in the formation of a full thickness perforation of the mucosa, muscle and skin.^{3,5,6} This condition is called noma (cancrum oris) (Figure 3).

Necrotising gingivitis and early necrotising periodontitis respond favourably to systemic antibiotic therapy and frequent lavage with saline or preferably with a chlorhexidine mouthwash. Once the pain has been controlled by these measures, together with analgesics, then plaque control, scaling and if necessary root planing should follow.^{7,8} This simple treatment regimen will prevent the progression of necrotising periodontal disease to necrotising stomatitis, so early treatment is essential.⁵

Necrotising stomatitis is a polybacterial anaerobic infection frequently occurring in a host immunocompromised by systemic infection (i.e. HIV), by malnutrition, or by other states of debility.¹ Severely debilitated patients with advanced necrotising stomatitis should be admitted to hospital for intravenous antibiotic treatment, fluid, electrolyte and nutritional supplementation and for daily irrigation of the necrotic intra-oral lesions with saline or with chlorhexidine solution, debridement, and removal of mobile teeth and necrotic bone (Figure 1).^{6,9}

In an HIV-seropositive subject with necrotising gingivitis/necrotising periodontitis/necrotising stomatitis, who is not receiving highly active antiretroviral therapy (HAART), that regime should of course be started immediately, as any improvement in the immune status may help to contain the necrotising process.

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Figure 1: (a) Severe necrotizing stomatitis of the left buccal mucosa, and (b) mandibular and maxillary necrotizing gingivitis, with early necrotizing stomatitis of the labial mucosa (arrow) apparently from contact with the gingival lesions, in a 16-year-old HIV-seropositive adolescent with a CD4+ T cell count of 17 cells/mm³, who had been on HAART for the previous four years. All the lesions developed rapidly. Microscopic examination of a biopsy from the buccal lesion showed non-specific surface ulceration covered by a fibrinopurulent membrane, with an intense mixed inflammatory infiltrate of the underlying lamina propria. The patient was admitted to hospital and Ringers lactate, penicillin, metronidazole and gentamycin were administered. Daily irrigation of the intra-oral lesions with saline, and a semi-fluid high-protein diet were started immediately. The lesions were debrided, and were dressed daily with bismuth-iodoform-paraffin paste (BIPP). The patient was referred to the local HIV clinic to optimize the HAART regimen. (c) Five days after admission to hospital, the left buccal mucosa was healing and the necrotizing gingivitis had resolved. The patient was discharged from hospital, but was lost to follow-up.



Figure 2: (a) Necrotizing stomatitis of the left alveolar mucosa extending to involve the buccal mucosa of a 64-year-old malnourished HIV-TB co-infected female. From the medical history it appeared that about five days previously, she had had painful 'sores' on her gingiva that progressed rapidly to involve the maxillary alveolar and buccal mucosa on the left. Her CD4+ T cell count was 4 cells/mm³. She had been diagnosed with HIV-TB coinfection two-weeks previously and HAART and anti-TB medication were instituted at that time. Figure 2b shows the partially healed buccal mucosa after seven days of thrice daily amoxicillin 500mg, metronidazole 400mg, and improvement of her nutrition. In this case, the patient was not admitted to hospital, and although there was no lavage or topical treatment, the treatment provided was effective and improvement was sustained during five weeks of observation.



Figure 3: Necrotic loss of the lower lip extending from the midline to the right commissure in an 11-year-old HIV-seropositive HAART-naïve child with a CD4+ T cell count of 13 cells/mm³. The parent reported that this lesion had developed quite rapidly. Owing to the severity of pain of the lesion, any extension to the buccal alveolar mucosa and gingiva could not be observed. The patient was admitted to hospital and a regimen of treatment similar to that outlined in the legend to Figure 1 above was instituted with satisfactory resolution of the acute lesion. The patient was referred to a plastic surgeon with a view to future reconstructive surgery.

DISCUSSION

While necrotising stomatitis is caused primarily by anaerobic bacteria including, but not limited to spirochaetes and fusiform bacilli, these micro-organisms can exist in the mouths of debilitated, malnourished or immunocompromised persons and even of healthy persons, without causing necrotising gingivitis/periodontitis/stomatitis. Clearly, therefore, other risk factors must also exist for necrotising stomatitis to develop.³ HIV-associated neutropenia, low CD4+ T cell count and cytokine dysregulation are some of the factors that may favour the anaerobic bacterial challenge.^{1,10}

The anaerobic bacteria associated with the necrotising process are highly-proteolytic and tissue invasive.¹ They release virulent agents that are cytopathic to periodontal cells and to local immuno-inflammatory cells, that degrade extracellular matrix proteins and that disrupt the local vasculature, ultimately causing direct tissue damage with associated haemorrhage.^{1,5} These bacterial agents also have the capacity to attenuate local immune responses, promoting tissue colonisation and invasion, and tissue destruction and

in a debilitated vulnerable host, these effects culminate in a necrotic condition.¹⁻³

Furthermore, in HIV-seropositive subjects, HIV-associated elevated levels of cytopathic viral and fungal species, by interacting synergistically with the complex of anaerobic bacteria, exaggerate the tissue necrosis.^{1,2}

COMMENTS

- The natural progression from an initial anaerobic bacterial infection of the marginal gingiva to full-blown necrotising stomatitis is the result of dynamic interactions between virulent bacteria on the one hand and the host's general state of health, immune system, and local micro-environmental factors, on the other hand.
- In the South African context nowadays, necrotising stomatitis occurs predominantly in HIV-seropositive persons. Further research is needed into the relationship between HIV infection and necrotising stomatitis, into the general prevalence of necrotising stomatitis and into factors that either, confer protection against, or promote the progression of necrotising periodontal disease to necrotising stomatitis. This may allow the formulation of evidence-based guidelines for the prevention of necrotising stomatitis.
- In summary, whether related to HIV, to malnutrition or to any other state of debility and in the presence of a fairly specific complex of anaerobic bacteria, diminished immunity appears to be the systemic common denominator in the pathogenesis of necrotising stomatitis.

References

1. Feller L, Lemmer J. Necrotizing periodontal diseases in HIV-seropositive subjects: pathogenic mechanisms. *Journal of the International Academy of Periodontology* 2008; 10: 10-5.
2. Feller L, Lemmer J. Necrotizing gingivitis as it relates to HIV infection: a review of the literature. *Perio - Periodontal Practice Today* 2005; 2: 285-91.
3. Feller L, Altini M, Chandran R, Khammissa RA, Masipa JN, Mohamed A, Lemmer J. (2013a). Noma (cancrum oris) in the South African context. *Journal of Oral Pathology & Medicine* 2014; 43 (1) : 1-6.
4. 1999 International Workshop for a Classification of Periodontal Diseases and Conditions. Papers. Oak Brook, Illinois, October 30-November 2, 1999. *Annals of Periodontology / The American Academy of Periodontology* 4: i, 1-112.
5. Masipa JN, Baloyi AM, Khammissa RA, Altini M, Lemmer J. Feller L. Noma (cancrum oris): a report of a case in a young AIDS patient with a review of the pathogenesis. *Head and Neck Pathology* 2013; 7: 188-92.
6. van Niekerk C, Khammissa RA, Altini M, Lemmer J and Feller L. Noma and cervicofacial necrotizing fasciitis: clinicopathological differentiation and an illustrative case report of noma. *AIDS Research and Human Retroviruses* 2014; 30: 213-6.
7. Shangase L, Feller L, Bignon E. Necrotising ulcerative gingivitis/periodontitis as indicators of HIV-infection. *South African Dental Journal* 2004; 59: 105-8.
8. Phiri R, Feller L, Bignon E. The severity, extent and recurrence of necrotizing periodontal disease in relation to HIV status and CD4+ T cell count. *Journal of the International Academy of Periodontology* 2010; 12: 98-103.
9. Feller L, Khammissa R, Kramer B, Lemmer J. Oral squamous cell carcinoma in relation to field precancerisation: pathobiology. *Cancer Cell International* 2013b; 13: 31.
10. Feller L, Khammissa R, Wood N, Meyerov R, Pantanowitz L, Lemmer J. Oral ulcers and necrotizing gingivitis in relation to HIV-associated neutropenia: a review and an illustrative case. *AIDS Research and Human Retroviruses* 2012 ; 28: 346-51.