CORRESPONDENCE

Necrotising Ulcerative Gingivitis: A Rare Manifestation of *Pseudomonas* Infection

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Dear editor,

Management of intra-oral infections in immunocompromised patients can be potentially challenging and deceiving [1]. Opportunistic pathogens including bacteria, viruses and fungi are the major cause of necrotising intra-oral infections in immunocompromised patients [2]. Overlapping clinical features produced by various infective agents acting alone or in combination may challenge clinical judgement at bedside. We present a case of acute myeloid leukemia (AML) who developed *Pseudomonas aeruginosa* related necrotising ulcerative gingivitis.

A 19-year-old girl, known case of AML, post allogeneic hematopoietic stem cell transplant (HSCT) with graft failure was planned for second allogeneic-HSCT. She presented on Day + 128 with fever and exquisite gingival pain in right maxillary pre-molar region of 1-day duration. She also complained difficulty in opening the mouth and pain on chewing food. Neither she had any such complaint in the past nor did she develop any such symptoms during high dose chemotherapy and HSCT. At presentation, she had fever (101.2 °F), tachycardia (112 beats/min) and tachypnea (26 breaths/min); her blood pressure was normal (114/72 mmHg). On oral cavity examination, generalised gingival erythema and edema was present (Fig. 1a) which was most conspicuous in right lateral maxillary region. A necrotic gingival plaque measuring 10 mm × 10 mm was present alongside the right upper premolar tooth (Fig. 1b).

Investigations revealed Hemoglobin 94 g/L, total leucocyte count $0.3 \times 10^9/L$, absolute neutrophil count $0.1 \times 10^9/L$ and platelet count $64 \times 10^9/L$. Peripheral smear was unremarkable for blasts/atypical cells. A panoramic dental radiograph was normal. Blood and urine cultures were sterile. On bacterial culture, swab from necrotic gingival plaque revealed growth of *Pseudomonas aeruginosa* on day 3 of admission. Fungal smear and culture were unremarkable.

Inj. Cefoperazone + sulbactam (2 g IV TDS) and Inj. Vancomycin (1 g IV BD) were empirically started with supportive measures (Fentanyl transdermal patch and morphine IV boluses for pain relief; 1% clotrimazole mouth paint and chlorhexidine mouth rinses). On day 3 of admission, in view of high grade fever and persistent pain, gram negative cover was escalated from Cefoperazone + sulbactam to Inj. Cefepime (2 g IV TDS) and Inj. Amikacin (750 mg IV OD). Vancomycin was stopped after sterile blood culture report.

She became afebrile by day 5 of admission. Gingival pain subsided completely by day 9. Gingival swab culture repeated on day 5 of admission was sterile. By day 17 of admission, necrotic gingival tissue got completely dislodged by underlying healthy granulation tissue (Fig. 1c, d). Cefepime and Amikacin were administered for a total of 3 weeks.

Intra-oral infections in immunocompromised patients result in substantial morbidity and mortality. These infections frequently lead to substantial pain and impaired feeding which in turn compromise tolerance and compliance to treatment especially in patients with haematological malignancies. It is well recognised that soft tissue infections in neutropenic patients have frequent association with little or no pus formation and favourably respond to prompt antimicrobial therapy. Clinical

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Fig. 1 On day 1; generalized gingival erythema and edema (a), most conspicuous in right lateral maxillary region with a 10 mm necrotic plaque close to premolar tooth (b). On day 17; erythema and edema subsided, and healthy granulation tissue (c, d) replaced the necrotic slough

improvement in such infections has been reported to correlate with concurrent neutrophil count recovery. There is a limited role of operative management in view of risk of excessive bleeding due to concomitant thrombocytopenia and concerns regarding delayed healing [2, 3]. Maintenance of good oral hygiene and close adherence to neutropenic precautions have proven role in preventing such noxious infections [4]. Presence of dental caries and chemotherapy related transformation of oral flora are the important risk factors that favour development of destructive intra-oral infections after superinfection by pathogenic microorganisms [5]. *Pseudomonas aeruginosa* related bacteremia and necrotising soft tissue infections are known to portend a serious risk to severely neutropenic patients [6]. It is well-known that *P. aeruginosa* frequently inhabits oral cavities of immunocompromised patients. By virtue of its ubiquitous nosocomial existence, differentiation of *P. aeruginosa* infection from colonisation can be cumbersome [1]. The index case highlights some crucial learning points. Early isolation of *P. aeruginosa* in this severely neutropenic patient and prompt escalation to a combination of Cefipime and

Amikacin proved worthy. Disappearance of *P. aeruginosa* on repeat swab and concurrent significant clinical improvement after starting combination of Cefipime and Amikacin reasonably speculates the role of *P. aeruginosa* as the perpetrator of gingivitis in this case. Gingival swab bacterial culture didn't reveal growth of *Porphyromonas*, *Prevotella* or *Fusobacterium*—the microorganisms most often implicated in intra-oral infections [7]. Recently, the role of gram negative anaerobes belonging to phylum *Synergistetes* has been incriminated in necrotizing ulcerative gingivitis [8]. In view of severe neutropenia (due to underlying allograft failure) throughout the course of illness, it seems obvious that the combination antibiotic therapy played a major role in achieving a favourable outcome in this case. Despite no proven superiority of combination antibiotic therapy over monotherapy in *P. aeruginosa* infections, the decision to use a combination therapy in this case can be defended in view of anticipated prolonged neutropenia. Therefore, it shall be imperative to consider *P. aeruginosa* in the list of probable etiological agents causing intraoral infections in immunocompromised patients.

Compliance with Ethical Standards

Conflict of interest There is no conflict of interest between the authors.

Informed Consent Informed signed written consent was taken from the patient involved.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Human and Animals Rights No animals were involved in the study.

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