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Oral Manifestation of *Pseudomonas Aeruginosa* in a Kidney Transplant Recipient with Cytomegalovirus Co-Infection: a Case Report

Manifestação Oral por *Pseudomonas Aeruginosa* em Paciente Transplantado Renal com Coinfecção por Citomegalovírus: Relato de Caso

Camila Maria Simas Almondes*[a]; Danila Lorena Nunes dos Santos[ab]; Maria do Socorro Alves Cardoso da Silva[ab]; Syomara Pereira da Costa Melo[ab]; Fernanda Ferreira Lopes[c]

[a]Universidade Federal do Maranhão. MA, Brasil.
[b]Hospital Universitário Presidente Dutra. MA, Brasil.
[c]Universidade Federal do Maranhão, Programa de Pós-Graduação Stricto Sensu em Odontologia. MA, Brasil.
*E-mail: camila.simas@yahoo.com.br

Abstract

Opportunistic viral infections are common in kidney transplant recipients. They are mainly caused by cytomegalovirus, which in addition to causing infection, can increase immunosuppression and facilitate colonization by other pathogens. This study presents the clinical case report of a kidney transplant recipient affected by cytomegalovirus who presented oral lesions caused by *Pseudomonas aeruginosa*. A 55-year-old male patient with gingival burning and chewing pain presented whitish areas in his gums in the region from element 22 to 24, surrounded by erythematous areas. Culture examination and biopsy revealed the presence of the bacteria *P. aeruginosa,* confirmed by blood culture. After seven days of antibiotic therapy, a significant improvement was observed in his oral condition. Thus, it was concluded that the oral cavity was the infection site in this kidney transplant patient, demonstrating the importance of a dentist in a multidisciplinary team to perform early diagnosis of oral lesions, and thus prevent possible systemic complications that may culminate in graft rejection.

Keywords: Kidney Transplantation. Immunosuppression. *Pseudomonas aeruginosa*. Oral Manifestations.

Resumo

Infecções virais oportunistas são comuns em transplantados renais, principalmente causadas pelo citomegalovírus, que além de causar infecção, pode aumentar a imunossupressão e facilitar a colonização por outros patógenos. Nós apresentamos aqui o relato de caso clínico de um transplantado renal acometido por citomegalovírus que apresentou lesões bucais causadas por P. aeruginosa. Paciente do sexo masculino, 55 anos, com ardência gengival e dor à mastigação, apresentava áreas esbranquiçadas em gengiva na região do 22 ao 24 circundadas por áreas eritematosas. Exame de cultura e biópsia revelaram a presença da bactéria P. aeruginosa, confirmada na hemocultura. Após sete dias de antibioticoterapia, observamos melhora significativa da condição bucal. Assim, concluímos que a cavidade bucal foi o sítio da infecção no paciente transplantado renal demonstrando a importância do dentista em equipe multidisciplinar para realizar diagnóstico precoce de lesões bucais e assim prevenir possíveis complicações sistêmicas que possam culminar com a rejeição do enxerto.

Palavras-chave: *Transplante de Rim. Imunossupressão. Pseudomonas aeruginosa. Manifestações Bucais.*

1 Introduction

Kidney transplantation is the treatment of choice for individuals with end stage renal disease, as it increases survival and improves patients' quality of life[1,2]. However, to avoid the new organ rejection, recipients are subjected to immunosuppressive therapy[3]. This reduces the patient's immune response and increases susceptibility to infections, which are the leading cause of morbidity and mortality in post-transplant patients[4]. In these cases, opportunistic viral infections are common, mainly caused by cytomegalovirus (CMV), occurring in up to 85% of recipients in the first three months after transplantation, when immunosuppression is more intense[5,6]. CMV may affect any organ of the individual; however, intraoral localization is rare, although involvement of the entire gastrointestinal tract has already been described[5]. In addition to causing infection, CMV can increase patient immunosuppression and facilitate colonization by other opportunistic pathogens, such as bacterial agents[7].

Pseudomonas aeruginosa is an aerobic, gram-negative, and opportunistic bacteria, since is rarely associated with infection in immunocompetent individuals[8,9]. It causes infections in kidney transplant recipients mainly affecting the lungs, surgical site, urinary tract, and bloodstream [10-12]. In the oral cavity, *P. aeruginosa* has been found in other immunosuppressed patients, such as HIV carriers and patients undergoing cancer treatment, but there are no reports in the literature regarding kidney transplant recipients[13,14]. Thus, the aim of the present study is to report the presence of oral lesions caused by *P. aeruginosa* in a kidney transplant patient affected by CMV.

2 Case Report

This study was approved by the Research Ethics Committee of the University Hospital of the Federal University of Maranhão under number 3.714.315.

55-year-old hypertensive male patient with chronic

kidney disease of undetermined cause, with a history of cardiac surgery and hepatitis C. Being a kidney transplant recipient for five months, he was hospitalized and treated for febrile neutropenia and CMV infection.

During the anamnesis, the patient reported a burning sensation in marginal gums in the region of elements 22 to 24, in addition to discomfort and pain during chewing, which prevented him from eating.

In the dental clinical evaluation, performed in the dental clinic, with the aid of a flat mouth mirror and artificial light (lantern), whitish areas (which did not give in to scraping, i.e., not removed with gauze) were observed in marginal gums in the region of elements 22 to 24 (Figure 1) and in the region of elements 42 to 44 (Figure 2) surrounded by erythematous areas. The initial diagnostic hypothesis was necrotic lesion, possibly caused by CMV.

Figure 1 - Lesion in superior marginal gingiva in the region from 22 to 24

Source: The authors.

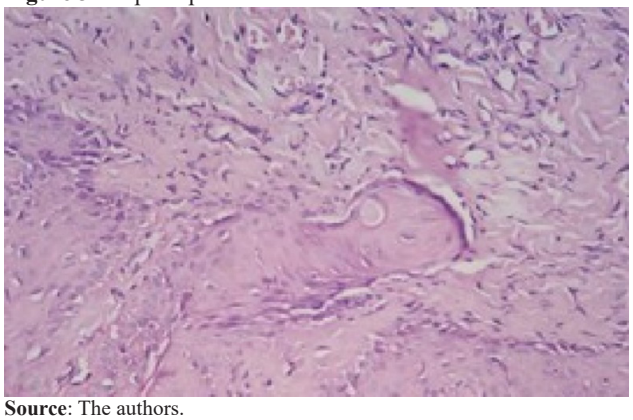
Figure 2 - Lesion in inferior marginal gingiva in the region from 42 to 44

Source: The authors.

Gingival fluid was collected from the whitish areas with the aid of a swab, for culture examination, and the presence of the bacteria *P. aeruginosa* was detected. There was no growth of other bacterial or fungal species.

A fragment of the marginal gums from the region of elements 22 to 24 was also collected, which was sent for biopsy. A biopsy of the region from element 42 to 44 was not deemed necessary, as the lesions had similar characteristics and it was preferred to avoid bleeding in another area. The result revealed a chronic inflammatory process, with formation of granulation tissue, necrosis, and overlapping bacterial colonies (Figures 3, 4, and 5). No alterations suggestive of viral or fungal infection were identified. Due to the results of the tests described above, it was concluded that the lesions were not caused by CMV; rather, they were of bacterial origin. In agreement with the diagnosis, the result of blood culture revealed the presence of the same bacteria, *P. aeruginosa,* in the patient's blood.

Figure 3 –Repair epithelium

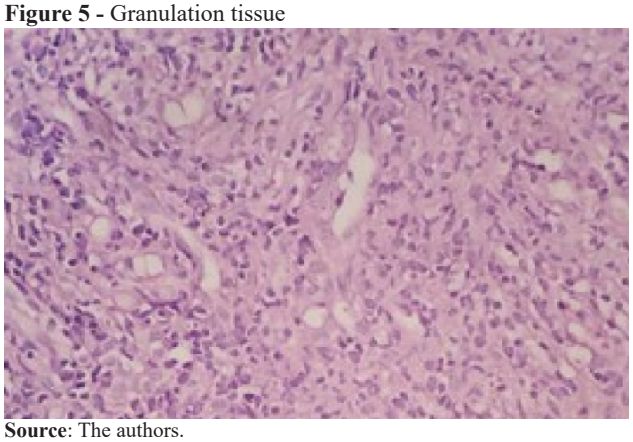


Source: The authors.

Figure 4 - Overlapping bacterial colonies

Source: The authors.

Figure 5 - Granulation tissue



Source: The authors.

For CMV infection treatment, the patient had already been prescribed Gancylovir 250 ml (87.5 ml intravenously, once a day, for 14 days), and systemic antibiotic therapy was initiated with Cefepime Hydrochloride 2 g for bacterial infection (intravenous 1x a day for 7 days), with Teicoplanin 400 mg (once every 3 days for 10 days). In addition to medical

treatment, two supragingival scraping sessions (7-day interval between sessions) were performed with the aid of Gracey curettes associated with chlorhexidine digluconate 0.12% (2 × per day) during the hospitalization period (10 days). The patient also received oral hygiene guidance.

After seven days of antibiotic treatment, a significant improvement in oral condition was observed. The whitish areas disappeared and the gums presented a normal aspect (Figure 6 and 7). The patient reported that the painful symptoms ceased and that he could eat normally.

Figure 6 - Aspect of the superior marginal gingiva after seven days of antibiotic therapy

Source: The authors.

Figure 7 - Aspect of the inferior marginal gingiva after seven days of treatment with antibiotic therapy

Source: The authors.

The case report presented here corroborates reports that oral lesions caused by cytomegalovirus are rare and clinically characterized by the formation of painful ulcerations at the edge of the tongue, lips, and mucous membranes[7]. In the present case report, the patient developed unusual oral lesions in marginal gums that were initially related to CMV due to the patient being treated for infection with this virus. Upon examining the culture results and biopsy examination, the lesions were found to be associated with *P. aeruginosa.* CMV infection is believed to increase immunosuppression and facilitated colonization and subsequent opportunistic infection by *P. aeruginosa*[7]. Given that kidney transplant recipients are under continuous immunosuppressive therapy to prevent graft rejection, they are more susceptible to systemic complications and the development of oral diseases. Therefore, lesions in the oral cavity may arise as a result of drug interactions or immunosuppression[15,16].

P. aeruginosa has been reported in several studies as one of the main bacteria causing opportunistic infections in renal transplant recipients, and the urinary tract is the site with the highest occurence[17-19]. It is noteworthy that in this clinical case, the oral cavity was the infection site in the kidney transplant patient, a situation that had not yet been reported in an adult patient. Another interesting finding was that this bacteria was not found in the urine culture test, but was detected in the oral cavity and blood. A similar finding was reported by Souza et al.[14] who detected *P. aeruginosa* both in the oral cavity and in the blood of a chronic pediatric kidney patient undergoing peritoneal dialysis treatment, and the child presented the same symptoms as the adult patient in this case, which were pain in the gingival region and eating difficulties.

Barasch et al.[13] described three cases of immunosuppressed patients: two HIV patients and one diagnosed with leukemia, who presented oral cavity lesions caused by *P. aeruginosa.* The lesions characteristics were similar to each other and presented the same aspects as the lesions found in the present case report: a necrotic zone surrounded by an erythematous area. To rule out other oral diseases with a necrotizing aspect (necrotizing gingivitis and necrotizing periodontitis), the authors suggest the inclusion of *P. aeruginosa* infection in the differential diagnosis of oral necrotic lesions, emphasizing the importance of performing culture tests for correct therapeutic management.

The frequency of infections in kidney transplant recipients depends on the intensity of the immunosuppression induced and the serological status for the various infectious agents identified in the patient before transplantation[1,2]. Between the second and sixth month, the most varied opportunistic infections prevail , caused mainly by viruses, fungi, and bacteria [20,21]. In the present report, the patient had completed 5 months of kidney transplantation and was affected by two opportunistic pathogens: CMV virus and the bacteria *P. aeruginosa.*

The investigation of the origin of oral lesions led to the discovery of the bacteria *P. aeruginosa,* thus emphasizing the importance of a dentist in the multidisciplinary health team of kidney transplantation. Concomitant treatment for the virus and the bacteria was important for the restoration of the patient's health. Systemic antibiotic therapy eliminated the bacteria causing oral lesions and periodontal treatment restored gingival health.

3 Conclusion

This case report is of paramount importance to health professionals, since it demonstrated that the oral cavity can be colonized and infected by the pathogen *P. aeruginosa*. Thus, an early diagnosis of oral lesions is necessary in kidney transplant recipients to avoid possible systemic complications that may culminate in graft rejection.

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