American Journal of Case Reports

e-ISSN 1941-5923
© Am J Case Rep, 2026; 27: e954665
DOI: 10.12659/AJCR.954665

Received: 2026.06.29
Accepted: 2026.10.21
Available online: 2026.11.12
Published: 2026.XX.XX

Linezolid-Induced Black Hairy Tongue During Treatment of Intestinal Tuberculosis: A Case Report

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

AEF 1 Hazem Abdalla
AF 2 Ahmad Abdalla
F 3 Sara Almarzooqi
E 4 Agyad Bakkour
ABCDEFG 3 Waqar Haider Gaba

1 Royal College of Surgeons in Ireland (RCSI), Dublin, Ireland
2 Pennsylvania Hospital, University of Pennsylvania Health System, Philadelphia, PA, USA
3 Department of Internal Medicine, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates
4 Abu Dhabi Health Research Center, Abu Dhabi, United Arab Emirates

Corresponding Author: Hazem Abdalla, Address: Sheikh Khalifa Medical City Department of Internal Medicine, PO Box 51900, Al Karamah St, Abu Dhabi, United Arab Emirates
Phone: +353 83 030 0719, e-mail: hazemabdalla22@rcsi.ie

Financial support: None declared
Conflict of interest: None declared

APPROVED GALLEY PROOF

Patient: Male, 33-year-old
Final Diagnosis: Black hairy tongue
Symptoms: Tongue discoloration
Clinical Procedure: —
Specialty: Infectious Diseases

Objective: Unusual or unexpected effect of treatment

Background: Linezolid, a synthetic oxazolidinone-class antibiotic, has become an essential reserve treatment for various antimicrobial-resistant infections, including methicillin-resistant *Staphylococcus aureus* pneumonia and vancomycin-resistant enterococcal bacteremia. Less commonly, linezolid is used to treat highly resistant strains of tuberculosis. A rare side effect of linezolid is black hairy tongue (BHT), in which elongated papillae on the dorsal tongue produce a characteristic blackened appearance. Although benign and self-limiting, the condition can have psychosocial implications due to its hygiene-related stigma. We describe a case of BHT during linezolid treatment for intestinal tuberculosis, then discuss its implications and management.

Case Report: A 33-year-old man receiving treatment for intestinal tuberculosis presented to the clinic with black discoloration of the tongue. Two weeks earlier, his antibiotic regimen had been changed to isoniazid, ethambutol, moxifloxacin, and linezolid due to abnormal liver function test results. He reported no pain, changes in taste, or discomfort; he denied smoking, alcohol use, and coffee or tea consumption. A review of systems was negative, his vital signs were normal, and no laboratory abnormalities were noted. After discontinuation of linezolid and encouragement of good oral hygiene, the discoloration rapidly improved and completely resolved within 3 weeks. The Naranjo algorithm (used to assess causality) indicated that linezolid was the probable causative medication.

Conclusions: Although rare, linezolid-induced BHT should be considered in patients presenting with acute tongue discoloration. Withdrawal of the offending medication usually resolves BHT but may disrupt management of the underlying condition. During BHT management, physicians should consider both patient preferences and the clinical context of each case.

Keywords: Drug-Related Side Effects and Adverse Reactions • Linezolid • Tongue, Hairy • Tuberculosis
Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/954665

1270 1 3 14

Publisher's note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher

This work is licensed under Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

APPROVED GALLEY PROOF

Introduction

Linezolid is a synthetic antimicrobial belonging to the oxazolidinone class, originally studied for its activity against methicillin-resistant *Staphylococcus aureus*, *Streptococcus pneumoniae*, and vancomycin-resistant enterococci [1]. This class of antimicrobials has also demonstrated efficacy against both drug-susceptible and drug-resistant *Mycobacterium tuberculosis* strains [2-4]. Despite its efficacy, linezolid is associated with rare but serious side effects, including peripheral neuropathy and serotonin syndrome [5].

Black hairy tongue (BHT), or lingua villosa nigra, is a rare, benign, and self-limiting condition characterized by abnormally hypertrophied and elongated filiform papillae on the dorsal surface of the tongue. Although the exact mechanism underlying BHT is not fully understood, these elongated papillae are thought to be covered with layers of keratin that trap porphyrin-producing chromogenic bacteria and yeasts, contributing to discoloration [6,7]. Various medications have been implicated in the development of BHT. Antibiotics such as penicillins, tetracyclines, and linezolid; antipsychotics such as olanzapine; and hydrogen peroxide-containing mouthwashes have all been documented as triggers [8,9]. Other predisposing factors include immunosuppression and poor oral hygiene [9,10]. The timing of BHT onset is unpredictable, ranging from days to months after medication initiation [10].

BHT is usually asymptomatic, although some patients report halitosis, nausea, or altered taste [11]. In most cases, BHT is diagnosed clinically without requiring tissue biopsy [12]. Treatment includes patient education, discontinuation of the offending medication, and maintenance of good oral hygiene. The prognosis is excellent, and most cases show complete resolution within weeks [10]. We describe and discuss a case of linezolid-induced BHT in a patient treated for intestinal tuberculosis.

Case Report

A 33-year-old man was diagnosed with intestinal tuberculosis based on a positive interferon-gamma release assay and an intestinal biopsy revealing granulomatous inflammation. First-line antituberculosis therapy was initiated, consisting of oral rifampicin (600 mg once daily), isoniazid (300 mg once daily), pyrazinamide (2 g once daily), and ethambutol (1200 mg once daily). After 1 month of treatment, the patient developed abnormal liver function test results, which were attributed to rifampicin and pyrazinamide. These medications were replaced with moxifloxacin (400 mg once daily) and linezolid (600 mg once daily). Isoniazid and ethambutol were continued, and no other new medications were prescribed.



Figure 1. Black discoloration of the dorsal surface of the tongue.

No prior exposure to linezolid was reported. Two weeks after starting the new regimen, the patient presented to the clinic with black discoloration on the dorsal surface of his tongue. He reported no pain, changes in taste, or discomfort; he denied smoking, alcohol use, and coffee or tea consumption. A complete review of systems was negative.

On physical examination, the patient's vital signs were within normal limits. As shown in **Figure 1**, black discoloration was confined to the dorsal aspect of the tongue, sparing the tip and lateral borders. The gums and pharyngeal tissues were unaffected. Laboratory investigations, including a complete blood count, liver function tests, and a metabolic panel, showed normal results; human immunodeficiency virus testing was negative. Several differential diagnoses were considered. Staining secondary to smoking or the use of coffee, tea, bismuth-containing products, or peroxide-containing mouthwash was considered unlikely because the patient denied these exposures. Hyperpigmentation secondary to tuberculosis-induced adrenal insufficiency was considered unlikely due to the absence of systemic manifestations, as well as the presence of normal vital signs and metabolic panel results. Oral candidiasis and oral hairy leukoplakia were ruled out based on the absence of white plaques, lack of extension beyond the dorsal tongue, and the patient's negative human immunodeficiency virus status. Potassium hydroxide preparation, fungal culture, and tongue biopsy were not performed because the lesion's characteristic appearance and temporal relationship with linezolid initiation were strongly suggestive of BHT.

The patient received a clinical diagnosis of linezolid-induced BHT. Given that the patient expressed substantial cosmetic concern, linezolid was discontinued after a discussion of

This work is licensed under Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]



Figure 2. Partial resolution of black discoloration of the dorsal surface of the tongue at the 1-week follow-up after discontinuation of linezolid.

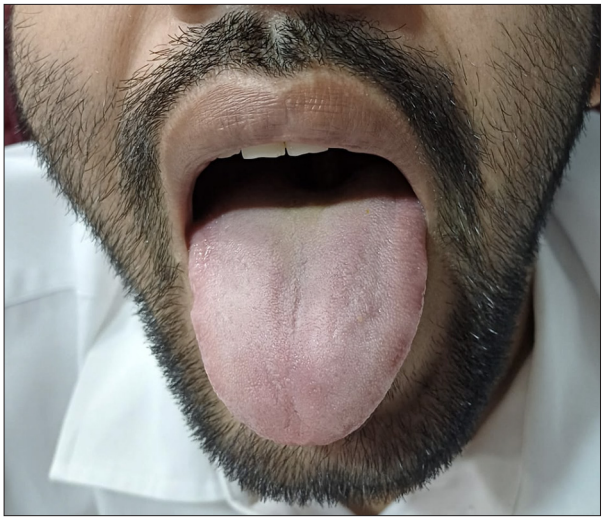


Figure 3. Complete resolution of tongue discoloration 3 weeks after discontinuation of linezolid.

Table 1. Naranjo algorithm adapted from Naranjo et al [13]. Underlined scores indicate responses applicable to this case.

Question	Yes	No	Do not know
1. Are there previous conclusive reports of this reaction?	**+1**	0	0
2. Did the adverse event occur after the suspected drug was administered?	**+2**	-1	0
3. Did the adverse reaction improve when the drug was discontinued or a specific antagonist was administered?	**+1**	0	0
4. Did the adverse event recur when the drug was readministered?	+2	-1	**0**
5. Are there alternative causes (other than the drug) that could have caused the reaction independently?	-1	**+2**	0
6. Did the reaction recur when a placebo was administered?	-1	+1	**0**
7. Was the drug detected in blood (or other fluids) at concentrations known to be toxic?	+1	0	**0**
8. Was the reaction more severe when the dose was increased or less severe when the dose was decreased?	+1	0	**0**
9. Did the patient experience a similar reaction to the same or similar drugs during previous exposure?	+1	**0**	0
10. Was the adverse event confirmed by objective evidence?	+1	**0**	0
Total score:	6		

Score interpretation: ≥9, definite; 5-8, probable; 1-4, possible; ≤0, doubtful.

treatment options. The remaining antituberculosis regimen was not changed. Proper oral hygiene, including the use of a tongue scraper, was also encouraged. This approach led to rapid resolution of the discoloration: **Figures 2 and 3** highlight the clinical improvement noted after 1 and 3 weeks, respectively. The Naranjo algorithm was used to evaluate linezolid as the causative medication (**Table 1**). The resulting score of 6 indicated that linezolid was the probable trigger [13].

Discussion

Despite the increasing use of linezolid and the growing number of reported cases associating linezolid with BHT development, this link remains poorly reported, and the incidence of linezolid-induced BHT has not been established [5]. Black discoloration of the tongue often causes confusion among patients and potentially even physicians. Such confusion is likely attributable to the rarity of BHT and its benign, self-limiting

APPROVED GALLEY PROOF

This work is licensed under Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

APPROVED GALLEY PROOF

course. Clinicians may perceive the condition as insignificant relative to the often severe infection being treated. The resulting lack of patient education may contribute to the impact of BHT on self-image and the perceived stigma of poor hygiene. Moreover, limited clinician awareness of BHT may delay diagnosis and lead to unnecessary investigations, such as tongue biopsy, thus increasing the patient burden. Although not performed in the present case, dermoscopy may be considered as a noninvasive diagnostic aid in more ambiguous cases [14].

Our case suggests that the challenge of managing BHT arises neither from diagnostic difficulty nor from the condition's clinical course. Instead, the challenge may be related to determining whether the benefits of discontinuing the causative medication outweigh the risks of compromising management of the underlying disease. In the present case, withdrawal of linezolid allowed complete resolution of BHT. However, discontinuation of linezolid may increase the risk of treatment failure and unsuccessful tuberculosis eradication. Given that BHT is benign and primarily cosmetic, a patient who is unbothered by tongue discoloration may elect to continue linezolid as part of the existing antibiotic regimen to optimize treatment outcomes. This risk-benefit assessment depends on the severity of the underlying infection and the feasibility and consequences of replacing linezolid with another agent, if necessary. The numerous variables involved limit the applicability of broad clinical recommendations for managing linezolid-induced BHT. Such risk-benefit assessments are further complicated in cases involving medications prescribed for an indefinite duration (eg, antipsychotic-induced BHT). Regardless, patient-centered discussions should be undertaken with consideration of the clinical context of each case.

Rather than describing a novel mechanism, the present report recontextualizes the recognition and clinical course of BHT in the setting of intestinal tuberculosis, in which multidrug therapy and increasing drug resistance already place patients at greater risk of drug-related adverse effects. Specifically, it reframes BHT management from simply discontinuing the offending medication to considering the secondary consequences in conditions that require complex pharmacological management. Notably, our experience cannot be used to predict BHT outcomes with continued linezolid therapy or support extending recommendations to the broader BHT patient population. Amid increasing global linezolid use, further investigations comparing BHT outcomes in patients who continue versus discontinue linezolid may help guide future recommendations for managing this condition.

Conclusions

New-onset tongue discoloration temporally associated with antimicrobial use should prompt consideration of linezolid as a possible trigger. Although BHT is benign and self-limiting, its psychosocial impact and associated stigma emphasize the importance of recognizing the condition. Such recognition presents an important clinical challenge for physicians: the risks of altering antimicrobial treatment for the underlying infection must be weighed against the consequences of continuing linezolid despite BHT. Management should be individualized and patient-centered, considering the symptom burden, severity of the underlying condition, and availability of alternative medications.

Institution Where Work Was Done

Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates.

Patient Consent

The patient provided informed consent for the publication of this report.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

References:

1. Dresser LD, Rybak MJ. The pharmacologic and bacteriologic properties of oxazolidinones, a new class of synthetic antimicrobials. Pharmacotherapy. 1998;18(3):456-62
2. Ashtekar DR, Costa-Periera R, Shrinivasan T, et al. Oxazolidinones, a new class of synthetic antituberculosis agent. In vitro and in vivo activities of DuP-721 against *Mycobacterium tuberculosis*. Diagn Microbiol Infect Dis. 1991;14(6):465-71
3. Rodríguez JC, Ruiz M, López M, Royo G. In vitro activity of moxifloxacin, levofloxacin, gatifloxacin and linezolid against *Mycobacterium tuberculosis*. Int J Antimicrob Agents. 2002;20(6):464-67
4. Vinh DC, Rubinstein E. Linezolid: A review of safety and tolerability. J Infect. 2009;59 (Suppl. 1):S59-74
5. Beekmann SE, Gilbert DN, Polgreen PM. Toxicity of extended courses of linezolid: Results of an Infectious Diseases Society of America Emerging Infections Network survey. Diagn Microbiol Infect Dis. 2008;62(4):407-10
6. Manabe M, Lim HW, Winzer M, Loomis CA. Architectural organization of filiform papillae in normal and black hairy tongue epithelium. Arch Dermatol. 1999;135(2):177-81
7. Harada Y, Gaafar H. Black hairy tongue. J Laryngol Otol. 1977;91(1):91-96
8. Thompson DF, Kessler TL. Drug-induced black hairy tongue. Pharmacotherapy. 2010;30(6):585-93
9. Schlager E, St Claire C, Ashack K, Khachemoune A. Black hairy tongue: Predisposing factors, diagnosis, and treatment. Am J Clin Dermatol. 2017;18(4):563-69

This work is licensed under Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

10. Siddiqui MA, Adil M, Amin SS, Xess K. Linezolid-induced black hairy tongue: A case report and review of literature. J Dermatol Dermatol Surg. 2022;26(2):77-79
11. Vañó-Galván S, Jaén P. Black hairy tongue. Cleve Clin J Med. 2008;75(12):847-48
12. Gurvits GE, Tan A. Black hairy tongue syndrome. World J Gastroenterol. 2014;20(31):10845-50
13. Naranjo CA, Busto U, Sellers EM, et al. A method for estimating the probability of adverse drug reactions. Clin Pharmacol Ther. 1981;30(2):239-45
14. Kobayashi K, Takei Y, Sawada M, et al. Dermoscopic features of a black hairy tongue in 2 Japanese patients. Dermatol Res Pract. 2010;2010:145878

APPROVED GALLEY PROOF

This work is licensed under Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]