

# Postoperative Candida Infection following Complex Periocular Reconstruction

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**Summary:** Postoperative candida infection is a rarely reported complication in cutaneous surgery, although it may develop more often in particular clinical settings. We present a 59-year-old woman with a well-controlled human immunodeficiency virus infection. She developed a bright red eruption with satellite pustules 2 weeks after excision of recurrent lentigo maligna melanoma of the left lower eyelid and periocular region. Due to defect size and complexity of the reconstruction (glabellar transposition flap, Hughes flap, composite graft from upper contralateral eyelid, and full-thickness skin graft from ipsilateral retroauricular region), she was placed on prophylactic oral amoxicillin-clavulanic acid and topical bacitracin and polymyxin. Immediate postoperative course was unremarkable, and sutures were removed after 7 days. Three days later, she developed bright red erythema and pustules within the surgical site and complained of burning. Empirically she was switched to topical gentamicin and oral ciprofloxacin, and later to linezolid, due to inadequate response. Wound culture grew *Candida albicans* sensitive to fluconazole and voriconazole. After oral fluconazole and topical clotrimazole initiation, the patient rapidly improved. The graft remained viable and apart from small partial dehiscence on the cheek, the healing was unremarkable. Apart from the case presentation, we also discuss different factors associated with postoperative candida infection, including immunocompromised status, surgical procedure location, and postoperative antibiotic use. Early recognition and treatment of postoperative candida infections are crucial to prevent delayed healing and associated morbidity. (*Plast Reconstr Surg Glob Open* 2021;9:e3891; doi: [10.1097/GOX.0000000000003891](https://doi.org/10.1097/GOX.0000000000003891); Published online 2 November 2021.)

Postoperative candida infection is a rarely reported complication in cutaneous surgery. Although often part of the normal skin flora, like many opportunistic microorganisms, *Candida albicans* may lead to infection of skin and mucosa in the appropriate setting.<sup>1</sup> Postoperative candidiasis is typically characterized by a bright red eruption, with satellite pustules presenting

1–2 weeks after surgery. In contrast to the acute nature of bacterial infections, those caused by *C. albicans* are often delayed in onset and do not respond to oral antibiotics. We describe a case of cutaneous candidiasis after staged excision of a recurrent lentigo maligna melanoma in an immunocompromised patient.

## CASE REPORT

A 59-year-old woman with well-controlled human immunodeficiency virus (HIV) infection presented for excision of a recurrent lentigo maligna melanoma on the left periocular cheek. Her HIV viral load was undetectable, and CD4 counts were within normal limits on bicitegravir, emtricitabine, and tenofovir alafenamide. Over a span of 12 years, the patient underwent four wide local excisions, with recurrence at another institution. Before surgery, sentinel lymph node biopsy and PET-CT were unremarkable. Staged excision with horizontal tissue sectioning was

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performed, with three stages required to achieve clear margins. (See figure, Supplemental Digital Content 1, which shows the surgical defect with clear margins after three stage excision. <http://links.lww.com/PRSGO/B820>.) Due to tissue processing, reconstruction occurred 5 days after the initial stage and required a complex approach. The medial canthus was reconstructed with a glabellar transposition flap, posterior and anterior lamella of the left upper eyelid with Hughes flap, full-thickness skin graft from the retroauricular region, and composite graft from contralateral eyelid, respectively (Fig. 1). The infraorbital cheek was repaired with fat transfer from the buttock and a full-thickness skin graft from the supraclavicular region. Following the procedure, the patient was started on prophylactic oral amoxicillin-clavulanic acid as well as topical bacitracin and polymyxin. Sutures were removed in 1 week and the patient seemed to be healing well. However, three days after suture removal, the patient developed erythema and pustules within the graft site along with periocular burning and pain (Fig. 2). The wound was cultured immediately and out of concern for *Staphylococcus aureus* infection; the patient was switched to oral ciprofloxacin, topical gentamicin, and then linezolid with no improvement. The culture grew heavy colonies of yeast further identified as *Candida albicans* (using flight mass spectrometry; VITEK MS system, bioMérieux SA, F-69280 Marcy L'Etoile, France) sensitive to fluconazole and voriconazole (Fig. 3). Oral fluconazole (300 mg weekly for 4 weeks) and topical clotrimazole were immediately initiated. Rapid improvement was noted within 48 hours. The graft remained viable with excellent functional and cosmetic result at both the 2- and 6-month follow-up (Fig. 4). The patient continues to be monitored with serial

CT imaging every 6 months, with no evidence of disease progression.

## DISCUSSION

Postoperative surgical site infection (SSI) is an uncommon complication in Mohs micrographic surgery, occurring in approximately 0.4%–2.5% of cases.<sup>2–4</sup> The risk of SSI following Mohs micrographic surgery or staged excision in the periorbital area is also very low.<sup>5</sup> Although the vast majority of SSIs are bacterial in nature, fungal etiologies should be considered in the appropriate clinical context. *C. albicans* is the most commonly implicated fungal species in postoperative infection and is part of the normal skin flora in over 70% of healthy individuals.<sup>6</sup> Under typical conditions, colonization does not result in symptomatic disease.<sup>6</sup> *C. albicans* is generally innocuous in surgical wounds and not confirmed by laboratory examination.<sup>7,8</sup> Apart from skin tumor excision and skin grafting, mucocutaneous candidiasis is associated with procedures that leave larger areas of nonepithelialized skin, including dermabrasion, laser resurfacing or in second intention healing after electrodesiccation and curettage.<sup>7,9–13</sup> The majority of postoperative candida infections occur in immunosuppressed patients. *Candida's* virulence is related to its ability to form biofilms and invade host cells with the assistance of secretory aspartyl proteinases and phospholipases.<sup>14</sup> In immunocompetent hosts, cellular immunity and the physical skin barrier generally restrict *C. albicans* to nonsterile superficial sites.<sup>14</sup> However, these critical defenses may be impaired in immunocompromised patients.<sup>1</sup>

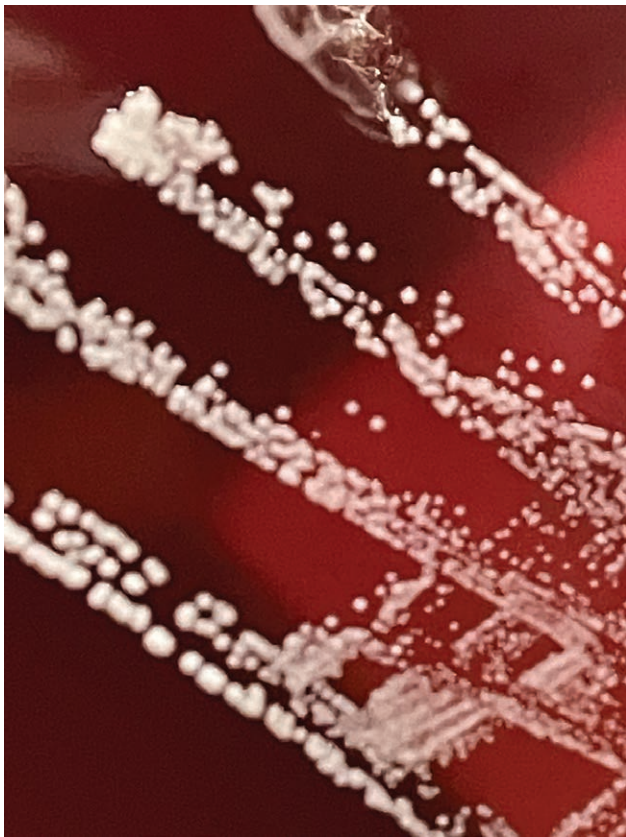


**Fig. 1.** Patient image on the seventh postoperative day at the time of suture removal.



**Fig. 2.** Patient photograph on the tenth postoperative day, with erythema and pustules on the surgical site.





**Fig. 3.** Growth of smooth, creamy colored, circular, raised fungal colonies with filamentous extensions from the edges after 24 hours at 37°C on routine sheep blood agar media, typical for *Candida albicans*.

Several factors may have influenced the development of candidiasis in our patient. HIV-positive status has been associated with higher levels of colonization with *C. albicans*, irrespective of viral load or CD4 cell count.<sup>15</sup> In addition, *C. albicans* exhibits proclivity for intertriginous areas including the eyelids, retroauricular folds, and genital region.<sup>1</sup> Therefore, it is possible that the infection may have originated from colonization of the eyelid surgical site or the retroauricular graft donor site. In addition, the patient endorsed applying topical bacitracin, polymyxin, and gentamicin ointments to the retroauricular donor site and the surgical reconstruction site with the same finger, potentially resulting in contamination.

Administration of postoperative antibiotics may have also played a role by creating an environment conducive to the growth of *C. albicans*. While the use of topical antibiotics is a common practice after eyelid surgery, topical gentamicin and bacitracin have been shown to selectively remove bacterial competitors, allowing *C. albicans* to proliferate.<sup>16,17</sup> In a study examining storage of full-thickness skin grafts harvested from the upper eyelid, colonies of *C. albicans* were isolated in 35% of grafts stored in gentamicin solution, whereas colonies of *C. albicans* were not detected in grafts stored in sterile saline solution.<sup>16</sup>

If there is clinical suspicion for a candida infection, a pustule can be sampled with a standard swab typically used for bacterial culture provided that concern for candidiasis



**Fig. 4.** Two-months postoperative image of the patient, with complete clearance of the infection after four weekly doses of oral fluconazole and daily topical clotrimazole.

is specified on the requisition form. Treatment of SSI with *C. albicans* involves removal of occlusive dressings and the use of systemic antifungal agents. Azole antifungals are the treatments of choice and work by inhibiting ergosterol synthesis, resulting in disruption of fungal membranes. Fluconazole is the most commonly used agent in this class and is generally effective and well tolerated. Although *C. albicans* resistance to fluconazole is rare, there are reports of resistance in other *Candida* species.<sup>18,19</sup>

It is imperative for surgeons to quickly recognize and treat postoperative candida infections. Misdiagnosis as staphylococcal or other common bacterial infections followed by the use of broad-spectrum antibiotics can result in greater proliferation of *Candida* and clinical deterioration. We present this case to highlight predisposing factors to postoperative candida infection and to recommend consideration of prophylactic antifungal therapy in high-risk patients.

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**PATIENT CONSENT**

The patient provided written consent for the use of her images.

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