

Balanoposthitis with Fungal and Bacterial Coinfection

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Balanoposthitis is an inflammation affecting both the glans penis and prepuce¹. It occurs in approximately 3~11% of males^{1,2}. Nonspecific balanoposthitis commonly results from poor hygiene¹. In cases of balanoposthitis caused by infections due to unhygienic circumstances, appropriate treatment of the underlying pathogen is required^{1,3}. Therefore, it is essential to identify the causative factors.

A 31-year-old male presented with a painful, itchy, erythematous-to-whitish, erosive patch on the prepuce of the penis, which had persisted for 1 year. Before the clinical visit, the patient had been treated with oral antibiotics and antifungals, including isoconazole, topical antifungals, and steroids, but not concurrently. The patient was circumcised, but the

symptoms did not improve. He had no underlying medical history but was severely obese with a body mass index of 41.5 kg/m². Physical examination revealed that the penis was completely buried below the surface of the skin due to the patient's severe obesity, and the erythematous-to-whitish erosive patch on the prepuce was accompanied by erythema on the glans penis, which was suggestive of balanoposthitis (Fig. 1). In addition, the patient's random glucose level was elevated to 230 mg/dl and the urological examination detected glycosuria, suggesting undiagnosed diabetes mellitus. Fungal culture on Sabouraud dextrose agar showed smooth, creamy-white colonies (Fig. 2D) identified as *Candida albicans* using matrix-assisted laser desorption/ionization time-of-flight

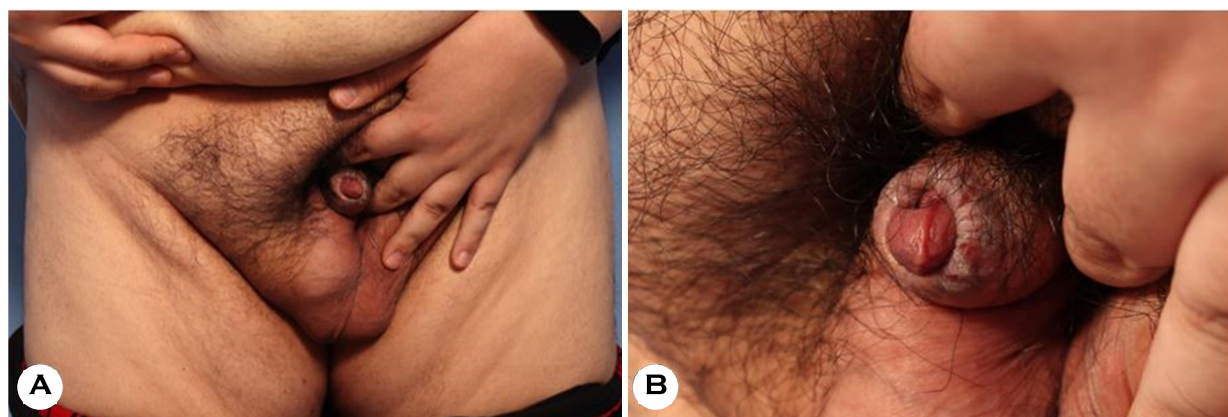


Fig. 1. (A) On compression of the pubic area, the penis, which had been completely buried below the surface of the skin, was apparent. (B) An erythematous-to-whitish erosive patch was present on the prepuce, along with erythema on the glans penis.

Received: August 13, 2021 Revised: September 8, 2021 Accepted: September 26, 2021

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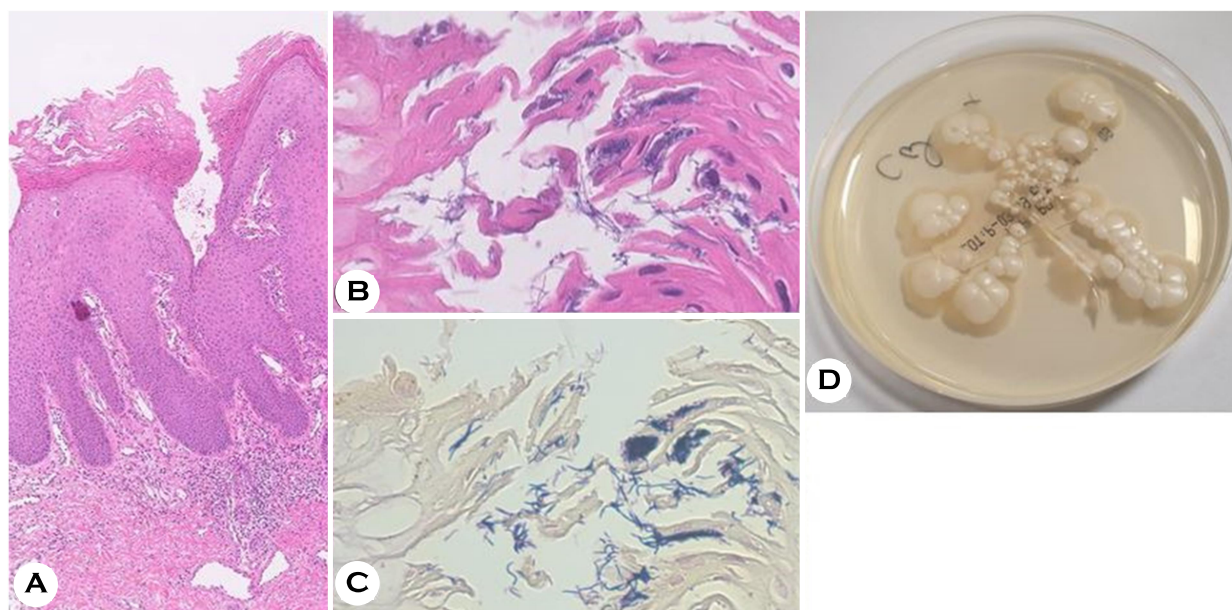


Fig. 2. (A) Histopathologic examinations showed parakeratotic hyperkeratosis and epidermal acanthosis, with a mild perivascular lymphohistiocytic infiltration in the upper dermis (H&E, $\times 40$). (B) Basophilic rod-shaped bacteria in the stratum corneum (H&E, $\times 400$) (C) Gram-positive, rod-shaped bacteria in the stratum corneum (Gram stain, $\times 400$) (D) Colonies with a smooth, white-to-cream-colored appearance presented in 48 hours at 25°C on a Sabouraud dextrose agar plate.

mass spectrometry (MALDI-TOF MS). Antifungal susceptibility test was also conducted, which showed susceptibility to fluconazole. Bacterial culture demonstrated growth of *Lactobacillus* spp. and *Staphylococcus epidermidis*. Skin biopsy showed parakeratotic hyperkeratosis and epidermal acanthosis, with a mild perivascular lymphohistiocytic infiltration in the upper dermis (Fig. 2A), and gram-positive, basophilic rod-shaped bacteria in the stratum corneum (Fig. 2B, 2C). The patient was treated with oral doxycycline (200 mg/day), fluconazole (150 mg once a week), topical fluconazole (in the morning), isoconazole cream (in the evening), and ofloxacin ointment (twice a day) for 4 weeks. After treatment, the lesion and symptoms improved significantly.

Balanoposthitis has a wide variety of causes and predisposing factors, most commonly diabetes^{1,2}. Balanoposthitis in patients with diabetes are usually infectious⁴. The most common pathogen is *Candida albicans*, and other causes of infection include aerobic bacteria, such as *Staphylococcus aureus*, Group A *Streptococcus*, anaerobic bacteria, and herpes simplex virus⁴. Glycemic control in patients with diabetes is important since glycosuria increases the growth of the pathogenic microorganisms⁴. Obesity can cause chronic irritation, poor genital hygiene, and improper immune responses, thus increasing the risk for balanoposthitis⁵. Balano-

posthitis can involve various factors; hence, the importance of determining the underlying pathogen and predisposition of the patient is essential for appropriate treatment.

This case emphasizes the importance of bacterial and fungal cultures for the appropriate treatment of the underlying pathogen(s) in patients with balanoposthitis, due to possible coinfections with multiple pathogens. Glycemic control and weight loss are crucial for patients with chronic or recurrent balanoposthitis, uncontrolled diabetes, and obesity.

Key Words: Balanoposthitis, *Candida albicans*, Coinfection, *Lactobacillus* spp.

ACKNOWLEDGEMENT

The authors have nothing to declare.

CONFLICT OF INTEREST

In relation to this article, we declare that there is no conflict of interest.

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PATIENT CONSENT STATEMENT

The patient provided written informed consent for the publication and the use of his images.

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