

Case Report

Erosive Balanitis Caused by *Staphylococcus aureus* in a Diabetic and Circumcised Adult Male

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Abstract: Background: Balanitis is an inflammation of the glans while balanoposthitis involves both the glans and the foreskin and occurs only in uncircumcised males. After *Candida* infections, aerobic bacteria are the second most common cause of acute infectious balanoposthitis, mainly streptococci groups B and A, and staphylococci, usually *Staphylococcus aureus*. Its clinical manifestations including diffuse erythema and oedema. Severe balanopreputial oedema with purulent exudate occurs in erosive balanitis. Diabetes is the most common predisposing factor for balanoposthitis and lichen sclerosus has been associated with diabetes. Therefore, it is recommended that patients with severe or recurrent balanoposthitis and patients with lichen sclerosus undergo screening for diabetes. **Case Presentation:** A 55-year-old man with diabetes underwent circumcision one month ago due to phimosis resulting from lichen sclerosus. The patient presented with a painful, erosive, and exudative plaque on the glans that had been present for 5 days. Abundant growth of *Staphylococcus aureus* was obtained in the bacterial culture. The fungal culture was negative. The genital lesions healed completely with treatment using oral cloxacillin and topical mupirocin. **Conclusions:** We present a diabetic male patient with severe, erosive balanitis caused by *Staphylococcus aureus* following circumcision to treat phimosis secondary to genital lichen sclerosus. We also highlight the association between diabetes and two genital skin conditions, lichen sclerosus and bacterial balanitis.

Keywords: Balanitis, Balanoposthitis, *Staphylococcus Aureus*, Diabetes, Lichen Sclerosus, Circumcision.

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INTRODUCTION

Balanitis refers to inflammation of the glans penis, while balanoposthitis is inflammation that affects both the glans penis and the foreskin [1]. However, the two terms are often used interchangeably [2].

Balanoposthitis is a very common inflammatory condition of the male genitals that affects both children and adults [1], and primarily affects uncircumcised men. It has been shown that the incidence of balanitis decreases significantly after circumcision [2], therefore, balanitis is rare in circumcised patients, and severe balanitis is even rarer [3].

Balanoposthitis can be classified as infectious or non-infectious and can also be categorized into acute and chronic forms. Infectious balanoposthitis are the most common forms of the acute conditions. Yeast infections caused by *Candida albicans* predominate as the main cause of acute balanoposthitis, followed by

aerobic bacterial infections [4]. In cases of bacterial balanoposthitis in adult men, streptococci (groups B and A) and staphylococci, particularly *Staphylococcus aureus*, are the most prevalent causes [1-5]. *Streptococcus pyogenes* and *Staphylococcus aureus* also causes balanitis in adolescents who are not sexually active [6].

The European guideline for treating balanoposthitis highlights streptococci and *Staphylococcus aureus* as the main aerobic bacteria causing balanitis, though other organisms may be involved. The guideline notes that clinical manifestations typically include inflammatory changes such as varying degrees of erythema and oedema. Treatment is usually topical, but severe cases may necessitate systemic antibiotics based on the sensibilities of the isolated organism [7].

Staphylococcus aureus is a Gram-positive coccus that can colonize the skin, especially

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intertriginous areas such as the armpits and perineum, as well as mucous membranes such as the nostrils, throat, intestines, or vagina. Most *Staphylococcus aureus* infections typically originate from asymptomatic colonization or, less frequently, from contaminated objects or through transmission from infected individuals or asymptomatic carriers. The nose is considered the primary site of *Staphylococcus aureus* colonization [8].

On the other hand, the most common conditions caused by *Staphylococcus aureus* are skin infections, which can range from superficial infections of hair follicles, nails, and sweat glands to deeper subcutaneous lesions, such as furuncles and carbuncles. Notable deep infections include septic arthritis, osteomyelitis, acute endocarditis, pneumonia and sepsis.

We are going to present a case of severe balanitis in a circumcised man caused by one of the aerobic bacteria that frequently cause this genital condition.

CASE PRESENTATION

A 55-year-old man with diabetes who was being treated with dapagliflozin/metformin 5 mg/1.000 mg tablets every 12 hours was diagnosed with genital

lichen sclerosus one year ago. He was treated with 0.05% clobetasol ointment at night for two months but showed no improvement. Sclerosis of the foreskin progressively worsened, making it impossible to retract the foreskin, so he underwent circumcision a month ago.

Subsequently, the patient consulted for an episode of itchy and painful, erosive and exudative lesions on the glans lasting 5 days. He had no dysuria or inguinal lymphadenopathy. On examination, an ulcerated plaque with figurate and erythematous borders and a shiny, exudative background was observed in the central area of the glans (figure 1).

A complete blood count, biochemical analysis, prostate-specific antigen (PSA) and urinalysis were normal. After 72 hours, abundant growth of *Staphylococcus aureus* was observed in the bacterial culture. The fungal culture was negative after 21 days. Based on the antimicrobial sensibility test, treatment was prescribed with 500 mg of oral cloxacillin every 6 hours and application of 2% mupirocin ointment three times a day for 14 days. The clinical picture improved, although exulcerated lesions persisted in the centre of the plaque on the glans (figure 2); therefore, it was recommended to continue topical application of mupirocin for another 14 days, after which the lesions resolved without leaving any residual scarring (figure 3).



Figure 1: An erosive plaque with erythematous and irregular borders and a shiny, exudative base on the glans



Figure 2: At 14 days, the ulcerated lesion has decreased in size, with peripheral epithelialization



Figure 3: At 28 days, the ulceration of the glans has healed, leaving mild residual erythema

DISCUSSION

Balanitis is more common in uncircumcised males due to the occlusive effect of the foreskin, which facilitates poor hygiene and smegma retention. This creates a warm and moist nidus for bacterial and fungal

overgrowth [2]. In several studies, all patients were uncircumcised [1, 2]. So, balanitis is much rarer in circumcised men, occurring in less than 5% of them [5].

Therefore, circumcision is considered a surgical procedure that prevents penile infectious dermatoses, with or without accompanying phimosis [2]. Circumcision causes dryness and keratinisation of the glans, creating a microenvironment that is less conducive to the proliferation of fungi or bacteria, thereby reducing the likelihood of balanitis [9].

Diabetes is the most common systemic predisposing factor for balanoposthitis. The chronic hyperglycaemia in tissues such as the glans and foreskin creates an environment conducive to fungal and bacterial proliferation [10]. Consequently, balanitis and balanoposthitis are more common in diabetic patients regardless of circumcision status [1]. A strong positive correlation has been demonstrated between poor glycaemic control and the severity of balanoposthitis [10].

Lichen sclerosus (LS) is a chronic, type 1 T helper (Th1) mediated, mucocutaneous disease that typically affects the genital skin; its etiopathogenesis remain unknown, and several factors are implicated, such as genetic predisposition, immune system abnormalities, chronic irritation and trauma, and hormonal status [11].

Clinically, the typical involvement of male genital LS are erythematous, shiny, and well-defined plaques evolving to whitish, indurated, and atrophic on the glans and foreskin. It is accompanied by pruritus, soreness, and tenderness, sometimes with dysuria [11]. When the sclerotic tissue formation progresses, the thickened foreskin cannot be retracted causing phimosis, with dyspareunia. The formation of painful, longitudinal fissures in the porcelain-like whitish sclerotic ring will hinder retraction of the foreskin and erection [3]. This phimosis, in turn, increases the risk of infection of the male genitals. The treatment of choice for patients with LS and non-retractile foreskin is circumcision, which also allows to confirm the histological diagnosis [3].

LS has been associated with diabetes and may be linked to metabolic syndrome [12]. Therefore, testing for diabetes is recommended for all patients with LS.

Acute, erosive and painful balanoposthitis is typical of streptococcal infections, in which severe oedema and a purulent exudate are observed [1-7]. Cases of severe bacterial balanitis caused by other Gram-positive cocci have also been reported in circumcised adult patients [3].

It is unclear whether bacterial balanoposthitis can be a sexually transmitted infection (STI), although unprotected sexual intercourse can increase the risk of developing infectious balanoposthitis, as well as other common STI [9]. A case of balanoposthitis caused by methicillin resistant *Staphylococcus aureus* (MRSA) has been also reported in a diabetic patient following

unprotected sexual intercourse; the patient responded well to treatment with topical mupirocin [13].

Staphylococcus aureus is also part of the microflora associated with aerobic vaginitis [14], which is a dysbiosis in which a significant reduction in lactobacilli is replaced by aerobic enteric bacteria such as *Escherichia coli*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus agalactiae* and *Enterococcus faecalis*. Aerobic vaginosis is characterized by an increase in vaginal discharge, which is usually purulent and foul-smelling [14].

Furthermore, in this case, we assume that there was prior genital colonization by this species of staphylococcus, since the patient did not have sexual intercourse with his asymptomatic wife after the circumcision.

However, the most recent guidelines recommend the use of antimicrobial therapy for infectious balanoposthitis, along with treatment for the sexual partner (A, 1c). They also recommend circumcision in cases of congenital phimosis or recurrent balanoposthitis (A, 1b) [15].

In conclusion, we present the case of a diabetic male patient who presented with severe, erosive and painful balanitis caused by *Staphylococcus aureus* following a circumcision performed to treat phimosis due to male genital LS. In addition, we highlight the association between diabetes and two genital skin conditions, LS and bacterial balanitis.

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