

# Klebsiella Pneumonia Presenting With Candida Balanitis In A 23-Year-Old Immunocompetent Male: A Case Report

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## Citation

Y Gofman, M Hernandez, T Weaver, J Mendez. *Klebsiella Pneumonia Presenting With Candida Balanitis In A 23-Year-Old Immunocompetent Male: A Case Report*. The Internet Journal of Dermatology. 2010 Volume 8 Number 2.

## Abstract

*Klebsiella pneumoniae* is a facultative gram-negative bacillus that is not commonly known to cause dermatological infections. However, *K. pneumoniae* is one of the etiological organisms of erysipelas, and has also been found to cause more serious skin infections.<sup>1,2</sup> According to C.M. Chang et al., *K. pneumoniae* was found to cause complicated skin (and soft tissue) infection of the extremities in adults sixteen years of age or older. Most of the patients infected with *K. pneumoniae* shared the characteristics of being male and frequently had liver cirrhosis, malignant neoplasm and alcoholism.<sup>3</sup> Although *K. pneumoniae* commonly causes infections in immunocompromised individuals, there has been a recorded incidence of infection in an immunocompetent male, whom presented with a severe cellulitis of his left leg without concomitant infection.<sup>4</sup>

## INTRODUCTION

Candida balanitis is a yeast infection of the glans penis caused by *Candida albicans*, commonly occurring in Diabetic males. It is more common in uncircumcised males due to improper cleaning of the penile area that results in a warm, moist, dark environment, which is an ideal location for yeast to grow. Although yeast infections are not usually considered sexually transmitted diseases (STDs), a male can acquire Candida balanitis through sexual intercourse with an infected female. In addition, Candida balanitis can be caused by STDs such as Syphilis and Gonorrhea.<sup>5</sup> Refer to Table 1 for a summary. To date, there have been no reports of *K. pneumoniae* resulting in a genital infection, and there have been no reports of concomitant infection with Candida balanitis.

## CASE REPORT

A 23 year-old immunocompetent and uncircumcised male complained of multiple lesions (occurring intermittently for 2 months) in the glans penis, which were pruritic, and only occasionally painful. Physical examination revealed erythematous, coalesced papules with punctuate maceration of glans and corona with slight induration and tenderness. There was also slight induration and erythema of the frenulum. Prior medical history was unremarkable (no illnesses, hospitalizations, or surgeries) except for phimosis when he was five years old. He has not had any major operations, and has never been hospitalized. At the time of

presentation, the patient also had a groin rash (consistent with Tinea Cruris infection), but was not taking any prescription or OTC medications. The patient tested negative for STDs and Diabetes. Blood and metabolic panels were within normal limits. Working diagnosis included STDs, drug reaction, psoriasis, trauma, and cellulitis. The patient was given Naftifine topical (Naftin) (bid 7 days) empirically until culture results were received. Patient improved to some extent, but the condition did not resolve.

When the culture came back equivocal for fungi and positive for *K. pneumoniae*, the patient was administered Ciprofloxacin 400mg (bid 7 days). At the end of those 7 days, the condition improved. Although there is a possibility that the *Klebsiella pneumoniae* was due to contamination, the likelihood of it being a true concomitant infection is high because the patient's condition improved with the antibiotic (Ciprofloxacin). A few days later, the condition worsened significantly to the extent that the patient could not sleep, and the lesions were far more discrete than before. At that point, the patient was given Betamethasone/Clotrimazole topical (Lotrisone) (bid 1 day), and responded favourably to the treatment. The pruritus subsided and the eruptions were greatly diminished. At this point, the culture was presumptive for *Candida albicans* and the patient was switched to Nystatin (for 4 weeks) which resolved the illness. A repeat culture was not taken because the results would be skewed due to the administration of the antibiotic and antifungals. There were no surgical interventions. The

outcome of the case was favourable.

## DISCUSSION

The subject in this case report was predisposed to balanitis caused by both fungal and bacterial infections because he was uncircumcised. The uncircumcised penile area resulted in an environment optimal for both fungi and bacteria to quickly proliferate in. Although there have not been previous reports of coinfection with *C. albicans* and *K. pneumonia*, a study has determined that bacterial infection with piliated *K. pneumonia* of an epithelial surface increases the binding and thus infection of the epithelial surface with *Candida albicans*. In this study, Centeno et al. demonstrated that *Candida albicans* binds to specific receptors called mannose-sensitive receptors on the pili of *K. pneumonia* that are already attached to epithelial cells. In this way, the bacteria promote the binding of *Candida* to the epithelial cells that the bacteria are attached to. Furthermore, this allows for the *Candida* to form pseudohyphae, invade the host cell and proliferate, resulting in co-infection with *K. pneumonia*. This indicates that the presence of a *K. pneumonia* skin infection predisposes to a concomitant *C. albicans* infection as occurred in this case. Additionally, a similar case in the future should be empirically treated with Nystatin while the lab results confirm the diagnosis and indicate which antibiotic to use as per the outcome of the patient in this report. The patient's partner must also be treated.

**Figure 1**

Table 1

Pathogens	Dermatologic Clinical Presentation
Cutaneous Candidiasis (Balanitis)	May follow antibiotic use and can be sexually transmitted. <sup>6</sup> Pinpoint erythematous papules evolving into umbilicated pustules on the glans and the coronal surface of the penis with macerated debris under the foreskin with or without satellite pustules. Pustules rupture and leave a 1-2mm white erosion. <sup>7</sup>
Erysipelas (MRSA, Group A, Beta hemolytic Streptococci, Klebsiella Pneumoniae.)	Erysipelas: Acute Superficial Cellulitis and soft tissue manifestations in devitalized compromised hosts. <sup>8</sup> Superficial skin infections most commonly on the face, superior lower extremities, and periumbilical area. <sup>4</sup> Presents with bright erythema, sharply demarcated, painful, tissue callor, and plaques without the presence of underlying suppurative foci. <sup>9</sup> The superficial tissue may have a Peau d' orange (orange peel) appearance with lesions. <sup>8</sup> The lesions are raised above the level of surrounding skin with a clear line of demarcation between involved and uninvolved tissue.
Bacterial Infection and Candidiasis (Coinfection)	Coinfection is rare but can occur in anaerobe fusiform bacteria and non-syphilitic treponemas with pyogenic organisms. <i>Gardereella vaginalis</i> and anaerobes such as <i>bacteroides</i> . <sup>10</sup> With increasing age, there is colonization with <i>Corynebacterium</i> spp., <i>Candida albicans</i> , gram-negative anaerobes, and potentially pathogenic <i>Mycobacterium smegmatis</i> . <sup>6</sup>

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