


Extensive Urinary Tract Fungal Bezoars Causing Anuria: A Case Report

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ABSTRACT: Fungal bezoar formation is a complication of fungal urinary tract infections that are usually caused by *Candida* species and other fungal types. They can form in any site along the urinary tract and may cause an obstruction to the urine flow that would require drainage by nephrostomy, a ureteric stent, and sometimes surgical intervention is needed. In this case report we discuss a case of an adult male who had an extensive fungal bezoar infection caused by *Candida tropicalis* causing him anuria and acute kidney injury. The bezoars were found in the bladder, the ureters, and both kidneys. The patient was treated with bilateral ureteric stent insertion and with fluconazole for 3 weeks. Bilateral ureteroscopy and urine culture were done after 2 months and they showed that the bezoars have been eradicated on both gross and microscopic levels.

KEYWORDS: Fungal bezoars, fungal balls, urinary tract infection, *Candida tropicalis*, hydronephrosis, anuria

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Introduction

Fungal infection of the urinary tract is a common condition and its incidence is usually underestimated. *Candida* is the most common fungal species causing urinary tract infections (UTI).¹ *Candida albicans* is the most common type causing UTIs, followed by *Candida glabrata* and *Candida tropicalis*.² The presence of candidal infection in the urinary tract might only manifest as an asymptomatic candiduria, or it might cause a clinical illness that may present as cystitis, pyelonephritis, prostatitis, epididymo-orchitis, or urinary tract fungus balls, and in critically ill patients, candiduria might disseminate to other parts of the body.³ Many factors increase the risk of having candidal UTIs such as the treatment with broad-spectrum antibiotics, diabetes, and glycosuria, pregnancy, aging, renal failure, kidney transplant, renal stones, female sex, ICU admission, use of glucocorticoids, urinary catheterization, and urinary stasis.^{2,4,5}

Fungal balls are luminal debris that can be found along the urinary tract, they may originate from necrotic tissue nucleus from papillary necrosis caused by a parenchymal candida infection.^{3,6,7} These bezoars may obstruct the urinary tract which might need urgent drainage of the urinary system with nephrostomies, ureteral stents, or catheterization. *Candida albicans*, followed by *Candida tropicalis* are the most reported infections causing fungal balls.⁸ Systemic antifungal medications are the main treatment for bezoars as they originate from deep parenchymal fungal infections.³ Local treatment using irrigation of the infected area with antifungals, such as

amphotericin B, via a nephrostomy or a urinary catheter, has also been used in the practice and it has shown to be effective.^{3,5}

Case Report

In our case, we will discuss a case of urinary fungal ball infection that was severe enough to obstruct both ureters and render the patient anuric. The patient was acquainted that his case will be a part of this study and informed written consent was obtained from him. Our patient is a 47 years old male, he had no known chronic medical illnesses or urological problems, except for a brain tumor (clival chordoma) since 2009. His brain condition left him on a gastric peg tube since November 2021 due to his inability to swallow which caused loss of vision in the left eye. He had 3 brain surgeries (trans-oral, trans-nasal, and trans-sphenoidal procedures) since his diagnosis, the last one was on April 2022. Since his last surgery, the patient was hospitalized for a long period because of severe atypical pneumonia with hypoxia, also a tracheostomy was performed due to pharyngeal bleeding. He also had a positive blood culture for *Klebsiella pneumoniae*. During that period, the patient was on multiple antibiotics including vancomycin, amikacin, colistin, and meropenem, in addition to dexamethasone, and an oxygen mask. The patient was kept under the intensive care unit (ICU) care for most of his stay for treatment, and he was kept on a urinary catheter as it was difficult for him to mobilize.

One month after the last brain surgery, while he was still in the ICU, the patient felt bladder fullness and his silicon urinary



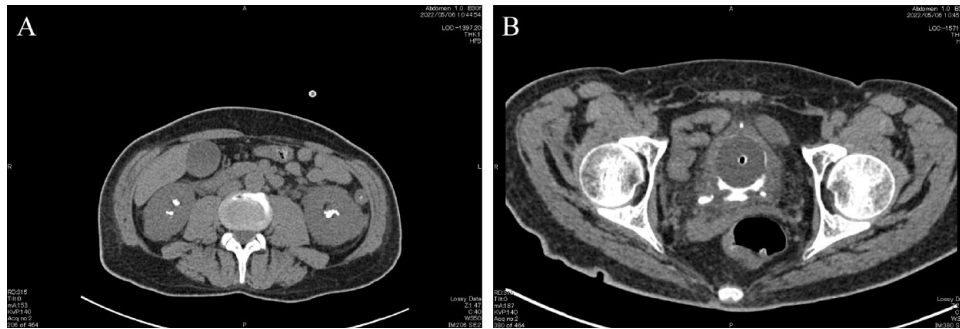


Figure 1. Non-contrasted CT scan images at the kidney (A) and at the level of the urinary bladder (B) showing bilateral renal and urinary bladder hyperdense lesions reported as stones.

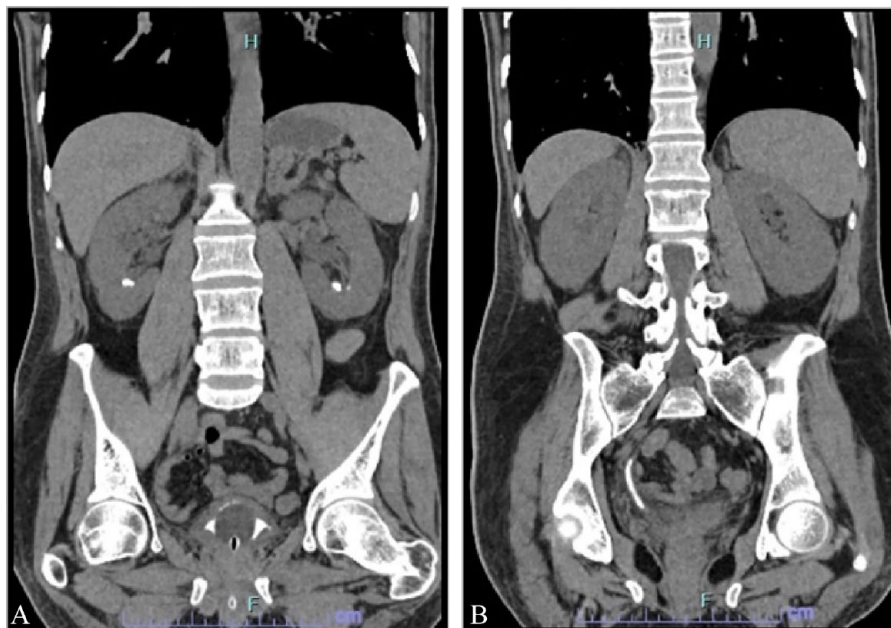


Figure 2. Non-contrasted coronal CT scan images showing multiple hyperdense lesions in both kidneys and urinary bladder (A) and the lower part of the right ureter (B) reported as stones.

catheter made nil urine output. Flushing with normal saline was done for the catheter and retention was relieved. On the following day, the patient complained of bilateral flank pain with anuria despite changing his urinary catheter to another silicon catheter and flushing the catheter with normal saline. He had attacks of fever reaching 38.5°C, his other vitals were stable, and he was conscious and oriented. His blood creatinine level became elevated from his normal baseline (around 0.4 mg/dl) up to 1.8 mg/dl, blood urea was also elevated (52 mg/dl), CRP 18 mg/dl, while other electrolytes were within the normal range. Complete blood count showed an increase in white blood cell count (12000 WBCs per microliter, 93% neutrophils), with no drop in hemoglobin (Hb) level (his Hb baseline was around 10 g/dl), and normal platelets count. Urinary tract non-contrasted computed tomography (CT) scan was done and it showed multiple bilateral renal (Figure 1), ureteric and urinary bladder (Figure 2) hyperdense lesions (ranging from

254 to 648 H.U.), the largest was 6 mm at the right vesicoureteral junction and they were reported as stones/stone fragments causing bilateral hydronephrosis. In the urinary bladder, the stones were reported at the dependent part and around the balloon and the tip of the urinary catheter. The stones were radiolucent on the X-ray images. On the same day, the patient was sent to the operation room for bilateral ureteral stent insertion. Upon cystoscopy, the urinary bladder was filled with whitish, thick fluffy material that suggested a fungal infection. The bladder was washed and flushed, ureteral stents were inserted bilaterally and a sample from urine was sent for culture. The patient was started on IV fluconazole. In the following days, the creatinine level returned to normal, and the urine culture came back positive for *Candida tropicalis* and the blood culture was positive for *Candida krusei*. The infectious disease team's recommendation was to keep the patient on IV fluconazole for 5 days and then discharge him on oral

fluconazole for 3 weeks. The urinary catheter was removed before discharge, and after the patient finished his antifungal course, a new urine culture was sent and it showed no bacterial or fungal growths. A non-contrasted urinary tract CT scan was repeated and it showed that all the presumed to be stones in the ureters, kidneys, and bladder had disappeared. After 2 months, bilateral ureteral stent removal was done with bilateral ureteroscopy. There was no evidence of any fungal matrix or stones neither in the bladder or in both ureters up to the renal pelvis.

Discussion

Unlike simple bacterial or fungal UTIs, the treatment of fungal bezoars may require local intervention in addition to systemic therapy with antifungals. Candidal UTIs are more likely to develop in patients with risk factors for the condition, and in our case, the patient had multiple risk factors such as urinary catheterization, ICU stay, use of broad-spectrum antibiotics, and glucocorticoids.^{2,4,5} Bezoars may be found anywhere in the urinary tract, and the clinical presentation is usually related to the site of the bezoars. Renal pelvis and ureteric bezoars might cause an obstruction with hydronephrosis and elevated kidney function test in which case a nephrostomy or a ureteric stent is usually necessary.⁹⁻¹² The bladder outlet may also get obstructed by the fluffy material of the bezoars and in rare cases, it may lead to bladder perforation if not promptly managed by catheterization.^{13,14}

As in this case, fungal urinary tract infections may spread through the urinary tract to cause an extensive infection through the urinary tract. Previous case reports have shown fungal bezoars spreading to both pelvicalyceal systems causing bilateral renal obstruction at the level of the renal pelvis and the ureters leading to acute renal failure and anuria.¹⁵⁻¹⁸ Urgent relief of the obstruction using nephrostomies or ureteral stents is essential in such cases to save the patients from renal damage.¹⁵⁻¹⁹ Measuring the urine output after the relief obstruction is also important as patients might suffer from post-obstructive diuresis.¹⁷

Imaging is necessary to know whether the fungal ball is causing obstruction and hydronephrosis, and it also can identify the site and dimensions of the bezoars. Bezoars could be found as filling defects on fluoroscopy imaging such as cystogram and retrograde pyelogram.²⁰ Ultrasound shows the bezoars as a hyperechoic lesion on renal or bladder ultrasonography.^{10,21} As in our case, a non-contrasted CT scan could show the fungal balls as low density lesions which might resemble urinary stones and may be reported mistakenly as such.¹² However, as in other reported cases, a CT scan might only show hydronephrosis, fatty stranding around the kidney, and rarely air bubbles without an identifiable lesion of the bezoar, in such cases, a CT scan with an excretory phase can identify the bezoars as filling defects.^{9,22,23}

Systemic antifungal therapy is the mainstay for treating the bezoars as they originate from a deep parenchymal infection.³

Local treatments with antifungals by irrigation with amphotericin B and other antifungals such as fluconazole through nephrostomies or 3 ways urinary catheters have shown to be effective in dissolving the fungal bezoars and are used in most of the reported cases.^{3,5,9} Fungal balls could be also directly extracted using flexible ureteroscopy, cystoscopy, PCNL, or by surgical exploration in more complicated cases.^{10-14,21,22} In our case, the treatment of the fungal balls with a systemic antifungal agent (fluconazole) was sufficient enough for a complete eradication of an extensive fungal bezoar infection that was extending through the calyceal systems, ureters, and urinary bladder.

Suspecting fungal infections should have a lower threshold, especially in susceptible populations such as hospitalized patients, or ones with multiple comorbidities, as the proper treatment of this condition would be of the essence to prevent further complications and to avoid the need for more invasive measures.

Author Contributions

Adel Alrabadi: review of the article, correspondence.

Nedal Alsabatin: writing of the article, data collection, correspondence.

Hosam Marwan Masadeh: data collection.

Azmi Hadidy: contribution to the radiology part of the article.

Abdulrahman Al-shudifat: contribution to the neuro-surgery part of the article.

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