

CASE REPORT

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A case report of candidal cystitis

Farhad Ahmadi, Ehsan Zolfi, Hossein Saffari, Nasrollah Abian

ABSTRACT

Introduction: Candidal cystitis is an uncommon fungal infection of the urinary bladder, predominantly caused by *Candida albicans*. It usually occurs in patients with predisposing factors such as uncontrolled diabetes mellitus, prolonged catheterization, immunosuppression, recent antibiotic therapy, or prior urological interventions. The clinical presentation often resembles bacterial cystitis, making diagnosis challenging. We report a rare case of candidal cystitis presenting with intravesical fungal balls that initially mimicked an enterovesical fistula on imaging.

Case Report: A 63-year-old man with poorly controlled diabetes mellitus presented with severe dysuria and passage of thick urethral discharge. Initial ultrasonography was unremarkable; however, non-contrast computed tomography (CT) demonstrated air-containing debris-like lesions within the bladder, raising suspicion for an enterovesical fistula. Contrast-enhanced CT with oral contrast and delayed imaging excluded fistulous communication. Cystoscopy revealed multiple mushroom-shaped intravesical masses, diffuse erythematous bladder mucosa, and no evidence of a fistula. The fungal masses were evacuated, and urine culture confirmed *C. albicans*. The patient was diagnosed with candidal cystitis complicated by fungal balls secondary to uncontrolled diabetes. He underwent bladder irrigation

with amphotericin B followed by oral fluconazole (150 mg twice daily for two weeks), resulting in complete clinical improvement and restoration of normal urinary flow.

Conclusion: Candidal cystitis should be considered in diabetic patients presenting with persistent lower urinary tract symptoms and unusual intravesical imaging findings. Fungal balls may closely mimic enterovesical fistulas or bladder neoplasms, potentially leading to diagnostic confusion. Prompt recognition through urine culture and cystoscopy, combined with appropriate antifungal therapy and correction of underlying risk factors, can achieve excellent clinical outcomes while avoiding unnecessary interventions.

Keywords: *Candida*, Cystitis, Diabetes mellitus, Fungal ball

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INTRODUCTION

Candidal cystitis, also known as fungal cystitis, is a relatively uncommon but significant urinary tract infection caused by *Candida* species, primarily occurring in individuals with specific risk factors [1, 2].

Epidemiology and Risk Factors

- The true prevalence is unclear, but it is rare in the general, non-hospitalized population [1].
- More commonly seen in hospitalized patients, particularly in intensive care units [2].
- Major Risk Factors:

1. Indwelling urinary catheterization (the most significant factor) [2].
2. Poorly controlled diabetes mellitus [2].
3. Prolonged or broad-spectrum antibiotic use [3, 4].
4. Immunosuppression [chemotherapy, organ transplantation, human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS)] [1, 3].
5. Anatomical abnormalities of the urinary tract [2].
6. Recent genitourinary surgery [2, 5].
7. Corticosteroid use [3]

Pathogenesis [2, 3]

- *Candida* typically enters the bladder via the ascending route from the urethra.
- In severely immunocompromised patients, hematogenous (blood-borne) dissemination can occur.
- *Candida* can form resistant biofilms on urinary catheters.
- Common species: *C. albicans* (most common), *Candida glabrata*, *Candida tropicalis*.

Clinical Presentation [1, 2]

Affected individuals commonly report symptoms that resemble those of bacterial cystitis. These include increased frequency of urination, a sudden urge to void, and a stinging or burning feeling during urination. Discomfort, pain, or a sensation of pressure in the suprapubic region is frequently observed. In certain cases, the urine may look turbid or show traces of blood. Occasionally, strands or aggregates of fungal material can be detected in the urine. When the condition worsens or extends beyond the bladder, systemic signs such as fever and chills may occur.

Diagnostic Evaluation [4, 5]

The diagnostic process typically starts with routine urinalysis, which may reveal the presence of leukocytes, suggesting inflammation, or erythrocytes in the urine.

Urine culture plays a crucial role in confirming the diagnosis. The detection of *Candida* species in significant quantities (generally $\geq 10^3$ CFU/mL) supports an infectious process, although differentiating true infection from simple colonization can sometimes be challenging.

In more complex or persistent cases, imaging studies such as renal and bladder ultrasonography may be employed to identify fungal aggregates, often referred to as fungal balls or bezoars. Furthermore, cystoscopic examination can be used to directly inspect the bladder mucosa for inflammatory changes or abnormal lesions.

Serologic Tests are: *Candida* antigen/antibody assays (limited utility).

Treatment [3, 4]

1. Removal of Predisposing Factors (most crucial steps):
 - Removal or change of the urinary catheter.
 - Tight glycemic control in diabetic patients.
 - Discontinuation of unnecessary antibiotics.

Antifungal Management

Primary treatment

Oral fluconazole is generally considered the initial therapeutic option, administered at a daily dose of 200–400 mg for a duration of 7 to 14 days.

Management of fluconazole-resistant infections or non-albicans *Candida* species

In cases where resistance is present or non-albicans strains are identified, alternative antifungal agents are recommended, including:

- Intravenous amphotericin B
- Flucytosine
- Echinocandin-class antifungals such as caspofungin or micafungin

Local and intravesical treatments

For refractory or resistant infections, localized therapy may be employed. This can include direct instillation of amphotericin B into the bladder. In some situations, bladder irrigation with sterile saline may also be used as an adjunctive measure.

Surgical Management

Surgical intervention becomes necessary when sizable fungal aggregates lead to urinary tract obstruction. Depending on the severity and location, removal may be performed endoscopically through cystoscopy or, in more severe cases, via open surgical procedures.

CASE REPORT

A 63-year-old diabetic male presented with complaints of dysuria and the passage of thick discharge from the urethra (Figure 1). The patient's diabetes was poorly controlled, and he experienced severe pain during urination. Given the patient's ultrasound from two weeks prior, which was reported as normal, a non-contrast CT scan of the abdomen and pelvis was performed (Figure 2). As seen in the image, debris-like, air-filled lesions were observed within the bladder (Figure 2). Suspecting an enterovesical or rectovesical fistula, the patient was admitted for further evaluation. The patient also had a history of opium addiction and reported severe chronic constipation. A CT scan of the abdomen and pelvis

with oral contrast and delayed phases was obtained, showing no evidence of a fistula or contrast entry into the bladder (Figure 3A and B). The patient was scheduled for cystoscopy, and the cystoscopy report is provided. Urinalysis showed pyuria, and the patient's urine culture showed *C. albicans*. No fistula was visualized within the bladder. The patient was diagnosed with candidal cystitis due to uncontrolled diabetes, and the lesions were identified as fungal balls. The patient underwent bladder irrigation with amphotericin B and was discharged in good general condition, afebrile, with a prescription for oral fluconazole 150 mg every 12 hours for two weeks.

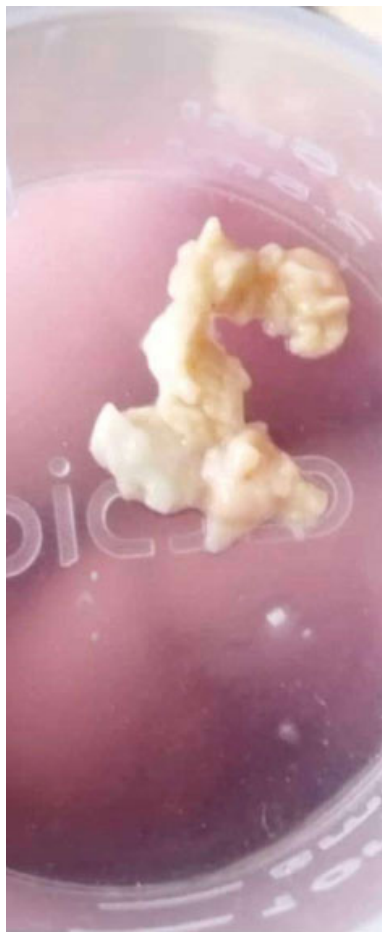


Figure 1: Fungal ball (bezoar).

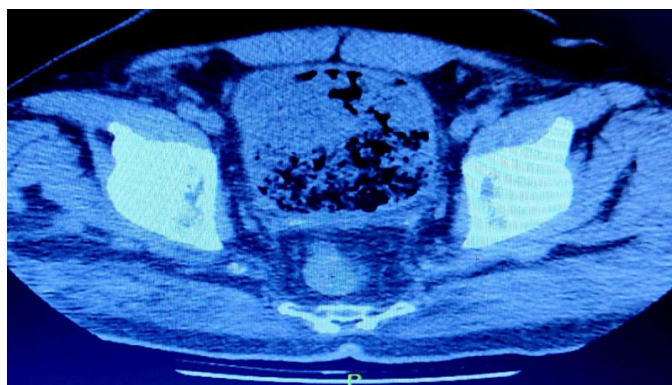


Figure 2: Axial cross-sectional CT scan of the abdomen and pelvis without contrast.

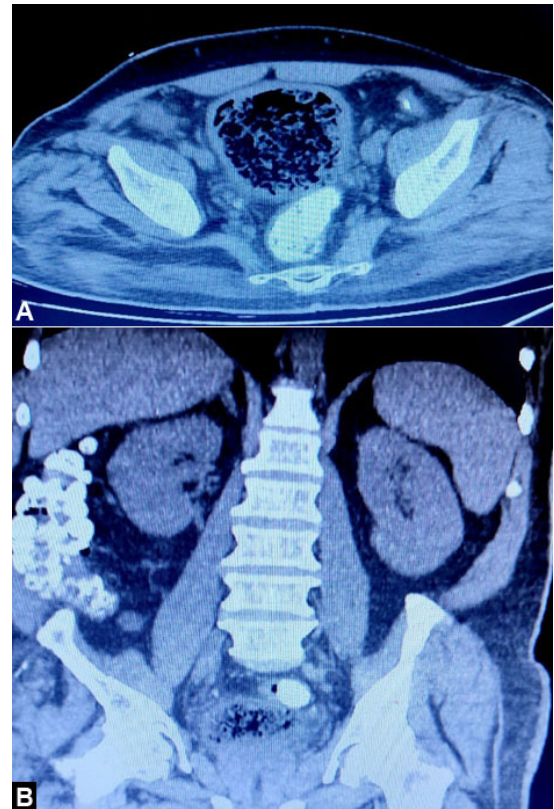


Figure 3: (A) Axial cross-sectional CT scan of the abdomen and pelvis with oral contrast. (B) Coronal cross-sectional CT scan of the abdomen and pelvis with oral contrast.

Cystoscopy Report

After General anesthesia and prep and drape, the patient underwent cystoscopy under sterile conditions. There was no urethral stenosis, no prostate lobe kissing, and there were mushroom-shaped ball-shaped lesions inside the bladder that were drained. Normal ureteral orifices were seen. The bladder wall was erythematous. No obvious fistula was seen. Finally, a 24-gauge three-way catheter was inserted and Urine flow returned to normal. The patient was transferred to the recovery room. Finally, a sample of the lesions was sent.

DISCUSSION

Candidal cystitis may manifest in various clinical forms, ranging from uncomplicated involvement of the bladder to more serious conditions, including fungal ball-associated cystitis, eosinophilic cystitis, and emphysematous cystitis.

Review of Literature

1. Review Article “Urinary tract infections and *Candida albicans*” (2015) [1].

Candidal cystitis represents the most common form of fungal infection encountered in hospital environments,

with *C. albicans* remaining the principal etiological agent, although shifts in species prevalence have been increasingly reported. Several factors heighten susceptibility to this condition, including diabetes, long-term urinary catheterization, extensive administration of broad-spectrum antimicrobials, compromised immune function, and prolonged admission to intensive care units. The pathogenesis of the infection is largely attributed to the organism's capacity to attach to host or artificial surfaces, develop structured biofilms, and undergo morphological transformation from yeast cells to invasive hyphal forms, thereby promoting penetration into deeper tissue layers.

A comprehensive review published in 2024 [6] addressing *Candida*-related urinary tract infections in adults indicates that candiduria is commonly detected among hospitalized patients and is frequently asymptomatic. The review emphasizes that antifungal therapy should not be routinely prescribed and is instead recommended only in specific clinical situations, such as in patients exhibiting clear symptoms, individuals with neutropenia, or those scheduled for invasive urological interventions. Fluconazole is the first-line therapy for symptomatic infection due to its high urinary concentration. For resistant cases or intolerance, amphotericin B is the alternative. Echinocandins are not adequately excreted in urine.

Three of the case reports reviewed are also described in detail in Table 1 [3–6].

CONCLUSION

Candidal cystitis refers to an infection of the urinary bladder caused by fungal organisms and is predominantly observed in patients with well-defined predisposing conditions. Although its incidence is notably lower than that of bacterial bladder infections, the diagnostic and therapeutic challenges associated with this condition make it clinically significant. This infection poses a particular concern in high-risk and immunocompromised individuals. Optimal control of candidal cystitis depends on a comprehensive strategy that includes precise identification of active infection versus mere fungal presence, administration of appropriate antifungal agents, elimination or modification of contributing risk factors, and systematic follow-up to reduce the likelihood of relapse. Enhancing clinicians' understanding of fungal urinary pathogens and evolving antifungal resistance trends is essential for improving clinical outcomes. Moreover, coordinated collaboration among urology specialists, infectious disease physicians, and clinical microbiologists plays a crucial role in achieving effective disease management.

Overall, candidal cystitis represents a multifactorial and clinically demanding infection, and successful resolution relies on an integrated approach combining pharmacological treatment, management of underlying conditions, and close monitoring of therapeutic response.

Table 1: The case reports reviewed are described in detail

Case report title (year)	Presentation	Diagnosis	Treatment	Outcome	Unique/Key point
1. Eosinophilic cystitis caused by <i>C. glabrata</i> (2019)	61-year-old man with HIV. - Symptoms: Dysuria, frequency, hematuria.	- Cystoscopy and biopsy: Severe eosinophilic cystitis (80 eosinophils/HPF). - Urine culture: Positive for <i>C. glabrata</i>.	Oral fluconazole for 2 weeks.	- Symptoms completely resolved. - Follow-up biopsy showed complete absence of eosinophils.	First reported association of eosinophilic cystitis with <i>C. glabrata</i> .
2. Fungal ball cystitis caused by <i>C. glabrata</i> (2022)	42-year-old woman with conservative management for placenta accreta post-C-section. - Symptoms: White debris in urine, dysuria (weeks later).	- Ultrasound: "Fluffy shadows" in the bladder. - Urine culture: Positive for <i>C. glabrata</i> (Fluconazole MIC = 16 µg/mL—dose-dependent susceptibility).	- Initial: Fluconazole for 24 days (failed). - Final: Intravenous amphotericin B for 7 days + endoscopic removal of fungal ball.	Cured after combined surgical and antifungal therapy.	Demonstrates treatment failure with fluconazole (likely due to elevated MIC) and need for combined approach.
3. Emphysematous cystitis caused by <i>C. glabrata</i> (2023)	68-year-old woman with poorly controlled diabetes. - Presenting symptom: Altered mental status.	- Imaging (CT): Air in bladder wall and extraperitoneal space. - Cultures: Both blood and urine grew <i>C. glabrata</i>.	- Conservative management with Foley catheter. - Antifungal therapy with micafungin	Succumbed to multi-organ failure.	First reported case of emphysematous cystitis caused by <i>C. glabrata</i> . Highlights severity and high mortality risk.

Abbreviations: CT: computed tomography; HIV: human immunodeficiency virus; HPF: high-power field; MIC: minimum inhibitory concentration.

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Artificial Intelligence (AI) Disclosure

Statement on the use of generative AI and AI-based tools: GhatGPT and Grammarly were used to improve the clarity, grammar, and language of the manuscript.

Author Contributions

Farhad Ahmadi – Conception of the work, Design of the work, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Ehsan Zolfi – Acquisition of data, Revising the work critically for important intellectual content, Final approval

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Hossein Saffari – Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Nasrollah Abian – Analysis of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

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Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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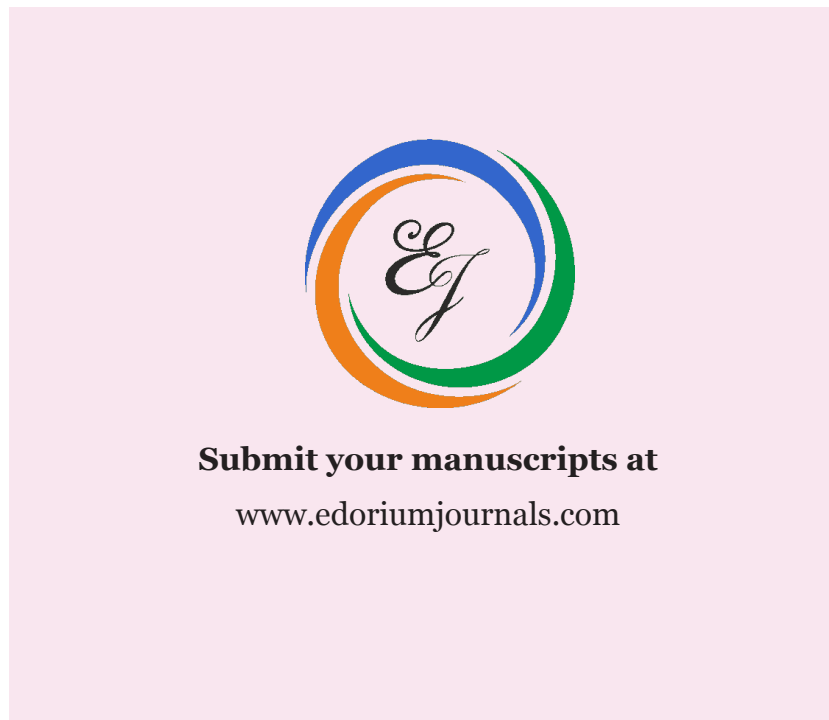
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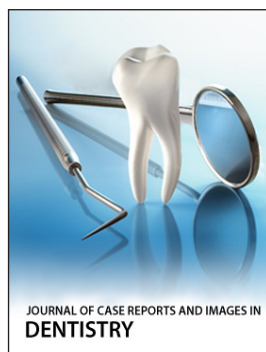
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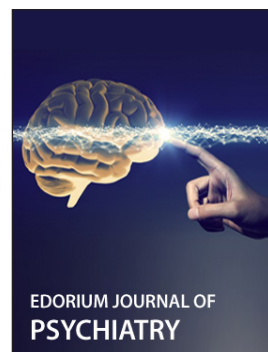
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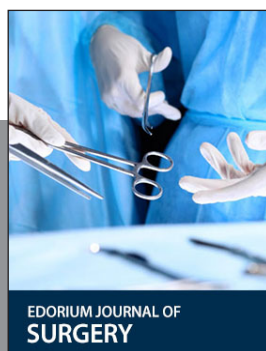
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