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A rare case of BK virus non-hemorrhagic cystitis following lung transplant

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ABSTRACT

BK virus cystitis is known to occur following hematopoietic stem cell transplant (HSCT), but few cases exist in the literature following lung transplant. Because of the rarity of this presentation, patients may have missed diagnoses and prescribed ineffective treatments. We present our case of an atypical presentation of BK virus cystitis appearing as bladder carcinoma in situ in a lung transplant patient.

1. Introduction

Solid organ transplant patients are at risk for opportunistic infections due to their immunosuppressed state. One of these opportunistic infections is the BK polyomavirus, a DNA virus that remains dormant in the renal and uroepithelium in most adults but reactivates with immunosuppression.[1,2] It is known that BK virus can cause hemorrhagic or, less commonly, non-hemorrhagic cystitis.[2] In this case, we present a rare presentation of non-hemorrhagic cystitis in a patient with a bilateral lung transplant.

2. Case presentation

This patient is a 59-year-old male presenting to the office for worsening urgency, frequency, nocturia, and incomplete bladder emptying. This had been ongoing for approximately one month. He denies hematuria, dysuria, erectile dysfunction, and a history of urologic disease. American Urological Association (AUA) Symptom Score was 14/35. Family history is significant for prostate cancer treated with prostatectomy and androgen deprivation therapy in his father. He endorses a former history of cigarette smoking and an occupational exposure to paints and chemicals while working in a body shop.

His past medical history is significant for bilateral lung transplant 4 months prior for idiopathic pulmonary fibrosis. He received immunosuppression with tacrolimus and prednisone daily, but one month prior to presentation, anti-thymocyte globulin was added for possible graft rejection. His lower urinary tract symptoms began approximately 1 month prior to presentation in the urology clinic.

His physical exam revealed normal external genitalia with a non-tender, symmetric prostate on a digital rectal exam. Comprehensive metabolic panel was within normal limits, including a creatinine of 0.9. Complete blood count revealed lymphopenia consistent with post-transplant immunosuppression. Prostate specific antigen (PSA) was 0.49, increased from 0.38 18 months prior. Urinalysis showed 4 WBC, 2 RBC, and negative leukocyte esterase and bacteria. Bilateral renal ultrasounds were negative for hydronephrosis but revealed a 0.8 cm right renal cyst. Post-void residual was 24 mL. Midstream urine cytology was obtained in the office, which was negative for high grade urothelial carcinoma but had cellular changes consistent with polyomavirus (Fig. 1).

Two weeks later, cystoscopy was performed to further evaluate the cause of his symptoms. During this procedure, non-obstructive bilateral lobar prostatic hyperplasia and moderate bladder trabeculation were noted. In addition, there were bilateral and posterior bladder wall erythematous lesions concerning for carcinoma in situ (CIS). Because of this finding, he was scheduled for an examination under anesthesia with bladder biopsies and counseled about the likelihood of requiring intravesical Bacillus-Calmette Guerin (BCG) therapy to treat the suspected CIS.

Pre-operative computed tomography urogram revealed concentric bladder wall thickening with focal thickening and mucosal hyperenhancement in the left bladder wall near the suspicious erythematous lesion. There was no evidence of invasion or upper tract disease. During the procedure, a 30-degree lens was used to visualize the erythematous lesions, and cold cup biopsy forceps were used to sample four suspicious lesions. Pathology revealed granulation tissue with benign urothelium.

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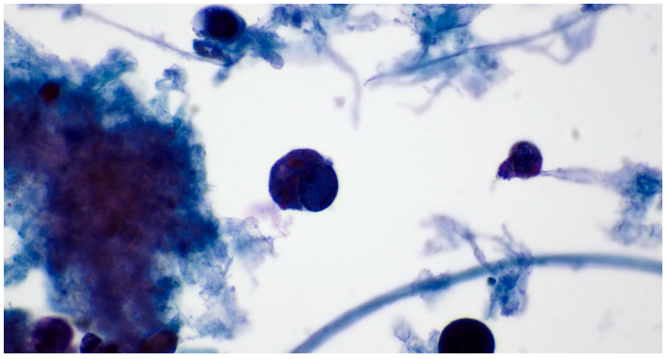

Fig. 1. Cytology showing BK Virus "Decoy Cells".

Because a malignant etiology was ruled out, the patient was diagnosed with BK virus cystitis.

3. Discussion

In this case, we present a lung transplant patient presenting with lower urinary tract symptoms and cystoscopic findings suspicious for carcinoma in situ who was ultimately found to have BK virus cystitis. It is well known that BK virus cystitis is associated with hematopoietic stem cell transplants (HSCT) but presentation is rare in solid organ transplants.[1,2] About one third of lung transplants have BK viruria, indicative of active viral shedding in the urine, but this finding is typically asymptomatic.[3] Non-hemorrhagic cystitis has been visualized in a few heart transplant cases and hemorrhagic cystitis has been reported in lung transplant patients,[4] but non-hemorrhagic cystitis in a lung transplant patient is rare.

When evaluating these patients with cystitis, other causes must be ruled out. Diagnosis is typically clinical and by exclusion,[5] but it should be highly suspected in transplant patients with cystitis and a negative bacterial urine culture.[4] Work-up will typically include cystoscopy, as performed in our case, which may reveal hemorrhage or chronic irritation. In our case, lesions were erythematous and flat, consistent with carcinoma in situ. The patient was counseled on intravesical BCG therapy until pathology resulted with benign inflammatory changes. This case highlights that the presentation of BK virus can be variable, including rarely in lung transplant patients.

Studies have also shown an association of BK virus with oncogenesis in the renal and uroepithelium. The virus can induce the cell to express large T antigen, which antagonizes tumor suppressors such as p53 and Rb, facilitating a state of uncontrolled replication and tumorigenesis. Because of the possibility of oncogenesis, even if BK virus cystitis is suspected, suspicious lesions should be biopsied to rule out cancer in these patients.

BK virus non-hemorrhagic cystitis is rare in solid organ transplants, especially lung transplants. Our case demonstrated a patient with recently increased immunosuppression presenting with lower urinary tract symptoms and cystoscopic findings of erythematous lesions. Only through exclusion and evidence of cytologic findings of BK polyomavirus could BK virus cystitis be diagnosed, but physicians should be aware of the potential for atypical presentations of BK cystitis. Other causes must be ruled out, but a viral etiology should be suspected in highly immunosuppressed patients with cystitis and a negative urine culture. It could even be possible that BK cystitis is slightly more common than it seems if patients have less bothersome symptoms than our patient.

BK virus non-hemorrhagic cystitis is rare following lung transplant. We present a case of BK virus cystitis and the clinical findings associated with it. The patient did not receive in urology treatment but was taken off of his mycophenolate by the transplant team which resulted in resolution of his lower urinary tract symptoms.

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