

Renal Allograft *Aspergillus* Infection Presenting With Obstructive Uropathy: A Case Report

L. Sadagah^a, M. Alharbi^{a,b}, M. Alshomrani^{c,d}, and A. Almalki^{a,d,*}

^aKing Abdulaziz Medical City, Western Region, Jeddah, Saudi Arabia; ^bUniversity of Manitoba, Winnipeg, Manitoba, Canada; ^cKing Abdulaziz Medical City, Central Region, Riyadh, Saudi Arabia; and ^dKing Saud Bin Abdulaziz University, Saudi Arabia

ABSTRACT

Background. Isolated renal allograft aspergillosis is rare and usually presents with fever and decreased glomerular filtration rate. Presentation with obstructive uropathy caused by aspergillus fungal balls is much less common. We report a young male patient who presented with obstructive uropathy secondary to isolated renal allograft aspergillus infection 6 weeks after transplant. He was treated with nephrectomy and antifungal medications.

Case presentation. A 29-year-old Saudi male patient had a recent living non-related kidney transplantation in Pakistan. Early Post-transplant course was complicated by acute cellular rejection (Banff Class IB) which was managed successfully with pulse steroid and anti-thymocyte globulin. The patient presented again to our emergency room on fortieth day post-transplant with a complaint of decreased urine output and passing white particles in his urine. This presentation was three weeks after treatment for cellular rejection, the urine fungal culture showed growth of *Aspergillus fumigatus*, and ultrasound imaging of the allograft kidney revealed mild to moderate hydronephrosis with echogenic materials within the renal pelvis. Biopsy of the transplanted kidney showed severe necrotizing granulomatous inflammation and fungal elements consistent with aspergillus species. The patient was given voriconazole as an antifungal agent and was weaned from immunosuppressive medication. The patient eventually required intermittent hemodialysis and underwent surgical allograft nephrectomy.

Conclusion. Suboptimal environmental and infection prevention and control precautions can explain this type of infection. It is important for clinicians to have a high index of suspicion and to investigate for fungal infection as a rare cause of obstructive uropathy in high-risk patients.

ASPERGILLUS is a common airborne mold; it represents up to 40% of hospital and home fungal contamination. Building activities at the workplace, particularly demolition, are associated with fungal and aspergillus airborne contamination. A significant increase in the colony count of molds occurs after demolition, and, in particular, higher temperature is associated with higher overall fungi concentration [1]. *Aspergillus* species (*A. fumigatus*, *A. flavus*, and *A. niger*) have been found in air and water samples of the majority of investigated hospitals [2]. It has been shown that 94% of water samples obtained from inside the National Hospital (Oslo, Norway) harbored filamentous fungi. *Aspergillus fumigatus* accounted for 35% of the total number of colony-forming units [3].

Invasive aspergillosis has been reported in approximately 0.7% to 4% of all renal transplant recipients [4]. There are several risk factors for aspergillosis after kidney transplant, including high doses and prolonged duration of corticosteroids, graft failure, and potent immunosuppressive therapy [5]. The reported mortality rate for invasive aspergillosis can be as high as 67% to 75%, depending on the underlying pathology [4-7].

Pathological renal disease caused by aspergillus infection is characterized by multiple micro-abscesses, which

*Address correspondence to Abdullah Hashim Almalki, King Abdulaziz Medical City, Western Region, PO Box 9515, Jeddah 21423, Kingdom of Saudi Arabia. E-mail: malkia02@ngha.med.sa

indicate a hematogenous spread to the kidney. *Aspergillus* infection in post-kidney transplant recipients primarily affects the lungs and the brain, with occasional dissemination [8]. On the other hand, *aspergillus* infection limited to renal allograft has been rarely reported. In most cases, patients present with fever and decreased glomerular filtration rate. Pseudo-aneurysms at the site of renal allograft anastomosis caused by aspergillosis have been reported [9–13].

Obstruction at the ureteric level is one of the most commonly reported urological complications after renal transplantation [14]. There are several causes of ureteric obstruction, including extrinsic compression (eg, hematoma, lymphocele, abscess, or tumor), intrinsic obstruction (eg, calculi, tumor, or clot), ureteral ischemia, ureteral kinking, technical error, or previously unrecognized uretero-pelvic junction obstruction [15]. A ureteric obstruction caused by *aspergillus* fungus ball is a very rare cause of obstructive uropathy. We report a young patient presenting with obstructive uropathy caused by *aspergillus* infection limited to the renal allograft.

Case Presentation

A 29-year-old Saudi male patient with end-stage renal disease (ESRD), on intermittent hemodialysis secondary to autosomal dominant polycystic kidney disease, underwent living non-related kidney transplantation in Pakistan. He presented to our hospital 3 days after kidney transplantation on arrival to the kingdom. On presentation, he had a 1-day history of hematuria and abdominal pain. The immunosuppression regimen consisted of cyclosporine 200 mg orally twice daily, mycophenolate mofetil 1 g orally twice daily, and prednisolone 40 mg daily. His serum creatinine level was 423 $\mu\text{mol/L}$. He underwent a renal allograft biopsy, which confirmed the diagnosis of acute cellular rejection (Banff class 1B) with no evidence of humoral rejection or polyomavirus infection. He was treated with pulse steroids and anti-thymocyte globulin (ATG). The cyclosporine was changed to tacrolimus. His serum creatinine level improved to a level of 170 $\mu\text{mol/L}$, and he was discharged on day 23 after transplant.

On day 40 after kidney transplant, the patient presented again to our hospital; he had decreased urine output and was passing white particles in his urine.

On examination, he was afebrile, normotensive, and euvolemic. There was tenderness at the allograft site on palpation without rebound. The surgical wound was healing, with no evidence of active infection. The rest of the examination was otherwise unremarkable.

Diagnostic Assessment

Laboratory values on presentation to the hospital are given in Table 1.

The urinalysis was positive for few leukocytes and few red blood cells, without bacteria.

Table 1. Laboratory Investigation Results

Laboratory Variable	Level
Na	130 mmol/L
Cl	99 mmol/L
K	5.9 mmol/L
HCO ₃	16 mmol/L
Urea	20 mmol/L
Creatinine	329 $\mu\text{mol/L}$
Tacrolimus	11 ng/mL
Serum albumin	44 g/dL
C-reactive protein	170
White blood cell count	15.1/mm ³
Neutrophils	14.5/mm ³
Hemoglobin	15.9/mm ³
Platelets	298/mm ³

Ultrasound imaging of the transplanted kidney (Fig 1) showed mild to moderate allograft hydronephrosis, with echogenic materials within the renal pelvis.

Therapeutic Intervention and Outcome

On hospital admission, a urine sample was sent for microbiological workup. The fungal culture result was positive for *A fumigatus*. The infectious diseases team suggested starting voriconazole orally, which was started along with tacrolimus to avoid toxic levels related to drug interaction.

The patient underwent cystoscopy and removal of the ureteral double-J stent. Later, anuria developed, along with worsening of the creatinine level, which increased to 700 $\mu\text{mol/L}$, with severe acidosis (bicarbonate of 7 mmol/L); therefore, hemodialysis was started. Ultrasound imaging revealed an increase in the echogenic material within the urinary bladder as well as the renal pelvis of the transplanted kidney, with persistent dilatation of the calyceal system.

A biopsy of the transplanted kidney (Fig 2) showed severe necrotizing granulomatous inflammation and fungal elements consistent with *aspergillus* species, with features of acute cellular rejection (Banff class III). No evidence of humoral rejection or polyomavirus infection was found.



Fig 1. Ultrasound image of the transplanted kidney.

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