CASE REPORT

Renal aspergillosis secondary to renal instrumentation in immunocompetent patient

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SUMMARY

Primary renal aspergillosis is a rare urological entity and immune-compromised persons are commonly prone to it. The clinical presentation resembles that of usual bacterial pyelonephritis. We report a case of localised unilateral renal aspergillosis with obstructive uropathy (hypoplastic contralateral kidney) in a young man, occurring after the endoscopic removal of impacted right upper ureteric calculus in a non-immunocompromised patient. In view of deranged renal function, he was initially managed by percutaneous nephrostomy and DJ stent removal followed by oral voriconazole therapy for 3 weeks. He responded well to the treatment. Subsequently, the patient was free of renal colic, fever and urine culture negative for *Aspergillus*.

BACKGROUND

Primary renal aspergillosis is a rare clinical entity. Aspergilli are ubiquitous in the environment and can be found in soil, water and air. The patient with predisposing factors such as diabetes, malignancies or immune suppression represents the primary target for fungal infections. The clinical features are non-specific and resemble that of usual bacterial pyelonephritis. We report a case of a young man who presented with obstructive uropathy due to unilateral localised renal aspergillosis following endoscopic procedure and contralateral small kidney. He had no predisposing factors (immunosuppression). He was treated primarily with percutaneous nephrostomy (PCN) tube followed by medical therapy (voriconazole). He responded well to the treatment and there was no evidence of recurrence during follow-up period of 12 months.

CASE PRESENTATION

A 34-year-old average built man presented in urology outdoor with chief symptoms of right lumbar pain with oliguria, irritative voiding symptoms and intermittent fever of mild-to-moderate grade lasting 2 months. The patient denied history of diabetes, hypertension and pulmonary tuberculosis. He was diagnosed 3 months earlier with a case of impacted right upper ureteric calculus for which right percutaneous nephrolithotomy was attempted but this failed to retrieve the calculus and therefore antegrade stenting was performed. This was followed by successful right ureteroscopic stone removal and stent change in another hospital a week later. Thereafter, the patient remained sick with non-resolving fever inspite of negative cultures. On clinical examination, the patient was

febrile and significant tenderness was appreciated at right renal angle.

INVESTIGATIONS

Renal function tests revealed raised serum urea (78 mg/dL) and creatine (2.8 mg/dL) levels. His electrolyte level was within the normal limits. His total leucocyte count was $15\,600\text{mm}^3$ and random blood sugar was 102 mg%. Urine routine showed plenty of pus cells (25–30) and few red blood cells (2–3). Urine culture was negative for bacterial growth. Ultrasound of kidney and bladder revealed right moderate hydronephrosis inspite of DJ stent in situ and small contralateral kidney. Chest X-ray was found to be normal.

In view of poor general condition and raised serum creatine, fluoro-guided right PCN was performed to decompress hydronephrotic kidney and right DJ stent was removed. The right kidney was draining 600–700 mL of urine/24 h. After normalisation of renal function and improvement in general condition, CT urogram was performed to search for the aetiology of obstructed nephropathy. CT urogram showed moderate right hydronephrosis with parenchymal streaky enhancement and contrast pooling along with narrowing at ureteropelvic junction. (figure 1) Radionuclide renal scan

Figure 1 CT urogram showing right moderate hydronephrosis with parenchymal streaky enhancement and contrast pooling (depicted by red arrow).

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(diethylene triamine pentaacetic acid) confirmed normal excreting, reduced functioning left small kidney (split function=22%) and enlarged right kidney with reduced and delayed tracer uptake (split function=78%) with patchy and non-uniform distribution as well as delayed clearance following forced diuresis suggestive of obstructive lesion. (figure 2A,B). Urine samples from right nephrostomy and midstream urine revealed Gram-positive fungal branching septate hyphae suggestive of *Aspergillus* species.

TREATMENT

Subsequently diagnostic ureteroscopy was performed under antifungal treatment cover. Ureteroscopy revealed the presence of white fluffy fungal balls in the right renal pelvis and the specimen was taken for biopsy. The tissue specimen showed characteristic angular dichotomously branching septate on microscopy and *Aspergillus flavus* on culture. Tab voriconazole was prescribed with a recommended dose of 6 mg/kg on the first day followed by 4 mg/kg for 3 weeks and the patient was advised to come for follow-up after 3 weeks.

OUTCOME AND FOLLOW-UP

Urine samples turned negative for fungus with improvement in general condition. On subsequent follow-up at 6 weeks, radio-nuclide scan suggested improved right kidney function with no outflow obstruction. He was doing well during the follow-up period of 12 months and there was no evidence of recurrence of disease.

DISCUSSION

Primary renal aspergillosis is a rare clinical entity. Aspergilli are ubiquitous in the environment and can be found in soil, water and air. *A. flavus* has been identified as a cause of urinary tract infection.¹ The patient who had predisposing factors like diabetes, malignancies or immune suppression represents the primary target for fungal infections. The clinical features are non-specific and resemble that of usual bacterial pyelonephritis.

The renal involvement by fungi has been found to be associated with increased morbidity and mortality particularly in cases of infections by angioinvasive fungi such as *aspergillus* and *mucor*.²⁻⁴ Aspergillosis of kidney may present in any other

following three patterns⁵. (A) Disseminated aspergillosis with renal involvement. It results from haematogenous spread of fungi to the kidneys leading to formation of multiple focal abscesses. (B) *Aspergillus* cast of renal pelvis. It results in obstructive uropathy which may present with urinary retention or anuria and can be diagnosed by demonstration of filling defects on ultrasonography. (C) Ascending pan-urothelial aspergillosis. It refers to the ascending infection involving the urethra, bladder, ureters and the kidney.

Primary renal aspergillosis in immune-compromised persons is well described in the literature. Biggers and Edward demonstrated anuria secondary to bilateral ureteropelvic fungal balls in a 62-year-old diabetic man. The patient was managed by bilateral ureteric catheterisation and antifungal therapy.⁶ Similarly, Kueter *et al*⁷ presents a case of anuria due to bilateral ureteral obstruction by *A. flavus* in an adult man with diabetes which was successfully treated with bilateral DJ stenting and antifungal therapy. Documentation of localised renal aspergillosis in immunocompetent is relatively rare. Krishnamurthi *et al*⁸ reported renal aspergillosis in a 60-year-old immunocompetent man causing sudden onset obstructive uropathy and recurrent anuric renal failure. He was treated by antifungal therapy and DJ stenting. Martinez-Pajares *et al*⁹ reported a case of an immunocompetent newborn with a bladder exstrophy who suffered from an acute renal failure caused by bilateral renal aspergilloma (*A. flavus*).

In our case, it was postinterventional contamination. It could possibly be due to fungal spores that have contaminated the instruments used in the endoscopic procedures or resulted due to inadequate sterilisation of the instruments. The infection was localised to renal tissue only and there was no other known focus of fungal infection elsewhere. Voriconazole and echinocandins (caspofungin) are new antifungal agents with broad activity against a wide variety of fungus including *Aspergillus* sp.¹⁰⁻¹¹ Oral voriconazole can be effectively given in patients with renal insufficiency on domiciliary basis.¹⁰

In conclusion, we present a case of primary renal aspergillosis in a young immunocompetent man following endoscopic intervention for the right upper ureteric calculus. Therefore, it should be considered as differential diagnosis in cases of non-

Figure 2 (A and B) Radionuclide scan showing reduced functioning left small kidney, enlarged right kidney with delayed clearance suggestive of obstructive lesion (red arrow indicates right kidney).

resolving bacterial pyelonephritis. Non-resolving pyelonephritis following endourology intervention should be focused on fungal aetiology especially if urine analysis is bacteriologically sterile, irrespective of the patient's immune status.

Learning points

- ▶ Primary renal aspergillosis in immunocompetent individuals is a rare entity.
- ▶ The symptoms are non-specific and resemble that of usual bacterial pyelonephritis.
- ▶ Non-resolving pyelonephritis should be focused on fungal aetiology irrespective of immune status.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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