

Inflammation and infection

Renal mucormycosis in immunocompromised patient, treated with Robotic Nephrectomy: Case report and review of articles



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Introduction

Mucormycosis is a rare Angioinvasive fungal infection that is commonly seen in immunosuppressed patients with reported mortality rates of 95% in disseminated diseases.¹ The disease is caused by the Filamentous fungi of the Mucorales Order (class of Zygomycetes)¹ Renal Mucormycosis is a manifestation of disseminated diseases. Isolated renal mucormycosis is extremely rare, only few cases have been reported.² We report a case of Renal Mucormycosis in an immunocompromised patient following chemotherapy for T-cell acute Lymphoblastic Leukemia. A literature reviews through Midline research was done and it was found that this is the only case of Mucormycosis infected kidney in which Robotic Nephrectomy was conducted.

Case report

A 15-year-old boy with a known case of T-Acute Lymphoblastic

Leukemia on chemotherapy. He presented respiratory symptoms in the form of cough and fever. There were no urinary tract symptoms. The clinical examination was unremarkable.

The Chest X-Ray showed large right pleural effusion. A CT scan for chest and abdomen showed right lung consolidation with bilateral pleural effusion, large hypo dense lesion of fluid attenuation measuring 6 × 5.5 cm in the right kidney with hepatic extension [Fig. 1]. Laboratory investigations showed a normal renal profile and serum electrolytes. The urine culture was negative.

Thoracic surgery was recommended; the procedures consisted of right sided pleural drainage, decortication and a pleural biopsy. Pleural fluid and tissue were sent for a microscopic examination and cultures. All cultures obtained were negative for bacteria, TB and fungal growth. His post-operative CXR showed marked improvement.

A repeat CT scan of the chest showed right upper lobe cavity with a fistula into the bronchus.

An ultrasound was conducted that showed areas of fluid collection in the right kidney. Percutaneous drainage was performed under ultrasound guidance. A minimal amount of fluid brownish in color came out. The culture showed no growth and a microscopic examination showed rare hyphae present.

Three FNA biopsies were conducted and results were negative. True cut biopsies were conducted under ultrasound guidance. The histopathology result revealed necrotic renal tissue with non-septate hyphae. DMSA renal scan showed that the right kidney contributed 39.2% and the left kidney contributed 60.8% of total renal function.

A multi-disciplinary meeting was performed and the decision was to perform a Right Robotic Nephrectomy followed by a Right Upper Lobectomy after a period of recovery.

Patient started on antifungal treatment with amphotericin B three weeks prior to surgery. Intraoperatively we found that the lesion was invading the liver [Fig. 2]. We were able to resect the liver extension completely. The kidney was removed along with the involved part of the liver.

During the Robotic nephrectomy, bronchoscopy, and washout of the broncho-pleural fistula was performed. Cultures from this wash

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Fig. 1. Large hypo dense lesion within the right kidney with hepatic involvement.

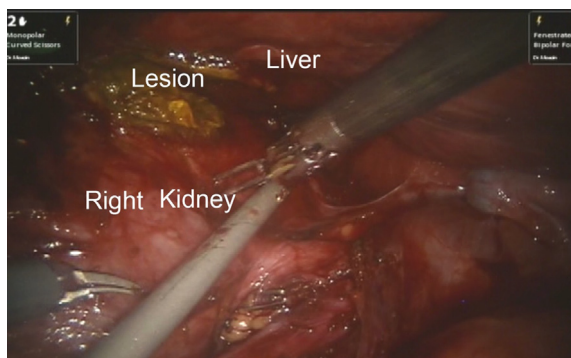


Fig. 2. Mucormycosis lesion is seen in the right kidney with extension to the liver.

also yielded mucormycosis. Patient had a smooth postoperative course. His serum creatinine remained in the normal level.

Histopathology report of the resected tissue revealed right kidney with a well-defined necrotic yellow mass. The liver tissue contained necrotic tissue with numerous non-septate hyphae consistent with Mucormycosis. [Fig. 3].

Later on, right upper lobectomy was performed. His postoperative recovery was uneventful.

Discussion

Awareness of invasive fungal infection has increased in clinical practice with the increased survival of patients having immunocompromised states. Their diagnosis is usually delayed because of the coexisting illnesses.³

Mucormycosis refers to serious fungi that have a minimal intrinsic pathogenicity, but can initiate grave and often fatal infection in certain clinical conditions with compromised host defenses.³

Renal mucormycosis

The organ most commonly involved with mucormycosis is the lungs, renal involvement has been reported in up to 20% of the cases with disseminated forms.⁴ Isolated renal mucormycosis is rare and only few cases have been reported.²

An analysis of the biopsy and autopsy records along with review of medical case histories of patients admitted to the PGIMER Institute in India for two decades (Jan 1981–Aug 2001) done by KL Gupta reported 90 cases with systemic mycoses and renal involvement. They included 79 males and 11 females with a mean age of 25.5 + 18.2 years. Twenty four of these cases had renal mucormycosis. Among them 13 had disseminated disease and 15 had isolated renal involvement. Main clinical features at presentation were fever (82%), flank pain and oliguria (78%). Renal failure occurred in 22 of the 23 (95.6%) patients with bilateral renal involvement. Additional laboratory features were leucocytosis (73%), hematuria and pyuria (65%) with evidence of gross hematuria in half of them.³ Our patient did not show any specific urologic symptoms; renal involvement was diagnosed based on radiologic findings in CT scan.

The mortality of different forms of mucormycosis reaches 75%–100% in most series. Survival for isolated renal zygomycosis is estimated to be 65%.⁵

Mucormycosis is characterized by uniform presence of extensive angioinvasion with resultant vessel thrombosis and tissue necrosis. This is associated with the penetration through endothelial lining of blood vessels and hematogenous dissemination of fungus from the original site of infection to other organs.²

Isolated renal mucormycosis may affect immunocompetent host and requires high index of suspicion for diagnosis and prompt treatment in view of associated poor prognosis. Due to non-specific

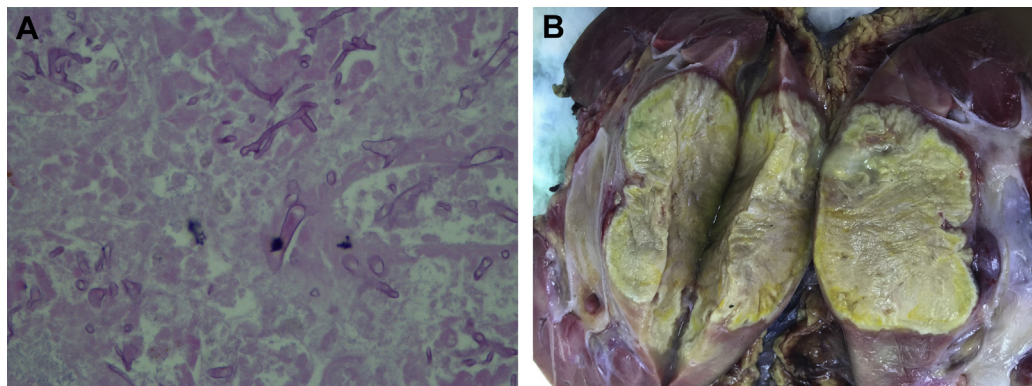


Fig. 3. A: Renal tissue Fungal hyphae. PAS stain. B: The kidney specimen showed a well-defined yellow mass. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

clinical and radiological characteristics, diagnosis requires identification of fungus on histopathology of renal tissue.² For extensively damaged tissues in patients with angioinvasive infections such as mucormycosis, debridement and excision of the tissue including nephrectomy may be necessary.¹ In a midline search we found that our case of robotic assisted nephrectomy for renal mucormycosis is the 1st case of fungal infection treated with robotic rather than open nephrectomy. There was a case of right nephrectomy that was attempted by laparoscopic partial nephrectomy and converted to open total nephrectomy.¹ Our patient discharged from hospital with stable general condition.

Conclusion

We present a case of mucormycosis of the kidney and lung and each of them has a high mortality rate. The patient was treated with robotic assisted right nephrectomy and resection of lung and liver

lesions. Aggressive surgical resection of focal lesions combined with antifungal therapy can improve the chance of survival.

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