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Renal Mucormycosis with Emphysematous Pyelonephritis: A Rare Case Report

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ABSTRACT

Mucormycosis is an invasive fungal infection with capacity to invade vessel wall causing thrombosis. Mucormycosis though less common than candidiasis and aspergilosis, have been shown increasing association with immunocompromised patients. Renal mucormycosis though rare, it is associated with fatal outcome and may lead to acute kidney injury, sepsis, shock. It is associated with high mortality. Hence early prompt diagnosis and treatment is necessary to prevent fatal outcome and can be lifesaving.

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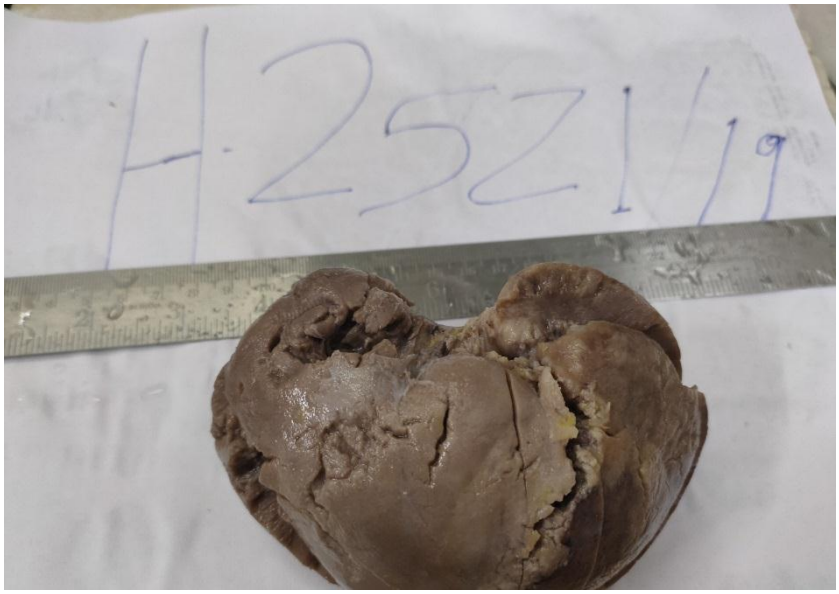
INTRODUCTION

Mucormycosis is invasive fungal infection caused by filamentous fungi belonging to class zygomycetes. These are distributed in soil, decaying vegetation, hay, stored seeds, house dust, poorly maintained vacuum systems or dirty indoor carpets[1]. They have capacity to invade vessel wall causing thrombosis and infarction. It commonly produce fulminant infection in patients with immunocompromised status[2]. However it can rarely affect immunocompetent individual also[3]. Mucormycosis infection can be isolated or disseminated and rarely may involve kidney alone[4]. . Emphysematous pyelonephritis is an acute necrotizing parenchymal and peri-renal infection caused by gas-forming uropathogens. The predisposing factors are diabetes mellitus and ureteric obstruction. E. coli is the most frequently identified pathogen[8].

CASE REPORT

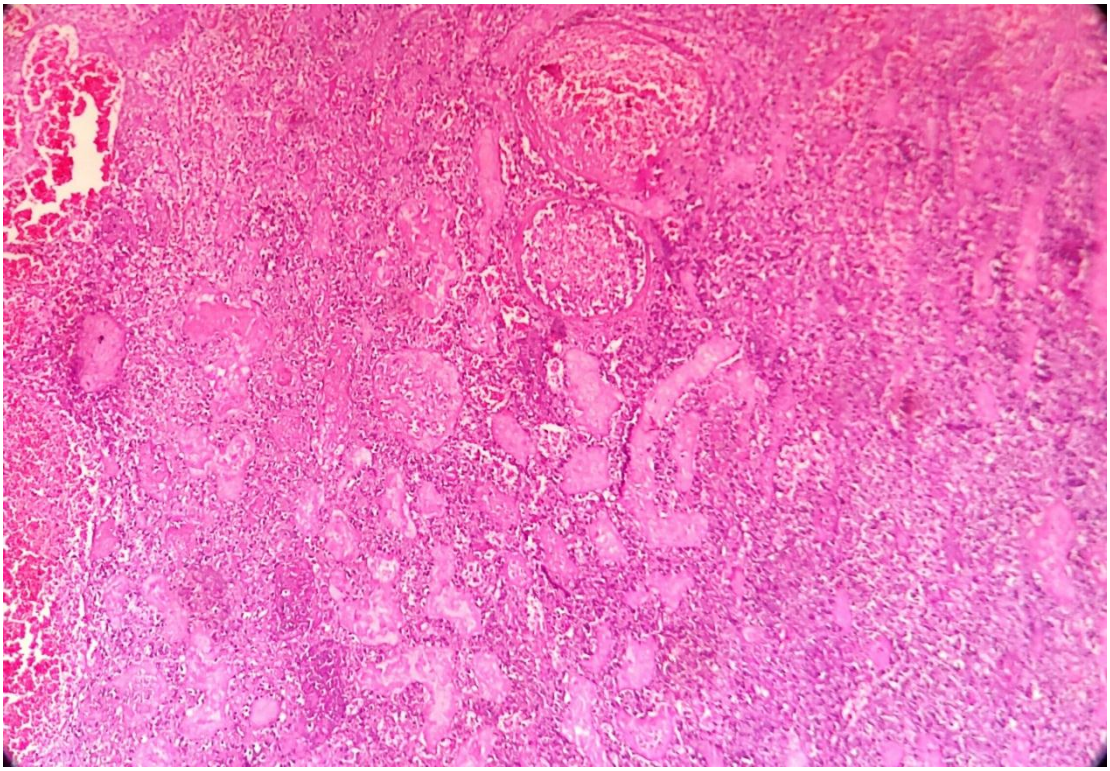
18 years old male with known case of diabetes mellitus came with history of fever since 15 days. He also had complains of pain in abdomen and vomiting since 5 days. His laboratory investigations on admission were as follows: CBC and peripheral smear revealed Normocytic Normochromic anemia with leukocytosis and thrombocytopenia. Sr.bilirubin was 1.5mg%, SGOT-46IU/L,SGPT-72IU/L, Urea-32mg%,Creatinine-1.1mg%, Amylase-6IU/L, Lipase-8IU/L. CRP was 20.0mg/L and procalcitonin 2.0pg/L. CT chest, abdomen and pelvis revealed:1. Consolidatory changes involving posterior segment of right upper lobe and collapse of right lower lobe suggestive of infective etiology.2.Moderate pleural effusion.3.Mild Ascitis.4.Mild hepatosplenomegaly. Pleural tapping was done and pleural fluid examination revealed Total leucocyte count of 200 cells/cumm with Neutrophils-55% and lymphocytes-45%. Fluid ADA was 15. Fluid was negative for PCR (genExpert) studies for tuberculosis. Later patient went into septic shock. Peripheral smear showed schistocytes suggestive of microangiopathy. Sr.bilirubin was 5.8mg%. CT Abdomen and pelvis revealed non visualization distal right renal artery suggestive of thrombosis and near complete absence of right renal enhancement with structural distortion and intermediate fluid attenuation seen replacing right renal parenchyma likely indicating renal infarction. There were also collection in segment VI of liver. Patient underwent right nephrectomy and pus was drained from liver. Pus culture did not receive any growth. Nephrectomy specimen was sent for histopathological examination to pathology department. Grossly right nephrectomy specimen received measured 8X6X4 cm in size. Externally kidney was enlarged and covered by hemorrhage and exudate. Cut surface had areas of infarction.



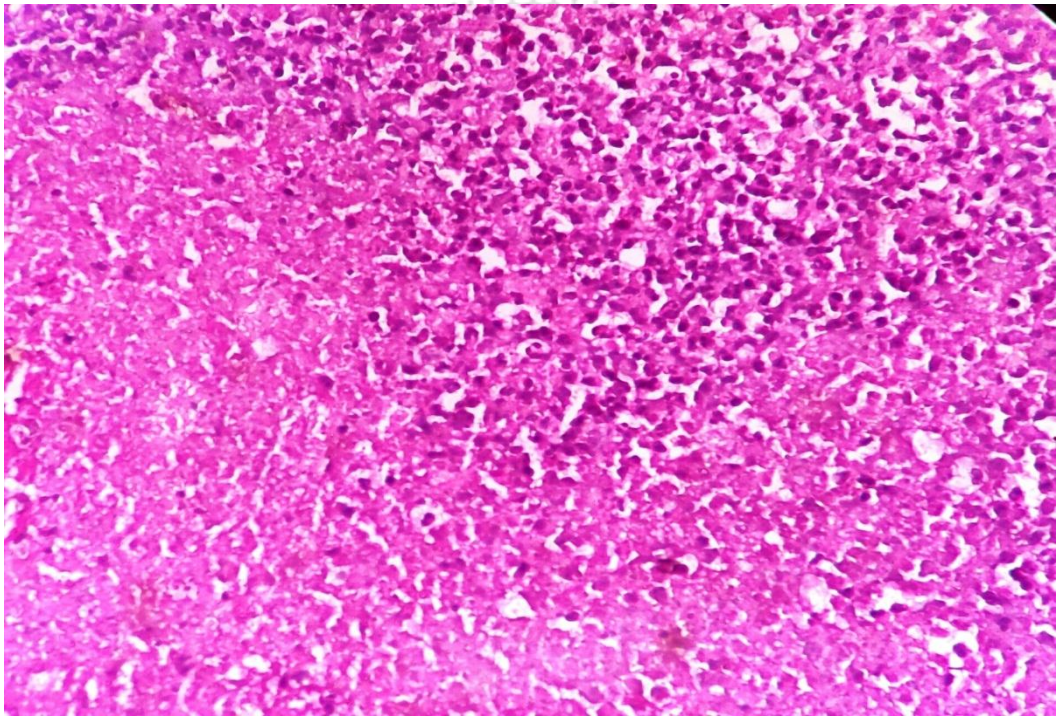
A. Gross photograph of kidney externally swollen, covered by areas of hemorrhage and exudate.

B. Photograph of cut surface of kidney showing areas of infarction.

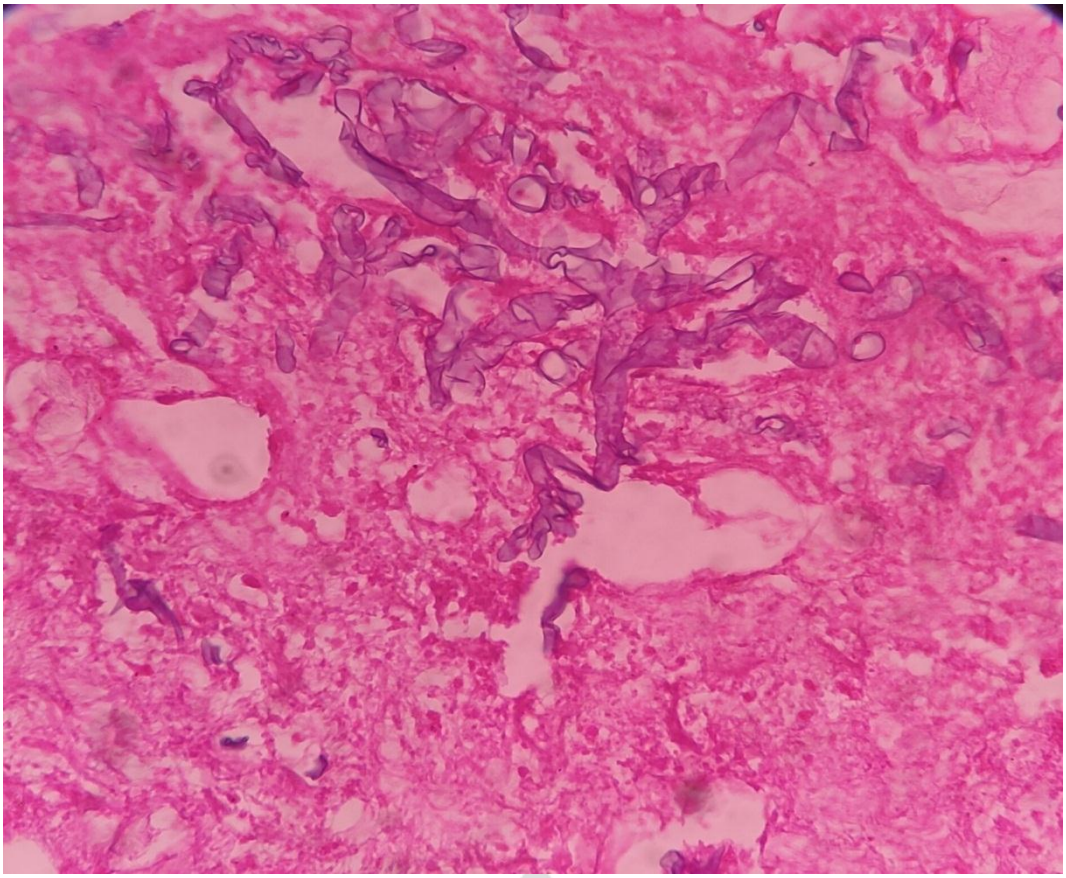
Microscopy revealed areas of ishaemic necrosis, with dense invasion of neutrophils, congested vessels. Few of the blood vessels were; thrombus revealed scattered broad, irregular, translucent, nonseptate hyphae with were confirmed by Gomori methenamine silver stain. Based on these findings the case was reported as renal mucormycosis with emphysematous pyelonephritis.



C. Photomicrograph (10X) of low power view showing vessels filled with blood and occasionally showing thrombus.



D. Photomicrograph (10X) low power view showing areas of necrosis and neutrophilic collections



E. Microphotograph (40X) high power view showing scattered irregular, wide, translucent nonseptate hyphae suggestive of mucormycosis.

DISCUSSION

Mucormycosis was first described in literature in 1885[5]. Although nosocomial in distribution, mucor can cause serious deep seated infections in immunocompromised conditions such as diabetic ketoacidosis, hematological malignancies or solid cancers, bone marrow/solid organ transplantation, AIDS, severe malnutrition, chelation with deferoxamine and many other conditions[1]. Based on anatomic locations, infection can be classified into 1. Occulocerebral mucormycosis. 2. Pulmonary 3. Cutaneous 4. Gastrointestinal 5. Disseminated 6. Uncommon forms[5]. The most common form of infection is rhinocerebral followed by pulmonary, cutaneous, gastrointestinal and disseminated. In the disseminated form, most commonly involved organ is lung followed by brain, kidney, heart, spleen, etc. Isolated renal mucormycosis is rare[6]. Mucormycosis can also cause otomycosis, keratitis. In pulmonary mucormycosis, patient may present with progressive severe pneumonia. Fungi may spread hematogenously to other parts of lung and other organs. Gastrointestinal mucormycosis may occur in malnutrition, uraemia and diarrhoeal diseases. Routinely for lab diagnosis of

mucormycosis, specimen can be obtained from lesion, pus, sputum, nasal discharge. Direct microscopy with KOH mount reveals nonseptate hyphae which are also seen on H And E sections. Fungi can be readily grown on SDA without cyclohexamide at 37ºC[7].

Nosocomial mucormycosis has been increasingly reported from many hospitals. Documented cases of mucormycosis have been noted after use of contaminated umbilical catheter and Elastoplast adhesive dressings, wooden stick and bandages. Outbreaks associated with wooden tongue depressors have been reported.

Clinical features of renal mucormycosis includes fever (88%), flank pain and tenderness (70%) and concomitant urinary tract infection (53%). Acute renal failure was observed in 92% cases.

Emphysematous pyelonephritis cases are generally associated with diabetes mellitus and ureteric obstruction. Women are affected more than men. *E. coli* is commonly recognized pathogen in urine culture of these patients. he mortality rate is 60-75% with antibiotic therapy and 21-29% after antibiotic treatment and nephrectomy. Though pathogenesis is less understood, it has been postulated that the high tissue glucose levels provide a substrate for microorganisms such as E. coli, which are able to produce carbon dioxide by fermentation of sugar[8].

CONCLUSION

Considering the fatal complications and mortality, prompt diagnosis and treatment of renal mucormycosis with antifungal therapy and nephrectomy may save patient from grave complications.

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