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Isolated renal mucormycosis in a case of bone marrow transplant with diabetes mellitus

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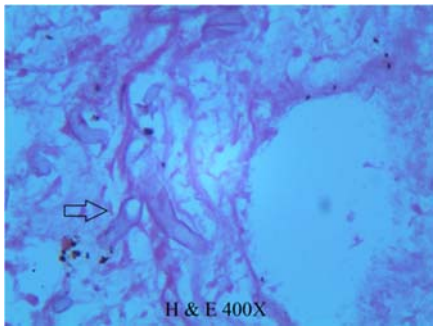
Abstract
Introduction: We present a first rare case of isolated renal mucormycosis in a diabetic bone marrow transplant patient. So far no case has been reported in the world literature. Mucormycosis is a rare opportunistic infection caused by the genera Rhizopus, Rhizomucor, Absidia and Mucor. Isolated renal mucormycosis is extremely rare. It is usually seen in immune-compromised patients and those with haematologic malignancies & diabetes mellitus.
Materials & Methods: A 50 year old patient presented with complaints of fever for 1 month, left flank pain for 15 days, generalised weakness, inability to walk, amnesia & disorientation for 7 days. Physical examination revealed left flank tenderness, anaemia, pedal oedema. Blood, urine and radiological investigation were done.
Results: Laboratory evaluation showed anaemia, leucopenia with neutropenia thrombocytopenia, hyponatremia, hyperkalemia, hyperglycemia. Serum creatinine was normal. Urine examination show 40-50pus cells, abundant RBCs, ketonuria. Urine culture showed significant growth of K. Pneumoniae, sensitive to colistin & polymyxin. Blood culture did not show any growth. Ultrasound suggested left pyelonephritis, no perinephric abscess/collection. CT suggested left kidney infarct due to renal artery thrombosis, with markedly bulky, swollen left kidney with complete loss of cortico-medullary differentiation, no perinephric collection and no enhancement of parenchyma on post-contrast study,. DTPA scan showed negligible function in left kidney. During left nephrectomy surgery kidney was grossly necrotic with renal vessel thrombosis. HPE revealed left kidney with extensive infarction and evidence of mucormycosis with renal vessel thrombosis. Postoperatively patient received Amphotericin B and recovered well.
Conclusion: We present a rare case of an isolated renal Mucormycosis in a diabetic bone marrow transplant patient in which by doing intervention at proper time we could save the patient.

Keywords: renal mucormycosis, bone marrow transplant, diabetes mellitus

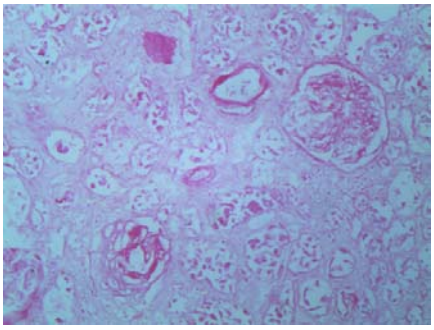
1. Introduction
Mucormycosis is a rare opportunistic infection caused by the genera Rhizopus, Rhizomucor, Absidia and Mucor. Isolated renal mucormycosis is extremely rare. It is usually seen in immune-compromised patients and those with haematologic malignancies & diabetes mellitus. Transplant recipients are at high-risk for mucormycosis because of chronic immunosuppression, frequent use of broad-spectrum antibiotics and metabolic disorder like diabetes mellitus, if present [1]. So far only few cases have been reported in the world literature [2]. We present a rare case of isolated renal mucormycosis in a diabetic bone marrow transplant patient.

2. Case Report: A 50 year old patient presented with complaints of fever for 1 month, left flank pain for 15 days, generalised weakness, inability to walk, amnesia & disorientation for 7 days. Physical examination revealed left flank tenderness, anaemia, pedal oedema. Blood, urine and radiological investigation were done. Laboratory evaluation showed anaemia, leucopenia with neutropenia, thrombocytopenia, hyponatremia, hyperkalemia, hyperglycemia. Serum creatinine was normal. Urine examination show 40-50pus cells, abundant RBCs, ketonuria. Urine culture showed significant growth of K. Pneumoniae, sensitive to colistin & polymyxin. Blood culture did not show any growth. Fungal culture was not done as mucormycosis was not suspected. Ultrasonography suggested left pyelonephritis, no perinephric abscess/collection. CT suggested left kidney infarct due to renal artery thrombosis, with markedly bulky, swollen left kidney with complete loss of

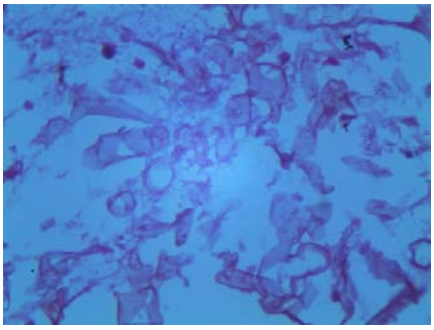
cortico- medullary differentiation, no perinephric collection and no enhancement of parenchyma on post-contrast study. DTPA scan showed negligible function in left kidney. After optimisation the patient left nephrectomy surgery was done. Intra-operatively left kidney was grossly necrotic with renal vessel thrombosis. HPE revealed left kidney with extensive infarction and evidence of mucormycosis with renal vessel thrombosis. Patient was then started Amphotericin B. Postoperatively patient recovered well and blood and urine cultures for mucor were negative.



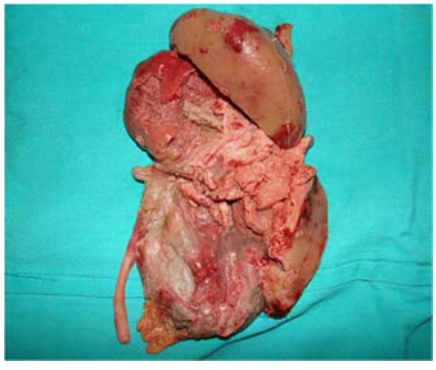
Showing fungal hyphae



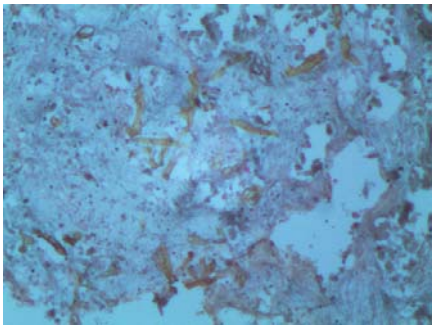
PAS 200 X – showing vascular thrombosis



PAS 400 X



Specimen after nephrectomy



SMA 400 X – special stain showing the fungus Mucor

3. Discussion

Mucormycosis (Zygomycosis) is an opportunistic upper respiratory tract and lung infection caused by mucorales fungi, and its most common pathogen species is Rhizopus Oryzae. The infection is transmitted by spores in the air. It can enter the body through gastrointestinal tract and wounded skin [3]. Zygomycetes are common in the environment but the infection with this fungus is rare in humans due to the effectiveness of the intact human immune system [4]. Renal involvement in disseminated mucormycosis ranges from 14% to 19% of patients [5]. Mucormycosis may rarely involve the kidney alone. Rhizopus Oryzae often invades blood vessels and disseminates through the haematogenous route [6]. Urinary system involvement can be asymptomatic or can manifest as signs and symptoms of kidney infection, such as pain, dysuria, gross haematuria, or acute renal failure [3]. Prout and Goddard (1960) were the first who reported a case of isolated renal mucormycosis accompanied by considerable constitutional upset. Symmers (1975) was the second person to report isolated involvement of a transplanted kidney recipient patient [7]. Kidney involvement has been seen in 50% of the patients who have died of disseminated mucormycosis. Several vessel thrombosis may lead to segmental or subtotal kidney infarction. Involvement can be unilateral or bilateral. Mucormycosis can be seen in three different forms in a patient with kidney disease. The first form is primary isolated infection of kidney. The second type of mucormycosis infection in patients with kidney disease is the involvement of other organs. The third form is mucormycosis infection in transplanted kidney [3]. Our case illustrates several important features of pathogenesis, predisposing risk factors and management of renal mucormycosis. In our patient diabetes mellitus and immunosuppression were the predisposing factors. A review of cases of zygomycosis in patients with AIDS indicated that IVDU is a significant risk [8]. Our patient had no history of IVDU but did have central venous catheter, which may have served as a portal of entry for the Rhizopus. In addition to parenteral intravenous access other significant risk factors for patients identified in our study were diabetes mellitus and immunosuppression. In the absence of an identified primary focus we can only speculate that he sustained a sub-clinical primary infection with haematogeneous dissemination to the kidney in a manner comparable with renal tuberculosis. Radiological findings in patients who present with renal involvement include enlarged kidneys on ultrasound with poor contrast excretion and presence of intrarenal and perinephric collections on CECT [9]. In our patient, Ultrasonography suggested left pyelonephritis, no perinephric abscess/collection and CT scan suggested left kidney infarct due to renal artery thrombosis, with markedly

bulky, swollen left kidney with complete loss of cortico-medullary differentiation, no enhancement of parenchyma on post-contrast study and no perinephric collection.

Our patient's infection was successfully managed with timely surgical intervention followed by Amphotericin B therapy. But as in other reported cases we did not suspected mucormycosis pre-operatively. Weng *et al*. in their study demonstrated relatively good prognosis for isolated renal mucormycosis with a survival rate of 76% (13 of 17 patients) [10]. This improved prognosis may be, in part, due to surgical resectability of isolated renal lesions. Overall survival for isolated renal mucormycosis is 65%. Mortality is nearly 100% for those who did not undergo nephrectomy [6].

4. Result

Patient was managed successfully by doing nephrectomy at right time followed by Amphotericin B therapy. By doing intervention at proper time we could save the patient, although mucormycosis was not suspected pre-operatively.

5. Conclusion

Isolated renal mucormycosis is a fatal and unusual cause of renal infarction which needs a high index of suspicion. A combination of aggressive surgical and medical treatment may improve the outcome. Mortality is nearly 100% for those who did not undergo nephrectomy.

6. References

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