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A rapidly fatal pulmonary infection in a kidney & pancreas transplant recipient

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Abstract

This is a case report of a 27 year old female patient with Type 1 diabetes, chronic kidney disease, who underwent cadaveric combined pancreas & kidney transplant and received heavy immunosuppression for the same. She eventually went on to develop pulmonary mucormycosis, and despite effective treatment and radical surgery, succumbed due to the illness.

Keywords

Pancreas & Kidney Transplant; Immunosuppression; Diabetes; Pulmonary Mucormycosis.

Introduction/Background

Immunosuppression is a double edged sword and has a risk of causing fatal opportunistic infections in high risk patients. Pulmonary mucormycosis is less common than the more prevalent rhino-cerebral-orbital form, but is more lethal as it involves vital structures for which one may not be able to perform radical surgery.

Case Presentation

This is a case report of a 27 year old female patient with Type 1 Diabetes Mellitus and chronic kidney disease on maintenance haemodialysis. She underwent a cadaveric pancreas & kidney transplant on 10th July 2022. She had been heavily immunosuppressed with high dose anti-thymocyte immunoglobulin and methylprednisolone as induction agents followed by tacrolimus, mycophenolate mofetil and prednisolone as maintenance therapy. She developed dyspnea and right sided chest pain 14 days after surgery. The patient was on the following drugs-Micafungin, preceded by Fluconazole and Linezolid, Polymyxin B, Mero-

penem and Tigecycline. Her HRCT revealed consolidation in posterior basal segment of right lower lobe as well as ground glass opacities in bilateral lower lobes with a reverse halo sign (Figure 1).

Mucormycosis seemed the most likely possibility followed by Aspergillosis. Therefore, the patient was started on Posaconazole to cover both these fungi.

The serum Galactomannan was positive (1.4839). There was a likelihood of combined Mucormycosis & Aspergillosis which does occur in 13% cases [1]. Likelihood of false positive galactomannan existed due to the use of various antibiotics. Serum Galactomannan after 20 days showed a reduction to 0.68, which may be due to improvement of aspergillosis if there was indeed a mixed mould infection. However, her clinical symptoms and HRCT worsened significantly which suggested an uncontrolled infection with mucorales (Figure 2).

Therefore, a decision was made to perform a right lower lobectomy (Figure 3) and Liposomal Amphotericin B was added to posaconazole. Histopathology (Figure 4) as well as microbiological tests confirmed the presence of mucormycosis (Figure 5). Inspite of all measures, patient had worsening of respiratory distress and eventually succumbed to the illness.

Discussion/Conclusion

Mucorales are ubiquitous fungi which occur naturally in the environment, found usually in decaying vegetations and soil. Rhino-orbital-cerebral is the most common form of the disease, followed by the pulmonary form. The various risk factors for developing this disease include diabetes mellitus, especially ketoacidosis, glucocorticoid therapy, haematological malignancy, hematopoietic cell transplant, solid organ transplant, deferoxamine treatment, iron overload, COVID-19 infection, etc [2]. It occurs after inhalation of spores into bronchioles and alveoli, resulting in pneumonia with infarction and necrosis, eventually disse-

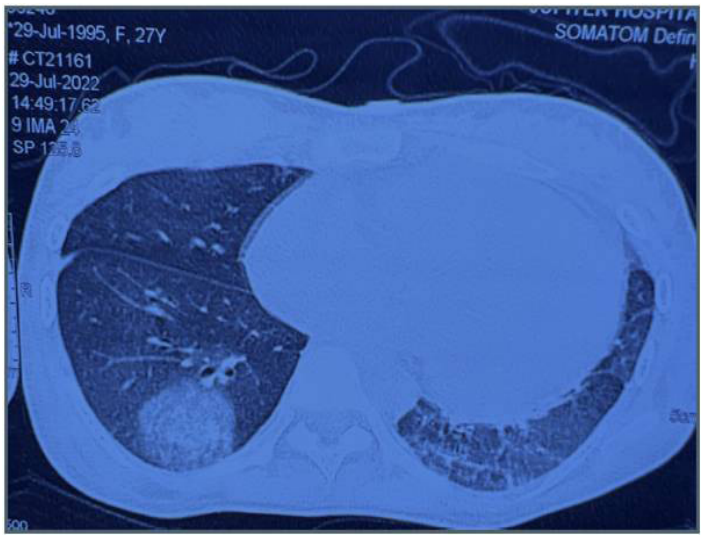

Figure 1: Consolidation in posterior basal segment of right lower lobe as well as ground glass opacities in bilateral lung lobes with an early reverse sign.

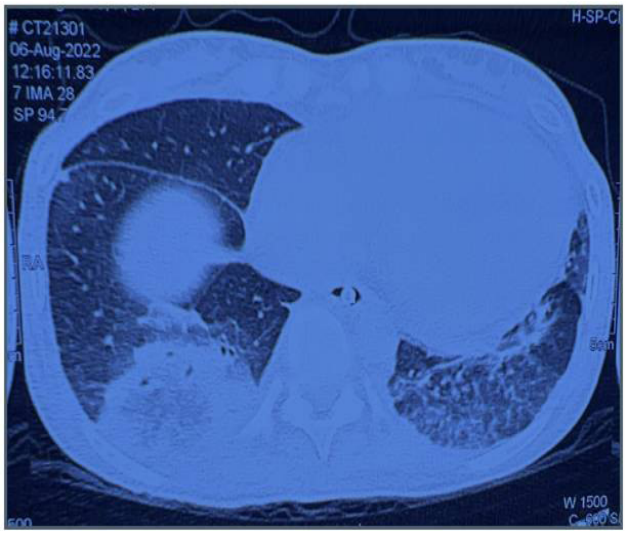

Figure 2: Reverse halo in posterior basal segment of right lower lobe, ground glass opacities in bilateral lung lobes, worsening compared to previous HRCT

Table 1: The differential diagnoses.

	Nodule with reverse halo sign	Infection likely acquired in community	Diabetes Mellitus	Severely immunocompromised	Antibiotics	Antifungal (Micafungin preceded by fluconazole)
Gram Positive Bacterial Pneumonia					Unlikely while receiving Linezolid, Tigecylcine	
Gram Negative Bacterial Pneumonia			Associated	Associated	Unlikely while receiving Meropenem, Polymyxin B	
Nocardia	Maybe seen	No	Associated	Associated	Unlikely while receiving Meropenem, Linezolid	
Aspergillosis	Maybe seen		No association	Strong association		Unlikely while receiving Micafungin
Mucormycosis	More characteristic	Yes Uncontrolled diabetes, ketosis	Strong association	Strong association		The current antifungal agents may increase the likelihood of mucormycosis

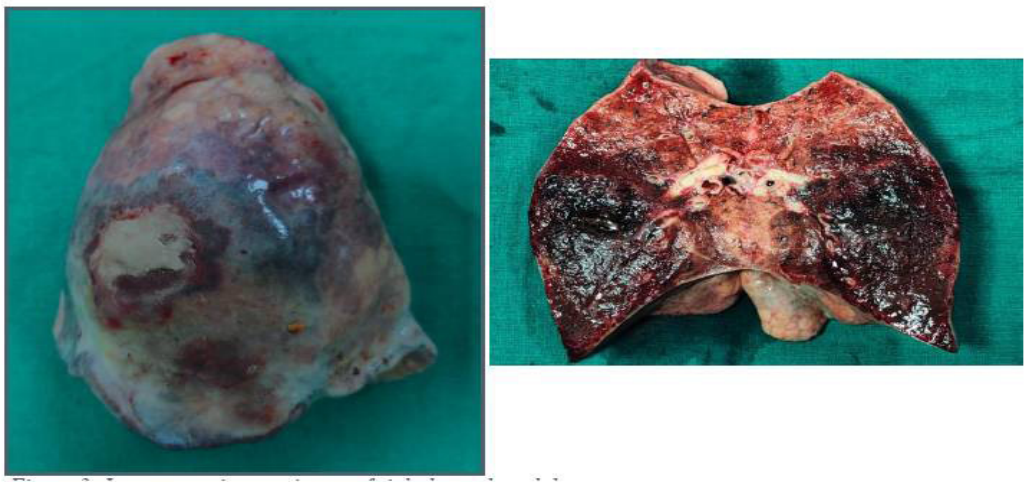

Figure 3: Intra-operative specimens of right lower lung lobectomy.

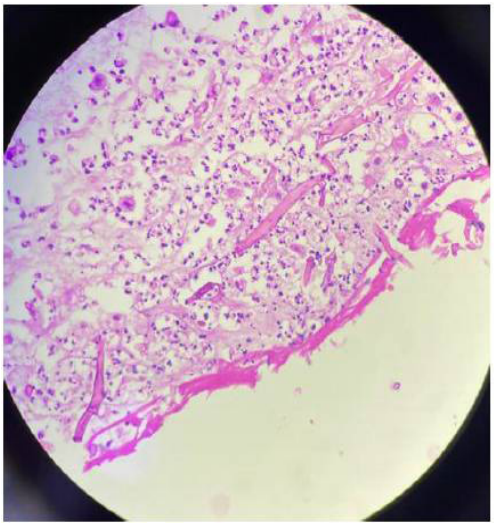

Figure 4: Histopathological specimen showing broad, aseptate hyphae with angioinvasion surrounded by areas of consolidation and haemorrhagic infarct.

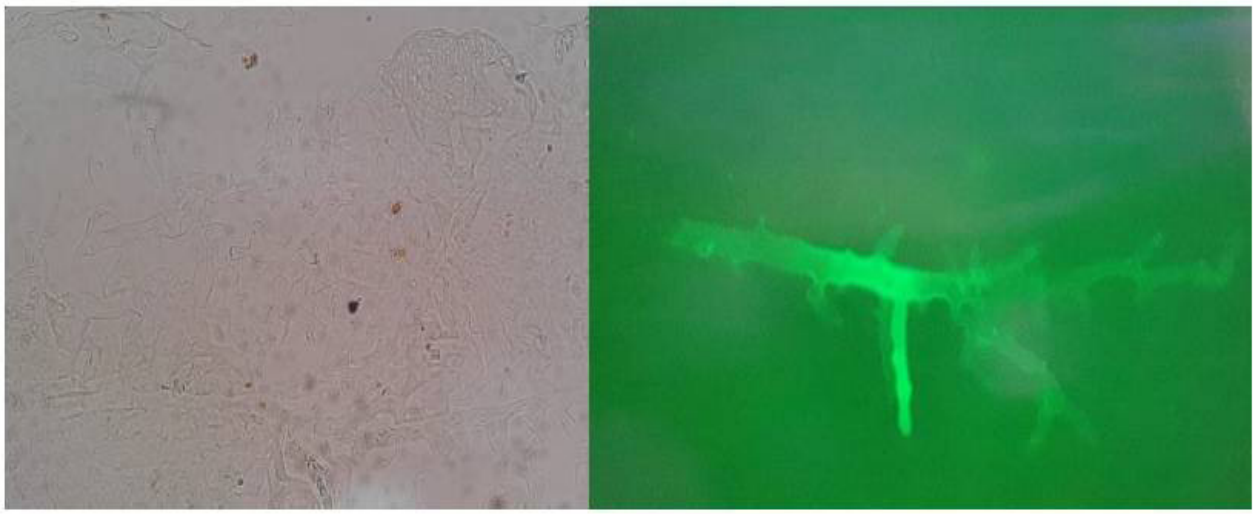

Figure 5: KOH mount (A) and calcofluor white staining (B) showing broad, aseptate hyphae with irregular branching, suggestive of mucormycosis.

minating to contiguous structures. Our patient likely had exposure to Mucorales spores in the community, was an uncontrolled diabetic who was brought to the hospital for transplantation the previous day and received immediate heavy immunosuppression which may have led to this devastating disease. Successful management of all forms of mucormycosis requires both extensive and thorough surgical debridement as well as appropriate antifungal therapy. Liposomal amphotericin B is the current drug of choice [3] followed by posaconazole/isavuconazole as alternative /step-down/salvage therapy [4,5]. Mortality rates are very high in pulmonary mucormycosis, approaching 65% despite aggressive treatment [6].

Declarations

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