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A CO-INFECTION OF H1N1, *ASPERGILLUS* AND *PSEUDOMONAS* IN A POST COVID PATIENT WITH RENAL TRANSPLANT-A CASE REPORT

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Abstract

A 52-year-old male with a 17-year history of hypertension presented with breathlessness, cough, orthopnoea, fever, and pedal oedema. He had a renal transplant 20 years ago due to reflux nephropathy, with stable graft function until a recent episode of Corona virus disease (COVID) in 2020, necessitating dialysis due to elevated creatinine and subsequent renal biopsy showing diffuse cortical necrosis. A subsequent bronchoalveolar lavage (BAL) revealed Pseudomonas. Further testing identified H1N1 and Aspergillus, supported by elevated serum β galactomannan levels. Treatment included mechanical ventilation, oral Tamiflu, intravenous Liposomal Amphotericin B, bronchodilators, and antihypertensives, resulting in recovery.

Keywords: H1N1 Influenza; COVID; Immunocompromised; Co-Infection.

INTRODUCTION

Centers for Disease Control and Prevention (CDC) defines- Coinfections as the infections occurring concurrently with the initial infection. Superinfections as the infections that follow on a previous infection, especially when caused by microorganisms that are resistant, or have become resistant, to the antibiotics used earlier. Three potential scenarios of bacterial/severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) co-infection- (i)Secondary SARS-CoV-2 infection following bacterial infection or colonisation (ii)Combined viral/bacterial pneumonia (iii)Secondary bacterial superinfection following SARS-CoV-2[1].

Co-infections involving multiple pathogens present complex challenges in clinical practice, often leading to increased morbidity and mortality rates compared to single infections. Among such intricate scenarios, the concurrent presence of H1N1 influenza virus, *Aspergillus* species, and *Pseudomonas aeruginosa* represents a particularly formidable clinical entity.The H1N1 influenza virus, a subtype of influenza A virus, has been associated with periodic outbreaks and pandemics, posing a significant global public health concern. Influenza viruses primarily target the respiratory tract, causing a wide spectrum of illness ranging from mild upper respiratory symptoms to severe pneumonia and acute respiratory distress syndrome (ARDS) [2]. Concomitant with influenza infection, opportunistic fungal pathogens such as *Aspergillus* species can colonize and invade the respiratory tract, leading to invasive pulmonary aspergillosis (IPA). *Aspergillus* spp. are ubiquitous environmental molds capable of causing a broad spectrum of diseases in immunocompromised hosts, including pneumonia, sinusitis, and disseminated infection [3]. The immunocompromised state induced by H1N1 infection further predisposes individuals to *Aspergillus* co-infection, complicating clinical management and prognosis.

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CASE REPORT

A 52-year-old male, with a 17-year history of hypertension, presented on January 25th, 2023, complaining of breathlessness, productive cough, orthopnoea for 3 days, and fever for 2 days, with pedal oedema persisting for a month. He had undergone renal transplant 20 years ago due to childhood reflux nephropathy. Vital signs: Blood pressure 140/80 mmHg, Pulse rate 82 beats per minute, Oxygen saturation 82% at room air, Respiratory rate 24 per minute. Clinical examination revealed bilateral crepitations with decreased breath sounds on the left side. Laboratory findings showed elevated urea (109 mg/dL) and creatinine (5.7 mg/dL). Chest xray antero-posterior view showing underexposed,rotated to left,tracheostomy tube in situ, ng tube insitu,left cp angle blunting, heterogeneous opacity of left mid and lower zone, mediastinal shift, ectatic changes of left upper zone, left diaphragm contour not visualised(Figure 1A).

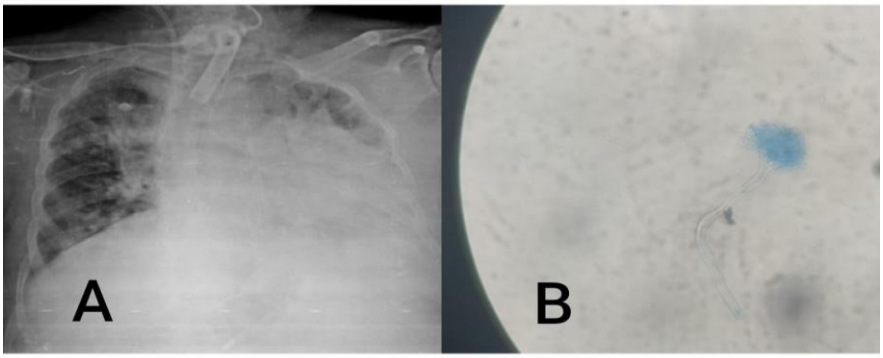

FIGURE 1 A-Chest xray AP view
FIGURE 1 B-Microscopy(Lactophenol cottonblue stain)

The patient was on triple immunosuppression therapy: Wysolone, Cyclosporine, and Azathioprine. Stable graft function was observed until 2020 when the patient had COVID, leading to increased creatinine levels necessitating dialysis and subsequent renal biopsy revealing diffuse cortical necrosis. BAL fungal culture on February 1st 2023 revealed powdery smoky green colonies on Sabouraud dextrose agar (SDA) and Lactophenol cotton blue staining showed smooth Conidiophore, single phialides(uniseriate), covering upper half vesicle (Figure 1B) indicating the growth of *Aspergillus fumigatus*.

A repeat BAL on february 4th 2023 was negative for acid fast bacilli but positive for H1N1, *Aspergillus*, and *Pseudomonas aeruginosa* via multiplex Polymerase chain reaction (PCR). Treatment included oral Tamiflu, intravenous liposomal Amphotericin B and Meropenem, nebulisation duolin and budecort given twelve-hourly, tablet Wysolone and anti-hypertensives. The patient recovered and was discharged with tablet Voriconazole for 1-week, oral Wysolone, Lasix, antihypertensives, fluid restriction (up to 1L/day), and salt restriction (<3gm/day). Follow-up revealed stable condition on immunosuppressants, maintenance hemodialysis, and diuretics.

DISCUSSION

The co-infection of H1N1, *Aspergillus*, and *Pseudomonas* in a post-COVID renal transplant patient represents a complex and potentially life-threatening clinical scenario, necessitating careful consideration and management due to the patient's

immunocompromised status and underlying renal transplant. Renal transplant patients are inherently immunocompromised due to the use of immunosuppressive medications to prevent organ rejection. This compromised immune response predisposes them to opportunistic infections, including those caused by *Aspergillus* and *Pseudomonas*. Additionally, recent COVID-19 infection may further impair immune function, increasing susceptibility to additional infections.Co- infection with H1N1, *Aspergillus*, and *Pseudomonas* can lead to severe respiratory complications, particularly in patients with underlying respiratory comorbidities or compromised lung function[4] .The presence of multiple infections in a renal transplant patient can further compromise renal function, potentially leading to acute kidney injury or exacerbation of pre-existing renal dysfunction[5]. Obtaining accurate microbiological diagnoses is crucial for guiding targeted antimicrobial therapy and preventing treatment delays or inappropriate use of antimicrobials.

CONCLUSION

Long-term management of co-infections in renal transplant patients requires close follow-up and monitoring for complications, including recurrent infections, graft rejection, and renal dysfunction. Optimizing immunosuppressive therapy while balancing the risk of infection and rejection is essential for maintaining graft function and overall patient well-being. Close collaboration between infectious disease specialists, nephrologists, transplant surgeons, and critical care teams is essential for optimizing patient outcomes and reducing the risk of complications associated with these infections.

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