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HIV and Pneumocystis Jiroveci Pneumonia (PJP) Managed With Extracorporeal Membrane Oxygenation (ECMO)

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Abstract

Presentation
A 40-year-old Irish female presented with a new diagnosis of HIV, advanced immunosuppression and severe respiratory failure.

Diagnosis
Patient was subsequently diagnosed with Pneumocystis jiroveci Pneumonia (PJP).

Treatment
The patient was treated for HIV and PJP and required mechanical ventilation. She continued to deteriorate and veno-venous Extracorporeal Membrane Oxygenation (V-V ECMO) was deployed in her management after 18 days of mechanical ventilation.

Conclusion
HIV presenting with extensive pneumonia secondary to PJP and advanced immunosuppression is still a treatable condition. All available respiratory support including ECMO should be considered for patients even if they have been on mechanical ventilation for more than 7 days.

Introduction

The number of patients with a new diagnosis of HIV in Ireland has increased annually by almost 50% between 2012 and 2016[1]. Notification rate was 11.1 per 100,000 population in 2018[2]. Late presenters (CD4 count < 350cells/µL) have previously been found to be more symptomatic at the time of diagnosis[3].

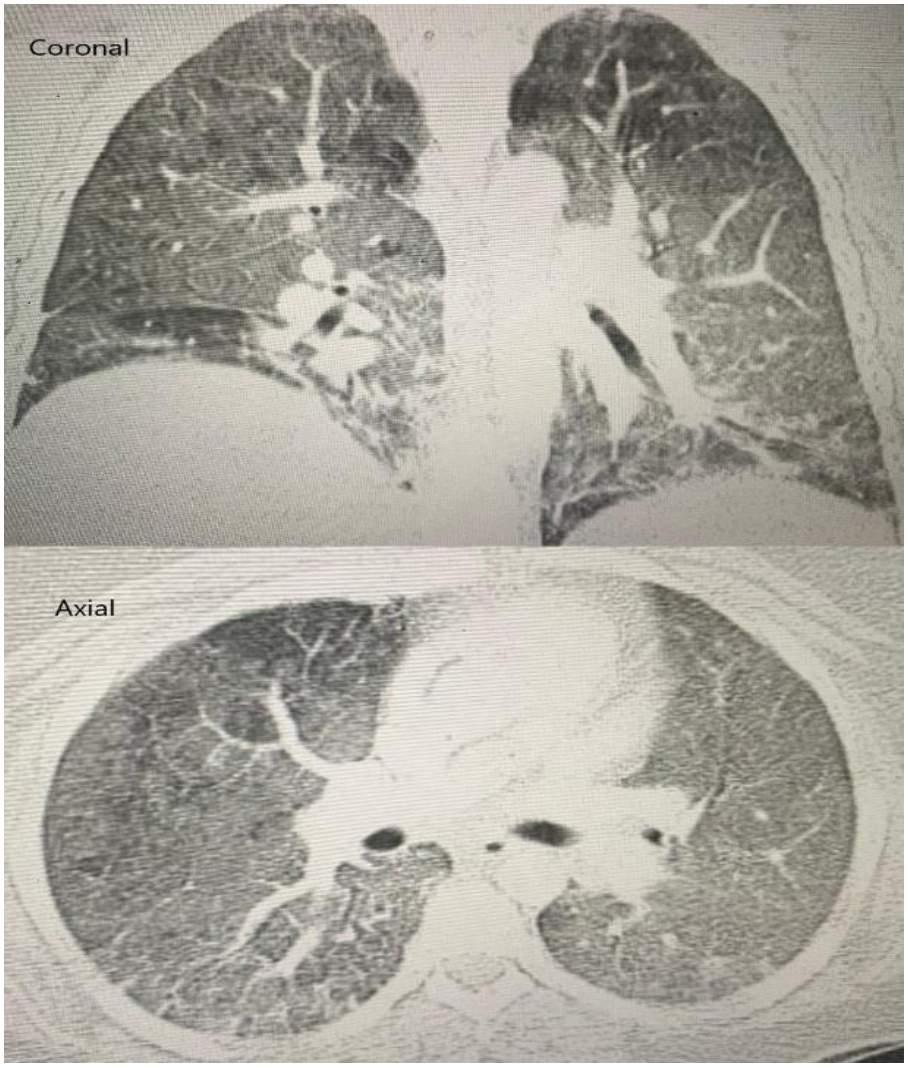
Case report

A 40-year-old Irish female presented with a 4 week history of progressive respiratory distress, cough and fever. Chest radiograph (CXR) showed patchy perihilar and lower lobe pneumonia bilaterally. She was treated empirically for a community-acquired pneumonia (ceftriaxone 2g/day IV and clarithromycin 500mg/12h PO; due to penicillin allergy) and influenza pneumonitis (oseltamivir 75mg/12hr PO).

A Computed tomography (CT) showed diffuse bilateral ground-glass opacification (Fig 1). Clinical deterioration prompted the addition of vancomycin (1.5g/12h IV) and empiric treatment with co-trimoxazole (120mg/kg/day IV)

and methylprednisolone (1g/day IV) for PJP as HIV testing reported a provisional positive result. The patient was transferred to the intensive care unit (ICU) on day 9 due to increasing hypoxia.

Fig 1: Coronal and Axial Computed Tomography (CT) images (Lung windows) show diffuse ground glass opacification of the lung parenchyma bilaterally.

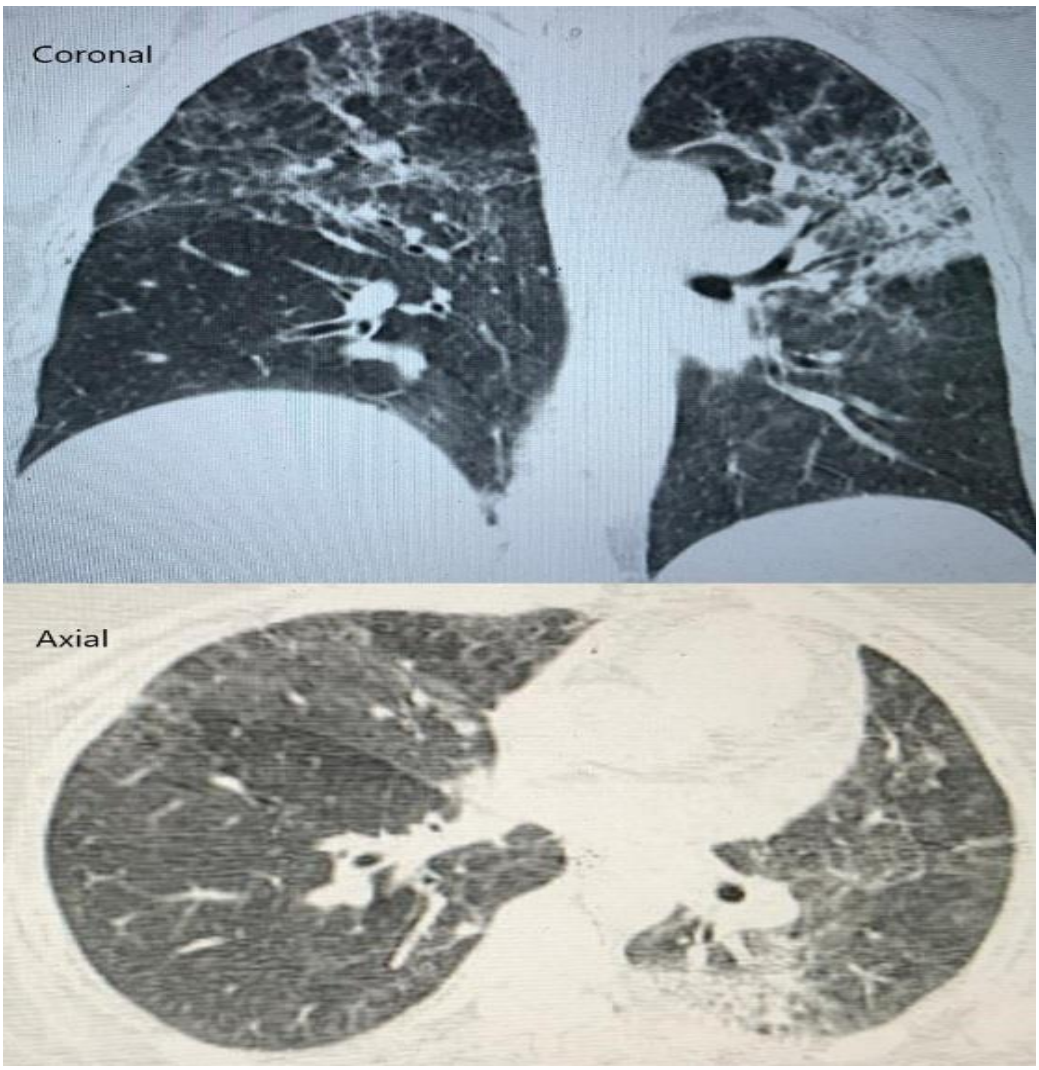


On day 11, the patient's trachea was intubated and the lungs were mechanically ventilated (MV). The diagnosis of PJP was confirmed by polymerase chain reaction (PCR) assay on sputum samples. Repeat testing confirmed the diagnosis of HIV, with CD4 count 40 cells/μL and HIV viral load 59,737 copies/mL. The patient was commenced on (ART) antiretroviral therapy (Truvada and Darunavir/Ritonavir). On day 14, a right-sided pneumothorax developed requiring tube thoracostomy.

By day 30, despite prone positioning, MV for 18 days, neuromuscular blockade and inhaled nitric oxide, the patient developed severe respiratory failure (PaO_2/FiO_2 ratio: 60, FiO_2: 1.0, pO_2: 8.0, PEEP: 12) and was commenced on V-V ECMO. ECMO was continued for 8 days without any complications. On day 1 post-ECMO, another right-sided tension pneumothorax was identified, causing an episode of bradycardia and cardiac arrest. The patient was successfully resuscitated and underwent emergency tube thoracostomy.

The patient was weaned from positive pressure ventilation (PPV) over the following 22 days (Fig 2). Subsequently the recovery was slow, marked by acute kidney injury, PE, myopathy and reactive depression. The patient was discharged from acute hospital 79 days after first presentation and was continuing to do well 49 days after the hospital discharge.

Fig 2: Coronal and Axial CT images (Lung windows) showing resolution of previously seen bilateral ground glass opacification with residual upper lobe parenchymal scarring greater in the left upper lobe following ECMO treatment.



Discussion

Patients with HIV and severe respiratory failure secondary to PJP are at increased risk of tension pneumothorax during PPV. The experience of ECMO in HIV positive patients is limited to case reports and case series[4, 5].

The more widespread availability of ECMO as well as the results of the recent EOLIA study has encouraged us to consider ECMO at an earlier stage in severe ARDS patients, particularly if there are complications (pneumothorax) with conventional MV[6]. There are no clear recommendations when it is too late to consider ECMO but the older practice of not deploying ECMO if high mechanical ventilator settings had been used for more than 7 days is probably less rigidly applied today[7]. Recovery of native lung function is possible even after prolonged MV prior to ECMO as was demonstrated in this patient.

Plasma concentration of antiretroviral medication may be altered in HIV patients on ECMO and could require dose adjustment[8]. The low CD4 count at the time of diagnosis identified our patient as a late presenter. This highlights the need for more widespread and routine testing for HIV as has been done in another Irish Hospital[9]. This approach aims to diagnose HIV infections earlier and reduce the number of late presentations such as we report here.

The prognosis for HIV is excellent with appropriate ART and this case further underscores the fact that PJP in the setting of advanced HIV diagnosis is a fully reversible condition and patients should be considered for full respiratory support including early ECMO.

Declaration of Conflicts of Interest:
The authors have no conflicts of interest to

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