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CASE REPORT

Invasive *Candida auris* Complicating Influenza H1N1 in North Sharqiy-Oman

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Abstract

Candida auris remain a major healthcare problem in intensive care units (ICU) as it is multidrug resistant and complicates an immunocompromised patient

Our case is a 56-year-old gentleman admitted for H1N1 pneumonia and intubated, with prolonged antibiotics and imunocompromised status the patient develops *Candida auris* in blood and treated with anidulafungin.

Conclusion the *Candida auris* is rare, which must be considered when treating patients with predisposing risk factors such as long hospital stays, and prolonged antibiotic therapy used prompt antifungal therapy should be considered.

Introduction

Influenza virus is one of the most common causes of lower respiratory tract infections worldwide. Fungal infections complicating influenza pneumonia are associated with increase disease severity and mortality [1]. *Candida auris* is a newly emerging fungus, that presents a serious global health threat. It is an opportunistic pathogen that infects immunocompromised, ICU admitted patients [2]. The importance of *C. auris* is its resistance to many antifungals and tendency to cause hospital outbreaks as it persists for a long time in the environment and leads to biofilms formation on plastic surfaces, the hospital environment, and medical devices [3]. The accurate identification of *C. auris* is challenging because it is crucial for providing prompt patient care, management including selection of antifungals, and applying infection prevention and control measures [4].

The Case

Our patient is a 56-year-old omani male from Sharqiya-Oman. The patient presented to us with a four-day history of cough, fever, progressive shortness of breath, and fatigue. The patient was seen in a remote hospital where he was assessed and intubated because of severe hypoxemia due to severe HINI acute respiratory distress syndrome (ARDS) and referred to us for further management. His previous medical history included; hypertension for five years, with newly diagnosed diabetes mellitus which possibly flared up due to sepsis. On presentation, the patient was lying in the bed, dyspneic, and unable to speak treated in our ICU - has multiple complications, repeated ventilator-associated pneumonia (VAP), empyema, urinary tract infection and blood stream infection, repeated multi-drugs resistance organisms (MDROs) infections, *Candida auris* infection on 19/12/21, barotrauma, critical illness

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polyneuropathy/myopathy. His temperature was 38.6 °C, his heart rate was 82 beats per minute, respiratory rate was 21 breaths per minute. He was on mechanical ventilation for a long time and due to severe ARDS could not be weaned from the ventilator. Therefore, a surgical tracheostomy was performed to reduce ventilator-associated pneumonia and to wean him from mechanical ventilation. 3 weeks later with the patient developed fever, blood, and sputum culture shoed Burkholderia cepatia which was treated with trimethoprim. On blood culture after 24 hours showed growth of yeast, which seen by gram stain. Then Anidulafungin was started at a dose of 200 mg then 100 mg daily. *Candida auris* was isolated according to Matrix-Assisted Laser Desorption/Ionization-Time of Flight (MALDI-TOF) and the sensitivity done by VitteckII. There were no CLSI breakpoint for *C. auris*; so the results used based on Centers for Disease Control and Prevention (CDC) recommendations. Resistant to fluconazole, Amphotricin and sensitive to Anidulafungin and micafungin. The invasive lines were removed and the Candidemia cleared successfully after 28 days. And the patient discharged for follow up.

Discussion

C. auris first isolated from external ear canal from patients in Japan in 2009, hence the name "auris". From the time of isolation; *C. auris* continue to become a major healthcare problem worldwide and the significance of this is its role in immunocompromised patients and multidrug resistance of the pathogen [5]. In this study the co-infection *Candida auris* was complicating influenza H1N1 when we compared with other studies which the co-infection was COVID-19. Most reported cases of *C. auris* worldwide have occurred in patients with prolonged stay in intensive care units in hospitals, most of them had intravenous catheters, urinary catheters, on mechanical ventilation, and most of them received broad spectrum antibiotics, especially in COVID-19 patients.

Genetic studies and geographical distributions revealed 4 major discrete clades of *C. auris*; the South Asia Clade (I), the East Asia Clade (II), the South Africa Clade (III), and the South America Clade (IV). Based on very few single-nucleotide polymorphisms (SNPs) and new clade was identified in Iran (Clade V), this clade is separated from the other clades by greater than 200,000 SNPs [6]. *C. auris* has been isolated in over 40 countries across 6 continents, it has also led to several recent outbreaks in hospitals across the globe of further concern is the fact that most clinical isolates exhibit resistance to at least one class of the antifungal drugs currently used to treat Candida infections. In 2019, the Centers for Disease Control and Prevention of the United States (CDC) declared that *C. auris* infection as one of the urgent bug for international public health in the area of multidrug-resistant microorganisms. It exhibits several concerning features compared to other Candida species, including persistent colonization of the skin and nosocomial surfaces, and ability to resist common disinfectants and to survive for weeks on surfaces [7]. The organism can be isolated from different clinical samples, body fluids, respiratory sections, urine, bile, tissues, wounds, and mucocutaneous swabs. Blood stream infection (BSI) is the most observed invasive infection, with in-hospital mortality rates may reach up to 60% and 1-month case-fatality rates of about 17%-28% and may reach up to 50% in ICU admitted patients. *C. auris* can be misidentified as *C. haemulonii* as most available commercial identification systems can't identify it properly. But the most reliable and commonly used Matrix-Assisted Laser Desorption-ionization Time of light (Maldi TOF MS) which utilizes a laser-based proteomic analysis of bacterial and fungal pathogens is now considered suitable for identification [8]. In our patient, the reason for systemic fungal infection could be an underlying viral infection (H1N1 pneumonia) leading to immunocompromised state, use of corticosteroids for ARDS, use of broad-spectrum antibiotics for multidrug resistant organisms. In our case, we could obtain a positive fungal culture growth from the blood and the eye. *Candida auris* is multidrug-resistant and therefore the treatment is challenging. In a study done by Chowdhary, et al. the authors investigated the susceptibility patterns of 350 *C. auris* isolates and demonstrated that 90% of isolates were resistant to azoles (fluconazole), 8% were resistant to polyene (amphotericin B), and 2% were resistant to echinocandins (anidulafungin and micafungin [9].

Conclusion

C. auris is an emerging pathogen that led to multiple types of hospital-acquired infections, with challenging diagnostic options and limited treatment choices. Infection control measures were needed to establish safety protocols to prevent the colonization of this opportunistic pathogen in intensive care units (ICU) and hospital wards.

Conflict of Interest

None.

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