Candida auris – A Brief Overview

Introduction

Since it was first identified in Japan in 2009, *Candida auris* has gained widespread attention for being a nosocomial infection that poses both diagnostic and therapeutic challenges. Invasive infections have been reported from all continents with increasing frequency. Its meteoric rise is reflected by outbreaks in the UK and Spain between 2015 and 2017 and a growing number of cases across the US. There are many factors that make *C. auris* an invasive, difficult-to-treat infection that requires a high degree of suspicion from the health-care team. As an up and coming global infectious threat, it is now a reportable disease to the Centers for Disease Control and Prevention.

Evaluation

There are no real diagnostic or lab parameters that are unique predictors of an active or latent *C. Auris* infection when compared to other invasive fungal infections. It is therefore likely that you will discover the organism during a broad infectious workup. However, once an active or latent infection is discovered, it is imperative that further patient exposure is limited and isolation initiated. Exposed patients may become colonized and proceed to infect other patients without ever expressing explicit symptoms themselves.

C. auris can be misidentified as other fungal species, candida, or otherwise, making it difficult to isolate and track.[2] This is becoming less frequent with the use of advanced mass spectrometry (MS) (matrix-assisted laser desorption/ionization–time of flight [MALDI-TOF]), but this technology is likely not available at all centers.[3] While it is highly transmissible horizontally from person to person, it also has a multidrug-resistant profile. In addition, it has a propensity to form biofilms on polymeric surfaces, as noted when recovered from environmental samples in hospitals. Additionally, it has the ability to resist physical and chemical disruption proving it to be difficult to eradicate from hosts/surfaces causing prolonged infections.[4,5]

In the absence of the more expensive diagnostic facilities such as MALDI-TOF or MS in low-and middle-income countries, physicians must suspect C. Auris (CA) in the following settings:[6,7]

1. If the patient is from an intensive care unit or high-dependency area
2. In patients transferred from other hospitals after a long stay
3. Patients who have undergone multiple interventions
4. Candida isolates that are resistant to fluconazole
5. Patients with prior antifungal exposure
6. Whenever a commercial system reports: *Candida haemulonii, Candida famata, Candida guilliermondii, Candida lusitaniae, Candida parapsilosis, Rhodotorula glutinis, Candida* sake, and *Saccharomyces cerevisiae*.

Finally, as with most invasive infections, source identification and control remains paramount. Besides laboratory testing of blood, urine, and sputum samples, thorough physical examinations must be undertaken to identify hidden sources such as infiltrated lines, joint effusions, hematomas, and dental examinations, especially in patients unable to describe symptoms. If altered mentation is a presenting symptom, a lumbar puncture must be performed after adequate computed tomography (CT) imaging of the brain. Routine echocardiograms and ocular testing must also be performed. If the patient remains fungemic, CT imaging of the chest, abdomen, pelvis, and spinal canal should be performed.

Prevention and Isolation

C. auris is not a commensal organism, and therefore a true nosocomial threat. Its early detection is key to isolation planning. Primary infection control measures for transmission prevention include:

1. Hand hygiene with alcohol based hand sanitizer or soap and water
2. Contact precautions are recommended in acute care and long-term acute care settings for the entire duration of stay. Contact or enhanced barrier precautions are preferred in nursing homes and skilled nursing facilities (SNFs)
3. Patients should be placed in single rooms when possible or consider cohorting patients with *C. auris* in the same rooms
4. CDC does not recommend routine reassessments for colonization; there have been reported cases of patients testing positive after having a negative screening test
5. Use of chlorhexidine for surfaces to limit biofilm progression.[4]

Treatment

Consulting with an infectious disease specialist is highly recommended both for treatments options and infection prevention recommendations. Based on resistance patterns to azoles as well as amphotericin B, most guidelines recommend using echinocandins as first-line empiric treatment, while susceptibility data are obtained.[8,9] Most *C. auris* strains found in the US have been susceptible to echinocandins, although reports of resistance are on the rise. Echinocandins, however, have poor penetration into CSF and the urinary

Table 1: Echinocandin treatment recommendations from the Centers for Disease Control[11]

Echinocandin drug	Adult dosing	Pediatric dosing
Anidulafungin	loading dose 200 mg IV, then 100 mg IV daily	not approved for use in children
Caspofungin	loading dose 70 mg IV, then 50 mg IV daily	loading dose 70mg/m^2/day IV, then 50mg/m^2/day IV (based on body surface area)
Micafungin	100 mg IV daily	2mg/kg/day IV with option to increase to 4mg/kg/day IV in children at least 40 kg

tract. Amphotericin B with 5-flucytosine combined may be a treatment option in these cases.[8] Switching to liposomal amphotericin B should be considered if the patient is clinically unresponsive to echinocandin or has persistent bacteremia >5 days. For neonates and infants <2 months of age, the initial treatment is amphotericin B deoxycholate, and when considered unresponsive to therapy should be switched to liposomal amphotericin B.[10,11] Based on resistance patterns to azoles as well as amphotericin B, most guidelines recommend using echinocandins as first-line empiric treatment [Table 1].

Ibrexafungerp (SCY-078), a1,3-β-d-glucan synthesis inhibitor, has emerged as a new therapeutic agent that has both oral and intravenous formulations.[5] While its availability may be limited at this time, it has shown effectiveness against *C. auris* and its oral formulation is likely to improve out of hospital treatment options.[12]

Research quality and ethics statement

The authors followed applicable EQUATOR Network (https://www.equator-network.org/) guidelines, notably the CARE guideline, during the conduct of this report.

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