

# *Candida auris*: An emerging fungus that presents a serious global health threat

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ISSN: 1658-3639

PUBLISHER: Qassim University

*Candida auris* is a fungal species that belongs to Ascomycetous fungi which are generally recognized as the sac fungi or ascomycetes.<sup>[1]</sup> It is the biggest phylum of Fungi, in which over 64,000 fungal species are included. *C. auris* belongs to the genus *Candida* that grows as a yeast.<sup>[2]</sup> Genomic analysis of *C. auris* DNA has revealed that it is a distinct fungal species bearing close resemblance of the phylogenetic profiles of *Candida haemulonii*, *Candida ruellia*, *Candida pseudohaemulonii* and *Candida duobushaemulonii*.<sup>[3]</sup> Its name is derived from the Latin word “*auris*” which means “ear”, as it was initially discovered in the year 2009 in Japan from the ear canal of a 70-year-old woman at the Tokyo Metropolitan Geriatric Hospital. Later in 2011, it was reported in South Korea following its spread across Asia and Europe, and in the year 2013, it was reported in United States.<sup>[4]</sup> Till present day, it has been reported in almost 35 countries located in all continents, with the exception of Antarctica.<sup>[4,5]</sup> *C. auris* is resistant to majority of antifungal drugs, hence establishing itself as a new example of one of the world’s most obdurate health threats resulting from infections caused by various drug resistant organisms for example Carbapenemase resistant *Klebsella pneumoniae*, *Vancomycin resistant Enterococci*, *Methicillin resistant Staphylococcus aureus*.<sup>[6]</sup> *C. auris* can endure on the surfaces of a health-care setting resulting in nosocomial infections as it can spread in between patients admitted in that health-care facility. *C. auris* can survive on a broad range of dry and moist surfaces, including plastic where the pathogen may dwell for up to 14 days.<sup>[7]</sup> *C. auris* is found to be resistant to a broad range of disinfectants that includes various quaternary compounds and cationic surface active products. Although the precise mode of transmission of *C. auris* is yet to be recognized, evidence suggests that *C. auris* spread is chiefly associated with direct or indirect contact with the contaminated surfaces located in a health-care setting as well as from healthcare personnel. Persistent outbreaks have been reported accusing transmission through hand and contaminated of surfaces.<sup>[8,9]</sup> Immunocompromised patients, patients have extensive hospitalization in intensive care unit or patients previously received antibiotic or antifungal medications are particularly more prone to be infected by

*C. auris*. Health-care facilities in different countries have reported that *C. auris* has been causing severe disease in patients. In several patients, this yeast has also been reported to enter the bloodstream resulting in spread of infection in different parts of the body, causing life-threatening invasive infections.<sup>[10,11]</sup> As this yeast is often resistant to most of the commonly used antifungal drugs, it leads in difficulty to treat such infected patients hence leading to an increase in morbidity and mortality rate. Fungal identification methods implied to identify yeasts in various clinical specimens, by the clinical laboratories, frequently misidentify *C. auris* as other yeasts therefore making the diagnosis and control of this multidrug resistant pathogen an enormous challenge. Morphologically *C. auris* is a budding yeast with cells that are approximately 2.5–5.0 micrometers in size and are arranged singly, in pairs or even in groups. It grows well at a temperature of 40°Celsius however the growth slows down at 42°C. *C. auris* does not form hyphae or pseudohyphae. Although, if it is grown under high-salt stress, such as on yeast extract, tryptone, and dextrose with 10% NaCl, and depletion of heat-shock proteins, it can result in production of pseudohyphae like forms.<sup>[12]</sup> The appearance of *C. auris* on culture medium varies depending upon the culture media. Globally, the most common media used for fungal growth is Sabouraud’s dextrose agar, on which *C. auris* will create smooth, white to cream-colored colonies.<sup>[13]</sup> Whereas on CHROM agar, *C. auris* will appear in different colors ranging from pale to dark pink. The ability of *C. auris* to build up resistance to several commonly used antifungal drugs may be a vital factor that had contributed for its high rate of mortality.<sup>[14]</sup> Antifungal susceptibility data published so far reflects that a number of *C. auris* strains demonstrate elevated minimum inhibitory concentration for three major classes of antifungal drugs, which includes azoles, polyenes, and echinocandins. Echinocandins were considered as the first line therapy for treating *C. auris* infection if resistance to azoles and amphotericin B is detected. However, as the resistance to echinocandins has also been established, patients should undergo close follow-up and microbiological culture based reassessment to detect therapeutic failure and consultation with an infectious diseases expert is recommended.

Scrupulous awareness of infection prevention and control, along with strict implementation of hand hygiene for health-care personnel and health-care facility visitors either by hand washing with soap and water or hand sanitizing with an alcohol-based hand rub is a vital step to control the spread of *C. auris*. Moreover, the health-care personnel should strictly follow the basic infection prevention and control measures that include the proper use of gowns and gloves, appropriate discarding of medical waste, and sterilizing or effectively disinfecting equipment and surfaces. Health-care facilities should have mounted directions to a specific ward or facility so that the visitors can follow those facility directions to prevent the spread of infection. Finally, the most crucial step is environmental cleaning and disinfection and health-care cleaning products that have a sporicidal activity or hydrogen peroxide containing solutions can contribute in an effective cleaning of surfaces in a health-care facilities leading to decrease in *C. auris* colony-forming unit.<sup>[15]</sup> Those patients who are colonized or with suspected *C. auris* infection should be kept in isolation under strict contact precautions until microbiological screening and diagnostic results are obtainable. Patients who are referred from the institutions where *C. auris* has been isolated should be screened for *C. auris* colonization. Suggested screening sites are axilla, groin, nose, throat, and rectal swab. Other high risk sites include cannula or catheter entry sites, wounds and endotracheal secretions. After a patient is discharged from a health-care facility, environmental decontamination procedures with chlorine-based detergents, ultraviolet light, and hydrogen peroxide vapor demonstrated have shown to be effective in environmental decontamination.<sup>[16]</sup> To restrain transmission, it is also recommended that central and peripheral line catheter, urinary catheter, and tracheostomy sites should be strictly monitored and in case of any sign of colonization or infection of central catheters or other invasive devices, should be removed, as it has shown to play a significant role in subsiding the candidemia and improving the clinical outcome. *C. auris* strains may continue to emerge independently and concurrently throughout the globe in the coming years that's why it is essential that the healthcare workers should be aware about this notorious organism and infection control policies regarding control and spread of *C. auris* should be design and implemented along with an enhanced diagnostic and therapeutic strategies.

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