Emerging Challenges in *Candida auris*: Understanding Resistance Mechanisms, Containment Strategies, and the Efficacy of Novel Drug Rezafungin in Healthcare Settings

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ABSTRACT

Introduction: *Candida auris*, an emerging multidrug-resistant yeast identified in 2009, poses significant healthcare challenges due to its drug resistance, outbreak potential, and high mortality rates. Understanding its resistance mechanisms is crucial for effective treatments. Rezafungin, a novel echinocandin, offers enhanced stability and weekly dosing. Based on recent research findings, this study evaluated the efficacy of rezafungin against *C. auris*.

Search Strategy: We systematically searched PubMed, Google Scholar, and Web of Science databases up to April 2024 to identify studies on the multidrug resistance of *C. auris* and the efficacy of rezafungin. According to the searches, multidrug resistance and genetic factors of *C. auris* and rezafungin potent antifungal activity were investigated. In this study, two independent reviewers extracted summary data from published sources, assessing methodological quality and risk of bias. Disagreements on study inclusion were resolved through discussions with the corresponding author. We combined the key search terms using Boolean operators, which encompassed "*Candida auris*", "multidrug-resistant", "MDR", "Genetic Factors", "Genetic mutations", "Biofilm", "echinocandins", and "rezafungin."

Results: Of 7,180 potential results, we identified 358 studies focusing on *C. auris* multidrug-resistant mechanisms and rezafungin efficacy. Traditional biochemical methods often misidentify *C. auris*, resulting in underreporting. Advanced techniques such as MALDI-TOF MS and DNA sequencing ensure accurate identification. *C. auris* resisted multiple antifungal classes, including azoles, polyenes, and echinocandins, with some strains showing pandrug-resistance. Genetic mutations in ERG11, FKS1, and TAC1B genes were linked to resistance. *C. auris* formed biofilms, enhancing its persistence in hospitals. Rezafungin showed excellent in vitro activity against *C. auris*, even for isolates with *FKS* mutations.

Conclusion and Discussion: Based on our study, *C. auris* is a formidable pathogen due to its multidrug resistance, biofilm formation, and persistence in healthcare environments. Genetic mutations in ERG11, FKS1, and TAC1B are crucial to its resistance. Rezafungin shows potent activity against *C. auris*, demonstrating efficacy in animal models, clinical trials, and in vitro studies, making it a strong candidate for treating invasive candidiasis. Addressing *C. auris* requires improved diagnostics, novel treatments, and stringent infection control.

Keywords: Candida auris, Rezafungin, Yeasts

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