THE EFFECTIVENESS OF THE CANDIFAST TESTING METHOD

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Abstract

Candidiasis is a common issue in medical practice, with significant implications for patient health and therapeutic strategies. Rapid and accurate identification of Candida species is essential for initiating appropriate treatment and preventing recurrences. The Candifast test provides a standardized diagnostic method, combining species identification with antifungal susceptibility testing. In our study, we used the Candifast kit to evaluate clinical samples from patients with suspected fungal infections. The results demonstrated a high accuracy of the method in differentiating pathogenic species and a practical usefulness in selecting the optimal antifungal treatment. We conclude that the use of the Candifast test can significantly contribute to improving diagnosis and to the individualization of antifungal therapy in current medical practice.

Keywords*:* Candida, infection, Candifast test

INTRODUCTION

Fungal infections caused by ***Candida*** species represent a major public health concern, with increasing prevalence both in hospital settings and outpatient practice. In recent years, a shift has been observed from the predominance of ***Candida albicans*** toward non-albicans species, which are often characterized by higher resistance to conventional antifungal therapies. This trend poses significant diagnostic and therapeutic challenges, highlighting the need for rapid and accurate species identification.

Candida albicans remains the most frequently isolated species, accounting for more than half of candidiasis cases. Its ability to form hyphae and pseudohyphae facilitates tissue adherence and invasion, contributing to both superficial infections (oral, vaginal, cutaneous candidiasis) and severe invasive forms (candidemia, endocarditis, disseminated disease). While generally susceptible to antifungal agents, resistant strains may emerge, particularly after repeated treatments.

Candida glabrata ranks second in prevalence in many regions. Although less virulent than *C. albicans*, it exhibits intrinsic resistance to azoles—especially fluconazole. Infections are typically associated with elderly, immunocompromised, or long-term hospitalized patients.

Candida tropicalis demonstrates high invasive potential and is commonly detected in immunocompromised hosts, especially those with neutropenia or hematologic malignancies. It is implicated in candidemia and urinary tract infections, with higher associated mortality compared to other species.

Candida parapsilosis is strongly linked to nosocomial infections, particularly in patients with intravascular catheters, prosthetic devices, or other invasive medical equipment. Its ability to form biofilms on artificial surfaces complicates eradication, and it is a leading cause of neonatal candidemia.

Candida krusei is clinically important due to its intrinsic resistance to fluconazole. Although infections are less common, treatment requires alternative antifungal agents, such as echinocandins or voriconazole.

Other emerging species, including *Candida kefyr*, *Candida lusitaniae*, and *Candida dubliniensis*, are less frequently encountered but of growing relevance in certain regions. Notably, *Candida auris* has recently emerged as a global health threat due to its epidemic potential, multidrug resistance, and challenges in routine laboratory identification.

Traditional diagnostic methods based on culture and biochemical profiling are time- and resource-intensive, often delaying appropriate therapy. In this context, commercial diagnostic tools such as Candifast

offer a valuable alternative, enabling both rapid species identification and antifungal susceptibility testing. By integrating these steps, Candifast provides a practical and efficient approach with direct clinical relevance for guiding personalized antifungal therapy.

MATERIAL AND METHODS

For the accomplishing of the objectives proposed was used the retrospective study. The material basis of the study included the observation sheets of the patients, submitted at the archive of the hospitals, the computerized data of the two units, respectively.

The data obtained were interpreted statistically based on the determination and calculation of some series of indices.

Candifast Testing Procedure

For the Candifast test, clinical specimens are collected under aseptic conditions, depending on the site of the suspected infection:

- Vaginal secretions – obtained with a sterile swab from the posterior vaginal fornix, avoiding contamination with cervical or urethral secretions.
- Oral/pharyngeal secretions – collected by firmly swabbing the affected mucosa.
- Urine samples – collected using the midstream ("clean-catch") technique in sterile containers, preferably from the first morning urine.

All specimens are immediately transported to the laboratory in sterile containers, maintained at controlled temperature (2–8 °C), and processed within a maximum of 2 hours after collection to avoid contamination or reduced fungal viability.

Candifast Testing Protocol

The Candifast kit (International Microbio, France) includes microplates containing chromogenic media and biochemical substrates for *Candida* species identification, as well as wells impregnated with antifungal agents (fluconazole, itraconazole, ketoconazole, miconazole, amphotericin B, and 5-flucytosine).

1. A standardized fungal suspension (2 McFarland density) is prepared from each clinical specimen.
2. The suspension is inoculated into the microplate wells according to the manufacturer's instructions.
3. Plates are incubated at 37 °C for 24–48 hours.
4. Species identification is performed based on specific chromogenic and biochemical changes characteristic of each *Candida* species.
5. Antifungal susceptibility testing is interpreted by assessing fungal growth or inhibition in the presence of antifungal agents.

RESULTS AND DISCUSSIONS

The study, conducted at the medical analysis laboratory *S.C. Diaser* in Oradea, included 150 clinical samples collected from patients with suspected fungal infections. Testing with the Candifast kit enabled the rapid identification of *Candida* species and the determination of their susceptibility to major antifungal agents.

The distribution of identified species showed that ***Candida albicans*** was predominant, being detected in 60% of samples. ***Candida glabrata*** accounted for approximately 15% of cases, particularly in patients with a history of prior antifungal treatment. ***Candida tropicalis*** was identified in 10% of cases, more frequently among immunocompromised patients.

Candida parapsilosis was isolated in 8% of samples, mainly associated with hospitalized patients and those carrying invasive medical devices. ***Candida krusei*** represented 4% of isolates, while other less common species, such as ***C. lusitaniae*** and ***C. kefyr***, were detected in 3% of cases.

Table 1. Distribution of Candida *species and antifungal susceptibility profile*

Candida species	Isolation rate (%)	Susceptible to Fluconazole	Susceptible to Itraconazole	Susceptible to Ketoconazole	Susceptible to Amphotericin B	Remarks
C. albicans	60%	92%	90%	88%	100%	Predominant species, good antifungal susceptibility
C. glabrata	15%	55%	70%	68%	98%	High resistance to fluconazole
C. tropicalis	10%	75%	72%	70%	95%	Frequently associated with immunocompromised patients
C. parapsilosis	8%	80%	78%	76%	96%	Commonly implicated in nosocomial infections
C. krusei	4%	0% (rezistenţă naturală)	65%	60%	97%	intrinsically resistant to fluconazole
Other species	3%	70%	68%	65%	90%	Rare species (*C. lusitaniae, C. kefyr, C. dubliniensis*)

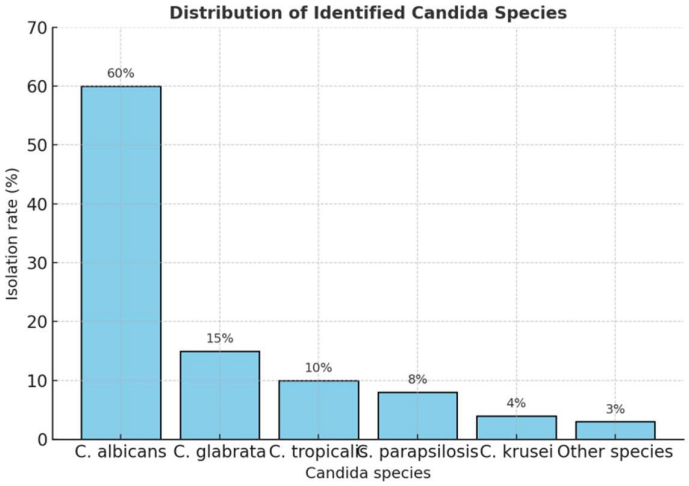

Fig. 1. Distribution of identified *Candida* specie

Antifungal susceptibility testing demonstrated good sensitivity of ***Candida albicans*** to azoles and amphotericin B, increased resistance of ***Candida glabrata*** to fluconazole (observed in over 40% of isolates), and inherent resistance of ***Candida krusei*** to

fluconazole, confirmed through testing. Variable sensitivity to itraconazole and ketoconazole was observed among non-***albicans*** species, while echinocandins consistently exhibited high efficacy**.**

These findings confirm that Candifast represents an effective method for the rapid and comprehensive diagnosis of candidiasis. The simultaneous identification of species and their antifungal susceptibility profiles provides a significant clinical advantage over traditional methods, which require longer processing times and additional procedures.

Consistent with existing literature, *Candida albicans* remains the predominant species. However, the notable proportion of non-*albicans* species (approximately 40% in this study) underscores the importance of accurate species differentiation. The presence of *C. glabrata* and *C. krusei*, both characterized by distinct resistance profiles, further emphasizes the necessity of antifungal susceptibility testing prior to treatment initiation.

A further advantage of this method lies in its practical applicability, as results can be obtained within 24–48 hours, enabling early implementation of targeted antifungal therapy and reducing the risk of resistance associated with empirical treatment. Limitations include higher costs compared to conventional methods and the requirement for specialized laboratory infrastructure to process the kits.

According to Fendrihan Sergiu in the study *Medical Challenges Nowadays Facing Vulvovaginal Candidiasis*, biochemical tests for *Candida* strain identification rely on the metabolism of specific substrates. The resulting metabolic products serve as key markers for taxonomic identification of strains. This approach can also determine enzymatic activity, with each strain possessing a unique enzymatic profile, albeit not in an absolutely rigid manner.

In conclusion, Candifast has proven to be a valuable tool in mycological diagnostics, with the potential to enhance therapeutic decision-making and support the judicious use of antifungal agents.

CONCLUSIONS.

The study highlights that *Candida albicans* is the most frequently isolated species in fungal infections, followed by *C. glabrata*, *C. tropicalis*, and *C. parapsilosis*, each associated with specific risk factors. Rapid testing with Candifast proves valuable for species identification and optimization of antifungal therapy.

Candifast represents a rapid and efficient method for the identification of *Candida* species and antifungal susceptibility testing. *Candida albicans* exhibits good sensitivity to azoles and amphotericin B, whereas *Candida glabrata* and *Candida krusei* demonstrate increased resistance to fluconazole. Non-*albicans* species show variable sensitivity to itraconazole and ketoconazole but consistently respond to echinocandins.

Accurate species differentiation and susceptibility testing are essential for targeted antifungal therapy and reducing the development of resistance. The test provides results within 24–48 hours; however, higher costs and the requirement for specialized laboratory infrastructure remain limitations.

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