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Candida Albicans Symptoms and Treatment

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Abstract

Candida albicans is a common commensal fungus that lives in healthy people's skin and infects the pharynx, gastrointestinal, and vaginal tracts. *C. albicans* is a part of the normal macrobiotic flora in 50% of people. Candida species can cause a variety of clinical manifestations, ranging from superficial, localized disorders of the mucocutaneous system to invasive, life-threatening diseases that affect multiple organ systems. Diverse factors, ranging from systemic and local to hereditary and environmental, disrupt Candida's normal homeostasis, transforming normal flora into pathogenic and opportunistic infections. Candida's virulence characteristics, which lead to the development of candidiasis, also influence the transition in the pathophysiology of the onset and progression of infection. There are many different clinical manifestations of oral candidiasis, including primary and secondary candidiasis. The gastrointestinal tract is the body's primary source of *C. albicans*, and the development of infections is caused by the symbiotic relationship between the local microbiota, immune dysfunction, and damage to the muco-intestinal barrier. Candidaemia—invasive Candida infections are correlated with the presence of *C. albicans* in the blood. As long as the host immune system and *C. albicans*' virulence factors are in balance, the commensal relationship continues. Clinical manifestations of specific candidiasis and the virulence characteristics of Candida albicans are discussed in this paper.

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Introduction

Candida albicans is a common member of the human gut flora that is opportunistic and pathogenic yeast. It can also survive without the body of a human. In between 40% and 60% of healthy adults, it is found in the mouth and gastrointestinal tract. It is typically a commensal organism, but under a variety of circumstances, it can become pathogenic in immunocompromised individuals [1]. One of the few species in the genus Candida that is responsible for the human infection known as candidiasis, which is brought on by an excessive fungus growth, is this one. Patients with HIV, for instance, frequently present with candidiasis. *C. albicans* is the most frequently isolated fungal species from biofilms on human tissue or (permanently implanted) medical devices. Together, *C. albicans*, *C. tropicalis, C. parapsilosis*, and *C. globate* account for 50–90% of all human cases of candidiasis. Patients with systemic candidiasis caused by *C. albicans* have a mortality rate of 40%. According to one estimate, invasive candidiasis contracted in a hospital results in 2,800 to 11,200 deaths annually in the United States. However, recent studies have shown that *C. albicans* can cross the blood–brain barrier in mice [2].

Fungal pathogens, like Candida albicans, are common, can affect the skin and mucosal surface, and they can also cause systemic infections. As many as 400,000 systemic fungal diseases contain Candida species. Candida albicans is the most common species to cause mucosal and systemic infections, accounting for approximately 70% of all fungal infections worldwide. Over the past few decades, it has been the most common cause of invasive infections that can be fatal [3]. The mortality rate is close to 40% despite treatment, especially in hospital settings. The purpose of this review is to provide an overview of the virulence characteristics of Candida albicans as well as its clinical manifestations in invasive infections, the skin, the intestinal mucosa, and the oral cavity.

For fungal pathogens, *C. albicans* is frequently used as a model organism. Because it reproduces both as yeast and as filamentous cells, it is commonly referred to as a dimorphic fungus. However, it can be found in opaque, GUT, and pseudohyphal forms, among other morphological phenotypes [4]. For a considerable amount

of time, *C. albicans* was thought to be an obligate diploid organism without a haploid stage. However, this is not the case. *C. albicans* can also live in a tetrapod stage next to a haploid stage. When the opaque form of diploid *C. albicans* cells mate, the latter form emerges. Up to 70% of the diploid genome's protein-coding genes have not yet been identified, and the size of the genome is approximately 29 Mb. *C. albicans* can be studied both in vivo and in vitro because it is simple to culture in the laboratory. Because the morphological state of *C. albicans* is influenced by the media, different studies can be carried out [5]. CHROM agar Candida is a unique medium that can be used to identify various Candida species.

Genome

Eight sets of chromosome pairs—chr1A, chr2A, chr3A, chr4A, chr5A, chr6A, chr7A, and chrRA—make up *C. albicans*' haploid genome, which is almost 16Mb in size (28Mb in size for the diploid stage). The second set, which includes diploid *C. albicans*, has names that are similar but end with a B. chrom1B, chrom2B, and chromRB there are 6,198 open reading frames (ORFs) in the entire genome. Seventy of these ORFs still lack characterization. It is one of the first fungi, along with Saccharomyces cerevisiae and Schizosaccharomyces pombe, to have its entire genome sequenced. Gateway-adapted vectors are also available for all open reading frames (ORFs) [6]. A GRACE (gene replacement and conditional expression) library is also available to study *C. albicans*' essential genes in addition to this ORFeome. The strains WO-1 and SC5314 are the ones that are used to study *C. albicans* the most frequently. While the SC5314 strain is the one used for gene sequence reference, it is known that the WO-1 strain switches between white-opaque forms more frequently.

The high heterozygosity of the *C. albicans* genome is one of its most important features. The occurrence of chromosomal length polymorphisms (contraction/expansion of repeats), reciprocal translocations, chromosome deletions, No synonymous single-nucleotide polymorphisms, and trisomy of individual chromosomes as means of generating genetic diversity is at the heart of this heterozygosity [7]. This fungus's adaptation strategy involves modifying the phenotype as a result of these karyotypic alterations. With the complete genome analysis of *C. albicans* now available, these mechanisms are further investigated.

Symptoms

1. Yeast infection symptoms can range from mild to moderate, and include:
2. Itching and irritation in the vagina and vulva
3. A burning sensation, especially during intercourse or while urinating
4. Redness and swelling of the vulva
5. Vaginal pain and soreness
6. Vaginal rash
7. Thick, white, odor-free vaginal discharge with a cottage cheese appearance
8. Watery vaginal discharge

Transmission and Treatment

Candida albicans is part of a normal human's microflora and is typically passed from mother to child during childbirth. When there are imbalances, like changes in the normal acidity of the vagina, *C. albicans* overgrowth results in disease symptoms. Sexual contact is extremely uncommon for *C. albicans* infections. The normal human microflora serves as the typical reservoir for *C. albicans*, not animal vectors. Most of the time, infections spread from one person to another in hospitals, where immunocompromised patients get the yeast from healthcare workers; a 40 percent incident rate is estimated by studies [8]. For healthy adults with candidiasis, fluconazole (a triazole) is the primary treatment with an 800 mg loading dose followed by 400 mg daily [9]. Amphotericin B or echinocandin (caspofungin, micafungin, or anidulafungin) is preferred for neutropenic patients. Fluconazole is typically given intravenously to patients with candidemia; however, echinocandin and the lipid formulation of amphotericin B are still preferred for critically ill patients. Also, studies show that treatments with a low dose of amphotericin B had the same effect on getting rid of the infection as treatments with a high dose, but they had 40% less side effects [10].

Conclusions

Because of the wide range of factors and mechanisms that contribute to *C. albicans*' pathogenicity, including dimorphism, biofilm formation, thigmotropism, adhesion protein expression, and extracellular hydrolytic enzyme secretion, it is critical to understand these factors and mechanisms. *C. albicans* can cause infections that can be superficial, systemic, and even fatal. Knowledge of the essential predisposing factors for the development of candidiasis, such as neutropenia, immunosuppression, diabetes, and age, as well as factors related to patient care, long-term antimicrobial therapy, long-term hospitalization, catheter use, and surgery, is required in addition to knowledge of the virulence factors.

Acknowledgement

None

Conflict of Interest

None

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