

Candidiasis: Oral candidiasis and Diagnosis, Treatment

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Abstract

Oral candidiasis, also known as oral thrush among other names, is candidiasis that occurs in the mouth. That is, oral candidiasis is a mycosis (yeast/fungal infection) of *Candida* species on the mucous membranes of the mouth. *Candida albicans* is the most commonly implicated organism in this condition. *C. albicans* is carried in the mouths of about 50% of the world's population as a normal component of the oral microbiota [1]. This candidal carriage state is not considered a disease, but when *Candida* species become pathogenic and invade host tissues, oral candidiasis can occur. This change usually constitutes an opportunistic infection by normally harmless micro-organisms because of local (i.e., mucosal) or systemic factors altering host immunity.

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Introduction

Candidiasis is a fungal infection due to any type of *Candida* (a type of yeast) [2]. When it affects the mouth, in some countries it is commonly called thrush. Signs and symptoms include white patches on the tongue or other areas of the mouth and throat [3]. Other symptoms may include soreness and problems swallowing. When it affects the vagina, it may be referred to as a yeast infection or thrush. Signs and symptoms include genital itching, burning, and sometimes a white "cottage cheese-like" discharge from the vagina. Yeast infections of the penis are less common and typically present with an itchy rash. Very rarely, yeast infections may become invasive, spreading to other parts of the body. This may result in fevers along with other symptoms depending on the parts involved.

More than 20 types of *Candida* can cause infection with *Candida albicans* being the most common. Infections of the mouth are most common among children less than one month old, the elderly, and those with weak immune systems [4]. Conditions that result in a weak immune system include HIV/AIDS, the medications used after organ transplantation, diabetes, and the use of corticosteroids. Other risks include dentures, following antibiotic therapy, and breastfeeding. Vaginal infections occur more commonly during pregnancy, in those with weak immune systems, and following antibiotic use. Individuals at risk for invasive candidiasis include low birth weight babies, people recovering from surgery, people admitted to intensive care units,

and those with an otherwise compromised immune system [5].

Efforts to prevent infections of the mouth include the use of chlorhexidine mouthwash in those with poor immune function and washing out the mouth following the use of inhaled steroids. Little evidence supports probiotics for either prevention or treatment, even among those with frequent vaginal infections. For infections of the mouth, treatment with topical clotrimazole or nystatin is usually effective. Oral or intravenous fluconazole, itraconazole, or amphotericin B may be used if these do not work. A number of topical antifungal medications may be used for vaginal infections, including clotrimazole. In those with widespread disease, an echinocandin such as caspofungin or micafungin is used [6]. A number of weeks of intravenous amphotericin B may be used as an alternative. In certain groups at very high risk, antifungal medications may be used preventatively. Infections of the mouth occur in about 6% of babies less than a month old. About 20% of those receiving chemotherapy for cancer and 20% of those with AIDS also develop the disease. About three-quarters of women have at least one yeast infection at some time during their lives. Widespread disease is rare except in those who have risk factors.

Diagnosis

The diagnosis can typically be made from the clinical appearance alone, but not always. As candidiasis can be variable in appearance, and present with white, red or combined white and red lesions, the differential diagnosis can be extensive. In pseudomembranous

candidiasis, the membranous slough can be wiped away to reveal an erythematous surface underneath [7]. This is helpful in distinguishing pseudomembranous candidiasis from other white lesions in the mouth that cannot be wiped away, such as lichen planus, oral hairy leukoplakia. Erythematous candidiasis can mimic geographic tongue. Erythematous candidiasis usually has a diffuse border that helps distinguish it from erythroplakia, which normally has a sharply defined border.

Special investigations to detect the presence of candida species include oral swabs, oral rinse or oral smears. Smears are collected by gentle scraping of the lesion with a spatula or tongue blade and the resulting debris directly applied to a glass slide. Oral swabs are taken if culture is required. Some recommend that swabs be taken from 3 different oral sites. Oral rinse involves rinsing the mouth with phosphate-buffered saline for 1 minute and then spitting the solution into a vessel that examined in a pathology laboratory [8]. Oral rinse technique can distinguish between commensal candidal carriage and candidiasis. If candidal leukoplakia is suspected, a biopsy may be indicated. Smears and biopsies are usually stained with periodic acid-Schiff, which stains carbohydrates in fungal cell walls in magenta [9]. Gram staining is also used as Candida stains are strongly Gram positive.

Sometimes an underlying medical condition is sought, and this may include blood tests for full blood count and hematinics.

If a biopsy is taken, the histopathologic appearance can be variable depending upon the clinical type of candidiasis. Pseudomembranous candidiasis shows hyperplastic epithelium with a superficial parakeratotic desquamating (i.e., separating) layer. Hyphae penetrate to the depth of the stratum spinosum, and appear as weakly basophilic structures. Polymorphonuclear cells also infiltrate the epithelium, and chronic inflammatory cells infiltrate the lamina propria. Atrophic candidiasis appears as thin, atrophic epithelium, which is non-keratinized. Hyphae are sparse and inflammatory cell infiltration of the epithelium and the lamina propria. In essence, atrophic candidiasis appears like pseudomembranous candidiasis without the superficial desquamating layer [10].

Hyperplastic candidiasis is variable. Usually there is hyperplastic and acanthotic epithelium with parakeratosis. There is an inflammatory cell infiltrate and hyphae are visible. Unlike other forms of candidiasis, hyperplastic candidiasis may show dysplasia.

Treatment

Oral candidiasis can be treated with topical anti-fungal drugs, such as nystatin, miconazole, Gentian violet or amphotericin B. Surgical excision of the lesions may be required in cases that do not respond to anti-fungal medications.

Underlying immunosuppression may be medically manageable once it is identified, and this helps prevent recurrence of candidal infections. Patients who are immunocompromised, either with HIV/AIDS or as a result of chemotherapy, may require systemic prevention or treatment with oral or intravenous administered anti-fungals. However, there is strong evidence that drugs that are absorbed or partially absorbed from the GI tract can prevent candidiasis more effectively than drugs that are not absorbed in the same way.

If candidiasis is secondary to corticosteroid or antibiotic use, then use may be stopped, although this is not always a feasible option. Candidiasis secondary to the use of inhaled steroids may be treated by rinsing out the mouth with water after taking the steroid. Use of a spacer device to reduce the contact with the oral mucosa may greatly reduce the risk of oral candidiasis.

In recurrent oral candidiasis, the use of azole antifungals risks selection and enrichment of drug-resistant strains of candida organisms. Drug resistance is increasingly more common and presents a serious problem in persons who are immunocompromised.

Prophylactic use of antifungals is sometimes employed in persons with HIV disease, during radiotherapy, during immunosuppressive or prolonged antibiotic therapy as the development of candidal infection in these groups may be more serious.

The candidal load in the mouth can be reduced by improving oral hygiene measures, such as regular toothbrushing and use of antimicrobial mouthwashes. Since smoking is associated with many of forms of oral candidiasis, cessation may be beneficial.

Conclusion

Yeast-free diets, or people, are both impossible to come by. They can only be totally avoided in the diet by eating solely fresh dairy, meat, fish and peeled fresh fruits and vegetables. From a practical standpoint, this is neither feasible nor necessary. Total elimination of yeast from the body is also neither feasible nor desirable, considering that yeasts are beneficial to the body when a proper balance exists. Treatment of candida overgrowth does not seek the eradication of candida from the diet or the person, but rather a restoration of the proper and balanced ecological relationship between man and yeast.

Acknowledgement

None

Conflict of Interest

None

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