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REVIEW - ORAL THRUSH

S. Sreekanth*¹, Kaithavalappil¹, V. Ganesan¹, M. Kannappan¹, Deepa. T. Vasudevan¹

¹*Department of Pharmaceutics, Research Scholar, Karpagam University, Coimbatore, Tamilnadu, India.

ABSTRACT

The existence of *Candida albicans* in the human body is entirely compatible with a life time of excellent health. They produce a broad range of infections, ranging from non-life threatening mucocutaneous illnesses to invasive process that may involve virtually any organ. Such a broad range of infections requires an equally broad range of diagnostic and therapeutic strategies. Oral thrush in neonates is conventionally described as moniliasis or candidiasis. Drugs such as broad spectrum antibiotics alter the local oral flora creating a suitable environment for candida to proliferate. The normal oral flora is restored once the antibiotics are discontinued. For infants, mild antifungal medication should be given. For adults with weakened immune system - antifungals like fluconazole, clotrimazole, nystatin etc is recommended. For esophageal candidiasis itraconazole, ketocanazole should be given. The only prevention is Good Oral Hygiene. From this review we can come into a conclusion that, need for new therapy is needed because resistance to the currently available drugs has been reported.

KEY WORDS

Oral Thrush, candidiasis and Oral hygiene.

Author for Correspondence:

S. Sreekanth,
Research Scholar, Karpagam University,
Coimbatore, Tamilnadu, India.

Email: sreekanthsk16@yahoo.co.in

INTRODUCTION

Oral candidiasis is one of the most common, treatable oral mucosal infections seen in persons. It is commonly seen with human immunodeficiency virus (HIV) infection or acquired immune deficiency syndrome (AIDS) ¹. *Candida albicans* carriage and a history of oral candidiasis are other significant risk factors for oral candidiasis². However, sucrose containing topical agents can be cariogenic when used over prolonged time periods³,

such that adjunctive topical fluoride therapy may be needed.

There are many species of *Candida*⁴ but *C. albicans* is the fungal microorganism most often encountered in the ambulatory general practice dental patient. Changes in the oral environment that can predispose or precipitate oral candidiasis include: antibiotics, corticosteroids, dry mouth (xerostomia), diabetes mellitus, nutritional deficiencies, and immune suppressive diseases and therapy¹.

Saliva contains antifungal proteins including histatins and calprotectin that help protect patients from *Candida* infections⁵. Oral thrush in neonates is conventionally described as moniliasis or candidiasis. According to modern taxonomy however, moniliasis is now reserved for fungal infections in plants while candidosis is the accepted term for human infections⁶. It is well recognized that *candida* esophagitis may coexist with other esophageal disorders in these patients⁷. The occurrence of multiple simultaneous processes makes definitive endoscopic examination important⁸. Oral thrush is an infection of yeast fungus, *Candida albicans*, in the mucous membranes of the mouth. It is only a temporary candida infection in the oral cavity of babies. It also includes candida infections occurring in the mouth and throat of adults, also known as candidiasis or moniliasis.

PATHOPHYSIOLOGY

Candida is present in the oral cavity of almost half of the population. Everyone who wears dentures will have candida, without necessarily suffering any ill effects. *C. albicans* causes thrush when normal host immunity or normal host flora is disrupted. Overgrowth of yeast on the oral mucosa leads to desquamation of epithelial cells and accumulation of bacteria, keratin, and necrotic tissue. This debris combines to form a pseudo membrane, which may closely adhere to the mucosa.

SIGNS AND SYMPTOMS

White, cream-coloured, or yellow spots in the mouth (Figure No.1). There is normally no pain in

the area underneath the spots, but it can cause an uncomfortable burning sensation in the mouth and throat.

RISK / PREDISPOSING FACTORS

- Newborn babies⁹.
- Denture users¹⁰.
- Adults with diabetes or other metabolic disturbance.
- People with a dry mouth relating to side-effects of their medication (eg. anti-psychotics) or medical conditions (eg. Sjögren's Syndrome).
- People undergoing antibiotic or chemotherapy treatment.
- People prescribed oral steroid medication or steroid metered dose inhalers.
- Drug users.
- People with poor nutrition.
- People with an immune deficiency.

INFANTS AND BREAST FEEDING MOTHERS

Affected neonates are typically colonized by *C. albicans* during passage through the birth canal. Hence, the risk for thrush is increased when the mother has an active vaginal yeast infection. Other sources of transmission to neonates include colonized breasts (for breastfed infants), hands, and/or improperly cleaned bottle nipples. Kissing has also been implicated.

Candida albicans frequently and asymptotically inhabits the GI tract of many children and adults, and the GI tract has been implicated as a reservoir for yeast contamination of the perineum. Thus, candidal diaper rash frequently occurs in conjunction with thrush.

CAUSES

Thrush is caused by an overgrowth of the yeast *Candida albicans*, which is commonly found on skin surfaces, the oral cavity^{11, 12} and throughout the intestinal tract of healthy individuals. Newborn infants often are exposed during delivery and may develop oral evidence of thrush within 10 days post-delivery. Breastfeeding infants may infect their

mother's nipple area during breastfeeding. In addition, an overgrowth of *Candida* in the stool may be associated with a characteristic diaper rash. Contamination of formula bottle nipples and pacifiers with *Candida* may also introduce the yeast into a child's oral cavity.

In older children and adults, oropharyngeal candidiasis is associated with several risk behaviors including prolonged or repeated oral antibiotics, smoking, dentures, use of birth control pills and diabetes (either type I or type II). Perhaps the most common association for developing thrush is improper technique during the use of inhalers containing corticosteroids for the control of asthma or COPD (chronic obstructive pulmonary disease). Such medications require water rinsing and spitting out in order to eliminate any non-inhaled medication. Patients using a metered dose inhaler (MDI) for administration of their steroids are recommended to use a "spacer" to lessen the amount of potential residual steroid left in the mouth. Immune-compromised individuals more commonly experience thrush compared with their healthy counterparts.

Drugs such as broad spectrum antibiotics alter the local oral flora creating a suitable environment for candida to proliferate¹³. The normal oral flora is restored once the antibiotics are discontinued.

COMPLICATIONS

Oral thrush is seldom a problem for healthy children and adults, although the infection may return even after it's been treated. If you have a compromised immune¹⁴ system, thrush can be more serious. It is more likely to spread to other parts of your body, including your digestive tract, lungs and liver. You may have especially severe symptoms in your mouth or esophagus, which can make eating painful and difficult. The infection can spread to the intestines, making it difficult to receive adequate nutrition.

TEST AND DIAGNOSIS

In mouth

Oral thrush can usually be diagnosed simply by looking at the lesions. If your doctor suspects, he or she will perform a physical exam as well as recommend certain blood tests to help find the source of the problem.

In esophagus

Thrush that extends into the esophagus can be serious. To help diagnose this condition, the following tests should be done.

Throat culture or Biopsy¹⁵

The back of your throat is swabbed with sterile cotton and the tissue sample was cultured on a special medium of dye - periodic acid-Schiff (PAS) - is used to determine which bacteria or fungi are causing the symptoms

Endoscopic examination

Esophagus, stomach and the upper part of your small intestine (i.e. duodenum) is examined using a lighted, flexible tube with a camera on the tip of it (endoscopic examination).

TREATMENT AND DRUGS

For infants and nursing mothers

If you're breast-feeding an infant, you and your baby will do best if you're both treated. Otherwise, you're likely to pass the infection back and forth.

- A mild antifungal medication for your baby and an antifungal cream for your breasts.
- If baby is using a pacifier or feeds from a bottle, rinse nipples and pacifiers in a solution of equal parts water and vinegar daily and allow them to air dry to prevent fungus growth.
- If you use a breast pump, rinse any of the detachable parts that come in contact with your milk in a vinegar and water solution.

For adults with weakened immune systems

Antifungal medication

This comes in several forms, including lozenges, tablets or a liquid that you swish in your mouth and then swallow.

Fluconazole¹⁶ (Diflucan tablets)

Diflucan is a tablet that must be swallowed. The dose is 100mg a day for 7 to 14 days.

Clotrimazole¹⁷ (Mycelex trouches)

These trouches, or lozenges, are used either four or five times a day for one or two weeks. Lozenges should be dissolved in the mouth slowly and should not be chewed or swallowed whole. Clotrimazole can cause stomach upset.

Nystatin¹⁸ (Mycostatin liquid or pastilles)

Nystatin is available in liquid and pastille (lozenge) form. The liquid dose is 5 milliliters four times a day for one or two weeks; it should be swished around the mouth slowly, for as long as possible (i.e., a few minutes), and then swallowed. One or two pastilles are taken four or five times a day for 7 to 14 days; they should be dissolved in the mouth slowly and should not be chewed or swallowed whole.

Itraconazole¹⁹ (Sporanox liquid suspension)

This medication is a liquid that must be swallowed. While it is as effective as the three medications listed above, it is not as well tolerated as fluconazole tablets.

Ketoconazole²⁰ (Nizoral) or itraconazole (Sporanox) capsules

These capsules, which must be swallowed, are less effective than fluconazole. However, they are alternative options if the four medications listed above cannot be used.

Gentian violet

Dip the swab in the dye and coat the Candida blotches in the mouth. It is best to avoid swallowing the drug, as it can cause stomach upset. Gentian violet can also stain the inside of the mouth, but this fades over time.

Esophageal Candidiasis

Esophageal candidiasis is considered to be more severe, deeper in the body, and harder to treat than either oral thrush, more powerful drugs—using higher doses than those used to treat oral candidiasis—are usually needed to treat it.

Fluconazole (Diflucan)

To treat esophageal candidiasis, an intravenous solution or 200 mg tablet of fluconazole is taken once a day for two or three weeks. Fluconazole is considered the first choice for treating esophageal candidiasis, because blood levels of fluconazole

fluctuate less than either itraconazole or ketoconazole.

Itraconazole (Sporanox)

If itraconazole tablets are used, they are often taken with another drug, **flucytosine (Ancobon)**, to increase effectiveness for esophageal candidiasis, the dose is usually 200 mg a day for two or three weeks. Itraconazole tablets should be taken with food; itraconazole liquid should be taken on an empty stomach.

Ketoconazole (Nizoral)

400 mg of Nizoral is taken every day for three or four weeks.

Severe or Drug-Resistant Candidiasis

Sometimes, candidiasis can become resistant to the "azole" drugs (all of those listed above) or is so severe that it cannot be adequately treated using any of these treatments. As a result, a drug called amphotericin B is often used. It is usually administered in a hospital through an IV line.

The two types of amphotericin B are **Standard Amphotericin B²¹ (Fungizone)** and **Liposomal Amphotericin B (Abelcet, AmBisome, Amphotec)**.

Treatment for pregnant women

Because many of the drugs used to treat fungal infections can be toxic to the developing fetus, only topical treatments—such as creams—be used whenever possible.

LIFESTYLE AND HOME REMEDIES

To ease the pain, discomforts, and inconvenience of oral thrush, consider the following home remedies:

Practice Good Oral Habits

Brushing²² at least twice a day and flossing at least once can cut down on the amount of time you have to suffer an oral thrush infection. Make sure to frequently replace your toothbrush until the infection is gone.

Natural Home Remedies for Oral Thrush

Mix equal parts of a tincture consisting of liquorice, myrrh, and Echinacea. Use one teaspoon of this remedy as a mouthwash that is taken with water every three to four hours.

Saltwater Rinses

Add ½ teaspoon of salt into one cup of warm water. After the salt has dissolved, swish the rinse in your mouth and then spit out.

Anti-Fungal Home Mouthwashes

Blend warm water, cider vinegar and a pinch of salt to create a home remedy that fights fungus. Swish the wash around the mouth, making sure to reach all corners. Use it as a gargle for the throat.

Garlic and Onions

Tap into the antifungal power of onions and garlic, which can help kill candida in the mouth. Increase the amount of garlic used in your diet to eliminate yeast infection. Onions also help heal the white patches (lesions) found in the mouth.

Yogurt

Incorporate yogurt with live-acting cultures into your diet to boost the level of healthy bacteria in your mouth. Swish the yogurt about your mouth and then refrain from eating or drinking anything shortly afterwards.

Thorough Cleaning

If you wear dentures²³ and have thrush, cleaning your mouth and dentures each night is a must. Make sure to soak your dentures in a cleaner overnight. Rinse them well after removing from the solution²⁴ and before placing back into your mouth.

PREVENTION

The risk of getting oral thrush can be reduced by following the advice outlined below.

Oral hygiene

Your chances of getting oral thrush are reduced if you keep your mouth clean and healthy. You can do this by:

Rinsing your mouth after meals

Visiting your dentist regularly for check-ups

Eating a healthy balanced diet

Keeping your dentures clean

- Brushing your teeth twice a day with a toothpaste that contains fluoride
- Flossing regularly
- Using a mouthwash as part of your routine

Denture hygiene

If you wear dentures clean them every night before you go to bed. They can be done by brushing them with warm, soapy water and scrubbed with a nailbrush on the non-polished side of the dentures.

Dentures can then be soaked in any liquid that can be used to sterilize babies' bottles. However, products containing bleach should not be used on dentures that contain metal.

You should visit your dentist to correct dentures that do not fit properly. This can also reduce the risk of oral thrush and soreness underneath the dentures.

Smoking

Smoking encourages yeast in your mouth to grow and increases your chance of getting oral thrush.

Corticosteroids

If you use inhaled corticosteroids as part of your asthma treatment, you can help prevent oral thrush by:

Rinsing your mouth with water after using your inhaler

Developing a good technique when you inhale corticosteroids by using a spacer

NEED FOR NEW THERAPY

A new oral treatment for oral candidiasis is as effective as the current standard of treatment and may be even better at preventing relapse in HIV-positive individuals, according to an international, randomised, study published in the April 15th edition of *Clinical Infectious Diseases*. Oral thrush is the most common opportunistic infection seen in HIV-positive individuals. Topical, oral and intravenous treatments for candida infections of the mouth and oesophagus are available. The current standards of care are fluconazole or itraconazole, but resistance to these drugs can develop.



Figure No.1: Signs and Symptoms

CONCLUSION

Oral health is fundamental to general health. The prevention of oral candidiasis will be less costly than the treatment of the oral and systemic diseases that occur as a consequence of poor oral health. The provision of effective oral care can make a huge difference to people's health, comfort, wellbeing and quality of life. In most of the cases, oral candidiasis is a cause of superficial infection which can easily be resolved with antifungal therapy.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

REFERENCES

1. Greenspan D. Treatment of oral candidiasis in HIV infection, *Oral Surg Oral Med Oral Pathol*, 78(2), 1994, 211-5.
2. MacPhail LA, Hilton JF, Dodd CL, Greenspan D. Prophylaxis with nystatin pastilles for HIV-associated oral candidiasis, *J Acquir Immune Defic Syndr*, 12(5), 1996, 470-6.
3. Pons V, Greenspan D, Lozada-Nur F, MacPhail L, Gallant JE, Tunkel A, et al. Oropharyngeal candidiasis in patients with AIDS: randomized

- comparison of fluconazole versus nystatin oral suspensions, *Clin Infect Dis*, 24(6), 1997, 1204-7.
4. Scully C, el Kabir M, Samaranyake LP. Candida and oral candidosis: A review. *Crit Rev Oral Biol Med*, 5(2), 1994, 125- 157.
5. Challacombe SJ. Immunologic aspects of oral candidiasis, *Oral Surg Oral Med Oral Pathol*, 78(2), 1994, 202-210.
6. Holmstrup P, Axell T. Classification and clinical manifestations of oral yeast infections, *Acta Odontol Scand*, 48(1), 1990, 57-59.
7. Schwartz DA, Wilcox CM. Atypical cytomegalovirus inclusions in gastrointestinal biopsy specimens from patients with the acquired immunodeficiency syndrome: diagnostic role of in situ nucleic acid hybridization, *Hum Pathol*, 23(9), 1992, 1019-1026.
8. Connolly GM, Hawkins D, Harcourt-Webster JN, Parsons PA, Husain OA, Gazzard G. Esophageal symptoms, their causes, treatment and prognosis in patients with the acquired immunodeficiency syndrome, *Gut*, 30(8), 1989, 1033-1039.
9. Manning DJ, Coughlin RP, Poskit EM. Candida in mouth or on dummy, *Arch Dis Child*, 60(4), 1985, 381-2.
10. Stafford GD, Arendorf GD, Huggett R. The effect of overnight drying and water immersion on candidal colonisation and properties of complete dentures, *J Dent*, 14(2), 1986, 52-6.
11. Epstein JB. Antifungal therapy in oropharyngeal mycotic infections, *Oral Surg Oral Med Oral Pathol*, 69(1), 1990, 32-41.
12. Guida RA. Candidiasis of the oropharynx and oesophagus, *Ear Nose Throat J*, 67(11), 1988, 832-40.
13. Epstein JB, Truelove EL, Izutzu KL. Oral candidiasis: pathogenesis and host defense, *Rev Infect Dis*, 6(1), 1984, 96-106.
14. Guida RA. Candidiasis of the oropharynx and oesophagus, *Ear Nose Throat J*, 67(11), 1988, 832-40.

15. Budtz Jorgenson E. Etiology, pathogenesis, therapy and prophylaxis of oral yeast infections, *Acta Odontol Scand*, 48(1), 1990, 61-9.
16. Diflucan [package insert]. *New York, NY; Pfizer*; March 2008.
17. Mycelex troche [package insert]. Mountain View, CA; *Alza Corporation*; February 2003.
18. Available at <http://www.clinicalpharmacology.com>, Accessed January 12, 2010.
19. Sporanox [package insert]. Raritan, NJ; *Pricara*; March 2009.
20. Nizoral [package insert]. Titusville, NJ; *Janssen*; 1998.
21. Ancobon [package insert]. Alisa Viejo, CA; *Valeant*; January 2008.
22. Odman PA. The effectiveness of an enzyme containing denture cleaner, *Quintessence Int*, 23(2), 1992, 187-90.
23. Stafford GD, Arendorf GD, Huggett R. The effect of overnight drying and water immersion on candidal colonisation and properties of complete dentures, *J Dent*, 14(1), 1986, 52-6.
24. Arendorf TM, Walker DM. The prevalence and intra-oral distribution of *Candida albicans* in man, *Arch Oral Biol*, 25(1), 1980, 1-10.

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