Oral Thrush in a One-Month-Old Infant: Etiology and Treatment

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LEARNING OBJECTIVES:
After reading this article, the individual will learn:

• The basic diagnostic issues regarding infant oral fungal infections.
• Treatment of oral fungal infections in infants and the importance of also treating the mother’s breasts and pacifiers.

ABOUT THE AUTHORS

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INTRODUCTION

This article, including a case report, examines the etiology and treatment of perinatal oral thrush. Further, it addresses the factors of pacifier use which can be a mode of inoculation and reinfection if not properly disinfected after a diagnosis of moniliasis (candidiasis). The breast-feeding dyad of mother and child is affected by oral candidiasis, and adequate treatment of mother and child is paramount for the health and well being of both.

Asymptomatic oral candidiasis in infants is a relatively common finding. It is associated with cutaneous maternal mammary candidial infection and the use of a pacifier. Darwazeh and al-Bashir isolated candida species from 48% of infants without determining a significant relationship to age, gender, or between breast-fed or bottle-fed infants. Candida albicans is the most frequently isolated human oral fungal pathogen. Candida exists as an oral commensal in 40% to 60% of humans. Candida is an opportunistic organism and becomes active as a parasite when the oral environment is encouraging due to such factors as oral dryness, antibiotic therapy, and immunodeficiency.

Included within the immunodeficiency subgroupings are the oncology, organ transplant, and human immunodeficiency virus (HIV) disease pediatric populations.

Candida also has the potential to be transmitted from one individual to another or from a surface to a human host. With the occurrence of the HIV pandemic in the 1980s, the incidence of infant candidiasis has increased exponentially. Fisher-Hoch and Hutwagner reported that between 1980 and 1989 neonatal rates of oropharyngeal candidiasis increased 4.7 times from 0.34 to 1.6 cases per 1,000 admissions per year, and the number of pediatric deaths secondary to oropharyngeal candidiasis increased 5-fold. Therefore, it is important for dental clinicians to be aware of the clinical and diagnostic aspects of oral candidiasis within infants. General practitioners should be aware of this condition at least to the capability of proper referral.
CASE REPORT

A one-month-old infant was referred to the Pediatric Dental Clinic at Howard University College of Dentistry to confirm the diagnosis of oral candidiasis. The infant was examined following proper barrier techniques. The classic presentation of white plaques was visible on the mucosal surfaces of the dorsal tongue and hard palate (Figure). The clinician determined that the clinical appearance was sufficient to make the diagnosis, and a determination was made not to attempt to wipe off the white plaque as this may have caused discomfort for the infant.

The mother reported that she was breast-feeding her infant. The mother noted no subjective reports of mammary pain. The mother was directed to return to her physician for evaluation of a possible diagnosis and therapy regarding a likely candidial dermatologic breast infection. The mother was also counseled to utilize several pacifiers and to treat them in a water and bleach solution between uses. Also, the mother was cautioned to rinse the pacifier thoroughly in water after removing it from the bleach solution.

The infant was referred back to the pediatrician with a recommendation for the initiation of anti-candida therapy.

DISCUSSION

Being a common organism of the epidermal and mucosal environment, \( \textit{C. albicans} \) is ubiquitous. This fungal organism is held in check by the normal body defenses and oral flora. It is only when the body’s defenses are overwhelmed by various disease states and conditions such as HIV disease, oral dryness, cancer, chemotherapy for tumor therapy, immunosuppression for transplant treatment, or broad spectrum antibiotic therapy that candida spores are activated and supercolonization of the mycotic organisms occurs.\(^5,6,8,9\)

Just as oral candidiasis in adults is a relatively common condition, oral candidiasis is also relatively common within pediatric patients. Jabra-Rizk, et al\(^11\) noted that in a study evaluating the prevalence of oral yeast species among 196 North American children during a routine oral examination, 130 (66%) of the subjects had fungal growth. \( \textit{C. albicans} \) isolates were noted in 56% of the children, although an extensive diversity of nonalbican species was observed. In evaluating oral \( \textit{C. albicans} \) in healthy preschool and school children in Poland, Roskiewicz, et al\(^12\) reported that \( \textit{C. albicans} \) was found in 64% of children with dental caries. They isolated a total of 123 strains of \( \textit{C. albicans} \) in which 49% were derived from supragingival plaque, 39% from carious lesions, and 11.4% from pharyngeal swabs. Overall, they found an incidence of oral candidiasis in healthy children of approximately 40%.

In evaluating neonatal candidiasis of intensive care patients in Venezuela, Hartung de Capriles, et al\(^13\) reported the prevalence of \( \textit{candida} \) spp. as 44 out of 128 patients. The clinical sample breakdown of \( \textit{candida} \) spp. was: \( \textit{C. albicans} \) (72%), \( \textit{Candida parapsilosis} \) (31%), \( \textit{Candida tropicalis} \) (10%), \( \textit{Candida guilliermondii} \) (3%), and \( \textit{Candida glabrata} \) (1.5%). Significant risk factors associated with \( \textit{candida} \) spp. isolation included prolonged hospitalization, missing prenatal birth control, and parenteral nutrition. (All of these 44 total neonates who evaluated positively for fungal disease were successfully treated with amphotericin B.)

Olivas-Escárcega, et al\(^14\) evaluated the prevalence of oral candidiasis in chronic renal failure and renal transplant pediatric patients. They evaluated 66 patients, of whom 21
demonstrated microbiologic evidence of oral candidiasis. *C. albicans* was the most frequently isolated species. Duration of therapy and oral hygiene were associated with the presence of oral candidiasis. Further, Cerqueira, et al\(^1\) noted that dentinal carious lesions appear to be a predisposing factor for the oral prevalence of candidiasis in HIV-infected children. In their pediatric patient population, 80% were positive for candida growth.

As oral candidiasis is an opportunistic infection, it is expected that medically compromised patients are at greater risk for such an infection. González-Gravina, et al\(^1\) noted that oral candidiasis represents a serious problem for children with cancer in that oral candidiasis increases the rate of mortality in these patients. They evaluated 62 patients between the ages of birth to 16 years and noted that 69% of the cases were positive for oral candidiasis. *C. albicans* was the most frequent species found (30%), followed by *C. parapsilosis* (15%), *C. tropicalis* (13%), *C. krusei* (4%), *C. glabrata* (2%), and *C. lusitaniae* (2%). *Psuedomembranous candidiasis* was the most frequent clinical presentation found. Melo, et al\(^1\) investigated oral candidiasis in Brazil of HIV-infected children undergoing sequential HIV therapies. They evaluated 52 Brazilian HIV-infected children while these patients received antiviral monotherapy and subsequently highly active antiretroviral therapy (HAART) with the use of a protease inhibitor. After HAART with protease inhibitor, *C. albicans* (52%) remained the most commonly isolated species. Other isolated species included *C. tropicalis* and *C. parapsilosis*, which were found in 9 and 8 of these patients, respectively. The majority of these fungal infections were sensitive to amphotericin B. Most of the *C. albicans* isolates were susceptible to fluconazole, itraconazole, and ketoconazole. However, there were exceptions as a few of the isolates demonstrated cross-resistance to azoles and amphotericin.

Rowen, et al\(^1\) noted that infants’ immune systems are developing and may develop the white plaques of candida colonies which are pathognomic of oral candidiasis or diaper dermatitis. Mucocutaneous involvement may precede systemic infection and warrants thoughtful attention, particularly with extremely low-birthweight premature infants.\(^1\) This particular presentation was also noted by Brent,\(^1\) and elucidates the importance of treating the breast-feeding dyad; both the mother and child must be treated.

Treatment for infantile thrush is usually 1 mm of 100,000 units of nystatin (mycostatin) divided equally in 2 drops in the maxillary vestibule four times a day for a period of 10 to 14 days. Nystatin is a very safe antifungal medication which is not systemically absorbed and has no drug interactions. The action of nystatin relies on prolonged contact, therefore the pastille (lozenge) form is more effective; however, this form is not appropriate for use with this age group (infants) due to aspiration or airway blockage. There has been a case of aspiration of clotrimazole gel used topically on the mother’s breast. Mycostatin pastilles are not being manufactured at this time in the United States, which is a loss to the treatment armamentarium. Other antifungal medications include amphotericin B, clotrimazole, fluconazole, and ketoconazole. Clotrimazole (10 mg/ml) oral suspension can be used in the same administration regime as nystatin rinses. Ketoconazole would not be considered for the infant less than 2 years of age due to drug manufacturer recommendation and its inherent toxicity (liver) compared to the 2 former antifungal agents.\(^1,3,13-19\)

The usual therapy for the mother’s cutaneous fungal breast infection is a 2-week regimen of fluconazole. Additionally, breast-feeding should be continued. Morrill, et al\(^2\) concluded that early reversion to the bottle may increase the risk of mammary candidiasis. Tanguay, et al\(^2\) recommended avoiding the use of antibiotics or at least using the shortest effective course. Also advised was the treatment of vaginal moniliasis in the third trimester and postpartum aggressively, and to treat the mother for mammary candidiasis if the baby has oral thrush or diaper candidiasis/dermatitis. Predisposing factors may be early nipple damage, mastitis, recent use of postpartum antibiotics or long-term use prior to delivery, and a history of vaginal thrush.\(^2\)

Live-cultured yogurt containing acidophilus bacteria has demonstrated efficacy in the treatment of mucosal candidiasis.\(^2,3,24\) Yogurt may not be viable for infants because their dietary intake consists of either breast milk or
formula, but may be considered for adjunctive care in infants at least 6 months of age. Therefore, yogurt as an adjunctive therapy was not advocated for our patient. Acrylic removable appliances may harbor candida organisms in adults, and pacifiers may harbor candida organisms in infants. Therefore, it is suggested that appropriate measures are taken to deter reinfection.

**CONCLUSION**

It is important for the general dentist to be familiar with the clinical appearance of oral candidiasis in infants. It is also important for dentists to have basic knowledge of the causes of this condition and of the therapies. As the successful treatment of candidiasis also involves addressing secondary cutaneous infections and pacifier contamination, it is important to have an appreciation for all aspects of transmission. Further, it is important for the dental clinician to communicate with the infant’s pediatrician in order to coordinate successful therapy.

**REFERENCES**

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3. What product found in the grocery store is thought to be helpful in controlling fungal infections?
   a. Liver  
   b. Milk  
   c. Yogurt  
   d. Cheese

4. With regard to the treatment of oral candida in infants, it is also necessary to treat_____.
   a. skin lesions.  
   b. the mother’s breast.  
   c. the infant’s feet.  
   d. the family pet.

5. Treatment of a baby’s pacifier consists of _______.
   a. an antibiotic solution.  
   b. boiling.  
   c. applying isopropyl alcohol.  
   d. a water and bleach solution.

6. The reason that infants are prone to oral candidiasis infections is:
   a. they tend to infect themselves with debris from the floor.  
   b. their immune systems are in development and not fully competent.  
   c. they tend to infect themselves from the family pet.  
   d. they tend to be on broad spectrum antibiotics.

7. With regard to the treatment of oral candidiasis in infants, the recommended drug is?
   a. Nystatin  
   b. Clotrimazole  
   c. Fluconazole  
   d. Ketoconazole

8. What material utilized in dentistry is known to harbor candidial organisms?
   a. Metal  
   b. Porcelain  
   c. Acrylic  
   d. Composite
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