

Clinical appearance of acute pseudomembranous candidiasis in children and the importance of good communication, information and education to patients: A case report

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ABSTRACT

Background: Oral candidiasis is a common opportunistic infection of the oral cavity caused by an overgrowth of the *Candida* species, in particular, *Candida albicans*. The incidence varies depending on age and certain predisposing factors. In the practice of dentistry, doctor-patient communication is an important component. Effective communication between doctor and patient is needed to convey information and educate patients so that treatment can be administered appropriately. **Purpose:** This case aimed to discuss the clinical appearance of acute pseudomembranous candidiasis (APC) in children and the importance of good communication, information and education of patients. **Case:** A five-year-old male patient came with his mother on November 6, 2020 complaining of white deposits on the mucosa of the upper and lower lips that had been present for a week. **Case management:** The diagnosis was defined as a typical APC lesion although the potassium hydroxide (KOH) test showed negative results. Characteristic lesions found in APC are often seen clearly in some cases and treatment can begin immediately. Patients receive the empirical therapy, Nystatin oral suspension 100.000 i.u., and the patient is instructed to maintain optimal oral hygiene care, maintain nutrient intake and book a follow-up consultation. **Conclusion:** Mistakes in patient preparation procedures in taking supporting examinations will result in false negative/positive results, so communication and education information regarding the preparation of supporting examinations for patients is important to note.

Keyword: acute pseudomembranous candidiasis; children; *Candida albicans*

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INTRODUCTION

Oral candidiasis is an opportunistic infection that mostly affects the oral mucosa. *Candida albicans* (*C. albicans*) is the most common cause of lesions and is a parasitic stage organism developed from normal commensal flora (saprophytic stage). *Candida albicans* are typically weak pathogens, and candidiasis affects the very young, the very old and the extremely ill. The use of broad-spectrum antibiotics, oral corticosteroids and an underdeveloped immune system are all common causes of fungal infections in infants and neonates.¹

Candida albicans infection is an opportunistic infection that occurs when the host's immune system is impaired and the natural flora gets infected. Exposure

to causal agents and the likelihood of infection are two critical variables in opportunistic infections. *C. albicans* has virulence characteristics that can contribute to its potential to induce infection and can affect hosts who are immunocompromised. The role of *Candida* virulence factors in infection is determined by the type of infection, its location, the infection stage and the host response. Many variables, including virulence factors, phenotypic switching, morphological dimorphism, adhesion and production of hydrolytic enzymes play a role in the pathogenesis of *C. albicans* infection.²

Subjective assessment, objective examination and supportive examination can all be used to confirm a candidiasis diagnosis. A characteristic clinical indication that suggests the existence of candidiasis infection

might arise in some circumstances. Direct and indirect examinations are examples of supporting examinations that can be used to confirm a *candidiasis* diagnosis. Colouring with potassium hydroxide and Parker™ ink (KOH) is frequently used as a supportive examination to aid in the direct detection of *candida* infection and indirect examination with fungal culture.³ It is important to keep track of the steps that the patient must undertake in order for the supportive examination to succeed and produce the desired outcomes.

Communication between the dentist and the patient is crucial in dentistry. In addition to being a scientific expert who is skilled in their speciality, a doctor must effectively communicate with the patient to establish a therapeutic doctor-patient connection.⁴ For doctors, poor doctor-patient communication can hinder therapeutic success. A doctor's responsibility is to provide as much information as possible about a treatment technique in order for it to be effective. The success of the process of getting a diagnosis and choosing a treatment plan might be harmed by poor information transmission throughout treatment operations. In order for therapy to operate well, effective doctor-patient communication is required to convey information and educate patients. The goal of this case is to explore what constitutes clinical evidence.

CASE

A five-year-old male patient came with his mother on November 6, 2020 complaining of white deposits on the mucosa of the upper and lower lips that had been present for a week. There were no reports of discomfort, itching or burning. White plaques had appeared on the patient's tongue, cheeks and palate during the preceding few days. There was no past history of recurring canker sores and the patient was active as normal with an adequate diet and plenty of rest. The patient had not experienced this before. There were no other lesions. When the white plaques formed on the patient's lips, the patient's mother purchased *Echinacea purpurea* from the pharmacy and administered it to the patient once a day. The patient had not had this condition examined by a doctor. According to his mother, neither the

patient nor his parents had a history of allergies or systemic disorders. There are no similar lesions elsewhere. The application of *Echinacea purpurea* had no effect.

CASE MANAGEMENT

Objective inspection of the upper and lower labial mucosa, palate durum, dextra and sinistra buccal mucosa and lateral dextra and sinistra of the tongue revealed white, multiple, clear bordered, irregular edge pseudo membranes that could be scraped away, leaving a reddish region (Figure 1). *Acute pseudomembranous candidiasis* (APC) was the temporary diagnosis given to the patient. The patient was referred for a KOH examination as well as a fungal culture test and given aloe vera extract gel.

On the third day, the patient returned with the results of the laboratory examinations. The patient's mother reported that in the morning before going to the laboratory, the patient's father cleaned up the white plaques using sterile gauze and warm water. The evidence of white plaques was reduced.

An objective examination on the upper and lower lips found macula, redness, multiple clear-bordered, irregular edge desquamation and white, clear bordered, irregular-edged rough surfaces (Figure 2). The laboratory examinations showed the results of direct fungal examinations but not fungal cultures. The examination of fungal cultures is not done by the laboratory. Results of laboratory tests obtained from KOH examinations that are negative can be influenced by a variety of factors and false negatives can be produced. Anamnesis and clinical examination revealed that the most convincing diagnosis was *acute pseudomembranous candidiasis* and the patient was subsequently prescribed with the antifungal drug Nystatin oral suspension of 100,000 iu/ml at the second visit.

When the patient came ten days later for his third visit, the problem had cleared up and the patient reported that the Nystatin oral suspension had been used regularly. An objective examination found that the mucosa and lesions had disappeared, which indicated that there had been a good healing process (Figure 3). The patient was advised to use Nystatin for two weeks afterwards.



Figure 1. The condition of the patient's oral cavity on initial examination; a) pseudo membrane on upper and lower labial mucosa; b) pseudo membrane in dextra buccal mucosa; c) pseudo membrane in sinistra buccal mucosa; d) pseudo membrane in palatum durum and dextra-sinistra of the tongue.



Figure 2. Condition of the patient's oral cavity at the first control; a) pseudo membrane in dextra-sinistra lateral of the tongue; b) macula in upper and lower lips; c) pseudo membrane in dextra buccal mucosa.

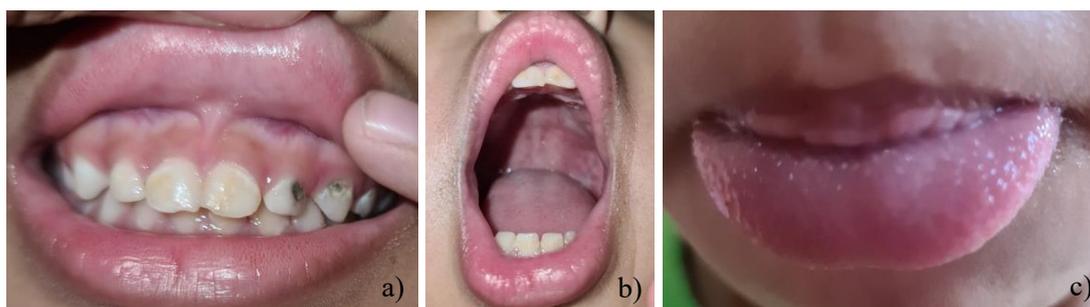


Figure 3. Condition of the patient's oral cavity at the second control; a) pseudo membrane disappears in upper and lower of lips mucosa; b) pseudo membrane disappears in palate durum; c) pseudo membrane disappears in dextra-sinistra lateral of the tongue.

In this case, the operator provided information and education to the patient in relation to the preparation required before taking the supporting examination specimen. The operator instructed the patient not to use Nystatin before taking the specimen. However, the operator did not inform the patient not to rub the lesion before taking a supporting examination specimen. The patient's father cleaned the lesions using gauze and warm water before taking the specimen, thus causing a false negative result.

DISCUSSION

Oral *candidiasis* in children can be caused by a number of different reasons, both local and systemic. Saliva, topical medicine and food are examples of local variables that might affect children. *Candidiasis* can be caused by a malfunction of the salivary glands, which might be a predisposing factor. *Candida* overgrowth is inhibited by salivary constituents, such as histidine-rich polypeptides, lactoferrin, lysozyme and sialo peroxidase.⁵ Topical medications, such as corticosteroid inhalers and antiseptics might disrupt the natural flora balance in the mouth cavity. Unbalanced dietary consumption of refined sugars, carbohydrates and dairy products (rich in lactose) may act as growth promoters by lowering pH levels and so promoting *candida* development.⁶

Systemic factors in children that may occur as predisposing factors of the appearance of *candidiasis*

include age, a set of nutrients, systemic drugs, immune disorders and congenital conditions. *C. albicans* are usually weak pathogens and *candidiasis* occurs in very young, very old and very sick patients.¹ Transferrin and other iron-dependent enzymes lose their fungistatic ability when iron levels are low.⁶ The use of broad-spectrum antibiotic drugs, corticosteroids and antineoplasma over a long period of time causes many normal flora bacteria to die. This causes pressure on *C. albicans* growth to decrease, resulting in excessive proliferation and more growth of *C. albicans*.⁷ In research conducted by Williams, oral *candidiasis* in HIV-uninfected paediatric patients was most likely due to long-term antibiotic use.⁸ The most known immune disorder condition closely related to *candidiasis* is acquired immunodeficiency syndrome (AIDS). *Candida* infections are frequent in people with congenital diseases linked with a faulty immune system, such as Di George's syndrome, hereditary myeloperoxidase deficiency and Chediak-Higashi syndrome.⁵

Diagnosis can be achieved with several examinations; firstly, from subjective examination or anamnesis; secondly, by objective or clinical examination; and thirdly, from supporting examination.⁹ Diagnosis of oral *candidiasis* is basically clinically enforceable. When a clinical diagnosis has to be verified to rule out other diseases as a differential diagnosis, or when antifungal treatment resistance is suspected, a supporting evaluation using microbiological methods is performed. The commonly used method of supporting examination for diagnosing primary *candidiasis*

is by staining KOH and culture (Sabouraud dextrose agar) or a biopsy performed on suspicion of hyperplastic candidiasis.³ Some cases of *acute pseudomembranous candidiasis* will give a typical clinical appearance in the form of a *pseudomembranous* layer that can be scraped, and a reddish area left in the trace tissue scraped APC is a superficial infection of the epithelium's outer layers that causes patchy white plaques or flecks to appear on the mucosal surface. When plaques are gently rubbed or scraped away, an area of erythema or even superficial ulceration is generally seen. The lesions of thrush or APC are easily identified because of their ubiquity, distinctive appearance and simplicity of removal, and a diagnosis of thrush is commonly established based on the appearance of the lesion.¹ In this case, a specific clinical view of the APC was indicated with the presence of pseudo membrane that was easily rubbed and left a reddish area.

Nystatin is drug of choice for fungus infections. Nystatin is a membrane-active polyene macrolide generated by *Streptomyces noursei* strains that come in a variety of forms, including oral suspension, topical cream and oral pastille.¹⁰ Nystatin binds to ergosterol membranes and plasma forms on pore fungus, producing intracellular potassium loss and fungicide action. In addition, autooxidation caused by Nystatin induces additional cell damage. Nystatin has a wide range of anti-*Candida* properties.¹¹ Previous research revealed that Nystatin's effectiveness can be increased by giving it to patients for up to four weeks.¹²

Appropriate information for the patient is important in the preparation of supporting examinations. Specimen collection should be done before the application of any drug to the lesions. Specimen collection should be done as soon as the patient arrives and no interventional measures should be taken on the lesion so that the specimen obtained can represent the actual condition. Interventional measures such as wiping lesions using sterile kassa and warm water can remove the pseudomembranous layer containing hyphae so that false negative results are obtained.

Doctors have a role also in the success of supporting examinations with the right results. Doctors must provide communication, information and education relating to diseases that may be suffered by patients, including causal factors, predisposing factors, conveying the stages of care that will be undergone by patients and supporting examination measures that must be carried out to enforce the diagnosis and prognosis of a disease. Effective doctor-patient communication is a critical clinical function in developing a therapeutic doctor-patient relationship, which is the heart and soul of medicine.¹³ In the above case, the patient and the doctor experienced miscommunication about the actions to be taken before specimen collection. The patient's parents had cleaned the pseudomembranous layer before the specimen was taken and it affected the

results of the examination. Poor information delivery creates ineffective communication, can lead to misconceptions and can result in a failure of therapy.⁴

The clinical appearance of the patient in this case was the presence of pseudo membrane that was easily rubbed and left an area of redness, which indicates a typical clinical appearance of acute pseudomembranous candidiasis. Even although the KOH painting test showed negative results and the patient was still treated using oral Nystatin suspension, miscommunication and misinformation resulted in a false negative test. Diagnosis will affect the success of the treatment. Supportive examination is required to determine the definitive diagnosis. In conclusion, mistakes in patient preparation procedures in taking supporting examinations will result in false negative/positive results, so communication and education information regarding the preparation of supporting examinations for patients is extremely important. The delivery of good communication, information and education is the key to the success in the treatment of patients.

REFERENCES

1. Lu S-Y. Oral candidosis: Pathophysiology and best practice for diagnosis, classification, and successful management. *J Fungi*. 2021; 7(7): 555.
2. Lestari PE. Peran faktor virulensi pada patogenesis infeksi *Candida albicans*. *Stomatognathic - J Kedokt Gigi*. 2010; 7(2): 113–7.
3. Coronado-Castellote L, Jiménez-Soriano Y. Clinical and microbiological diagnosis of oral candidiasis. *J Clin Exp Dent*. 2013; 5(5): e279–86.
4. Kee JWY, Khoo HS, Lim I, Koh MYH. Communication skills in patient-doctor interactions: Learning from patient complaints. *Heal Prof Educ*. 2018; 4(2): 97–106.
5. Patil S, Rao RS, Majumdar B, Anil S. Clinical appearance of oral *Candida* infection and therapeutic strategies. *Front Microbiol*. 2015; 6: 1391.
6. Martins N, Ferreira ICFR, Barros L, Silva S, Henriques M. Candidiasis: predisposing factors, prevention, diagnosis and alternative treatment. *Mycopathologia*. 2014; 177(5–6): 223–40.
7. Williams D, Lewis M. Pathogenesis and treatment of oral candidosis. *J Oral Microbiol*. 2011; 3: 1–11.
8. Mushi MF, Loi N, Mshana SE. Oral candidiasis in HIV-uninfected pediatric population in areas with limited fungal diagnosis: A case study from a tertiary hospital, Tanzania. *Ther Adv Infect Dis*. 2021; 8: 20499361211016964.
9. National Academies of Sciences, Engineering and M. Improving diagnosis in health care. Balogh EP, Miller BT, Ball JR, editors. Washington, D.C.: The National Academies Press; 2015. p. 444.
10. Kaur IP, Kakkar S. Topical delivery of antifungal agents. *Expert Opin Drug Deliv*. 2010; 7(11): 1303–27.
11. Quindós G, Gil-Alonso S, Marcos-Arias C, Sevillano E, Mateo E, Jauregizar N, Eraso E. Therapeutic tools for oral candidiasis: Current and new antifungal drugs. *Med Oral Patol Oral Cir Bucal*. 2019; 24(2): e172–80.
12. Lyu X, Zhao C, Hua H, Yan Z. Efficacy of nystatin for the treatment of oral candidiasis: a systematic review and meta-analysis. *Drug Des Devel Ther*. 2016; 10: 1161–71.
13. Ha JF, Longnecker N. Doctor-patient communication: a review. *Ochsner J*. 2010; 10(1): 38–43.