

Angular cheilitis: Microbiological study

Abdullah I. Hamad, Emad H. Abdulla, Faisal A. Lafita
College of Dentistry, Tikrit University

Abstract

A clinical and microbiological study was carried out to determine the main causative pathogens of the angular cheilitis was carried out in Tikrit City during the year 2008 in 29 patients (13 males and 16 females) ranging in age from 31-68 years old. Twelve patients were denture wearers (41.38 %), others were not. Patients with angular stomatitis, prior to any therapy, was sampled and shown that the concentration of *Candida albicans* always exceeded 8,000 organisms per square centimeter per patient in many of denture wearer patients, while with over-closure of the mouth, the concentration of *Candida albicans* always exceeded 6,500 organisms per square centimeter per patient in 18 of these patients. 15 of them (52 %) showed that the isolated microbial pathogens were *Staphylococcus aureus*. nine of them (31%) showed *Streptococcus sanguis*; seven of them (24 %) showed *Streptococcus mutans*. The number and percentage of isolated pathogens were increased with the advancing of age, wearing of dentures and over-closure of the mouth for many patients with angular cheilitis, especially *Candida albicans* and *Staphylococcus aureus*.

Key words: angular chelitis, microbial study,

Introduction

Angular Cheilitis (also called perleche, cheilosis or angular stomatitis) is an inflammatory lesion at the labial commissure, or corner of the mouth with or without fissuring, and often occurs bilaterally. The condition manifests as deep cracks or splits. In severe cases, the splits can bleed when the mouth is opened and shallow ulcers or a crust may form. Patients are usually very symptomatic with local soreness, tenderness, pain or burning (1).

Although the disease has an unknown etiology, the sores of angular cheilitis may become infected by the fungus *Candida albicans* (thrush), or other pathogens. Studied have linked the initial onset with nutritional deficiencies, namely riboflavin, vitamin B12 and iron deficiency anemia, which in turn may be evidence of poor diets or malnutrition. Other causes of this lesion include *Staphylococcus aureus* infection (2).

Angular cheilitis occurs frequently in the elderly population who experience a loss of vertical dimension due to loss of teeth, thus allowing for over-closure of the mouth. Less severe cases occur when it is quite cold (such as in the winter time), and is widely known as having chapped lips. This lesser form mostly happens to young children/teenagers.

The child may lick their lips in an attempt to provide a temporary moment of relief, only serving to worsen the condition (3).

The growth of *Candida* in oral cavity was accompanied by a rapid decline in pH from 7.5 to 3.2 over 48 h and the major acidic components initiating and sustaining this pH drop were pyruvates and acetates. These acidic metabolites may play an important role in the pathogenesis of oral *Candida* infections (4).

Patients and Methods

Twenty-nine patients (16 females and 13 males) between the ages of 31-68 years with angular cheilitis were refereed to teaching hospital and private dental clinic in Tikrit city. The study of the samples was between March and June 2008. Medical history was taken for each patient for the presence of any systemic disease. Intra and extra oral examination was done for each patient, using dental light, mirror, probe and tweezers.

A total of 29 samples of angular cheilitis patients were taken from the cracking area of the corner of the mouth by a piece of sterilized gauze and placed in a sterile tube containing 100 mm of reduced transport fluid (RTF) for microbiological estimation. The samples were incubated in

nutrient, blood agar (Oxoid) aerobic and anaerobic for 72 hour at 37 C. All samples were processed using standard technique.

Results

Twenty-nine patients were examined (13 males and 16 females) between the age of 31-68 years with a mean age of (38.43) years. Each was with angular cheilitis. Twelve patients were denture wearers (41.38 %), others were not. The patients, prior to any therapy, was sampled to evaluate the most common isolated pathogens that found in angular cheilitis patients. Our results revealed that the distribution of isolated pathogens in patients with angular cheilitis was as the following:

The concentration of *Candida albicans* always exceeded 8,000 organisms per square centimeter per denture wearer patient; while with over-closure of the mouth, the concentration of *Candida albicans* always exceeded 6,500 organisms per square centimeter per patient in 18 of these patients. 15 of them (52 %) showed that the isolated microbial pathogens were *Staphylococcus aureus*. 9 of them (31%) showed *Streptococcus sanguis*; 7 of them (24 %) showed *Streptococcus mutans*. The number and percentage of isolated pathogens were increased with the advancing of age, wearing of dentures and over-closure of the mouth for many patients with angular cheilitis, especially *Candida albicans* and *Staphylococcus aureus* as demonstrated in table (1).

Discussion

The findings of the present study revealed that the angular cheilitis is caused by an overgrowth or infection of the corner of the mouth by a yeast-like fungus, *candida*, which the important and commonest ones are (*C albicans*), and also *Staphylococcus aureus*, *Streptococcus sanguis* and *Streptococcus mutans* were the most pathogenic that causes angular cheilitis. This lesion was associated with the wearing of dentures, over-closure of the mouth, advance in age, impaired functions of salivary glands, nutritional and vitamins deficiencies, and hormonal disturbance, especially in females patients.

The findings of the present study are in agreement with the results reported by Xiaosong, (7) who indicated that *Candida albicans* is the most frequent colonizer (70-80%) but any of the non-*albicans Candida* spp. may be seen. Salivary flow, salivary pH, and glucose concentration are among the factors that influence the frequency of oral *candidal* colonization. Specifically, carriage rates are higher in denture users, diabetic and Aids patients.

The results of our study are similar to the findings of Regina Helena, (8), who reported dentures predispose to infection with *candida* in as many as 65% of elderly people wearing complete and partial (fixed & removable) dentures. Wearing of dentures produces a microenvironment conducive to the growth of *candida* with low oxygen, low pH, and an anaerobic environment. This may be due to enhanced adherence of *Candida* spp to acrylic, reduced saliva flow under the surfaces of the denture fittings, improperly fitted dentures, or poor oral hygiene. The adherence of *Candida albicans* to acrylic dentures in patients with angular stomatitis was proportional to the concentration of sugar (glucose, sucrose, galactose, fructose, or maltose as the carbon source) in the growth medium, but equimolar concentrations of different sugars promoted adherence to different extents. The findings of the present study revealed that the most causative pathogens of angular cheilitis were (*candida*, *Staphylococcus aureus*, *Streptococcus sanguis* and *Streptococcus mutans*); which is disagrees with the findings of Webb, (9), who demonstrated that most infection of the corner of the mouth is associated with certain pathogenic variables (*candida* & *Staphylococcus aureus*).

References

1. Meiller T, Jelley MA, DePaola LG, Baqui A, and Falkler WA, In vitro studies of the efficacy of antimicrobials against fungi. *J Oral Surg Oral Med Oral Pathol*. 2001; 91:663-670.
2. Rindum JL, Stenderup A, and Holmstrup P. Identification of *Candida albicans* types related to healthy and pathological oral

mucosa. *J Oral Pathol Med.* 1994; 23: 406 - 412.

3. Schweiz M Z. Stomatitis Denture : Etiology 2007 ; 117 (7):749-61.

4. Shay K, Truhlar MR, Renner RP. Oropharyngeal candidosis in the older patient. *J Am Geriatr Soc* 1997;45:863-70.

5. Abu-Elteen KH, Abu-Alteen RM. The prevalence of candida albicans populations in the mouths of complete denture wearers. *New Microbiol* 1998;21:41-8.

6. FIGUEIRAL MH, AZUL A, PINTO E, FONSECA PA, BRANCO FM & SCULLY C. Denture-related stomatitis: Identification of aetiological and predisposing factors – a large cohort. *Journal of Oral Rehabilitation*, 2007; 34(6):448-455.

7. Xiaosong Liu, Hong Hua. Oral manifestation of chronic mucocutaneous candidiasis: seven case reports. *Journal of Oral Pathology & Medicine* 2007, 36(9): 528-532.

8. Regina Helena PG, Elaine TM, Lilian CB, Marcelo TM, José EZ, Maria José SMG. Genetic relatedness of commensal strains of *Candida albicans* carried in the oral cavity of patients' dental prosthesis users in Brazil. *Mycopathologia J* 2007, 45(7): 341-46.

9. Webb BC, Thomas CJ, Willcox MD, Harty DW, and Knox KW. *Candida*-associated denture stomatitis. Aetiology and management: a review. Part 1. Factors influencing distribution of *Candida* species in the oral cavity. *Aust Dent J.* 1998; 43:45-50.

Table (1): Types and per cent of isolated pathogens with No. of patients

Factors	Types and per cent of isolated pathogens with No. of patient			
	<i>Candida</i>	<i>Staphylococcus</i>	<i>Streptococcus S.</i>	<i>Streptococcus M</i>
Denture wearer.	8,000 organisms per square centimeter per patient	15 patient: 52 %	9 patients: 31 %	7 patients: 24 %
Over-closure of the mouth.	6,500 organisms per square centimeter per patient			