Oral Candida Colonization in Thai Patients with Psoriasis

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Objective: *To investigate the prevalence and risk factors of oral Candida colonization in psoriatic patients at Siriraj Hospital.*
Material and Method: *Sixty patients with psoriasis, aged older than 18 years, were recruited for the study group. Sixty healthy individuals similar to the patients in the study group in terms of age and gender were recruited for the control group. Candida spp. was isolated from oral swabs and oral rinses taken from all subjects.*
Results: *During the study period, 27 (45.0%) psoriatic patients used only topical treatment and the remaining patients were on systemic treatment. Oral Candida colonization was significantly higher in patients with psoriasis (30%), as compared with healthy controls (13.3%). Candida albicans was the predominant Candida species isolated. Presence of oral candidiasis was significantly associated with systemic treatment.*
Conclusion: *Oral Candida colonization is associated with psoriasis, especially in patients who receive systemic treatment.*

Keywords: *Candida, Colonization, Psoriasis*

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Various microorganisms, including bacteria, virus, and fungi can act as superantigens that activate specific T-cells and initiate the pathogenic cycle of psoriasis[1-3]. The source of these microorganisms may colonize in the skin itself or may locate in other parts of the body, such as *Streptococcus* in the throat and *Candida* in the digestive system[4]. The association between *Candida* and psoriasis has been investigated since 1980; however, data addressing oral *Candida* colonization in patients with psoriasis, especially in Asian patients, are limited and inconclusive[4,5]. The objective of this prospective study was to investigate oral *Candida* colonization in Thai patients with psoriasis and compare them with demographically matched healthy controls. Both the swab and oral rinse techniques were used for collecting *Candida* specimens in this study.

Material and Method

This study was approved by the Siriraj Institutional Review Board (SIRB), Faculty of Medicine Siriraj Hospital. Sixty patients with chronic plaque-type psoriasis and 60 healthy individuals aged older than 18 years were recruited from the Department of Dermatology, Faculty of Medicine Siriraj Hospital. None of psoriasis patients had been exposed to systemic immunosuppressive drugs, apart from methotrexate and cyclosporine, for one month prior to enrollment in the study. Exclusion criteria for patients and healthy controls included (i) exposure to local steroid in the oral cavity and/or use of systemic antibiotics, antifungals, or corticosteroids within one month of enrollment, (ii) presence of other severe systemic diseases, and (iii) currently a smoker. All participants were residents of Bangkok, Thailand. Demographic data for each psoriasis patient and healthy control were recorded. Oral examination of all subjects was performed using artificial light. A sterile cotton swab was moistened with sterile distilled water before being used to swab 1 cm^2 of both lateral borders and the dorsal surface of the tongue for five seconds each, using sufficient pressure. For oral rinse technique, each subject was supplied with a container with 10 milliliters of 0.9% sterile normal saline to be used as an oral rinse for one minute[6]. Once participants completed the one-minute oral rinse process, the normal saline rinse solution was returned directly from the participant's mouth to the container. All specimens were immediately transported to the

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laboratory of the Division of Infectious Diseases and Tropical Medicine, Department of Medicine, Faculty of Medicine Siriraj Hospital. Mouth rinse specimens were centrifuged at 1,700 g for 15 minutes. Supernatant was abandoned and the precipitate was reconstituted with 1 mL of 0.9% sterile normal saline and agitated on a vortex mixer for one minute. 0.1 mL of both reconstituted suspension and oral swab specimen were inoculated on chromogenic agar medium for selective isolation of *Candida albicans* and non-albicans *Candida* species (CandiSelect™, Bio-Rad Laboratories, Inc., Hercules, CA, USA). Plates were incubated at 30°C for 24 to 48 hours. PASW Statistics version 18 (SPSS, Inc., Chicago, IL, USA) was used for statistical analysis. Association between two categorical variables was compared using Chi-square test. The *p*-value of less than 0.05 were considered to be statistically significant.

Results

Each group consisted of 28 men and 32 women with a mean age of 46.0±14.6 years for the psoriasis group and mean age of 45.5±14.6 years for the control group. Mean (SD) age at onset and mean (SD) disease duration in patients with psoriasis were 31.8 (14.9) years and 14.2 (11.8) years, respectively. During the study period, 27 (45.0%) patients used only topical treatment, 26 (43.3%) received oral medications, including methotrexate (2.5-25 mg/week), acitretin (10-25 mg/day), and/or cyclosporine (3-5 mg/kg/day), four (6.7%) received phototherapy, and three (5%) received a combination of phototherapy and oral medications. Mean (SD) Psoriasis Area and Severity Index (PASI) score was 6.0 (5.5).

In the psoriasis group, two patients (3.3%) had pseudomembranous patches on the tongue without microbiologic evidence of oral candidiasis, one patient (1.7%) had geographic tongue, and one patient (1.7%) had fissured tongue. Normal tongue was observed in all healthy controls. Data regarding presence of oral *Candida* colonization recovered from oral swabs and oral rinses are presented in Table 1 and 2. For both specimen collection techniques, oral *Candida albicans* colonization was significantly higher in patients with psoriasis when compared with healthy controls. The diagnostic yield of the oral rinse technique was superior to that of the swab technique. Psoriasis treatment modality was found to be the only factor associated with oral *Candida* colonization (Table 3). Psoriatic patients who received systemic treatment were at significantly increased risk of *Candida* colonization, as compared with psoriatic patients who received topical treatment (odds ratio: 4.24, 95% CI: 1.19-15.03).

Table 1. Positive oral *Candida* colonization in patients with psoriasis and healthy controls

	Patients (n = 60)	Controls (n = 60)
Oral swab technique, n (%)		
Positive culture	12 (20.0)	5 (8.3)
Negative culture	48 (80.0)	55 (91.7)
Oral rinse technique, n (%)		
Positive culture	18 (30.0)	8 (13.3)
Negative culture	42 (70.0)	52 (86.7)

Discussion

Previous studies observed that psoriatic patients had significantly higher prevalence of oral *Candida* colonization than healthy controls, with prevalence ranging widely between 23% and 78%[2,5,7,8]. Moreover, Bedair et al and Waldman et al showed that *Candida albicans* was the predominantly isolated oral *Candida* species[4,5]. Using the oral rinse technique, oral *Candida* colonization was found in approximately 30% of patients; a finding consistent with previous studies. Previous studies suggested that reduction in the number of natural killer cells, lower levels of serum immunoglobulins against *Candida*, and increased affinity of oral epithelial cells for yeasts in psoriatic patients[9-11] may explain this observation.

There have been previous attempts to identify significant factors associated with oral *Candida* colonization in patients with psoriasis. Bedair et al and

Table 2. Presence of oral *Candida* colonization in patients with psoriasis and healthy controls

	Oral swab technique			Oral rinse technique		
	Patients (n = 12)	Controls (n = 5)	*p*-value	Patients (n = 18)	Controls (n = 8)	*p*-value
Candida albicans	12 (20.0%)	4 (6.7%)	0.03*	17 (28.3%)	7 (11.7%)	0.02*
Non-albicans *Candida* (NAC) species	0 (0%)	3† (5.0%)	0.24	1 (1.7%)	3† (5.0%)	0.62

† Two healthy controls were colonized with *Candida albicans* and non-albicans *Candida* (NAC) species simultaneously

Table 3. Oral *Candida* colonization in different subgroups of patients with psoriasis

Groups	*Candida* colonization n (%)	*p*-value
Psoriasis duration		
<10 years (n = 26)	7 (26.9)	0.65
≥10 years (n = 34)	11 (32.4)	
Onset of psoriasis		
<40 years (n = 43)	13 (30.2)	0.95
≥40 years (n = 17)	5 (29.4)	
Treatment options		
Topical treatment (n = 27)	4 (14.8)†	0.02*
Systemic treatment (n = 33)	14 (42.4)‡	
Psoriasis severity		
PASI <10 (mild, n = 52)	14 (26.9)	0.42
10≤ PASI <20 (moderate, n = 6)	3 (50.0)	
PASI ≥20 (severe, n = 2)	1 (50.0)	

PASI = Psoriasis Area and Severity Index

† Patients with topical treatments: 3 had positive culture to *Candida albicans* and 1 had positive culture to non-albicans *Candida* species

‡ Patients with systemic treatments: 14 had positive culture to *Candida albicans*

Picciani et al showed that age at onset and clinical severity, respectively, were significant risk factors associated with *Candida* colonization[2,5]. Interestingly, our study did not find these two factors to be significantly associated with *Candida* colonization. Rather, we found systemic treatment for psoriasis to be significantly associated with oral *Candida* colonization. Systemic treatment for psoriasis can diminish T-cell proliferation, leading to an increase in prevalence of oral candidiasis[2]. However, none of our patients had symptoms of oral candidiasis at the time of the study. Our study had some inherent limitations, including: (i) small number of subjects; (ii) lack of potassium hydroxide preparation to differentiate between *Candida* colonization and *Candida* infection; and (iii) lack of follow-up to determine clinical significance of oral *Candida* in patients with psoriasis.

In conclusion, our study showed that *Candida* colonization is associated with psoriasis, especially in patients with systemic treatment. Further studies are needed to determine clinical significance of *Candida* colonization in the exacerbation and persistence of psoriasis.

What is already known on this topic?

Various microorganisms, including bacteria, virus, and fungi can act as superantigens that activate specific T-cells and initiate the pathogenic cycle of psoriasis. The association between *Candida* and psoriasis has been demonstrated in several studies in Caucasian populations.

What this study adds?

Oral *Candida albicans* colonization was significantly more prevalent in patients with psoriasis than in healthy controls. Diagnostic yield from the oral rinse technique was better than that of oral swab technique.

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Potential conflicts of interest

None.

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เชื้อราแคนดิดาในช่องปากของผู้ป่วยไทยที่เป็นโรคสะเก็ดเงิน

ลีนา จุฬาโรจน์มนตรี, ชนิษฎา วงษ์ประภารัตน์, ปภาพิต ตู้จินดา, วรนรี วินะยานุวัติคุณ, อธิรัฐ บุญญาศิริ, กนกวลัย กุลทนันทน์, วิษณุ ธรรมลิขิตกุล

วัตถุประสงค์: *ศึกษาความชุกของเชื้อราแคนดิดาในช่องปากของคนไทยที่เป็นโรคสะเก็ดเงินเทียบกับผู้ที่ไม่ได้เป็นโรคสะเก็ดเงิน*
วัสดุและวิธีการ: *ผู้ป่วยโรคสะเก็ดเงิน 60 ราย และอาสาสมัครปกติ 60 รายที่มีอายุมากกว่า 18 ปี ถูกเก็บตัวอย่างน้ำลายโดยใช้สำลีป้ายบริเวณช่องปากและลิ้น และอมน้ำเกลือบ้วนลงในภาชนะปราศจากเชื้อ*
ผลการศึกษา: *ผู้ป่วยโรคสะเก็ดเงินจำนวน 27 ราย (ร้อยละ 45) ได้รับการรักษาด้วยยาทาอย่างเดียว ส่วนผู้ป่วยที่เหลือได้รับการรักษาด้วยยารับประทานหรือการฉายแสงอาทิตย์เทียมร่วมด้วย ผู้ป่วยโรคสะเก็ดเงินมีเชื้อราแคนดิดาในช่องปาก (ร้อยละ 30) มากกว่าคนปกติ (ร้อยละ 13.3) อย่างมีนัยสำคัญทางสถิติ โดยเชื้อ Candida albicans เป็นสายพันธุ์ที่พบบ่อยที่สุด ความชุกของเชื้อราแคนดิดาในช่องปากของผู้ป่วยโรคสะเก็ดเงินสัมพันธ์กับการได้รับยารับประทานหรือการฉายแสงอาทิตย์เทียม*
สรุป: *เชื้อราแคนดิดาในช่องปากสัมพันธ์กับโรคสะเก็ดเงินโดยเฉพาะกลุ่มผู้ป่วยโรคสะเก็ดเงินที่ได้รับการรักษาด้วยยารับประทานหรือการฉายแสงอาทิตย์เทียม*