Nail Abnormalities, Quality of Life and Serum Inflammatory Marker in Psoriatic Arthritis Compare to Psoriasis Without Arthritis

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Background: *The prevalence of nail abnormality in psoriasis is 15 to 50%. The rate is increased in psoriatic arthritis.*

Objective: *To study the nail abnormalities quality of life and serum inflammatory marker in psoriasis patients in relation to psoriatic arthritis.*

Material and Method: *A case-control study was performed at Phramongkutklao Hospital between January 1 and October 31, 2013. The demographic data and laboratory investigations of 55 cases of psoriasis patients with and without arthritis were compared.*

Results: *Psoriasis patients with arthritis had more nail abnormalities than those without (43 vs. 29, p-value = 0.005). The most common type of nail involvement was onycholysis. Quality of life in psoriasis patients with arthritis was worse than those without (visual analog score 50.24±23.13 vs.20.77±17.33, p-value <0.001). Nail involvement, ESR 37 mm/hour or more and hs-CRP 2.94 mg/dL or more were associated with arthritis in psoriasis (sensitivity 74.55%, specificity 58.18%, and area under curve 0.7286, and sensitivity 69.09%, specificity 60.00%, and area under curve 0.682 for ESR and hs-CRP respectively).*

Conclusion: *Psoriatic arthritis has more nail abnormalities. Arthritis is associated with worse quality of life in psoriasis. Nail abnormalities, ESR 37 mm/hour or more and hs-CRP 2.94 mg/dL or greater may predict arthritis in psoriasis patients.*

Keywords: *Psoriasis, Arthritis, Nail abnormalities, ESR, hs-CRP*

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Psoriasis is a common chronic skin disease with prevalence of 0.6 to 4.8%[1]. Clinical manifestation is characteristically well-defined erythematous plaque with silvery scales. It is symmetrically distributed on the extensor surface of the extremities, scalp, and lumbosacral areas. Plaque psoriasis is the most common subtype followed by guttate psoriasis, erythrodermic psoriasis, and pustular psoriasis. Psoriasis is associated with geographic tongue, nail abnormalities, and arthritis.

The prevalence of arthritis in psoriasis is 6 to 39%[2]. Psoriatic arthritis (PsoA) presents with oligoarthritis, symmetrical polyarthritis, distal interphalangeal joint arthritis, spondyloarthritis, arthritis mutilans, dactylitis, enthesitis, and tenosynovitis.

Psoriasis has nail abnormalities in 15 to 50%[3]. Nail involvement is associated with longer duration of psoriasis[4]. Previous studies showed the higher prevalence of nail abnormalities in PsoA[5-8] and longer duration of nail abnormality was associated with arthritis in psoriasis[9]. Nail abnormalities in psoriasis is included in the Classification Criteria for Psoriatic Arthritis (CASPAR) criteria for the diagnosis of PsoA[10].

To the best of author's knowledge, there is no study of the association between nail abnormalities and arthritis in Thailand. The present study aimed to study nail abnormalities, quality of life, and serum inflammatory marker in PsoA compared to Psoriasis without arthritis (Pso).

Material and Method

Patients

Psoriasis patients with and without arthritis who came to Dermatology and Rheumatology Departments of Phramongkutklao Hospital between April 1 and December 31, 2013 were enrolled into the study. The inclusion criteria were Pso patients and PsoA patients over the age of 18 years. The exclusion criteria consisted of the patients who had other causes of nail abnormalities such as onychomycosis, trauma, etc., or established underlying diseases such as rheumatoid arthritis, and systemic lupus erythematosus, etc.

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Study design and protocol

The present study was designed as a prospective case-control study. The patients were enrolled into two groups. The "PsoA group" diagnosed according to the CASPAR criteria[10] was included from Rheumatologic Department of Phramongkutklao Hospital. The "Pso group" was included from Dermatologic Department of Phramongkutklao Hospital. Both group was the age and sex-matched psoriasis patients. Investigators reviewed medical history and all medications. All cases received general physical and dermatological examinations. Data recorded were family history and duration of psoriasis, Psoriasis Area and Severity Index (PASI) score[11] and percentage of body surface area of involvement (BSAI)[12], the presence of geographic tongue, scalp involvement, Nail Psoriasis Severity Score Index (NAPSI)[13], and quality of life by visual analog scale (QLVAS)[14]. In the PsoA group, types, and numbers of arthritis together with the presence of resting pain, dactylitis, enthesitis, and fasciitis were also collected. Laboratory investigations: erythrocyte sedimentation

Table 1. Patients' demographic characteristics

Demographic data	Case [PsoA] (n = 55)	Control [Pso] (n = 55)	*p*-value
Age (year), mean ± SD	52.75±12.81	52.13±12.41	0.789
Female, n (%)	32 (58.21)	32 (58.21)	1.000
Smoking, n (%)			0.050
Non-smoker	43 (78.2)	36 (65.5)	
Ex-smoker	10 (18.2)	10 (18.2)	
Smoking	2 (3.6)	9 (16.4)	
Alcohol drinking, n (%)			1.000
Non-drinker	41 (74.5)	41 (74.5)	
Ex-drinker	8 (14.5)	8 (14.5)	
Alcohol drinking	6 (10.9)	6 (10.9)	
Duration of psoriasis, mean ± SD	14.13±11.55	11.53±11.37	0.240
1st to 2nd degree relative of Pso, n (%)	10 (18.2)	8 (14.5)	0.606
1st to 2nd degree relative of PsoA, n (%)	1 (1.8)	0	1.000
PASI score, median (min to max)	4.70 (0.50 to 40.40)	4.80 (0.50 to 58.20)	0.861
BSAI, median (min to max)	6 (1 to 80)	6 (1 to 70)	0.387
Geographic tongue, n (%)	0	1 (1.8)	1.000
Scalp involvement, n (%)	46 (83.6)	42 (76.4)	0.340
Medication used, n (%)	55 (100)	6 (10.91)	<0.001
Methotrexate	30 (54.55)	2 (3.64)	
Methotrexate + Secukimumab	5 (9.1)	0	
Methotrexate + Salazopyrin	5 (9.1)	0	
Methotrexate + Leflunomide	5 (9.1)	0	
Methotrexate + Azathioprine	2 (3.64)	0	
Methotrexate + Infliximab	1 (1.82)	0	
Sulfasalazine	2 (3.64)	0	
Leflunomide	1 (1.82)	0	
Secukinumab	1 (1.82)	0	
Cyclosporin	1 (1.82)	0	
Eternacept + Leflunomide	1 (1.82)	0	
Cyclosporin + Leflunomide	1 (1.82)	0	
Eternercept	0	1 (1.82)	
Acitretin	0	3 (5.45)	
Type of psoriasis, n (%)			
Plaque	46 (83.64)	48 (87.27)	
Guttate	5 (9.09)	2 (3.64)	
Pustular psoriasis	2 (3.64)	0	
Palmoplantar pustular psoriasis	0	4 (7.27)	
Erythroderma	0	1 (1.82)	
No rash	2 (3.64)	0	

PsoA = psoriatic arthritis; Pso = psoriatic; PASI = Psoriasis Area and Severity Index; BSAI = body surface area of involvement

rate (ESR) and high-sensitivity C-reactive protein (hs-CRP) were evaluated for the serum markers of inflammation.

Statistical analysis

At least 36 patients in each study group are required to show the relationship of nail abnormalities and arthritis, which give 99% study power and 1% error[5]. Baseline characteristics were presented as percentages for categorical data and as means ± standard deviation for continuous data. The authors used t-test for continuous variables, Chi-square test or Fisher's exact test for categorical variables and multivariate analysis for logistic regression. SPSS 16.0 (IBM Thailand Co., Ltd., Bangkok, Thailand) was used to analyze the data. A *p*-value less than 0.05 indicated statistical significance. All tests were two-sided.

The study protocol was approved by the Phramongkutklao Hospital Research Ethics Committee. Written informed consents were obtained from all participants.

Results

One hundred ten patients were enrolled, 55 patients each in PsoA and Pso groups. The baseline characteristics, including age, sex, family history, personal history, duration of psoriasis, PASI, BSAI, geographic tongue, and scalp involvement were similar between the two groups. The mean age and standard deviation were 52±12.81 years old in PsoA and 52.13±12.41 years old in Pso with female predominance in both group. The mean PASI score was 4.7 (0.5 to 40.4) and 4.8 (0.5 to 58.2) in PsoA and Pso respectively (Table 1). All PsoA used systemic drug treatment in contrast to 11% in Pso (Table 1).

The most common type of psoriasis was plaque type in both groups (Table 1). In PsoA, arthritis occurred 8.48 (1 to 35) years before the skin manifestation in seven patients (12.73%), presented simultaneously with skin manifestation in eight patients (14.55%) and occurred after 10.77 (1 to 31) years of skin manifestation in 38 patients (69.09%). Among the group that skin manifestation occurred before arthritis, 29/38 (76.32%) patients had nail involvement. Two PsoA patients had arthritis without any skin involvement.

The median number of arthritic joints in PsoA was 6 (1 to 48). Resting pain, dactylitis, enthesitis, and fasciitis were found in 51 (92.73%), 34 (61.82%), 17 (30.91%), and 6 (10.91%) patients respectively. The two most common type of arthritis were symmetrical polyarthritis 23 (41.82%) and asymmetrical oligoarthritis 24 (43.64%). Distal interphalangeal arthritis, arthritis mutilans, and spondyloarthritis were found in four (7.27%), three (5.45%), and one (1.82%), respectively.

PsoA had more nail involvement than Pso (43 vs. 29, *p*-value = 0.005). Hence, psoriasis with nail involvement increased the risk of arthritis with odd ratio 7.88 (95% CI 1.11 to 1.97). In terms of NAPSI score, PsoA was lower than Pso (46.91±33.22 vs. 61.21±34.91, *p*-value = 0.08). Onycholysis and pitting nail were the most common nail abnormalities in both PsoA and Pso (Table 2).

NAPSI had positive correlation with both PASI (r = 0.376, *p*-value = 0.001) and BSAI (r = 0.283, *p*-value = 0.017) by Pearson correlation (Fig. 1, 2).

Regarding the quality of life, PsoA had worse QLVAS than Pso (50.24±23.13 vs. 20.77±17.33, *p*-value <0.001). The NAPSI and mNAPSI had linear correlation to QLVAS (r = 0.050 and 0.056, *p*-value = 0.676 and 0.640, respectively).

Table 2. Nail abnormalities in psoriasis

	PsoA (n = 55)	Pso (n = 55)	*p*-value
Nail involvement, n (%)	43 (78.18)	29 (52.72)	0.005
Nail matrix , n (%)			
Pitting nail	33 (76.74)	21 (72.41)	0.805
Leukonychia	16 (37.21)	12 (41.37)	0.666
Red spot in lunular	0	0	NA
Nail bed crumbling	2 (4.65)	2 (6.90)	1.000
Nail plate , n (%)			
Oil drop	25 (58.14)	14 (48.28)	0.474
Onycholysis	40 (93.02)	26 (89.66)	1.000
Splinter hemorrhage	6 (13.95)	3 (10.34)	0.676
Subungual hyperkeratosis	28 (65.12)	21 (72.41)	0.435
NAPSI, mean ± SD	46.91±33.22	61.21±34.91	0.082
mNAPSI, mean ± SD	65.09±55.73	84.69±57.52	0.151

NAPSI = Nail Psoriasis Severity Score Index; mNAPSI = modified NAPSI; NA = not applicable

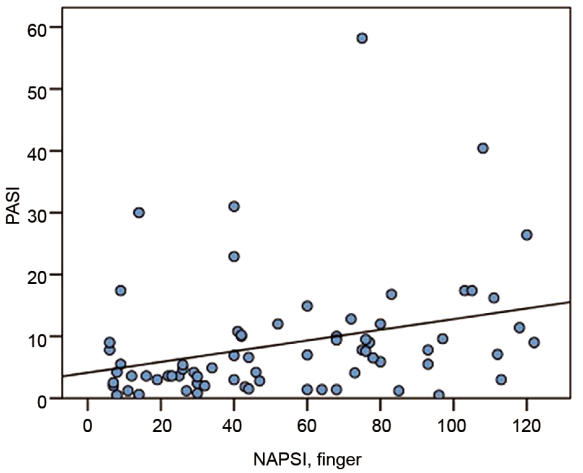

Fig. 1 Correlation between PASI and NAPSI of fingernail.

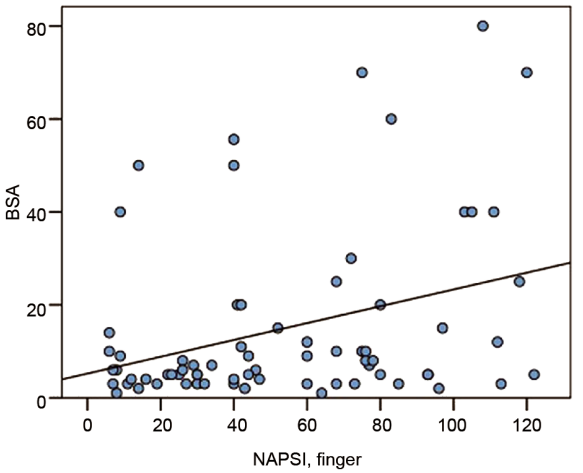

Fig. 2 Correlation between BSAI and NAPSI of fingernail.

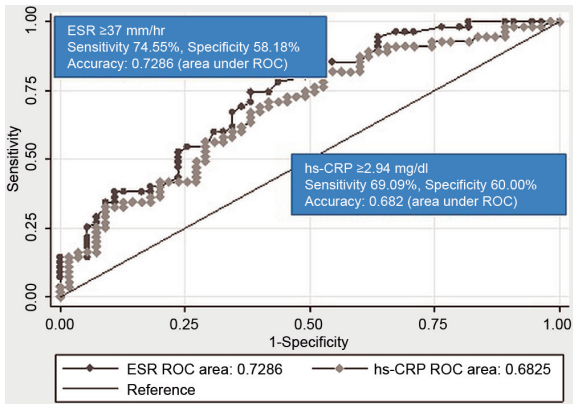

Fig. 3 ROC curve for ESR, hs-CRP, and arthritis in psoriasis.

In terms of laboratory investigation of the serum markers of inflammation, PsoA had higher ESR and hs-CRP than Pso (60.11±34.10 vs. 35.87±24.84 for ESR, *p*-value <0.001 and 4.56 (0.26 to 78.49) vs. 2.10 (0.06 to 70.90) for hs-CRP, *p*-value = 0.001). ESR 37 mm/hour or more correlated with arthritis in PsoA, sensitivity 74.55%, specificity 58.18%, and area under curve 0.729 (Fig. 3). The hs-CRP 2.94 mg/dL or more correlated with arthritis in PsoA, sensitivity 69.09%, specificity 60.00%, and area under curve 0.68 (Fig. 3). In subgroup analysis, the authors divided patients (n = 110) into two groups, the psoriasis with nail involvement (n = 72) and psoriasis without nail involvement (n = 38). Psoriasis with nail involvement increased risk of arthritis 3.27 times (95% CI 1.37 to 7.79, *p*-value = 0.007).

Discussion

The present prospective case-controlled study compared two groups of PsoA and Pso. In previous study, Nail involvement in psoriasis was higher in men than women and increased in patient with long duration of psoriasis[15]. Therefore, the author included the age and sex-matched psoriasis patients in both group.

In agreement with a previous study, PsoA had significant more nail involvement in comparison to Pso[5-8,16] and the most common nail abnormalities in both groups were onycholysis and pitting nail[7]. Over two third of the patients in the PsoA group suffered from skin involvement prior to the development of arthritis. Therefore, the need to monitor arthritis in psoriasis patients should be emphasized.

Another study showed PsoA had more severe nail abnormality compared to Pso. Additionally, subungual hyperkeratosis correlated well with the presence of arthritis[6]. Surprisingly, the authors found NAPSI score of the PsoA group was lower. This might be due to the fact that all patients in PsoA group were on systemic drug treatment, which also improved their nail condition. In contrast, only 11% of the Pso group was on systemic treatment.

Wilson et al reported that nail involvement increased the risk of arthritis by three times and skin lesion that affected three or more sites increased the risk of arthritis by 2.24 times[17]. The present study showed that nail abnormalities increased the risk of arthritis by 7.78 times. Conversely in subgroup analysis, arthritis also increased risk of nail involvement in psoriasis patients by 3.27 times.

Moreover, the present study rendered the same result as previous studies. NAPSI had linear correlation

with PASI and BSAI[4]. In contrast to a study that reported the prevalence of spondylitis at 20.9% in PsoA[18], the present study showed a much lower prevalence of spondylitis of 1.8%. Two most common arthritis were symmetrical polyarthritis and asymmetrical oligoarthritis with almost equal prevalence of 23.44% and 22.42%, respectively. PsoA had worse QLVAS, as a previous study[7].

Regarding the serum markers of inflammation, present study showed statistical significant higher ESR and hs-CRP in PsoA, which is the same as a previous study[19].

Since early detection of arthritis could decrease complication and morbidity in PsoA, any physical sign and/or laboratory investigations that could be used to predict the impending arthritis would be immensely useful for PsoA patients. According to the present study, the presence of nail involvement, ESR 37 mm/hour or more and hs-CRP 2.94 mg/dL or more maybe used as predictors for arthritis.

Limitation

The study enrolled patients from Dermatology and Rheumatology Outpatient Departments, Phramongkutklao Hospital, which is a tertiary care medical center. The population may represent the more severe disease in comparison to the overall psoriasis patients in Thailand. Moreover, the patients were the combination of both old and newly diagnosed psoriasis, so the disease may have been modified by prior treatment.

Conclusion

To the best of authors' knowledge, the present study was the first study done in Thai psoriasis patients looking at the relationship of nail involvement and PsoA. The results were comparable to other population except there was less prevalence of spondylitis of just 1.8%. The majority of PsoA patients had either symmetrical polyarthritis or asymmetrical oligoarthritis. The presence of nail involvement could increase the risk of arthritis by 7.78 times. The presence of nail abnormalities, ESR 37 mm/hour or greater, and hs-CRP 2.94 mg/dL or greater may be used to predict arthritis in psoriasis patients.

What is already known on this topic?

Psoriasis with arthritis had more nail abnormalities than Pso. NAPSI correlated with PASI and body surface area involvement. Psoriasis with arthritis had worse quality of life than Pso.

What this study adds?

Psoriasis patients in Thailand had the same characteristics as presented elsewhere in the world. Psoriasis with arthritis had higher ESR and hs-CRP than Pso. The presence of nail abnormalities, ESR of 37 mm/hour or greater, and hs-CRP of 2.94 mg/dL or more could be used as predictors of arthritis in psoriasis patients.

Potential conflicts of interest

None

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ความสัมพันธ์ของความผิดปกติของเล็บและข้ออักเสบในผู้ป่วยโรคสะเก็ดเงิน

รุจิกาญจน์ อัศวรุ่งนิรันดร์, จุลพรรธน์ อินทรศัพท์, อาทิตย์ นาคะเกศ, ขจร โรจนเมธินทร์

ภูมิหลัง: *ความผิดปกติของเล็บในผู้ป่วยสะเก็ดเงินพบได้ 15-50% และพบมากขึ้นในผู้ป่วยสะเก็ดเงินที่มีข้ออักเสบ*

วัตถุประสงค์: *เพื่อหาความผิดปกติของเล็บ คุณภาพชีวิต และระดับผลเลือด ที่แสดงค่าการอักเสบในผู้ป่วยโรคสะเก็ดเงินที่มีข้ออักเสบเทียบกับผู้ป่วยโรคสะเก็ดเงินที่ไม่มีข้ออักเสบ*

วัสดุและวิธีการ: *เก็บข้อมูลผู้ป่วยโรคสะเก็ดเงินที่มีข้ออักเสบ 55 ราย และผู้ป่วยโรคสะเก็ดเงินที่ไม่มีข้ออักเสบ 55 ราย ที่มารับการตรวจที่โรงพยาบาลพระมงกุฎเกล้า ตั้งแต่ วันที่ 1 มกราคม พ.ศ. 2556 ถึง 31 ตุลาคม พ.ศ. 2556*

ผลการศึกษา: *พบว่าผู้ป่วยโรคสะเก็ดเงินที่มีข้ออักเสบมีความผิดปกติของเล็บร่วมมากกว่ากลุ่มที่ไม่มีข้ออักเสบ [43 (78.2%) และ 29 (52.7%), p-value = 0.005] โดยที่ชนิดความผิดปกติของเล็บในผู้ป่วยทั้ง 2 กลุ่ม ไม่แตกต่างกัน onycholysis เป็นชนิดที่พบมากที่สุด คุณภาพชีวิตของผู้ป่วยโรคสะเก็ดเงินที่มีข้ออักเสบต่ำกว่ากลุ่มที่ไม่มีข้ออักเสบ (visual analog score 50.24±23.13 และ 20.77±17.33, p-value <0.001) นอกจากนี้ยังพบว่า ค่า ESR ≥37 มิลลิเมตร/ชั่วโมง และ hs-CRP ≥2.94 มิลลิกรัม/เดซิลิตร สัมพันธ์กับข้ออักเสบในผู้ป่วยโรคสะเก็ดเงิน (sensitivity 74.55%, specificity 58.18%, accuracy 0.7286 และ sensitivity 69.09%, specificity 60.00%, accuracy 0.682 สำหรับ ESR และ hs-CRP ตามลำดับ)*

สรุป: *พบความผิดปกติของเล็บในผู้ป่วยโรคสะเก็ดเงินที่มีข้ออักเสบมากกว่าผู้ป่วยโรคสะเก็ดเงินที่ไม่มีข้ออักเสบ ข้ออักเสบมีผลกระทบต่อคุณภาพชีวิตของผู้ป่วย ความผิดปกติของเล็บ ค่า ESR ≥37 มิลลิเมตร/ชั่วโมง และค่า hs-CRP ≥2.94 มิลลิกรัม/เดซิลิตร อาจนำมาใช้ทำนายการเกิดข้ออักเสบในผู้ป่วยโรคสะเก็ดเงินได้*