PSORIATIC ARTHRITIS: IS THERE A RELATIONSHIP OF SEVERITY OF NAIL DISEASE TO SKIN OR JOINT DISEASE?

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KEY WORDS: PSORIASIS, PSORIATIC ARTHRITIS.

ABSTRACT

Objective: To examine the relationship between the severity of nail disease and severity of both skin and joint disease as well as functional assessment among psoriatic arthritis (PsA) patients.

Patients & Methods: Thirty two patients were included in the current study. Pattern of arthritis was recorded and severity of joint disease was assessed using modified Ritchie index (adding DIPs, lumbar spine and sacroiliac joints) and scored as mild, moderate and severe. Psoriatic skin patterns were recorded and severity of skin disease was assessed using the percentage of body surface area (% BSA) affected with psoriasis. Severity of nail disease was assessed using Psoriasis Nail Severity Score (PNSS) where all the 20 nails were scored for pitting, onycholysis, hyperkeratosis and dystrophy. Functional assessment was done using HAQ. Finally, the presence of HLA-B17 and HLA-B27 were investigated.

Results: Pattern of arthritis was as follows: polyarthritis was found in 19 patients (59.4%), oligoarthritis in 7 (21.9%), spondyloarthropathy in 4 (12.5%), DIPs in 2 (6.2%) and arthritis mutilans was not found. Modified Ritchie index was mild in 11 patients (34.4%), moderate in 18(56.3%) and severe in 3 (9.3%). As for skin disease pattern, psoriatic plaques were found in 25 patients (78.2%), guttate in 4(12.5%), combined guttate and plaques in 2(6.2%) and pustular psoriasis in 1(3.1%). No erythrodermic or discoid pattern were found. The percentage of involved BSA ranged from (2.8-44%). Nail disease was detected in 26 patients (81.2%) and was distributed as follows: 6 patients (23%) scored PNSS > 10, 13(50%) scored
10-19, 5(19.4%) scored 20-29 and 2(7.6%) scored > 30. PNSS had no correlation with age or duration of arthritis but had significant positive correlation with skin disease duration (p<0.01) and with %BSA (p<0.01). Also, PNSS had positive correlation with modified Ritchie index but not with HAQ which was found to correlate with modified Ritchie index (p<0.05). Low PNSS scores were found in positive HLA-B27 and not in positive HLA-B17 patients but overall, no significant correlation were found between them.

Conclusion: PNSS, as a simple and practical method, could be used as a good indicator for assessment of nail disease severity among psoriatic arthritis patients. Also it correlates with duration and severity of skin involvement and severity of joint disease. Research for disease pathogenesis at genetic and cellular level is still needed to understand the true link between psoriatic nail, skin and joint disease.

INTRODUCTION

Psoriasis is a common skin disease occurring in 1-3 % of population world-wide. Among these patients, 15-20% will develop a seronegative inflammatory arthritis which may affect peripheral as well as spondyloaxial joints (Fleischer et al., 1996). Patterns of arthritis in PsA include oligoarthritis, polyarthritis, predominant DIP arthritis, spondyloarthropathy and arthritis mutilans (Bennett et al., 2001).

Generally, skin disease precedes the onset of arthritis in two-thirds of cases, while 20% develop simultaneous arthritis and psoriasis and only 5-15% report arthritis before psoriasis. Skin lesions include psoriasis vulgaris in the form of plaques, guttate or combination of both types, discoid, erythrodermic or localized pustular (Fredricksson & Pettersson, 1978).

Psoriasis of skin is frequently accompanied by nail disease. Between 40-82% of psoriatic patients suffer from nail changes. Finger nails are more frequently affected than toe nails (Gorter et al., 2002). Ajendran et al. (2003) believed that almost every psoriatic patient had some degree of nail involvement at least during short periods in the course of the disease. They also added that the natural history of nail psoriasis is partly similar to that of the skin with exacerbations and remissions.

El-Kayam et al. (2000) reported that PsA is associated with higher rates of nail disease rather than psoriasis alone. Common changes of nail disease include pitting, subungual hyperkeratosis, and onycholysis and nail dystrophy. Many studies have validated an association between psoriatic nail involvement, DIP joint arthritis, and between sacroiliitis and HLA-B27
typing in PsA (Alenius et al., 2002). Yet, there is little emphasis placed on the relationship between severity of nail disease and severity of both skin and joint disease.

**Aim of work:**

To study the relationship of nail disease severity to skin and joint disease severity, quality of life and HLA-B27 and B-17 in a group of psoriatic arthritis patients.

**PATIENTS AND METHODS**

Thirty-two PsA patients were included in this study (14 males and 18 females). They were selected according to Fournie's criteria for classification of psoriatic arthritis (Fournie' et al., 1999). Their ages ranged between 23-56 years. They were randomly selected from the Rheumatology & Rehabilitation and Dermatology Outpatient Clinics and Inpatient Departments over 8 months. Patients with positive RF, reactive arthritis, with infective triggering focus or gout, were excluded from the study. Included patients were subjected to the following:

A- Detailed history taking.

B- Clinical examination with stress on:

[I] **Joint examination:**

1- Pattern of arthritis: oligoarthritis, polyarthritis, DIP involvements of fingers and/or toes, spondyloarthropathy with sacroiliitis or arthritis mutilans.

2- Assessment of joint disease severity: using modified Ritchie index (Jones et al., 1994) (to include DIPs, lumbar spine joints and sacroiliac joints). Counting the number of involved joints and assessment was as follows:

* Mild (<10 joints).
* Moderate (10-20 joints).
* Severe (>20 joints).

[II] **Nail examination:**

1- Each finger and toe nail was examined for pitting, subungual hyperkeratosis, onycholysis and nail dystrophy.

2- Each of the listed features scored 1 for each finger (total score 40) or toe nails (total score 40) with a possible maximum nail score of 80. This is referred to as the Psoriasis Nail Severity Score (PNSS) (Williamson et al., 2004).
[III] Skin examination:

1- Pattern of skin lesions: Psoriatic skin lesions were diagnosed both clinically and histopathologically. They were examined for plaques, guttate, combined plaques and guttate, pustular and erythrodermic patterns.

2- Assessment of skin disease severity was made by measurement of the percentage of body surface area (%BSA) using the role of nines method (Ramsay & Lawrence, 1991).

[IV] Assessment of quality of life:

Assessment of functional status was done using the HAQ (Stanford Health Assessment Questionnaire) (Fries et al., 1980).

The HAQ sheet completed by patients is 'the reported HAQ' and the sheet completed by the doctors is 'the observed HAQ', the observed HAQ-the reported HAQ = discordance in HAQ. The mean HAQ score for every pattern of joint disease was recorded alone.

[V] The presence of HLA-B27 and B17 were tested by microcytotoxicity test (Hansen & Nilson, 1990).

[VI] Statistical analysis:

All data were coded, entered, checked and analyzed using EPI-INFO (version 6.02) software computer package. Data were represented as number and percent, mean±standard deviation and Pearson correlation coefficient (r). P value was considered significant at 5% level (Ztman, 1998).

RESULTS

Table (1) shows the characteristics of studied patients. There was a mild female preponderance (14:18). Mean age±SD was (48.2±16.6), mean duration of psoriasis was (16.3 ±10.9), while mean duration of arthritis was (10.2±8.7).

Table (1): Characteristics of studied patients.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Range</th>
<th>M ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>31-67</td>
<td>48.2 ± 16.6</td>
</tr>
<tr>
<td>Male: Female</td>
<td>14 : 18</td>
<td></td>
</tr>
<tr>
<td>Duration of psoriasis (yrs)</td>
<td>3-28</td>
<td>16.3 ± 10.9</td>
</tr>
<tr>
<td>Duration of arthritis (yrs)</td>
<td>1-23</td>
<td>10.2 ± 8.7</td>
</tr>
</tbody>
</table>
Table (2) shows the relationship of onset of arthritis to psoriatic lesions. As expected, psoriasis onset was recorded before arthritis in the majority of patients 23 (71.9%), simultaneous onset of psoriasis and arthritis in 6 patients (18.8%) and onset of arthritis before psoriasis in 3 patients (9.3%).

Table (2): Relationship of onset of arthritis to psoriatic lesions.

<table>
<thead>
<tr>
<th>Clinical data</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psoriasis onset first</td>
<td>23</td>
<td>71.9</td>
</tr>
<tr>
<td>Simultaneous psoriasis &amp; arthritis Onset</td>
<td>6</td>
<td>18.8</td>
</tr>
<tr>
<td>Arthritis onset first</td>
<td>3</td>
<td>9.3</td>
</tr>
</tbody>
</table>

Fig. (1) shows the pattern of arthritis. Polyarthritis was the commonest, 19 patients (59.4%), oligoarthritis 7 patients (21.9%), spondyloarthropathy 4 patients (12.5%), predominant DIP arthritis 2 patients (6.2%) and arthritis mutilans was not found (0%). Fig: (2) Shows results of modified Ritchie index, 18 patients (56.3%) had "moderate" score, 11 patients (34.4%) had "mild" score and 3 patients (9.3%) had "severe" score.

Fig. (1): Pattern of arthritis expressed as % of cases.
Fig. (2): % of results of modified Ritchie Index

Fig. (3) Shows patterns of skin disease where psoriatic plaques were the commonest in 25 patients (78.2%), guttate in 4 patients (12.5%), combined plaques and guttate in 2 patients (6.2%) and localized pustular psoriasis in 1 patient (3.1%). Discoid or erythrodermic types were not found (0%).

Fig. (3). Pattern of skin disease expressed as % of cases.
Assessment of skin severity using % BSA was shown in table (3). Most patients were suffering from mild psoriatic skin lesions (10 patients had < 5% BSA and 13 patients had 5-15 %BSA). Severe skin lesions was found only in one patient >36 % BSA.

Fig. (4). Pattern of nail disease expressed as % of cases.

Table (3): Assessment of severity of skin disease using %BSA.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>&lt;5%</th>
<th>5-15%</th>
<th>16-25%</th>
<th>26-36%</th>
<th>&gt;36%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No (%)</td>
<td>10  (31.2)</td>
<td>13 (40.7)</td>
<td>5 (15.7)</td>
<td>3 (9.3)</td>
<td>1 (3.1)</td>
</tr>
</tbody>
</table>

Fig. (4) shows the pattern of nail disease among studied patients. We found nail changes in 26 patients (81.2%). Pitting was the commonest sign and was found in 19 patients (73%), onycholysis in 16 patients (61.6%), subungual hyperkeratosis in 8 patients (30.8%) and dystrophy was found in 1 patient (3.8%).

Table (4): Assessment of nail disease severity using PNSS.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>&lt;10</th>
<th>10-19</th>
<th>20-29</th>
<th>≥30</th>
</tr>
</thead>
<tbody>
<tr>
<td>No (%)</td>
<td>6(23)</td>
<td>13(50)</td>
<td>5(19.4)</td>
<td>2 (7.6)</td>
</tr>
</tbody>
</table>
Table (4) shows the assessment of nail disease severity using PNSS, PNSS 10-19 was the commonest and was found in 13 patients (50%) and PNSS ≥30 was the least common and was found in 2 patients only (7.6%).

Fig. (5): The presence of HLA-B27 and B-17 in studied patients expressed as % of cases.

Table (5) shows results of mean HAQ score according to pattern of arthritis. Polyarthritis had the highest mean score (0.83) and DIPs arthritis had the lowest mean score (0.13).

Table (5): Results of mean HAQ score.

<table>
<thead>
<tr>
<th>Pattern of arthritis</th>
<th>No</th>
<th>Mean HAQ score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyarthritis.</td>
<td>19</td>
<td>0.83</td>
</tr>
<tr>
<td>Spondyloarthritis.</td>
<td>4</td>
<td>0.65</td>
</tr>
<tr>
<td>Oligoarthritis.</td>
<td>7</td>
<td>0.48</td>
</tr>
<tr>
<td>DIP arthritis.</td>
<td>2</td>
<td>0.13</td>
</tr>
</tbody>
</table>
Fig. (5) Shows the presence of HLA-B27 and HLA-B17 among studied patients, 5 patients (15.6%) had positive HLA-B27 and 1 patient (3.1%) had positive HLA-B17.

Table (6): Correlations of PNSS with age, disease durations, modified Ritchie index and %BSA.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age</th>
<th>Duration of arthritis</th>
<th>Duration of psoriasis</th>
<th>m. Ritchie index</th>
<th>% BSA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>p</td>
<td>r</td>
<td>p</td>
<td>r</td>
</tr>
<tr>
<td>PNSS</td>
<td>0.09</td>
<td>&gt;0.05</td>
<td>0.13</td>
<td>&gt;0.05</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>0.46</td>
<td>&lt;0.05</td>
<td>0.50</td>
<td>&lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>

Table (6) shows correlations between PNSS and age, disease durations, modified Ritchie index and %BSA. Significant positive correlations were found between PNSS and duration of psoriasis ($r=0.57$, $p<0.01$), modified Ritchie index ($r=0.46$, $p<0.05$) (Fig. 6a) and %BSA ($r=0.50$, $p<0.01$) (Fig. 6b) but not with duration of arthritis.

Table (7) Shows correlations between percentBSA, modified Ritchie index and mean HAQ score. The only significant increase was found between modified Ritchie index and mean HAQ score ($r=0.42$, $p<0.05$) as shown in Fig. (7).

![Correlation between PNSS and %BSA.](image-url)
Fig. (6b): Correlation between PNSS and modified Ritchie index.

Fig. (7): Correlation between modified Ritchie index and mean HAQ score.
Table (7): Correlations between percent BSA, modified Ritchie index and mean HAQ score.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>% BSA vs. m. Ritchie index</td>
<td>-0.027</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>% BSA vs. mean HAQ score</td>
<td>-0.03</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>m. Ritchie index vs. mean HAQ score</td>
<td>0.42</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Table (8) shows the correlation between PNSS to HLA-B17 and B27 in PsA patients. Low PNSS scores (<10) were found in 3 positive HLA-B27 patients, however, no significant correlation was found between them (p>0.05).

Table (8): Correlation of PNSS to HLA-B17 and HLA-B27.

<table>
<thead>
<tr>
<th></th>
<th>HLA-B27</th>
<th>HLA-B17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>p</td>
</tr>
<tr>
<td>PNSS</td>
<td>0.25</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Psoriatic arthritis is one of the seronegative arthropathies that exhibit some degree of spinal involvement and affect peripheral joints in symmetric or asymmetric pattern. It is characterized by a relatively greater upper limb joints involvement, especially in DIPs (Gorter et al., 2002). PsA may be a significant feature in up to 20% of psoriatic patients. Nail disease is known to occur more frequently in patients with PsA than in those with psoriasis alone (Koo et al., 2001). The relationship between DIP joint and nail disease is well recognized (Scarpa et al., 2004). However, the association between other aspects of PsA and nail disease is not fully understood. In the current study, we have assessed the nail disease severity in 32 patients with PsA and tried to find out the relationship of nail disease severity to severity of skin disease, severity of arthritis, HLA-B17, B27 and the quality of life among PsA patients.

Why is nail assessment important? previous reports recorded that nail disease in PsA patients causes cosmetic problems in 93%, pain in 52%,
difficulties in activities of daily living and functional impairment in 58% (Williamson et al., 2004).

Several methods are available to examine and assess psoriatic nails (Pierard & Pierard-Franchimont 1996, Tosti et al., 1998 and Rich & Scher 2003). We have used the PNSS to assess nail severity in PsA patients as it is simple and practical method that examine the most common symptoms in finger and toe nails. In our study over 80% of patients had clinically detectable nail disease which is similar to previous studies of (Kwang et al., 1995 and Gerster & Hohl, 2002).

In the current study, the pattern of arthritis was as follows: polyarthritis was the commonest (59.4%), followed by oligoarthritis (21.9%), spondyloarthropathy (12.5%) and predominant DIP arthritis (6.2%). We did not use symmetry to define our joint subgroups, this is because the fewer the number of joints involved, the more likely the disease to be asymmetrical. Similar patterns was previously reported by several authors as Kane et al. (2003) and Queiro-Silva et al. (2003). Several studies reported DIP arthritis subgroup to have more frequent nail disease than other subgroups (Scarpa et al., 2004), perhaps as a result of the common vascular supply of distal phalanx and nail matrix. In our study, only 2 patients (6.2%) had predominant DIP arthritis and both had nail affection but this small number is not sufficient for statistical analysis.

A significant positive correlation was found between nail disease severity and joint severity according to modified Ritchie index. Similar results were previously reported by (Goodfield, 1994 and Williamson et al., 2004) even with using a different method for assessing joint disease severity. On the other hand, Jones et al. (1994) reported that there is no correlation between PNSS and joint severity. This might be attributed to their different method for assessing nail severity as they assess severity of finger nails only.

In the present study, there was a significant positive correlation between severity of nail disease and both duration and severity of skin disease. These results were in accordance with those reported by (Jones et al., 1994. Cohen et al., 1999 and Williamson et al., 2004). On the other hand, McHugh et al. (2003) found no significant correlation between nail and skin disease severity in their PsA patients.

In the current study, psoriatic skin lesions were generally mild with different patterns. Some previous studies (Cohen et al., 1999) reported extensive skin lesions with PsA patients. However, more recent studies (Zachariae et al., 2002 and Alenius et al., 2002) agreed with our finding and reported mild skin disease with PsA. This finding may explain, in part, the small number of our cases with positive HLA-B27 and HLA-B17, which are
more common in patients with extensive psoriatic skin involvement as well as spondyloarthropathic pattern of joint disease; both were uncommon among our patients.

There is a limited impact on understanding the pathogenesis of PsA especially with lack of any specific serological markers for the disease (Fearon & Veale, 2001). There is no clear cut HLA association related to a specific subgroup of joint or skin disease (Zunkler & Rober, 2000). In our study, low PNSS scores (<10) were more frequent in positive HLA-B27 patients but no significant correlation was found between PNSS and HLA-B27 or B17. We did not study HLA antigens relations with characteristics of joint disease as we believed as some other authors (Alenius et al., 2002) that clinical manifestations are more reliable predictors for pattern or prognosis of arthritis rather than specific HLA antigens. It was also reported that HLA antigens seem to modify joint disease expression rather than susceptibility of joint disease.

In the current study, we used HAQ for functional assessment of PsA quality of life. We found a significant positive correlation between HAQ and joint severity but not with nail severity. These results go in accordance with Alenius et al. (2002) and Taccari et al. (1998). In contrast, Williamson et al., (2004) reported that severe nail disease (high PNSS) was positively correlated with functional impairment. However, it is may be reasonable that functional impairment could be related to number and severity of joints affected rather than nail disease severity.

In conclusion: nail disease in PsA is an aspect that is often overlooked in clinics and published studies as well. The positive correlations between nail severity and both severity of skin and joint diseases lend support to the hypothesis that nail pathology may be linked to skin and joint disease in PsA. Consequently, nail disease could be used as a predictor of the severity of skin and joint disease among these patients.

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الالتهاب المفصلي الصدفي: هل هناك علاقة بين شدة الإصابة في الأظافر والإصابة في كل من الجلد و المفاصل؟

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الهدف من البحث: هو دراسة العلاقة بين شدة الإصابة بالأظافر بمرض الالتهاب المفصلي الصدفي و شدة الإصابة في المفاصل و الجلد. وكذلك مدى تأثيرها على نوعية حياة المرضى في مرض.

الطريقة: وقد أجريت هذه الدراسة على 32 مريضا و ذلك بفحص الأظافر وتحديد نوعية الإصابة وتحديد نوعية و شدة الإصابة بالمفاصل. تم اتخاذن معايير حتى قد يقيسون نوعية حياة هؤلاء المرضى و مدى تأثيرها بالمرض. وعمومًا تم فحص عينات من الدم للكشف عن وجود عامل ( هـ.ل.) بـ 27 و 17.

النتائج: وقد وجد أن غالبية الإصابات المفصلية كانت من نوع الالتهاب الصدفي المفصلي المتعدد و لم نجد أي علاقة بين الالتهابات المفصلية بأخبارها المختلفة و شدة إصابة الأظافر في حين ارتبطت نوعية الحياة ارتباطا إيجابياً بشهادة الإصابات المفصلية مختلف أنواعها. و بالنسبة لإصابة الجلد بالصدفية فقد تسربت إيجابياً مع شدة إصابة الأظافر، كما لوحظ زيادة شدة إصابة الأظافر دلية قصيرة الإصابة بالرمي الجلدي.

الخلاصة: ويكشف من هذا البحث أنه بالرغم من ضرورة فحص الأظافر فحصًا جيدًا في كل حالات الالتهاب المفصلي الصدفي، إلا أنه يرتبط ارتباطًا وثيقًا بإصابة الجلد بالصدفية في حين أنه ليس مؤشراً للتبدو بإصابات المفاصل أو مدى شدتها.