Re-evaluation of Psoriatic Patients with Metabolic Syndrome: A Case Control Study Searching for the Highly Prevalent Criteria

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Abstract
Psoriasis is a common chronic inflammatory skin disorder, presented as erythematous plaques with salmon pink color and silvery white scales. The association between psoriasis and metabolic syndrome have recently demonstrated by many studies, and this link suggested by the presence of systemic inflammatory status with the high level of cytokines. The study aimed to evaluate psoriatic patient who have metabolic syndrome with recording of the frequency of the criteria of this syndrome. Sixty two cases of psoriasis involved in this study with age and gender matched controls. Patient was diagnosed as having metabolic syndrome if he has three or more of the criteria depend upon IDF/NHBLI/AHA/World Heart Federation/International Atherosclerosis Society/International Association. This study revealed that metabolic syndrome occur in a higher frequency among psoriatic patients (58%) than the controls (16%). The highly prevalent criteria among psoriatic patients with positive metabolic syndrome was increase waist circumference at the top (100%) and hypertriglyceridemia came next (69%), with low HDL, hypertension, and raised fasting blood glucose came successively. The study reiterates the fact that Metabolic Syndrome and psoriasis do have a close association. Our study shows that central obesity and hypertriglyceridemia occur with high frequency among psoriatic patients with positive metabolic syndrome.

Keywords: Psoriasis, metabolic syndrome.

Introduction
Psoriasis is a common chronic inflammatory skin disorder, presented as well defined plaques with salmon pink color and silvery white centrally attached scales. Psoriasis is considered to be a polygenic disorder (1,3). Recently, many studies demonstrated the association of psoriasis with systemic disorders like metabolic syndrome, cardiovascular disease, osteoporosis, inflammatory bowel disease, cancer, and depression. Systemic inflammation and the presence of interleukin-6 and tumor necrosis factor-α in high levels suggested the link between psoriasis and associated systemic disorders (4).

With regards to the immunopathogenesis of psoriasis and metabolic syndrome [chronic inflammation mediated by pro-inflammatory cytokines], both may develop “interdependently”. Additionally, “insulin-like growth factor 1” have implicated in psoriasis “as a shared mediator in the proliferation of keratinocyte “and the development of hyperlipidemia and diabetes (5-10).

Chronic inflammation (Th-1 and Th-17) with cytokines dysregulation, in addition to promotion of hyperplasia of epidermis in psoriasis, may also antagonize insulin signaling leading to increase risk of obesity and insulin resistance. In addition, both psoriasis and
metabolic syndrome sharing the genetic susceptibility by the existence of pleiotropic “PSORS2-4, CDKAL1, and ApoE4” genetic loci\(^{11,12}\). Significant clinical implications may be demonstrated in psoriatic patients with metabolic syndrome, especially those on chronic systemic treatments “use them with caution” because the coexisting metabolic disorders may be adversely affected\(^{13}\).

Aim of our study was to evaluate psoriatic patient who have metabolic syndrome with recording of the frequency of the criteria of this syndrome.

**Patients and Method**

This case control study was conducted over a period of nine months from October 2018 till March 2019. Sixty two cases of psoriasis involved in this study collected from Department of dermatology in AL-Yarmok teaching hospital in Baghdad province with age and gender matched controls. Psoriasis was diagnosed clinically and suspicious cases proved by histopathological study. Inclusion criteria are those with plaque psoriasis of at least 3 months, more than 18 years old, and not received any systemic medication for psoriasis for at least three months while Exclusion criteria are pustular and erythrodermic psoriasis, those taking systemic drugs in the three months before enrolling, pregnant women and those complaining from other autoimmune diseases.

Questionnaire was designed to obtain the information age, gender, duration of psoriasis, family history, height, and weight. Waist circumference was measured by placing a tape measure around the abdomen at the level of uppermost part of the pelvic bone. Blood pressure was recorded by taking the average of two separated measurements. Body mass index was measured by dividing the weight in kilogram on the square of height in meter and psoriasis severity evaluated by using the psoriasis area and severity index (PASI). Venous blood samples were taken 12 hour fasting status in the morning to measure fasting blood sugar and serum triglyceride in our hospital laboratories. For diagnosis of metabolic syndrome I depend upon “IDF/NHBLI/AHA/World Heart Federation/International Atherosclerosis Society/International Association for the Study of Obesity, 2009”. Patient was diagnosed as having metabolic syndrome if he has three or more of the following:

- waist circumference \(>94 \text{ cm in men and } >80 \text{ cm in women} \).
- serum triglycerides \( \geq 150 \text{ mg/dL} \) or lipid-lowering drugs.
- serum HDL \( <40 \text{ mg/dL in male and } <50 \text{ mg/dL in female} \).
- Blood pressure \( \geq 130/85 \text{ mm Hg} \) or antihypertensive therapy.
- Fasting plasma glucose \( \geq 100 \text{ mg/dL} \) or pharmacologic therapy.

To clarify the effect of difference factors in this study parameters, the “Statistical Analysis System 2012” program was used and Chi-square test applied to compare the significance.

**Results**

Sixty two psoriatic patients [34 male (55%) and 28 female (45%) with their matched control] enrolled in this study. Their age distribution: 46 (74.2%) between 21 years and 50 years, 10 (16.1%) above fifty years, and only six (9.7%) between 18 years and 20 years. Metabolic syndrome discovered to be presented in a higher frequency in psoriasis patients [36 (58%)] in comparison with controls [10 (16%)], the result is highly significant and the \( p \)-value was .000001. The highly prevalent criteria among psoriatic patients with positive metabolic syndrome was increase waist circumference \(36 (100\%) \) with same percent in controls with positive metabolic syndrome. Serum triglyceride in the second place (25 patients 69%) with a nearly equal value in control group (7 control 70%).

There were 12 (33%) psoriatic patients with positive metabolic syndrome found to have low S.HDL while in control group only two (20%) appeared to have low value of S. HDL. Elevated blood pressure was noticed in 22 patient (61%), in control group 6 (60%) persons have elevated blood pressure. Sixteen (44%) psoriatic patients had elevated fasting blood sugar, in contrast to control group in which there were only 2 persons.

Regarding PASI score among psoriatic patients with positive metabolic syndrome: 32 (89%) subjects with a score less than 8, while only 4 (11%) subjects above 10 body mass index measurement revealed that 16 (44%) patients were obese, 10 patients (28%) were overweight and the another 10 (28%) patients presented with normal weight.
Table 1: The frequency of metabolic syndrome criteria among psoriatic patients in comparison with controls

<table>
<thead>
<tr>
<th>Metabolic Syndrome Criteria</th>
<th>PSORIAISIS GROUP = (62)</th>
<th>CONTRPL GROUP = (62)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+ Metabolic Syndrome 36</td>
<td>- Metabolic Syndrome 26</td>
</tr>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>↑ Waist circumference</td>
<td>36</td>
<td>100</td>
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<tr>
<td>S . triglyceride</td>
<td>25</td>
<td>69</td>
</tr>
<tr>
<td>S.HDL</td>
<td>12</td>
<td>33</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>22</td>
<td>61</td>
</tr>
<tr>
<td>Fasting blood sugar</td>
<td>16</td>
<td>44</td>
</tr>
</tbody>
</table>

* (P<0.05), ** (P<0.01).

Fig. 1: Prevalence of metabolic syndrome among psoriatic patients in comparison with controls

Discussion

Recently, “the understanding of the role of inflammatory cells and mediators in the pathogenesis of psoriasis” have changed our look to psoriasis from being a cutaneous disease to that of a systemic disorder[14]. Psoriasis and metabolic syndrome are characterized by sharing inflammatory pathways display similar inflammatory profiles with Th1 and over expression of IL-6 and TNF-alpha[15]. Epidemiological link of psoriasis to metabolic syndrome and it’s prevalence was suggested by several observational studies (15–25% in the general population)[16].

In this study psoriatic patients examined for the presence of metabolic syndrome in comparison with controls, and data was analyzed to clarify the prevalence of criteria of such syndrome. Males were the predominant sex and maximum number of psoriatic cases (74.2%) was noted in the age group of between 21 years and 50 years. This study revealed that metabolic syndrome occur with a higher percentage inpsoriatic patients (58%) than controls (16%) this appear higher regarding recent case control study by Narendra Gangaiah, NS Aysha Roshin, et al (38% vs. 22%)[17]. Regarding the prevalence of metabolic syndrome criteria among patients :central
Obesity (Raised values of waist circumference) was at the top (100%) and hypertriglyceridemia came next (69%), with low HDL, hypertension, and raised fasting blood glucose came successively.

Visceral obesity and type 2 diabetes are the main components of metabolic syndrome. Adipose tissue pathologically has important effects as it infiltrated by macrophages that secrete cytokines in the systemic circulation resulting in a chronic inflammatory state which will lead to the development of numerous diseases associated with obesity(18). In most international studies obesity appear to be more frequent among psoriatic patients than controls(19). All psoriatic patients in the present study have increased Waist circumference and visceral obesity could be the possible mechanism that correlate psoriasis with metabolic syndrome and its comorbidities. It was also demonstrated that obesity is a risk factor[more than two times] for developing psoriasis(20). Middle or older age men with mild obesity are more likely to develop psoriasis as suggested by Naito and Imafuku(21).

Significant elevation in serum triglyceride levels have shown in various studies done in Caucasians(22-24). In the present study, psoriasis was strongly related with dyslipidaemia. Hypertriglyceridemia represent (69%) in psoriasis group with no difference among controls. Low value of S. HDL was found in 33% of psoriasis group, while it was found to be low in 20% of controls. Similar observations were documented in Lebanon study(25).

Hypertension was documented among 22 cases of psoriatic patients with positive metabolic syndrome, in comparison to controls with metabolic syndrome. Psoriasis patients in regards to the risk of developing hypertension showed modest increase in comparison with the general population(26,27). No known mechanism explain the relation that link psoriasis to hypertension. Multiple researchers proposed that the major source of angiotensigen is the adipose tissue and the derived angiotensin II [in addition to its function in salt retention by kidneys] may act assitmatator for T-cell proliferation. Perivascular fat which result from increased visceral adipose tissue “can serve as a reservoir for activated effector T cells” which in turn lead to the promotion of dysfunction in the blood pressure(28).

Regarding the relation between psoriasis and hyperglycemia, there is high risk to develop diabetes in addition to metabolic syndrome(29). Elevated fasting blood sugar was present in 44% of Psoriatic patients and in 20% of controls. This finding is supported by a study conducted by Samer A Dhaher, and Alaa Abdul Hassen Naif(18,30).

Both hypertension and dyslipidemia cause increase the “systemic inflammatory burden” together with obesity, all of these adds to the comorbidities of psoriasis(31). PASI score among psoriatic patients with positive metabolic syndrome was less than 8 in nearly 90% of cases, this gave usa negative impression about the relation between the severity of disease and metabolic syndrome. Nisa and Qazi study also found no significant correlation(32).

While studying of body mass index and its association with metabolic syndrome in both groups shows no significance. This comparable with Korean and Norwegian studies were they found a non-statistically significant association with increment in the weight(33,34).

**Conclusion:** The study reiterates the fact that Metabolic Syndrome and psoriasis do have a close association and showed that central obesity and hypertriglyceridemia occur with high frequency among psoriatic patients with positive metabolic syndrome

**Conflict of Interest:** None

**Funding:** Self

**Ethical Clearance:** Not required.

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