ABSTRACT

Background:
Psoriasis is an inflammatory disease of the skin and joints. Previous studies have shown a higher prevalence of metabolic syndrome (MetS) in psoriatic patients. Recent literature adds that non alcoholic fatty liver disease (NAFLD) is also frequent in patients with psoriasis.

Adiponectin is a cytokine secreted from the adipose tissue which has insulin- sensitizing effects and anti inflammatory properties. There are a few studies which have demonstrated that adiponectin is reduced in patients with psoriasis suggesting that this adipocytokine may play a role in the pathogenesis of psoriasis. There have been no studies so far on adiponectin in relation to psoriasis and MetS. Only one study has addressed adiponectin receptor expression in human keratinocytes.

Objectives:
Part 1A
To investigate the occurrence of metabolic comorbidities and NAFLD in patients with psoriasis and controls and to determine the relation between severity of psoriasis and the presence of metabolic comorbidities.

Part 1B
To assess the severity of NAFLD in both the groups.

Part 2A
This study was performed to analyze serum adiponectin and insulin levels in psoriasis patients with and without MetS and in controls with and without MetS.

Part 2B
To investigate if adiponectin receptors are expressed in human keratinocytes and to study the pattern of adiponectin receptor expression in keratinocytes of psoriatic patients with and without MetS and correlate the serum adiponectin values with the receptor expression.
**Materials & methods:**

**Part 1A:**

We performed a case control study on 333 adult patients with psoriasis and 330 controls matched for age, sex and body mass index. MetS was diagnosed by the presence of three or more of the South Asian modified national cholesterol education program’s adult panel III criteria. NAFLD was diagnosed by ultrasonography and liver enzymes after excluding other liver diseases.

**Part 1B:**

We compared the NAFLD subgroups in patients with psoriasis and controls by determining their fibrosis, steatosis and non-alcoholic steatohepatitis (NASH) scores.

**Part 2A:**

We performed a case control study on sixty psoriasis patients, 29 with MetS and 31 without MetS and 40 controls, 20 with and 20 without MetS matched for age, sex and BMI. Fasting serum insulin and adiponectin levels were measured in all groups.

**Part 2B:**

Twenty psoriasis patients, 9 with MetS and 11 without MetS were included in the study. Serum adiponectin levels and expression of adiponectin receptors 1 and 2 were examined immune-histologically in the epidermis of psoriatic patients and controls.

**Results:**

**Part 1A:**

MetS was significantly more common in patients with psoriasis than in controls (47% Vs 31.2, OR; 95% CI: 1.96; 1.43-2.69). Psoriatic patients also had a higher prevalence of triglyceridemic (36.3% vs 20.6%; p = 0.000, or 2.19, 95% CI : 1.54 – 3.10), abdominal obesity (63.7% vs 54.8% p = 0.02, or = 1.44, 95% CI = 1.05 – 1.96), elevated fasting blood sugar (57.7% vs 46.4%, p = 0.004, or = 1.53, 95%, CI = 1.53 – 2.08) and hypertension (26.7% vs 16.4%, p = 0.001, or = 1.86, 95% CI = 1.27 – 2.75). There was no correlation between duration of psoriasis, psoriatic arthritis and psoriasis severity with muts or its components. However psoriatic patients with coronary artery disease or stroke has a tendency towards more severe disease (p = 0.008, or = 2.09, 95% CI = 1.12 – 1.64).
The accuracy of NAFLD was higher in patients with psoriasis than in controls (17.4% vs 7.9% p = 0.000) NAFLD patients in the psoriasis group (n=58) were more likely to have mets (p=0.08) and diabetes (p = 0.02) than those with psoriasis above (n=254). The former group had a longer duration of psoriasis and arthritis (p = 0003 and 0.005).

**Part 1B**

Patients with psoriasis with NAFLD had more severe disease as per the psoriasis area and severity index scores (p = 0.02). Patients with psoriasis had more severe NAFLD than control as reflected by the steatosis, NASH and fibrosis scores (p=0.001, 0.003, 0.03 respectively)

**Part 2A**

The overall serum adiponectin levels were significantly reduced in psoriatic patients when compared to controls (p = 0.000). A significant reduction was also observed in psoriatic patients with mets than those without mets in the same group (p = 0.000). Similar decrease was observed between those with mets in the psoriasis and control group (p = 0.001). The lowest mean value of serum adiponectin (6387.9 ng/ml) was observed in psoriasis with mets group and highest value (12146.3 ng/ml) in controls without mets.

**Part 2B**

Both adiponectin receptors (Adipo R1 and Adipo R2) were expressed in all layers except stratum corneum in normal skin. There was a significant difference in the pattern and intensity of receptor expression between psoriasis lesions and controls (p=0.000). There was a significant reduction in expression and intensity of Adipo R, and Adip R2 in uninvolved skin of psoriatic when compared to controls (p=0.000). In most of the cases there was patchy focal loss affecting some layers in involved skin no significant difference was observed in the intensity and expression between psoriasis lesions in patients with and without mets.

**Conclusion :**

**Part 1A**

Mets is frequent in patients with psoriasis.

**Part 2A**
Adiponectin levels are decreased in patients with psoriasis irrespective of mets thus indicating a role in its pathogenesis. This study prompts further trials on drugs increasing adiponectin levels in patients with psoriasis.

**Part 2B**

This study highlights that there is a significant loss of expression of Adipo R1 and Adipo R2 in both involved and uninvolved then in psoriating irrespective of the presence of mets.