Association of psoriasis with metabolic disorders and their assessment using epicardial fat thickness, serum lipid profile and homocysteine level

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INTRODUCTION

Psoriasis is a papulo-squamous disorder which is characterized by exaggerated and disordered epidermal cell proliferation and keratinisation with prevalence range from 2-4%. The underlying pathology causing psoriasis includes increased levels of cyclic-adenosine monophosphate, epidermal growth factor receptor binding, protein kinase-C and transforming growth factor-α, collectively point to a disturbance in T cell function.

One of the most accepted hypothesis that regarding the cause of psoriasis is that it is an immune-mediated inflammatory skin disease that manifests in a genetically predisposed person exposed to certain environmental agents or triggers.
Moderate to severe psoriasis is frequently associated with metabolic disorders, including obesity, diabetes, dyslipidemia, non-alcoholic fatty liver disease and the metabolic syndrome.4

The objective of the present study was to access the correlation between psoriasis and development of metabolic syndromes in these psoriasis patient’s by using several parameters like serum lipid profile, serum homocysteine level, and epicardial fat thickness.

METHODS

This is a prospective observational study and done on patients attending Department of DVL, BRD Medical College, Gorakhpur with psoriasis.

A total of 150 patients were enrolled for a study period of 1 year from 15th December 2017 to 31st December 2018.

Inclusion criteria

Patients with psoriasis more than 18 years of age and those with psoriasis of at least 6 months duration and patients willing to undergo procedure and follow up were included in the study.

Exclusion criteria

Patients with psoriasis <18 years of age and those who have received cyclosporine or/and systemic retinoids therapy during the preceding one month were excluded from the study.

After obtaining informed consent from the patients, relevant data such as age, sex, occupation, age at the onset of psoriasis, percentage body surface area of involvement, body mass index (BMI), waist circumference, psoriasis area severity index (PASI), presence and distribution of psoriatic arthropathy and concomitant medications were collected in a proforma.

PASI was calculated as given below:

Four sites of affection, the head 10% (h), upper limb 20% (u), trunk 30% (t) and lower limbs 40% (l), were separately scored by using three parameters, erythema (E), induration (I) and desquamation (D), each of which was graded on a severity scale of 0-4, where 0= nil, 1= mild, 2= moderate, 3= severe and 4= very severe. The area-wise percentage involvement of the involved sites was calculated as: 1= ≤10% area; 2= 10-29%; 3= 30-49%; 4= 50-69%; 5= 70-89%; and 6= more than 90%.

The final formula for PASI score:

\[
\text{PASI} = 0.1 \times \text{EH} + 0.2 \times \text{EU} + 0.3 \times \text{Et} = 0.4 \times \text{AI} + 0.5 \times \text{Au} + 0.6 \times \text{Al}
\]

For serum lipid profile and serum homocysteine, venous blood samples were collected from the patients after they fasted overnight (at least 8 hours). Triglycerides and serum cholesterol were measured using standard enzymatic procedure.

Epicardial fat (EFT) is the thickness, area or volume of EFT can be measured and evaluated by two-dimensional echocardiography, computed tomography (CT) or magnetic resonance imaging (MRI), the gold standard in measuring EFT is MRI. Echocardiography is less accurate than CT or MRI, but echocardiography is a non-invasive, less costly and convenient method.

EFT was calculated on the free wall of the right ventricle in the still images obtained at end diastole on both parasternal long-axis and short-axis views. The anterior echo-lucent space between the right ventricle outer wall and the linear echo-dense pericardium was considered to be EFT.5

Statistical analysis was done using statistical package for the social sciences (SPSS version 16.0).

RESULTS

The study was conducted on 150 patients for a total period of 1 year. According to our study the mean age group was 45.8±6.5 years and duration of psoriasis was 12.2±8.4 years. Mean PASI being 10.8±4.2. Mean BMI in psoriatic patients was 27.4±3.9. The normal range for total cholesterol is less than 200 mg/dl, low density lipoprotein (LDL) <100 mg/dl, high density lipoprotein (HDL) >40 mg/dl. Triglycerides (TG) <150 mg/dl while in our study the mean cholesterol was 198±38 mg/dl, mean LDL 129.5±34 mg/dl, mean TG 140±75 mg/dl which is towards higher side. Mean homocysteine being 19.5±1.5 µmol/l, while the normal range was 4-15 µmol/l. EFT thickness on USG was found to be 7.4±0.5 mm in psoriatic patient. The median EFT for male is 7 mm and 6.5 mm in female (Iacobelis et al criteria) in general population.

Figure 1: Age and sex distribution of patients.
The mean homocysteine being 19.5±1.5 μmol/l, while the normal range is 4-15 micromoles/l. In a study conducted by Giannoni et al, a significant difference between the homocysteinaemia of psoriasis patients (mean 19.71±11.16) and control group (13.90±11.18), p<0.05. The mean plasma levels of homocysteine were directly correlated with disease severity.

We found that the EFT thickness on USG was found to be 7.4±0.5 mm in psoriatic patient. The median EFT for male is 7 mm and 6.5 mm in female (Iacobelis et al criteria) in general population. Bulbul et al demonstrated that EFT and CIMT are increased in patients with psoriasis, and that echocardiographic EFT is closely correlated with CIMT in patients with psoriasis. The echocardiographic assessment of EFT may have the potential to be a simple marker of subclinical atherosclerosis and increased cardiovascular risk in patients with psoriasis.

CONCLUSION

Psoriasis may elevate the risk of atherosclerosis, particularly cardiovascular disorders. Therefore, from the epidemiological point of view screening psoriatic patients, particularly those with severe psoriasis should be recommended. The results of the majority of the studies are coherent and indicate that the increased total cholesterol, LDL cholesterol and/or triglycerides, increased epicardial fat thickness and decreased HDL cholesterol in psoriatic patients serum. The composition of apo-lipoproteins, and increased production of oxygen metabolites are features of the metabolic syndrome.

These factors have also a great impact on some complication observed in psoriatic patients especially on cardiovascular diseases. These lipid disturbances are also connected with immunological abnormalities; this is why psoriasis could be classified as an immuno-metabolic disease. In many papers the importance of reduction of animal fat, introduction of fish and plant oil, preparations...
with the omega-6 and omega-3 fatty acids as well as BMI reduction, prevention of obesity and quitting addictions were suggested.

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