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Prevalence of metabolic syndrome as per the NCEP and IDF definitions vis-a-vis severity and duration of psoriasis in a semi-urban Maharashtrian population: A case control study

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ABSTRACT

Background: The inexorable inflammation in patients of psoriasis predisposes to various disorders, notably, a cluster of cardiovascular and metabolic abnormalities christened 'metabolic syndrome'.
Aim: To assess the prevalence of metabolic syndrome and its correlation with the severity and duration of psoriasis.
Methods: One hundred psoriasis patients and 100 age-and-sex matched controls were included, whose waist circumference and blood pressure were measured; fasting serum cholesterol, triglycerides and glucose levels quantified; disease severity assessed and metabolic syndrome defined separately by two globally accepted criteria.
Results: Metabolic syndrome (38%:12%), hypertriglyceridemia (53%:25%), impaired glucose tolerance (38%:16%) [$P < 0.001$] and low HDL ($P = 0.002$) were significantly more prevalent in cases as compared to controls as were the mean values of triglycerides and fasting blood sugar. Increased mean age of psoriasis patients and duration of disease strongly correlated with the presence of this syndrome. The divergence in definition of the syndrome by two separate criteria was also highly significant ($P < 0.001$).
Conclusion: Metabolic syndrome had significant presence in and increased with the duration but remained unaffected by the severity of psoriasis in our study patients.

1. Introduction

Psoriasis, an immune-mediated inflammatory disease characterized by epidermal hyperproliferation, abnormal keratinocyte differentiation, increased angiogenesis, blood vessel dilatation and excess Th-1/Th-17 inflammation, affects 2–3% of the population worldwide [1]. The inexorable inflammation during its chronic course also predisposes its patients to a number of disorders having an inflammatory component epitomised by metabolic syndrome (MS) – a constellation of interrelated risk factors of metabolic origin including abdominal obesity, impaired glucose tolerance, atherogenic dyslipidemia and hypertension [2]. Psoriasis being an independent risk factor for subclinical atherosclerosis and subsequent adverse cardiovascular events, its plaques can be looked upon as closely related to those of atherosclerosis with chronic inflammation underlying its etiopathogenesis, as well as that of metabolic syndrome. Similar inflammatory markers – namely, Th1 cytokines (intracellular adhesion molecule-1, TNF-α), osteopontin, leptin, adiponectin, homocysteine and C-reactive protein – play a role in these conditions [3]. Moreover, psoriatic disease activity can get stimulated by classic risk factors (smoking and obesity) of cardiovascular disease, whose prevalence is increased among psoriasis patients. Both the adipocytes and macrophages, the engines of obesity and psoriasis respectively, have a common mesothelial origin.

Each component of the metabolic syndrome is an established cardiovascular risk factor, multiple components conferring greater risk than the sum of the risks associated with each. However, comparison of its prevalence in varied populations – differing in genetic background, diet, levels of physical activity, age, sex and body habits – is inherently difficult and is further compounded by the lack of consensus in its proposed defining criteria (Table 1). The National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) [4] and World Health Organization (WHO) [5] definitions, primarily established for epidemiological studies, address the public health implications. However, the ease of measuring the criteria of fasting blood sugar

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Table 1
Diagnostic criteria for the metabolic syndrome.

Clinical measure	WHO (1998) [5]	NCEP (2001) [4]	IDF (2005) [6]
Insulin resistance	IGT, IFG, T2DM or ↓ insulin sensitivity[a] plus any two of the following	None but any three of the following five features	None but increased WC plus any two of the following
Body weight	Waist to hip ratio >0.90 in men or; >85 in women and/or BMI >30 kg/m^2	WC ≥102 cm in men or ≥88 cm in women (90 cm and 80 cm in Asians respectively)[b]	WC (population specific) (≥90 cm in men and ≥80 cm in women for Asians)[b]
Lipid	TG ≥150 mg/dL and/or HDL-C <35 mg/dL in men or <39 mg/dL in women	TG ≥150 mg/dL HDL-C <40 mg/dL (men) or <50 mg/dL (women)	TG ≥150 mg/dL or on TG Rx HDL-C <40 mg/dL(men) or <50 mg/dL (women) or on HDL-C Rx
Blood pressure	≥140/90 mmHg	≥130/85 mmHg	≥130 mmHg systolic or ≥85 mmHg diastolic or on hypertension Rx
Glucose	IGT, IFG, or T2DM	≥110 mg/dL (includes diabetes)[c]	≥100 mg/dL (includes diabetes)
Other	Microalbuminuria		

WHO, World Health Organization; NCEP, National Cholesterol Education Program Adult Treatment Panel III; IDF, International Diabetes Federation; IGT, impaired glucose intolerance; IFG, impaired fasting glucose; T2DM, type 2 diabetes mellitus; WC, waist circumference; BMI, body mass index; TG, triglycerides; HDL-C, HDL cholesterol.
[a] Insulin sensitivity measured under hyperinsulinemic euglycemic conditions, glucose uptake below lowest quartile for background population under investigation.
[b] As per the South Asian modified NCEP ATP III criteria.
[c] The 2001 definition identified fasting plasma glucose of ≥110 mg/dL (6.1 mmol/L) as elevated. This was modified in 2004 to be ≥100 mg/dL (5.6 mmol/L), in accordance with the American Diabetes Associations updated definition of impaired fasting glucose (IFG).

in the former (vis-a-vis the comprehensive assessment of impaired glucose tolerance in the latter) prompts its wide usage in clinical practice. With the growing evidence of its critical role, abdominal obesity was subsequently proposed as the mandatory component of the criteria for defining metabolic syndrome by the International Diabetes Federation (IDF) [6]. The initial (2001) recommendations for waist circumference, as per the NCEP definition (M:F::102:90 cm), were moderated in 2005 for Europeans (M:F::94:88 cm) and still downwards for Asians (M:F::90:80 cm) by the American Heart Association/National Heart, Lung and Blood Institute [7].

Studies, done in India and abroad, to determine the importance of early screening of psoriasis patients for cardiovascular risk factors, stroke and type 2 diabetes and the association of MS and its components with psoriasis continue to remain ambiguous. We intended to assess the prevalence of metabolic syndrome and to correlate the relationship of its components with the severity and duration of psoriasis through our present study in a semi-urban Maharashtrian population.

2. Material and methods

One hundred patients of psoriasis >18 years of age presenting to the dermatology department of our tertiary care hospital and an equal number of controls – patients with skin complaints other than psoriasis within the same source population – were included in this case–control study, conducted after obtaining ethical clearance from our institute. Each patient was subjected, after obtaining informed consent, to a detailed history, examination and relevant investigations. Waist circumference was measured as the smallest horizontal girth between the lower costal margin and the iliac crests at minimal respiration (at the end of normal expiration) by placing the measuring tape horizontally around the abdomen snugly without causing compression of the skin. Average of two readings of blood pressure was recorded after making the subjects sit for five minutes. Fasting (for at least 8 h) venous samples for measuring serum cholesterol and triglycerides (with enzymatic colorimetric analysis) and plasma glucose levels (by glucose oxidase method) were sent. Severity of psoriasis was assessed according to psoriasis area and severity index (PASI); PASI ≥10, considered severe.

Metabolic syndrome was diagnosed by the NCEP ATP III criteria (modified for South Asians)[8] with the presence of 3 or more out of the five criteria: waist circumference (>90 cm in men or >80 cm in women), serum triglycerides >150 mg/dl (1.7 mmol/l), high density lipoprotein (HDL) cholesterol <40 mg/dl (<1.0 mmol/l) in men or <50 mg/dl (1.3 mmol/dl) in women, blood pressure >130/85 mm of Hg and fasting plasma glucose of >100 mg/dl (6.1 mmol/l) and subsequently by the IDF criteria: presence of two or more of the above components in addition to the mandatory presence of abdominal obesity detected by increased waist circumference as above. Psoriatic arthritis (PsA) was diagnosed according to CASPAR criteria. All statistical analyses were performed using the Statistical Package for the Social Sciences, SPSS version 20 (SPSS Inc., Chicago, IL, USA). Odds ratio (OR) was calculated wherever applicable and a two-tailed $P < 0.05$ was considered significant.

3. Results

The study included 100 cases and 100 controls. The age of patients in the cases ranged from 23 to 70 (mean: 44.9 ± 11.1) years and of control group from 19 to 70 (mean: 43.3 ± 12.1) years; the male/female ratio of cases being 1.91:1 and controls, 1.77:1 [Table 2]. PASI score ranged from 0.6 to 30.3 (mean: 7 ± 6.9); 80 patients had mild and 20, severe psoriasis. Chronic plaque psoriasis accounted for 78% of cases. Disease duration ranged from 6 months to 30 (mean: 6.8 ± 6.1) years. Sixteen patients had psoriatic arthritis.

Waist circumference ranged from 57 to 112 cm in cases and 65 to 106 cm in controls. In either of these groups, the prevalence of obesity neither differed nor correlated significantly with increasing age, gender, smoking, alcohol intake or presence of psoriatic arthritis [Table 3]. The mean levels of waist circumference (83.5 ± 10.3 and 83 ± 8 cm), too, were similar in both the groups ($P = 0.74$) [Table 2].

The triglyceride levels ranged from 55 to 350 mg/dl in cases and 88 to 229 mg/dl in controls. A significant percentage (53%) of cases had hypertriglyceridemia compared to controls (25%) ($P < 0.001$) [Table 3]; mean TG levels, too, were significantly higher ($P < 0.001$) in cases (156.9 ± 58.5 mg/dl) than controls (133.3 ± 29.8 mg/dl) [Table 2]. Psoriatics consuming alcohol had a significantly higher incidence (74.1%) of hypertriglyceridemia compared to non alcoholics