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ORIGINAL ARTICLE

An Observational Study on the Obesity and Metabolic Status of Psoriasis Patients

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Background: Recent studies have suggested that obesity, hyperlipidemia, ischemic heart diseases, metabolic syndrome and hypertension can combine with psoriasis. However, the metabolic comorbidities have not been clearly demonstrated in Korean psoriasis patients. **Objective:** The purpose of this study was to analyze the association between psoriasis and metabolic abnormalities including obesity, glucose intolerance, hypertension and dyslipidemia in our center. Treatment response of cyclosporine between a high body mass index (BMI) group and normal BMI group was also analyzed to investigate how obesity may affect psoriasis treatment. **Methods:** A retrospective observational study was made on the obesity and metabolic status of psoriasis patients versus normal control group through electronic medical records from January 2008 to April 2009 at Department of Dermatology, Samsung Medical Center, (Seoul, Korea). Medical records, demographics and the Psoriasis Area and Severity Index score before and after cyclosporine treatment were analyzed. **Results:** There were no significant differences in the metabolic status between normal control and psoriasis patients. Also, there was no significant difference in the treatment response between high BMI group and normal BMI group, after 4 weeks and 8 weeks of cyclosporine treatment. **Conclusion:** Our study suggests that in Korean patients, an association between psoriasis and metabolic abnormalities is not obvious. This may reflect a different severity of obesity and metabolic abnormalities between Western and Asian populations. **(Ann Dermatol 25(4) 440～444, 2013)**

-Keywords-
Metabolic syndrome, Obesity, Psoriasis

INTRODUCTION

Psoriasis was regarded as a chronic recurrent disorder developing only in the skin for several decades, before it was demonstrated to be associated with joint manifestations in 1960s. Although many non-cutaneous disorders were reported to occur concomitantly with psoriasis, whether they were coincidental or truly associated with psoriasis remained uncertain until recently. At the turn of 21st century, a more robust epidemiological research in the form of prospective cohort studies and cross-sectional studies undertaken in large sample sizes began to portray psoriasis as a multi-system disorder involving the metabolic systems. Obesity was reported to be a risk factor for psoriasis development as well as to be correlated with psoriasis activity[1,2]. Subsequently, many obesity-related metabolic derangements such as glucose intolerance, hyperlipidemia and hypertension were shown to be correlated with psoriasis[3,4]. Since such disorders present risk factors in the development of cardiovascular disorders[5,6], it is not surprising that patients with psoriasis have shown an increased incidence of cardiovascular events including acute myocardial infarction. Currently psoriasis is not just a quality-of-life-impairment disorder but a quantity-of-life-compromised disorder. Obesity is a serious health issue not only in its individual aspects but also in terms of social health. The Asian region, including the countries Japan and Korea, has been regarded as less problematic for obesity at least in a relative sense. As

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clinicians, we have not had a solid perception of an association between psoriasis and obesity. Such has prompted our investigation into an association between psoriasis and obesity and psoriasis and metabolic derangements.

MATERIALS AND METHODS

We intended for a pilot study before performing a large sample-sized, multi-organ based epidemiological investigative study. We compared body mass index (BMI) of psoriasis patients with that of control group and measured fasting blood sugar level, blood pressure and lipid profiles. The results were compared with those of normal control group.

This study was designed as a retrospective cross-sectional study based on the database of Samsung Medical Information System (SMIS). The SMIS system is a type of electrical medical records system, where a digital database of age, sex, telephone number, vital signs, current medications and medical history may be obtained.

Case group was composed of patients with a diagnosis of psoriasis at the Samsung Medical Center (Seoul, Korea) from January 1, 2008 to April 10, 2009. The patients were investigated for BMI, Psoriasis Area and Severity Index (PASI), blood pressure, serum lipid profiles (total cholesterol, triglyceride; high density lipoprotein [HDL]-cholesterol, low density lipoprotein [LDL]-cholesterol), liver enzymes (aspartate aminotransferase, alanine aminotransferase) and fasting glucose.

Non-psoriatic control group I patients were defined as patients who visited our Dermatology Outpatient Clinic between April 27, 2009 and April 30, 2009. Psoriasis patients and other chronic inflammatory patients were excluded. We measured BMI for non-psoriatic control group I patients.

Non-psoriatic control group II patients were defined as patients who had routine check-ups at the Health Promotion Center of the Samsung Medical Center from January 2009 to April 2009. The group II control patients had no significant medical issues.

According to previous reports[7,8], incidence of metabolic syndrome may be restricted to patients with severe psoriasis. Those with metabolic abnormalities showed a poor response to the treatment compared to those without metabolic disorders. Therefore, we investigated the treatment response to cyclosporine according to the BMI status. In the case group, we included 38 patients on cyclosporine (4 mg/kg/d). Among 38 patients who were treated with cyclosporine, a treatment response based on monthly PASI score was evaluated in 32 patients.

Statistical analysis was performed to compare the difference of variables between psoriasis group and control groups. SPSS software was used for the analysis (SPSS version 12.0.1; SPSS Inc., Chicago, IL, USA). Chi-square tests were used to compare categorical parameters between the groups, and t-tests were used to compare continuous parameters. In all cases, *p*-values less than 0.05 were considered to be statistically significant.

This study was approved by the Institutional Review Board of Ethics Committee of Samsung Medical Center (2010-12-064).

RESULTS

Age and gender

This study included 370 patients with psoriasis, with 357 persons in control group I and 130 persons in control group II (Table 1). The mean age of the case patients was 42.33 years (standard deviation [SD]=15.81, range 2 to 80); and that of the control I was 46.90 years (SD=16.06, range 12 to 79), and that of control II was 44.82 years (SD=11.41, range 20 to 81). In the case group, there were 200 men (54.05%) and 170 women (45.95%). In control group I, there were 172 men (48.18%) and 185 women (51.82%); and in the control group II there were 75 men (57.69%), and 55 women (42.31%).

Comparison of metabolic abnormalities in the psoriasis patients and control groups

1) Body mass index

There was no significant difference in BMI between pso-

Table 1. Demographics of the psoriasis patients and control group

Variable	Psoriasis patient group	Control group	
		I	II
Number of patient	370	357	130
Age (yr)	42.33±15.81 (2~80)	46.90±16.06 (12~79)	44.82±11.41 (20~81)
Gender (male : female)	200 (54.05) : 170 (45.95)	172 (48.18) : 185 (51.82)	75 (57.69) : 55 (42.31)

Values are presented as number, mean±standard deviation (range), or number (%).

riasis patients and control group I ($p=0.199$), and psoriasis patients and control group II ($p=0.167$) (Table 2).

2) Blood pressure

No significant difference in blood pressure was noted between psoriasis patients and control group I ($p=0.100$), and psoriasis patients and control group II ($p=0.152$) (Table 2).

3) Fasting glucose

No significant difference in fasting blood glucose was noted between psoriasis patients and control group II ($p=0.765$) (Table 2).

4) Cholesterol, high density lipoprotein-cholesterol, low density lipoprotein-cholesterol, triglyceride

There was no significant difference in cholesterol, HDL-cholesterol, LDL-cholesterol and triglyceride between psoriasis patients and control group II ($p=1.000$) (Table 2).

Comorbidities in the control group

Except cancer, no significant difference was noted in comorbidities between the groups (Table 3).

Treatment response to cyclosporine in the case group

Among the psoriasis patient group, 38 patients were treated with cyclosporine (4 mg/kg/d). Treatment response based on monthly PASI score was evaluated in 32 patients. There was no significant difference in the treatment response between high BMI group and normal BMI group, after 4 weeks and 8 weeks of cyclosporine ($p=0.787$) (Table 4).

DISCUSSION

Psoriasis is considered a chronic inflammatory disease characterized by persistent inflammation, and many diseases fall into the category. Some examples of chronic inflammatory disorders include chronic obstructive pulmonary disease, lupus erythematosus and vasculitis. Accor-

Table 2. Metabolic abnormalities of the psoriasis patients and control groups (%)

Variable	Psoriasis	Control group		*p*-value	
		I	II	I	II
BMI				0.199	0.167
Normal (BMI < 23)	48.25	48.46	46.92		
Overweight (23 ≤ BMI < 25)	21.49	22.13	23.08		
Obesity (BMI ≥ 25)	30.26	29.41	30.00		
Blood pressure				0.100	0.152
Normal range	47.14	50.44	37.69		
Pre-HTN (120 ≤ SBP < 139) or (80 ≤ DBP < 89)	38.57	34.81	43.08		
HTN (SBP ≥ 140 or DBP ≥ 90)	14.29	14.75	19.23		
Fasting glucose		N/A		N/A	0.765
Normal range (FBS < 100)	59.00		73.85		
Glucose intolerance (100 ≤ FBS < 126)	29.00		12.31		
DM (FBS ≥ 126)	12.00		13.85		
Cholesterol		N/A		N/A	1.000
Normal range (110 ≤ cholesterol ≤ 240)	89.08		63.08		
Hypercholesterolemia (cholesterol > 240)	10.92		36.92		
HDL-cholesterol		N/A		N/A	1.000
Normal range (HDL-M ≤ 50, HDL-F ≤ 65)	86.63		80.77		
Low HDL-cholesterol (HDL-M < 35, HDL-F < 45)	13.37		19.23		
LDL-cholesterol		N/A		N/A	1.000
Normal range (40 ≤ LDL ≤ 130)	63.10		67.69		
High LDL-cholesterol (LDL > 130)	36.90		32.31		
TG		N/A		N/A	1.000
Normal TG (50 ≤ TG ≤ 200)	78.07		62.31		
High TG (TG > 200)	21.93		37.69		

BMI: body mass index, HTN: hypertension, SBP: systolic blood pressure, DBP: diastolic blood pressure, FBS: fasting blood sugar, DM: diabetes mellitus, HDL: high density lipoprotein, LDL: low density lipoprotein, M: male, F: female, TG: triglyceride, N/A: non-available.

Table 3. Comorbidities in psoriasis patients and control group I

Disease	Psoriasis group (n=370)	Control group I (n=357)	*p*-value
Hypertension	26	21	0.451
Acute myocardial infarction	0	4	0.058
Angina	3	9	0.085
Diabetes mellitus	29	39	0.132
Obesity	81	102	0.316
Dyslipidemia	5	8	0.412
Cancer	16	132	0.000
Chronic renal failure	1	4	0.209

Table 4. PASI score reduction rate after 4 weeks and 8 weeks of cyclosporine treatment

Treatment response	After 4 weeks		After 8 weeks	
	High BMI (n=13)	Normal BMI (n=19)	High BMI (n=13)	Normal BMI (n=19)
Good (PASI improvement>50%)	0 (0.00)	0 (0.00)	1 (7.70)	2 (10.53)
Moderate (25%<PASI improvement<50%)	2 (15.38)	2 (10.52)	2 (15.38)	5 (26.32)
Poor (0%<PASI improvement<25%)	7 (53.85)	9 (47.37)	2 (15.38)	2 (10.53)
No response or Treatment resistant (increased PASI)	4 (30.77)	8 (42.11)	8 (61.54)	10 (52.62)

Values are presented as number (%). PASI: Psoriasis Area and Severity Index, BMI: body mass index.

ding to recent reports, obesity and atherosclerosis, which are two characteristic findings of metabolic syndrome, are also considered to be chronic inflammatory diseases. There have been various reports investigating the association between psoriasis and metabolic syndrome. Many reports have outlined an increased risk of hypertension, metabolic syndrome, myocardial infarction, diabetes mellitus and insulin resistance in severe psoriasis patients, especially in a young adult group. A number of etiologies may cause increased metabolic abnormality and adverse cardiac event including decreased physical activity, hyperlipidemia, psychological stress, smoking habit and hyperhomocysteinemia. These findings are readily observed in patients with psoriasis[7].

Previous studies linking psoriasis with various metabolic abnormalities have been carried out, mostly in Western countries[5,7-12]. In contrast to studies in Western populations, several investigations based in few Asian countries, including Japan[13], Taiwan[14] and South Korea[15], have shown no significant difference in the incidence of metabolic syndrome between psoriasis patients and control group. Such is consistent with our results.

These observations may suggest that in Asian patients, including Korean patients, there may be no association between psoriasis and metabolic syndrome. This conflicting finding may be a result of the difference of severity of obesity and metabolic syndrome between the Western and Asian populations. It is uncommon to find a person with BMI over 30 in Asian countries, due to different lifestyles including eating habits, physical activity and genetic background. Although the prevalence of metabolic syndrome is increasing in Asian countries, the severity and tendency toward metabolic syndrome is much less apparent when compared to the Western countries.

According to a previous report, the severity of psoriasis is associated with metabolic syndrome in a dose-response manner. Based on this explanation, and considering that the mean BMI of Asian countries is lower than that of the Western countries, we can explain the psoriasis patients in Korea with high PASI score being uncommon.

Interestingly, there was no difference in the treatment response of psoriasis, between the high BMI group and low BMI group of psoriasis patients. This result is not consistent with previous reports[5,8,9], and suggests that BMI may not be an appropriate way to measure obesity or metabolic status in Korean patients. However, a small sample size and retrospective nature of our study requires further investigation to elucidate the different results.

In this pilot study, we tried to compare BMI, fasting glucose, blood pressure, lipid profiles between psoriasis patients and control groups. We also tried to compare treatment response to cyclosporine according to BMI in psoriasis patients in the Republic of Korea. A larger sample-sized, multi-organ based prospective studies are needed to demonstrate the relationship between psoriasis and metabolic abnormalities.

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