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Original Research Article

Obesity and Dyslipidemia in Patients with Chronic Plaque Psoriasis: Case Control Study

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Abstract:

Introduction: Psoriasis, a chronic immune-mediated disorder, has been associated with various comorbidities, including obesity and dyslipidemia. To investigate this correlation, we conducted a prospective case-control study in collaboration with the Departments of Skin and STD and General Medicine at Government Medical College, Amritsar.. Chronic plaque psoriasis, the most prevalent form of psoriasis, is known to impact patients both physically and emotionally. The aim of this study is to explore the potential correlation between chronic plaque psoriasis and metabolic factors, specifically obesity and dyslipidemia. Understanding these associations can provide valuable insights into the multifactorial nature of psoriasis and guide comprehensive patient management.

Methodology: Patients meeting the inclusion criteria underwent detailed clinical examinations, including the assessment of psoriasis severity. Additionally, anthropometric measurements and lipid profile assessments will be performed. Data from both groups will be compared to identify any significant correlations between chronic plaque psoriasis, obesity, and dyslipidemia. The study was approved by the Institutional Ethics Committee.

Conclusion: In conclusion, the study reveals noteworthy associations between chronic plaque psoriasis severity and both obesity and dyslipidemia. While a positive correlation was observed between psoriasis severity and waist circumference, suggesting a potential link with obesity, dyslipidemia exhibited a higher prevalence in psoriasis cases. These findings emphasize the intricate relationship between psoriasis, systemic inflammation, and metabolic disturbances. Addressing obesity and dyslipidemia should be integral to psoriasis management strategies, offering a comprehensive approach to improve patient outcomes and mitigate the risk of associated cardiovascular complications.

Keywords: Chronic Plaque Psoriasis, Obesity, Dyslipidemia, Case-Control Study, Psoriasis Comorbidities.

Introduction

Chronic plaque psoriasis is a common and chronic immune-mediated disorder characterized by altered proliferation and differentiation of keratinocytes, vascular remodeling, and skin inflammation. The disease presents as dry, dull red, scaly, indurated papules and plaques of variable sizes, predominantly distributed over the scalp and extensor surfaces. As a chronic condition, psoriasis exhibits recurrent remissions and relapses, often exacerbating in severity during the winter season.

Historically, the term "psoriasis" was introduced by Galen in the second century AD, derived from the Greek word 'psora,' meaning to itch. Over time, the understanding and differentiation of psoriasis from leprosy progressed, with Robert Willan providing the first detailed description, earning it the moniker "Willan's lepra." The 19th century marked a turning point, distinguishing psoriasis from leprosy, and Heinrich Koebner's observations in 1872 highlighted the appearance of psoriatic lesions following external triggers. Psoriasis has been linked to genetic predisposition, with a bimodal age of onset. Type I disease, associated with a positive family history, presents before the age of 40 and is more severe and recurrent. In contrast, Type II disease, occurring later in life, lacks HLA-Cw6 association and is sporadic in nature. The prevalence of psoriasis varies globally, ranging from 0% to 11.8%, with higher prevalence in Polar Regions. In India, studies suggest a prevalence ranging from 0.44% to 2.2%.

The aetiology and pathogenesis of psoriasis are multifactorial, involving complex interactions between genetic and environmental factors. While

earlier theories focused on epidermal hyperproliferation, later findings emphasized T-cell-mediated autoimmune processes. The disease manifests due to an inappropriate immune response against an unknown autoantigen, resulting in leukocyte recruitment and increased epidermal turnover.

Histopathologically, psoriatic lesions exhibit hyperkeratosis, parakeratosis, neutrophil aggregates, and dilated capillaries, reflecting the chronic inflammatory nature of the condition. Clinically, chronic plaque psoriasis presents as well-defined erythematous plaques covered with silvery-white scales, and characteristic signs like the Auspitz sign contribute to diagnosis.

Psoriasis has various clinical types, and chronic plaque psoriasis is the most common, representing coin-sized to large erythematous plaques predominantly on extensor surfaces. While the exact aetiology of psoriasis remains elusive, studies have explored associations with obesity and dyslipidemia as potential factors influencing disease severity.

Obesity, characterized by excessive adipose tissue, has been identified as a potential contributor to psoriasis severity. The prevalence of obesity in psoriasis patients is twice that of the normal population, and it is associated with a higher likelihood of severe psoriasis presentation [1]. Additionally, dyslipidemia, characterized by abnormal lipid levels, has been linked to an increased risk of cardiovascular comorbidities in psoriasis patients.

Recent research emphasizes the correlation between chronic plaque psoriasis, obesity, and dyslipidemia. Psoriasis is associated with an increased risk of cardiovascular diseases (CVD), and studies suggest that systemic inflammation in psoriasis may contribute to CVD or vice versa [2]. Factors such as hypertension, obesity, dyslipidemia, diabetes, and metabolic syndrome are more prevalent in psoriasis patients and correlate with disease severity.

Dietetic interventions and increased physical exercise have been explored as potential strategies to reduce psoriasis severity in overweight or obese patients. Moreover, addressing lifestyle factors such as alcohol consumption and smoking is crucial, as heavy drinking and smoking are linked to worsened psoriasis severity and reduced response to treatments [3].

In conclusion, chronic plaque psoriasis is a complex immune-mediated disorder with a significant impact on patients' quality of life. Understanding its correlation with obesity and dyslipidemia is essential for comprehensive management, emphasizing the importance of lifestyle modifications and targeted therapeutic approaches. As research continues to unravel the intricate mechanisms underlying psoriasis, addressing associated comorbidities becomes increasingly crucial for improving patient outcomes.

Material and Methods

Study Type: Prospective case control study.

Study Area: This study was undertaken in the Department of Skin and STD, in collaboration with Department of General Medicine of Government Medical College,

Amritsar after taking approval from Institutional Ethics Committee of Government Medical College, Amritsar

Study Population: The following category of patients were selected randomly for the study from patients attending OPD/ indoor of Government Medical College, Amritsar.

1. Group I (Study group): Sixty clinically diagnosed patients of chronic plaque psoriasis.
2. Group II (Control group): Sixty healthy volunteers, with no systemic or cutaneous disorders. (Age and gender matched).

Inclusion Criteria

1. Clinically diagnosed cases of plaque psoriasis with duration of 6 months or more (study cases).
2. Age >18 years (both groups).

Exclusion Criteria

1. Cases with guttate and pustular psoriasis.
2. Patients on current treatment and those who received cyclosporine / methotrexate / acitretin / psoralens in last 1 month.
3. Pregnant and lactating women and those with thyroid disorders, familial hyperlipidaemia, nephrotic syndrome, cholestasis, chronic renal failure (both groups).

Participants fulfilling the inclusion criteria of the study were informed about the purpose of study and written consent was obtained.

Results

Baseline data: The study included participants ranging from 19 to 75 years, with a mean age of presentation of 44.93±15.73 years in the study group and 47.15±15.61 years in the control group. The distribution of age in both groups was statistically matched (p=0.440). Males outnumbered females in both groups with a male-to-female ratio of 2.53:1, and the sex distribution was similar in both groups (p=1.000).

Regarding the duration of psoriasis in the study group, 8.4% had a duration of less than 1 year, 45%

had a duration between 1 to 5 years, and 23.3% had a duration of 6-10 years or more than 10 years, with a mean duration of 7.652±8.11 years. Most participants in the study group had an onset of the disease in the age group of 21-30 years, with a mean age of onset being 36.570±15.657.

In terms of comorbidities, 41.7% of participants in the study group had hypertension, and 58.3% were normotensive.

Regarding fasting glucose levels, 6.7% had levels of 110-125mg%, 18.3% had levels ≥126mg%, and 75% had normal fasting glucose levels. These findings highlight the diverse demographic and clinical characteristics of the study population, providing valuable insights into the age of onset, duration of psoriasis, and prevalence of comorbidities such as hypertension and abnormal fasting glucose levels.

Understanding these factors contributes to a more comprehensive evaluation of psoriasis and its associated health implications.

Table 1:

Age Group (years)	Study Group	Control Group	% (Study)	% (Control)
≤20	2	3	3.3%	5.0%
21-30	13	11	21.7%	18.3%
31-40	8	6	13.3%	10.0%
41-50	15	14	25.0%	23.3%
51-60	13	16	21.7%	26.7%
>60	10	15	15.0%	16.7%
Total	60	60	100%	100%
Mean Age	44.93±15.73	47.15±15.61		

Table 2:

Gender	Study Group	Control Group	% (Study)	% (Control)
Female	17	17	28.3%	28.3%
Male	43	43	71.7%	71.7%
Total	60	60	100%	100%

Correlation of Chronic Plaque Psoriasis with Obesity and Dyslipidemia: In the present study, the analysis based on body mass index (BMI) revealed a non-significant difference (p-value=0.097) in the prevalence of obesity between the study and control groups. Specifically, 65% of participants in the study group had obesity, while 50% in the control group were classified as obese. However, a significant distinction (p value=0.017) was observed when central obesity, determined by waist circumference, was considered. In this context, 63.3% of the study group and 41.7% of the control group exhibited central obesity. When applying the waist-to-hip ratio criterion, 45% of the study group and 25% of the control group were identified with central obesity. Regarding dyslipidemia, the study group showed a higher prevalence compared to the control group. Elevated serum cholesterol levels were found in 33.3% of individuals in the study group, contrasting with 21.7% in the control group (p-value=0.152). Similarly, hypertriglyceridemia was more prevalent in the study group (51.7%) than in the control group (40%), although this difference did not reach statistical significance (p value=0.200). Notably, a significant distinction in HDL levels (p-value=0.034) was observed, with 43.3% of the study group exhibiting low HDL levels compared to 25% in the control group.

In summary, while the overall prevalence of obesity did not significantly differ between the groups, central obesity, as determined by waist circumference and waist-to-hip ratio, showed a significant distinction. Furthermore, the study group displayed a higher prevalence of dyslipidemia, with specific variations in cholesterol and HDL levels, indicating a potential association between chronic plaque psoriasis and metabolic factors.

Table 3:

Parameter	Cases	Controls	'p' value
BMI ≥ 25	39 (65%)	30 (50%)	0.097
Waist Circumference >90cm (M), >80cm (F)	38 (63.3%)	25 (41.7%)	0.017*
Waist Hip Ratio ≥1 (M), ≥0.85 (F)	27 (45%)	15 (25%)	0.022*
Triglycerides (>150mg/dl)	20 (33.3%)	13 (21.7%)	0.200
Triglycerides (>150mg/dl)	31 (51.7%)	24 (40%)	0.200
HDL <40mg/dl (M), <50mg/dl (F)	26 (43.3%)	15 (25%)	0.034*

Table 4: Comparison of Mean Values

Parameter	Cases Mean ± SD	Controls Mean ± SD	'p' value
Waist Circumference (cm)	91.00±9.75	87.37±7.13	0.022*
Cholesterol (mg/dl)	183.50±43.83	177.61±50.43	0.497
Triglycerides (mg/dl)	170.10±77.62	141.53±65.05	0.016*
HDL-C (mg/dl)	42.83±8.15	48.58±8.77	0.001*

Discussion

Chronic Plaque Psoriasis with Obesity: The correlation between waist circumference and severity of chronic plaque psoriasis (PASI score) was positive and non-significant. According to BMI, study group had 65% cases with obesity compared to 50% subjects with obesity in control group, which was also statistically non-significant. The mean value of waist circumference of study group was significantly greater than the control group.

This finding was in concordance to the study by Neimann et al, which found greater prevalence of obesity in severe psoriasis (20.7%), and mild psoriasis (15.8%) compared to controls (13.2%). [4] The increased occurrence of obesity in psoriasis and vice versa could be due to greater number of inflammatory cytokines released from the adipose cells. Also, obese individuals have lesser distribution of systemic drugs owing to greater body mass, making routine dosage less effective. Adipose tissue serves as a source of angiotensinogen, which gets converted to Angiotensin II, which apart from being a salt retainer also acts as a T-cell proliferator.

Chronic Plaque Psoriasis with Dyslipidemia: In the present study, the prevalence of hypercholesteremia, hypertriglyceridemia and low HDL was greater in study group. The correlation between cholesterol, triglyceride, and HDL-C levels with severity of chronic plaque psoriasis (PASI score) were negative and non-significant. These findings were in discordance with the study by Salihbegovic showing a positive correlation between PASI score and dyslipidemia. [5] High prevalence of dyslipidaemia can be explained due to overexpression of proinflammatory cytokines and due to compensatory increased production of cholesterol due to loss of cholesterol in scales of patients. [6]

Conclusion

In conclusion, our study on chronic plaque psoriasis unveils intriguing correlations with obesity and dyslipidemia. While a positive non-significant link between waist circumference and psoriasis severity aligns with prior research, the prevalence of dyslipidemia contradicts some established findings. These intricate associations underscore the need for a nuanced understanding of psoriasis's systemic impact. The coexistence of obesity and dyslipidemia may result from inflammatory cytokine release and altered drug distribution in obese individuals. This study highlights the complex interplay between chronic plaque psoriasis and systemic factors, urging further research for a comprehensive approach to its management and associated comorbidities.

Ethical Approval: The was approved by the Institutional Ethics committee

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