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Psoriasis Area and Severity Index and its Correlation with Liver Function Test

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Author`s Contribution

[1,2]Substantial contributions to the conception or design of the work; or the acquisition, [4,6]Active participation in active methodology, [2,3]analysis, or interpretation of data for the work, [5]Drafting the work or revising it critically for important intellectual content

Funding Source: None
Conflict of Interest: None

Received: Sept 05, 2023
Accepted: Mar 24, 2024

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ABSTRACT

Objective: To determine Psoriasis Area and Severity Index score and its association with LFT values in patients of psoriasis.

Methodology: This cross-sectional study, was done on patients visiting the skin OPD of LUMHS Jamshoro/Hyderabad from July 2023 to Dec 2023. Diagnosed patients of Psoriasis, aged between 18 and 50 years and both genders were included. A 5cc blood sample was collected from each individual to evaluate the LFT. Psoriasis Area and Severity Index (PASI) scores was defined based on the percentage of body surface area affected by psoriasis lesion. All the information was entered and analyzed using SPSS version 26.

Results: The mean age of the patients was 44.81±11.10 years. Out of the total 102 patients, 74.5% were male patients and 25.5% were female. The mean duration of psoriasis was 6.46 ± 4.49 years. Out of all 32.4% had mild psoriasis (PASI < 7), 40.2% had moderate psoriasis (PASI 8-12), and 27.5% had severe psoriasis (PASI > 12). Regarding LFT values, 73.5% had elevated alanine transaminase (ALT), 32.4% had elevated aspartate transaminase (AST), 70.6% had elevated alkaline phosphatase (ALP), 68.6% had elevated bilirubin, and 67.6% had elevated gamma-glutamyl transferase (GGT). AST and GGT levels rise significantly linked to PASI (p- <0.05). Conversely, for ALP and Bilirubin levels, there is no significant difference across severity of PASI (p- >0.05).

Conclusion: Patients with severe psoriasis exhibit a predisposition to hepatic dysfunction. Study observed abnormalities in liver function tests (LFT) among psoriatic patients, suggesting a potential link to liver disease development.

Keywords: Psoriasis Area, Severity, ALT, AST, GGT, SGPT.

Cite this article as: Iqbal J, Memon SF, Hussain A, Nizamani YM, Shah H, Kazi S. Psoriasis Area and Severity Index and its Correlation with Liver Function Test. Ann Pak Inst Med Sci. 2024; 21(2):157-161. doi. 10.48036/apims.v20i2.1042.

Introduction

Psoriasis is a chronic inflammatory skin disorder characterized by red, scaly patches that can be localized or widespread. The severity of psoriasis is commonly assessed using the Psoriasis Area and Severity Index (PASI), which considers both the extent and severity of skin involvement. Interestingly, emerging evidence suggests a potential link between psoriasis severity and liver function abnormalities and may cause n the population with a risk of cirrhosis progression.

Psoriasis manifests as a diverse and chronic skin condition, appearing in various forms.[1] It is estimated that approximately 60 million individuals worldwide are affected by psoriasis, with a prevalence of 1.52% among the general population in the UK.[1] Inflammation can manifest externally as scaly patches or elevated plaques, the appearance of which varies depending on the patient's skin type.[2] Skin cell reproduction speeds up as a result of an overactive immune system. In a normal monthly cycle, all skin cells will have grown and shed. Psoriatic skin cells complete this process in as little as three or four days. In

this condition, dead skin cells build up on the skin's surface rather than being shed. Plaques from psoriasis can reportedly itch, burn, and sting in some cases. Although the elbows, knees, and scalp are particularly prone to the development of plaques and scales, they can appear anywhere on the body.[3] Psoriasis, traditionally viewed as a chronic inflammatory skin condition, has now been recognized to have systemic effects, impacting the entire body, including the gastrointestinal tract.[4] Individuals with psoriasis are at an increased risk of experiencing liver abnormalities, including conditions like hepatitis causes by drugs, non-alcoholic fatty liver disease, neutrophilic cholangitis and the alcoholic hepatitis, compared to the general population.[5] Multiple studies have found a correlation between the presence and severity of psoriasis and an increased prevalence and severity of NAFLD.

Furthermore, NAFLD has been identified as a significant predictor of elevated Psoriasis Area and Severity Index (PASI) scores.[6-9] Serum enzyme levels of ALT and AST may show mild elevation, particularly more common in non-alcoholic steatohepatitis (NASH) compared to non-alcoholic fatty liver disease (NAFLD).[10] Alkaline phosphatase levels might exhibit a slight increase, while gamma-glutamyl transferase (GGT) levels are often elevated. Conversely, bilirubin and albumin levels typically remain within normal ranges.[10,11] It is important to note that enzyme abnormalities may occur as a side effect of certain medications used to treat psoriasis.[10-12]

The occurrence of unexplained liver biochemical abnormalities in psoriasis has not been extensively documented in the medical literature as a distinct diagnostic entity.[13] Given the ongoing controversies regarding whether the chronic inflammatory nature of psoriasis contributes to or independently poses a risk for the development of hepatic issues,[14] coupled with a lack of national data on the subject, this study aims to assess the Psoriasis Area and Severity Index score and its correlation with liver function test values in psoriasis patients.

Methodology

This cross-sectional study was done on patients visiting the skin OPD, Department of Physiology and Diagnostic Research Laboratory of Liaquat University of Medical & Health Sciences Jamshoro/Hyderabad. Study was done during six months from July 2023 to Dec 2023. Non-probability purposive sampling was used**.** Diagnosed patients of Psoriasis, aged between 18 and 50 years and both genders were included. Patients aged below 18 and above 50 years, hypertension, diabetes, cigarette smoking, alcohol abuse, obese patient, any diagnosed inflammatory co-morbidity were excluded. Detailed questionnaires were followed regarding demographic details and al variables of this study. A 5cc blood sample was collected from each individual and Lipid profile & LFT were performed on machine (COBAS ROCHE). There was no financial implication on the study participant. Psoriasis Area and Severity Index (PASI) scores was defined based on the percentage of body surface area affected by psoriasis lesion. Its severity was defined using a PASI score the mild (body surface area affected by psoriasis lesion <10%, PASI<7), moderate (body surface area affected by psoriasis lesion 10-49%, PASI 7 to 15) and severe (body surface area affected by psoriasis lesion ≥50%, PASI > 15). All the information was entered and analyzed using SPSS version 26.

Results

The mean age of the patients was 44.81±11.10 (range 18-60 years). The majority of patients were aged between 41 and 50 years, comprising 50.0% of the total. In terms of gender distribution, 74.5% were male, while 25.5% were female. Regarding LFT values, a notable proportion of patients exhibited elevated levels across various parameters: 73.5% had elevated alanine transaminase (ALT), 32.4% had elevated aspartate transaminase (AST), 70.6% had elevated alkaline phosphatase (ALP), 68.6% had elevated bilirubin, and 67.6% had elevated gamma-glutamyl transferase (GGT). (Table I)

Table 1: Demographic characteristics and LFT values of the patients. (n=102)

Variables			N	%
Age groups		18 to 30	22	21.5%
		31 to 40	29	28.4%
		41 to 50	51	50.0%
Gender		Male	76	74.5%
		Female	26	25.5%
Prothrombin Time (PT)		Normal (<**12.5** U/L)	32	31.4%
		Elevated (>12.5 **U/L)**	70	68.6%
LFT	**ALT**	Normal (<**55** U/L)	27	26.5%
		Elevated (>55 **U/L)**	75	73.5%
	AST	Normal (<**48** U/L)	69	67.6%
		Elevated (>48 **U/L)**	33	32.4%
	ALP	Normal (<**129** U/L)	30	29.4%
		Elevated (>129 **U/L)**	72	70.6%
	Bilirubin	Normal (<**1.2** mg/dL)	32	31.4%
		Elevated (>1.2 **mg/dL)**	70	68.6%
	GGT	Normal (<**61** U/L)	33	32.4%
		Elevated (>61 **U/L)**	69	67.6%

The mean PASI score was 10.05 ± 5.10. Among the 102 patients, 33 (32.4%) had mild psoriasis (PASI < 7), 41

(40.2%) had moderate psoriasis (PASI 8-12), and 28 (27.5%) had severe psoriasis (PASI > 12). (Figure 1)

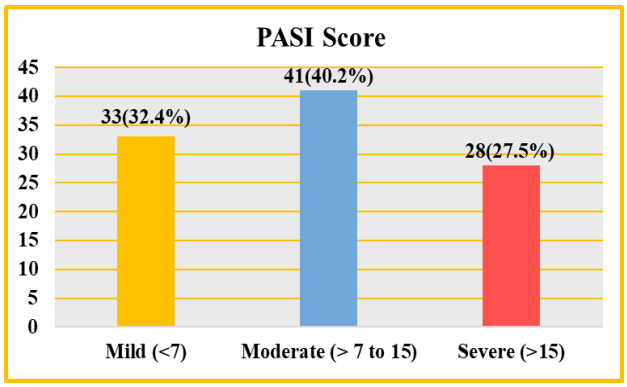

Figure 1. Graphical presentation of Distribution of patients according to psoriasis area and severity.

Aspartate Transaminase (AST), Alkaline Phosphatase (ALP), Bilirubin, and Gamma-Glutamyl Transferase (GGT) categorized by severity index (PASI) among 102 patients. Severity of psoriasis increases from mild to severe, the percentage of patients with elevated AST and GGT levels rises significantly (p- 0.014 and 0.030 respectively). Conversely, for ALP and Bilirubin, there is no significant difference in the frequency of abnormal levels across different PASI severity groups (p- 0.917 and 0.986 respectively). (Table II)

Table II: Frequency of normal and abnormal Aspartate Transaminase (AST) levels with PASI (n=102)

LFT		Severity index (PASI)			P-value
		Mild (n=33)	Moderate (n=41)	Severe (n=28)	
AST	Normal	28 (84.8%)	27 (65.9%)	14 (50.0%)	0.014*
	Elevated	5 (15.2%)	14 (34.1%)	14 (50.0%)	
ALP	Normal	9 (27.3%)	12 (29.3%)	9 (32.1%)	0.917
	Elevated	24 (72.7%)	29 (70.7%)	19 (67.9%)	
Bilirubin	Normal	10 (30.3%)	13 (31.7%)	9 (32.1%)	0.986
	Elevated	23 (69.7%)	28 (68.3%)	19 (67.9%)	
GGT	Normal	13 (31.7%)	6 (18.2%)	14 (50.0%)	0.030*
	Elevated	27 (81.8%)	28 (68.3%)	14 (50.0%)	

Discussion

Psoriasis is a chronic inflammatory skin condition associated with a higher incidence of various comorbidities, such as liver diseases. This study aimed to assess the Psoriasis Area and Severity Index (PASI) score and its correlation with liver function test (LFT) values in 102 psoriasis patients, with an average age of 44.81 ± 11.10 years and the study population comprised predominantly males (74.5%), with females accounting for 25.5% of the participants. In the comparison of this study Lubrano E et al[15] reported that the males were 51.8% and females were 48.2% with an overall mean age of 55.68±12.43 years. Consistently, in a study conducted by Sultan N et al[16] also it was reported that out of 140 patients, 87 (62%) were male and 53 (38%) were female, with a mean age of 40.97 ± 14.74 years. In continuation with previous research findings, the study conducted by Khan JM et al.[17] revealed a mean age of 40.48 years among psoriasis patients, ranging from 18 to 74 years. Among the 160 patients included in the study, there was a notable male predominance, with 118 (73.8%) being male and 42 (26.2%) being female. The observations this study of male predominance aligns with previous epidemiological trends in psoriasis, where males have been consistently reported to have a higher prevalence of the condition compared to females and this higher proportion of male patients in psoriasis may be attributed to various factors, including differences in genetic susceptibility, hormonal influences, and lifestyle behaviors, which may encompass smoking and other addictive habits. These findings emphasize the need for further research to elucidate the underlying mechanisms.

In this study the mean PASI score was 10.05 ± 5.10. Among the 102 patients, 33 (32.4%) had mild psoriasis (PASI < 7), 41 (40.2%) had moderate psoriasis (PASI 8-12), and 28 (27.5%) had severe psoriasis (PASI > 12). In aligns to this study Khan JM et al.[17] reported observed that the majority of patients, comprising 68 (42.5%), had moderate, 69 patients exhibited mild psoriasis based on the affected body surface area, while 70 had moderate disease, and 21 had severe disease. In the comparison to this study, as reported by Salgado-Boquete L et al[18] it was found that 116 patients (45.7%) were classified as having a mild form of the condition, while 70 (32.1%) were categorized as moderate, and 44 (20.2%) were deemed to have severe psoriasis.

In this study regarding LFT values, a notable proportion of patients exhibited elevated levels across various parameters: 73.5% had elevated alanine transaminase (ALT), 32.4% had elevated aspartate transaminase (AST), 70.6% had elevated alkaline phosphatase (ALP), 68.6% had elevated bilirubin, and 67.6% had elevated gamma-glutamyl transferase (GGT). Furthermore, we found severity of psoriasis increases from mild to severe, the

percentage of patients with elevated AST and GGT levels rises significantly (p- 0.014 and 0.030 respectively). Conversely, for ALP and Bilirubin, there is no significant difference in the frequency of abnormal levels across different PASI severity groups (p- 0.917 and 0.986 respectively). Similar to our study, Mahmood DA et al[19] also reported a significant increase in serum levels of alanine aminotransferase (ALT), alkaline phosphatase (ALP), and gamma-glutamyl transferase (GGT) in the psoriasis (PS) group compared to healthy controls.

Additionally, they observed a significant decrease in albumin and bilirubin levels in the PS group. Consistently, Balak DM et al[19] indicated that individuals with psoriasis face a twofold increased risk of developing non-alcoholic fatty liver disease (NAFLD) and are at a greater risk of advancing to more severe liver conditions. In the comparison, Ruan Z, et al[20] also noted an association between psoriasis and non-alcoholic fatty liver disease (NAFLD) in the outpatient adult population in the United States, even after adjusting for other factors and they suggested that this association should be taken into consideration by clinicians when prescribing potentially hepatotoxic medication for psoriasis management.[20] In the study by Gandha N et al[21] concluded that the extent of psoriasis correlates with the severity of non-alcoholic fatty liver disease (NAFLD). They suggested that further studies should delve into the detailed assessment of the impact of therapies on this pathophysiological connection, aiming to elucidate potential therapeutic strategies. It is recommended that clinicians should conduct screening and assess liver function tests when prescribing potentially hepatotoxic medication for managing psoriasis. However, this study has notable limitations such as a small sample size, absence of a control group, and lack of analysis of risk factors. Therefore, further research is warranted to investigate a more comprehensive pathophysiological connection, including the impact of various therapies, between psoriasis and hepatic injury. This is essential for enhancing our understanding and informing clinical management strategies for psoriasis patients.

Conclusion

There is a predisposition to liver dysfunction in patients with severe psoriasis. Psoriatic patients showed elevated lipid profiles and LFT abnormalities, which may contribute to liver disease. The results emphasize the importance of monitoring LFT levels in psoriatic patients as part of their clinical management to prevent or mitigate the onset of liver-related complications. Further research is needed to elucidate the underlying mechanisms and establish effective strategies for early detection and intervention in this patient population.

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