



ASSESSMENT OF SERUM BIOMARKERS IN PSORIASIS: A RETROSPECTIVE STUDY FROM JORDAN

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ABSTRACT

Background: Psoriasis is a chronic, immune-mediated skin disease influenced by genetic, environmental, and hormonal factors. Calcium, albumin, and alkaline phosphatase (ALP) levels have been associated with psoriasis severity, though the findings are inconsistent. **Methods:** A retrospective cross-sectional study was conducted with 600 patients, 300 with psoriasis and 300 without, to assess the relationship between serum ALP, calcium, and albumin levels. Data were collected from electronic medical records, and statistical analysis was performed using Chi-squared and t-tests. **Results:** The study found no significant differences in albumin, calcium, or ALP levels between psoriatic and non-psoriatic patients. While 6.3% of psoriatic patients had low calcium, and 4.7% had low albumin, these results did not reach statistical significance. No strong correlations were observed between the biomarkers and psoriasis severity. **Conclusion:** Serum ALP, albumin, and calcium levels were not significantly different in psoriasis patients compared to controls. Further research is needed to understand these findings.

KEYWORDS: Psoriasis, calcium, albumin, alkaline phosphatase, biomarkers, chronic skin disease, retrospective study.

INTRODUCTION

Psoriasis is a well-known chronic, immune, and genetic related disease. Usually, psoriasis targets the scalp and joint surfaces, but other regions are still susceptible to being infected.^[1] Psoriasis can be triggered by many factors including infections, cold, stress, and drugs associated with cardiac issues like beta-blockers.^[2] Other risk factors like obesity, alcoholic consumption, family history, and smoking are proven to have a connection with this disease.^[3-5,5]

The autoimmune pathogenesis of psoriasis depends on genetic, environmental, and hormonal predisposition. Cytokines secretion by T-cells stimulated by environmental factors leads to keratinocytes proliferation which in turn produces antigenic adhesion molecules causing skin lesions.^[6] Calcium plays a big role in regulating the keratinocytes proliferation, by creating a

gradient within the epidermis to form a permeability barrier to differentiate keratinocytes in both outside-in and inside-out signaling. This gradient disappears as psoriasis forms in the area.^[7] It has been observed by many authors that hypocalcemia is connected to psoriasis severity and its spreading pattern.^[8,9] Furthermore, since almost half of calcium ions are connected to albumin, it is always a good idea to monitor both serums levels simultaneously.^[10]

Many kinds of psoriasis have been observed, while plaque psoriasis is the most common, other types like guttate, inverse, pustular, and erythrodermic psoriasis could still manifest.^[11] Psoriasis could affect adults and children, many studies noted higher diagnosis rates among adults, prevalence for adults between the ages of 60 and 70 was reported to be 68.21% as of 2017 in high-

income countries, with studies suggesting that the prevalence may be increasing.^[12–14]

MATERIALS AND METHODS

Study Design

This is a retrospective cross-sectional study designed to analyze the relationship between serum levels of alkaline phosphatase (ALP), albumin, and calcium in psoriatic and non-psoriatic patients. The study included patients from a tertiary healthcare center, diagnosed with psoriasis and non-psoriatic individuals, between the ages of 18 and 70. The primary objective was to assess whether there were significant differences in these biomarkers between the two groups, and to identify any potential correlation with disease severity and patient demographics, such as age and gender.

Data Collection

Patient data were collected from electronic medical records, which included demographic information (age, gender), clinical diagnosis, and serum levels of ALP, albumin, and calcium. Patients with any known metabolic bone disorders or renal insufficiency were excluded to avoid confounding factors. Data were recorded for 600 patients, 300 with psoriasis and 300 without psoriasis, ensuring balanced groups for comparative analysis. The data collection period spanned from January 2020 to December 2022.

Statistical Analysis

Descriptive comparisons were made using Means (Standard Deviations) for continues variables, and Frequencies (Percentages) for categorical variables. Normally distributed data was analyzed using Chi-

squared and independent t-tests for categorical and continues data, respectively. Incase of assumption violation, Fisher's exact test and Wilcoxon sum-rank test were utilized for categorical and continues variables, respectively. All statistical analysis were performed using R studio software.

RESULTS

A total of 600 patients were included with a mean age of 43.0 (17.0) years, and 305 (51%) were males. Albumin was normal in the majority of patients (96%), 19 (3.2%) had low albumin, and only 5 (0.8%) had high albumin (**Table 1**). Calcium levels were normal in 554 (92%) of patients, low in 38 (6.3%), and high in 8 (1.3%) of patients, while ALP levels were normal in 531 (89%) of patients, high in 54 (9.0%) of patients, and low in 15 (2.5%) of patients. A total of 300 patients had psoriasis, with a mean age of 46.0 (16.0) years, compared to 40.0 (17.0) years in patients with no psoriasis (p-value <0.001).

There was a significant gender difference between patients with and without psoriasis, in which 185 (62%) of patients with psoriasis were males, compared to 120 (40%) of males in non-psoriatic patients (p-value <0.001). There was no significant differences in albumin, calcium, or ALP levels between patients with psoriasis and non-psoriatic patients (**Table 1**). There was a significant but very weak correlation between calcium and ALP levels in non-psoriatic patients (Pearson's $r = 0.152$, p-value = 0.152) as shown in **Table 2**. Figures 1A-C shows scatter plot between laboratory markers in psoriatic (red) versus non-psoriatic patients (blue).

Table 1: Demographic and clinical characteristics of included patients.

Characteristic	Non-psoriasis, N = 300	Psoriasis, N = 300	p-value	Overall, N = 600
Age	40 (17)	46 (16)	<0.001	43 (17)
Gender			<0.001	
Female	180 (60%)	115 (38%)		295 (49%)
Male	120 (40%)	185 (62%)		305 (51%)
Albumin class			0.1	
High	2 (0.7%)	3 (1.0%)		5 (0.8%)
Low	5 (1.7%)	14 (4.7%)		19 (3.2%)
Normal	293 (98%)	283 (94%)		576 (96%)
Calcium class			0.3	
High	3 (1.0%)	5 (1.7%)		8 (1.3%)
Low	15 (5.0%)	23 (7.7%)		38 (6.3%)
Normal	282 (94%)	272 (91%)		554 (92%)
ALP class			0.7	
High	27 (9.0%)	27 (9.0%)		54 (9.0%)
Low	9 (3.0%)	6 (2.0%)		15 (2.5%)
Normal	264 (88%)	267 (89%)		531 (89%)

Table 2: Correlation between laboratory levels between psoriatic and non-psoriatic patients.

All patients		ALP	Calcium	Albumin
ALP	Pearson's r	—		
	p-value	—		
Calcium	Pearson's r	0.064	—	
	p-value			

	p-value	0.115	—	
Albumin	Pearson's r	0.024	-0.012	—
	p-value	0.565	0.779	—
Psoriasis patients				
		ALP	Calcium	Albumin
ALP	Pearson's r	—		
	p-value	—		
Calcium	Pearson's r	-0.02	—	
	p-value	0.728	—	
Albumin	Pearson's r	0.032	-0.044	—
	p-value	0.58	0.446	—
Non-psoriasis patients				
		ALP	Calcium	Albumin
ALP	Pearson's r	—		
	p-value	—		
Calcium	Pearson's r	0.152	—	
	p-value	0.008	—	
Albumin	Pearson's r	0.016	0.019	—
	p-value	0.781	0.749	—

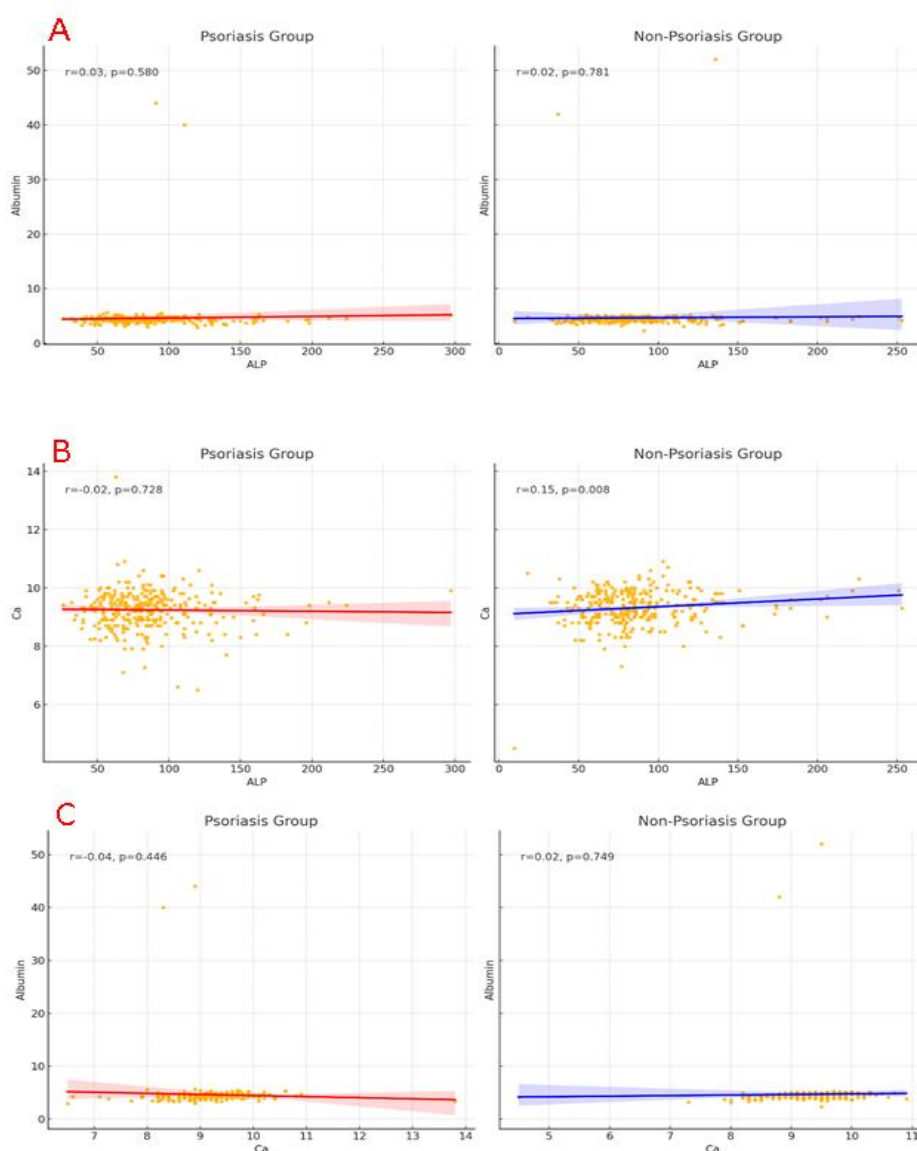


Figure 1: Scatter plot showing the correlation between A) ALP and albumin, B) ALP and Calcium, and C) albumin and calcium in psoriatic and non-psoriatic patients.

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