



A STUDY OF SERUM CALCIUM AND PHOSPHORUS IN PSORIASIS

Biochemistry

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KEYWORDS

INTRODUCTION

Globally, psoriasis affects approximately 125 million people¹ It is a serious global problem and the prevalence of psoriasis in different countries ranges between 0.09% and 11.4%^{2,3} Psoriasis is a hyperproliferative diseases because there is an increase of frequency of epidermis basal cells contributing in mitosis is seen in this disease. Several studies have observed the close association between psoriasis and serum calcium level. Intracellular calcium plays an important role in the regulation of proliferation and differentiation of keratinocytes⁴ Association of pustular psoriasis of von Zumbush, a rather severe form of psoriasis with mild hypocalcemia has been observed⁵. Even hypoparathyroidism may aggravate psoriasis in patients with surgical hypoparathyroidism and primary hypoparathyroidism⁶. There are very few studies done in India to assess the serum calcium, phosphorus level in psoriasis patients, hence the present study.

AIMS AND OBJECTIVE

1. To study serum calcium level in psoriasis
2. To study serum phosphorus level in psoriasis
3. To compare serum calcium and phosphorus levels in patients of psoriasis with that in healthy controls.

MATERIAL AND METHODS

A total of 100 age and sex matched subjects (50 diagnosed psoriatic patients and 50 healthy controls) were selected after written informed consent and ethical clearance between January 2017 to July 2018 at department of biochemistry in a tertiary care medical institute from dermatology OPD of GMCH Nagpur. Each subject underwent detailed clinical history, physical examination and systemic examinations as per predesigned proforma after satisfying all inclusion and exclusion criteria. 3ml of fasting venous sample was collected from each subject in clean plain bulb for serum calcium and phosphorus estimation on the same day after suitable aseptic precautions. Serum calcium was estimated using arsenazo method and serum phosphorus was estimated using photometric UV test in Beckman Coulter AU 5800, Fully Automated Biochemistry Autoanalyzer in CRL, GMCH, Nagpur.

Test principle:-

1. For calcium estimation⁷: Calcium ions reacts with Arsenazo III (2,2'- [1,8-Dihydroxy-3,6-disulphonaphthalylene - 2,7-bisazo]-bisbenzenearsonic acid) to form an intense purple coloured complex. In this method the absorbance of calcium-arsenazo 3 complex measured biochromatically at 660/700nm. The resulting increase in absorbance of the reaction mixture is directly proportional to calcium concentration in the sample.
2. For phosphorus estimation⁸: Inorganic phosphorus reacts with molybdate to form a heteropolyacid complex. The use of a surfactant eliminates the need to prepare a protein free filtrate. The absorbance at 340/380 nm is directly proportional to the inorganic phosphorus concentration in the sample.

Statistical analysis:

The collected data was entered in Microsoft Excel 2007 and then transferred to the SPSS (version 20). The qualitative data was represented with frequency and percentage and quantitative data with mean and standard deviation. Association between two qualitative data

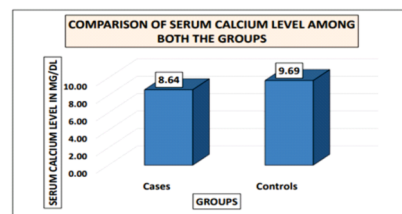
was calculated using chisquare test and difference between two mean was calculated using unpaired t test. P value less than 0.05 was considered as statistically significant.

OBSERVATION AND RESULTS

- The mean age of cases were 41.78 ± 12.45 years while mean age of controls were 40.90 ± 12.95 years. The difference between the two mean was not statistically significant.
- Amongst cases, 42% were females and 58% were males while among controls 34% were females and 66% were males. The difference between two proportions was not statistically significant.
- The major presenting complaint was multiple reddish raised lesions (74%) followed by itchy lesions (22%), scaly lesions (12%) etc.
- Among cases, majority of the patients had past history of Diabetes Mellitus (20%) followed by hypertension (16%), bronchial asthma (6%), hypothyroidism (4%) and TB (2%) while among controls majority among them had hypertension (10%) followed by Diabetes mellitus (2%) and bronchial asthma (2%). Diabetes Mellitus was found to be significantly more among psoriatic cases as compared to controls.
- Twenty percent of the cases were smokers and 40% were alcoholics while among controls 30% were smokers and 46% were alcoholics. The difference between the two proportions was not statistically significant.
- The mean serum calcium level among cases was 8.64 ± 1.59 mg/dl while among controls it was higher (9.69 ± 0.59 mg/dl) than cases. The difference between the two means was statistically significant. The normal level being 8.8-10.6 mg/dl.

Table 1: Comparison of serum calcium level among cases and controls

Serum Calcium	Group	N	Mean	Std. Deviation	P value
	Cases	50	8.64	1.59	0.0001
	Controls	50	9.69	0.95	



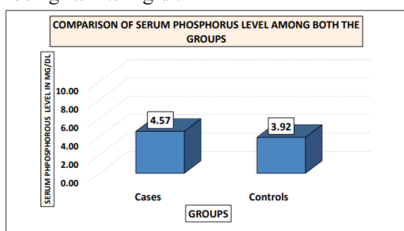
Graph 1: Comparison of serum calcium level among cases and controls

Table 2: Comparison of serum phosphorus level among cases and controls

Serum Phosphorus	Group	N	Mean	Std. Deviation	P value
	Cases	50	4.57	1.03	0.001
	Controls	50	3.92	0.79	

The mean serum phosphorus level among cases was 4.57 ± 1.03 mg/dl while among controls it was lower (3.92 ± 0.79 mg/dl) than cases. The

difference between the two means was statistically significant. The normal level being 2.5-4.5 mg/dl.



Graph 2: Comparison of serum phosphorus level among cases and controls

DISCUSSION

In the present study, majority of the cases had past history of Diabetes Mellitus (20%) followed by hypertension (16%), bronchial asthma (6%), hypothyroidism (4%) and TB (2%) while among controls majority among them had hypertension (10%) followed by Diabetes mellitus (2%) and bronchial asthma (2%). Diabetes Mellitus was found to be significantly more among psoriatic cases as compared to controls. Study conducted by Gisondi P et al observed similar findings where type 2 Diabetes mellitus cases were significantly more in psoriatic patients (17.6%) as compared to control groups (4.2%). Even hypertension was significantly higher among cases (51.3%) as compared to controls (37.8%)⁹.

In the present study, 20% of the cases were smokers and 40% were alcoholics while among controls 30% were smokers and 46% were alcoholics. The difference between the two proportions were not statistically significant.

Gisondi P et al observed smokers were more in psoriatic patients (16.8%) as compared to control group (15.1%). This is in contrary to our study and can be explained by the fact that, since we have chosen hospital controls, the control might come to hospital for some other diseases which might be affected by their smoking history⁹.

In the present study, the mean serum calcium level among cases was 8.64 ± 1.59 mg/dl while among controls it was higher (9.69 ± 0.59 mg/dl) than cases. The difference between the two means was statistically significant.

Intracellular calcium plays an important part in the regulation of proliferation and differentiation of keratinocytes (Lebwohl et al., 2009). Association of mild hypocalcemia with pustular psoriasis of von Zumbush, a rather severe form of psoriasis, has been observed (Plavina et al., 2008). Several studies have indicated to calcium role in controlling cellular multiplication and differentiation¹⁰.

Similar results were observed by Ali El et al where the mean serum calcium level among cases were 8.29 ± 0.72 mg/dl and 9.96 ± 1.04 mg/dl among controls and the difference was statistically significant (p value < 0.001)¹¹.

This finding was contradictory to the findings by Morimoto S et al, where Serum calcium level was similar in both the groups (9.1 ± 0.4 mg/dl among psoriatic patients and 9.3 ± 0.4 mg/dl among normal healthy individuals)¹².

Serum Phosphorus level

In the present study, the mean serum phosphorus level among cases was 4.57 ± 1.03 mg/dl while among controls it was lower (3.92 ± 0.79 mg/dl) than cases. The difference between the two means was statistically significant. The exact mechanism behind increase in serum phosphorus in patients with psoriasis is not known however there is an inverse relationship between calcium and phosphorus which may conclude our results.

Similar results were observed by Ali El et al where the mean serum phosphorus level among cases were 4.5 ± 0.40 mg/dl and 3.57 ± 0.58 mg/dl among controls and the difference was statistically significant (p value < 0.001)¹¹.

This finding was contradictory to the findings by Morimoto S et al, where Serum phosphorus level was similar in both the groups (3.8 ± 0.4 mg/dl among psoriatic patients and 3.7 ± 0.4 mg/dl among normal

healthy individuals)¹².

CONCLUSION

This study shows an increased prevalence of minerals abnormalities in patients with psoriasis. Hence, it is recommended early screening and treatment of minerals disturbances specially serum calcium, serum phosphorus as they are essential for a good health. With the treatment of oral calcium along with other medications we can reduce prevalence of psoriasis.

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