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Blood Sugar & Vitamin B12 Level in Psoriasis Patients in Relation to Diabetes Mellitus and Hyper Tension

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ABSTRACT

Background: *Psoriasis is a chronic disfiguring inflammatory and proliferative condition of the skin in which both genetic and environmental influences have a critical role. Several reports have shown an increased risk for the metabolic syndrome (a combination of central obesity, DM Type 2 or insulin resistance, Hyper Tension and combined hyperlipidemia) in patients with psoriasis, but there are few Indian studies on the association between psoriasis with diabetes and hypertension together.*

Objective: *To study blood sugar and serum B12 level at the beginning of study and after 8 weeks in 2 groups of Psoriasis patients.*

Method: *A cross-sectional study was performed in 300 clinically diagnosed Psoriasis patients (Group II) which were further grouped as 200 plain psoriasis (Group IIA) and 100 psoriasis cases with DM or DM and HT both (Group IIB) and 200 age and gender matched healthy subjects as the controls(Group I). Blood sugar and serum Vit. B12 level were measured at the beginning of study and after 8 weeks in both the groups.*

Result: *Patient presented no significant change in the blood glucose level in Group IIA psoriasis patients at the beginning of study and after 8 weeks as compared to controls but in Group IIB psoriasis there is significant increase ($P<0.01$) at the beginning but after 8 weeks its value is increased highly significantly ($P<0.001$) as compared to controls.*

Serum B12 level is decreased and increased significantly ($P<0.01$) in Group IIA psoriasis patients at the beginning and after 8 weeks respectively. But in Group IIB psoriasis patients its value is decreased and increased highly significantly ($P<0.001$)at the beginning of study and after 8 weeks which shows that B12 level is lower in psoriatic skin than in non-psoriatic skin and active lesions had lower level than healed lesions.

Conclusion: *Data suggests that psoriatic patients must be considered as a group at high risk for becoming diabetic due to high Blood sugar level and more prone for cardiovascular disease due to low serum B12 level in psoriatic skin than in non-psoriatic skin.*

Keywords- *Psoriasis, blood glucose, Vit. B12, diabetes, cardiovascular disease.*

Introduction

Psoriasis is a chronic disfiguring inflammatory and proliferative condition of the skin in which both genetic and environmental influences have a critical role. It affects 2–3% of the population worldwide. Recent studies indicate that psoriasis is associated with an increased risk of comorbidity and mortality[1]. Systemic inflammation in psoriasis and an increased prevalence of unhealthy lifestyle factors have been independently associated with obesity, insulin resistance, and an unfavourable cardiovascular risk profile[2]. Psoriasis patients appear to be at high risk for Diabetes Mellitus and cardiovascular disease [3]. More than 80% of individuals with diabetes develop hypertension, and approximately 20% of individuals with hypertension develop diabetes. In patients with hypertension and diabetes, the pathogenesis of cardiovascular disease is multifactorial, but recent evidence points toward the presence of a low-grade inflammatory process.[4] Large number of studies in western literature suggests association of Psoriasis with metabolic syndrome comprising obesity, heart disease, hyperglycemia, dyslipidemia and hyper tension [3].

In the present study, we measured blood sugar and serum B12 level in two groups of psoriasis patients at the interval of 8 weeks so that if changes are observed it will be helpful in the assessment and prevention of onset or progress of disease towards further complications "Prevention is better than cure".

Methods

A hospital based cross-sectional study was carried out consisting of:

A. 200 age and gender matched healthy subjects as the controls (Group I)
B. 300 psoriasis patients grouped as

i. 200 plain psoriasis (Group IIA) further divided as 80 of less than 40 years, 120 of more than 40 years of age
ii. 100 of psoriasis with mixed complications (Group IIB) further divided as 70 of psoriasis with DM and 30 of psoriasis with DM and HT.

These were selected from the outpatient clinic of Department of Medicine & Dermatology. The duration of the disease range from 1-25 years (Mean 11±6.71). Informed consent was obtained from the subject after fully explaining the purpose of study. All the patients had clinical diagnosis for psoriasis. Inclusion criteria for both the groups was patients with clinical diagnosis of psoriasis of any duration and exclusion criteria for Group IIA were coexisting inflammatory skin disease, smoking, alcoholics, diabetes mellitus and hypertension & history of dyslipidemia and for Group IIB were coexisting inflammatory skin disease, smoking and alcoholics.

Blood samples have been collected under all aseptic conditions at the beginning of study and after 8 weeks. 2ml blood is taken in plain vial for separation of serum for the estimation of Vitamin B12 level and 2ml blood in sodium citrate vial for separation of plasma for estimation of blood glucose.

Blood glucose level was measured colorimetrically at a wavelength of 520nm using glucose oxidase

peroxidase method (Marks & Lloyd, 1963) & serum Vit. B12 level was measured by ELISA (HM Waters, JA Thornton et al, 1981).

The results were expressed as mean ± standard deviation. A P<0.05 or P<0.01 was considered statistically significant. Statistical analysis was performed using Z-test.

Result & Discussion

The study included 300 patients with psoriasis and 200 controls. The mean age of psoriasis patients was 44.17±11 and of controls is 41.32±10 years. In psoriasis groups there were 74% males and 26% females.

Table no. 1: Comparison of blood sugar level between controls & different groups of psoriasis cases.

(Values are expressed as Mean±SD, in mg/dl)

Controls	Different group of Psoriasis cases	Beginning of study	After 8 weeks
91.30±14.71 n=200	Group IIA Plain Psoriasis n=200	93.30±12.8	95.25±11.3
90.98±11.31 n=54	Group IIA Plain Psoriasis (<40 years of age) n=80	90.36±9.8	91.2±10.14
92.01±13.86 n=146	Group IIA Plain Psoriasis (>40 years of age) n=120	95.86±11.4	98.2±9.86*
91.30±14.71 n=200	Group IIB Psoriasis with mixed complications n=100	138.3±14.4*	150.3±11.3**
92.01±13.86 n=146	Group IIB Psoriasis with DM n=70	132.1±12.2*	144.1±10.1*
92.01±13.86 n=146	Group IIB Psoriasis with DM & HT n=30	154.9±10.9**	166.8±12.1**

* P<0.01, ** P<0.001

As shown in Table no. 1, fasting blood glucose level in controls and Group IIA found no significant difference at the beginning of study and after 8 weeks. Similar results were found in patients of less than 40 years of age of Group IIA. Blood glucose level is increased significantly (P<0.01) after 8 weeks in more than 40 years of Group IIA which suggests that standard treatment for psoriasis may promote the development of diabetes esp. if patients were treated with systemic steroids[5].

Blood glucose levels in controls and Group IIB psoriasis with mixed complications is increased significantly (P<0.01) at the beginning of study but after 8 weeks its value is increased highly significantly (P<0.001) which shows that standard psoriasis treatment increases level of blood glucose, because the topical steroids that are often used in treatment of Psoriasis may be systemically absorbed if they are used on large body surface area for extended periods[6] and cause hyperglycemia which supports previous observation by Henseler and Christophers[7].

Blood glucose level in Group IIB Psoriasis patients with Diabetes Mellitus is increased significantly (P<0.01) at the beginning of study and after 8 weeks and in Group IIB psoriasis patients with Diabetes Mellitus & Hypertension is increased highly significantly (P<0.001) which supports previous observation by Cohen[8] which showed that inflammation caused due to high BP contribute to insulin resistance, a pre-diabetic stage where the body does not respond to the glucose regulating hormone, insulin.

Table no. 2: Comparison of S. B12 level between controls & different groups of psoriasis cases.

(Values are expressed as Mean±SD, in pgm/ml)

Controls	Different group of Psoriasis cases	Beginning of study	After 8 weeks
439±16 n=200	Group IIA Plain Psoriasis n=200	383±14*	386±15*
456±17 n=54	Group IIA Plain Psoriasis (<40 years of age) n=80	403±16*	408±16*
432±11 n=146	Group IIA Plain Psoriasis (>40 years of age) n=120	373±12*	409±12*
439±16 n=200	Group IIB Psoriasis with mixed complications n=100	234±9**	240±9**
432±11 n=146	Group IIB Psoriasis with DM n=70	212±7**	215±8**
432±11 n=146	Group IIB Psoriasis with DM & HT n=30	287±10**	298±9**

* P<0.01, ** P<0.001

Table no. 2 shows that in Group IIA plain psoriasis patients and in less than 40 years of age serum B12 level is decreased significantly (P<0.01) at the beginning of study but after 8 weeks its value is increased significantly (P<0.01). It supports the previous observation by M. Wolters[9] in British Journal of Dermatology. In Group II A plain psoriasis patients of more than 40 years of age Serum B12 level is decreased significantly at the beginning of study but after 8 weeks its value is increased significantly (P<0.01). Surveys done by Hokin, Bevan D & Terry[10] shown that most strict long term vegetarians are Vit B12 deficient. Vitamin B12 (Cobalamin) is a water soluble vitamin. In contrast to other water soluble vitamins it is not excreted quickly in the urine, but rather accumulates and is stored in liver, kidney and other body tissues. Normal blood level of Vit. B12 is 200-600 pgm/ml. The amount of vit B12 actually needed by body is very small, probably only about 2 µgm or 2 millionth of gm/day. The richest dietary sources of Vit. B12 are liver, kidney, egg, cheese and some species of fish.

In Group IIB psoriasis patients with mixed complications Serum B12 level in Group II B was 234±9 which is found to be highly significantly decreased & it is similar to findings of Stankler L[11] which shows that B12 level was lower in Psoriasis than non-Psoriatic skin and active lesions had lower levels than healed lesions. In group IIB psoriasis patients suffering from Diabetes Mellitus Serum B12 level is decreased and increased highly significantly (P<0.001) at the beginning of study and after 8 weeks. A cross sectional Cohort study done by Leif Spare Heimann[12] showed that metformin therapy given in Psoriatic diabetic patients causes decrease in Cobalimin level by 26.7%. Dr. Marry Ann Gilligan[13] estimates that 10-30% of patients on metformin develop a vit. B12 deficiency and points out there is some evidence that calcium supplementation will prevent it.

In psoriasis patients of Group IIB suffering from DM & HT serum B12 level is decreased and increased highly significantly at the beginning of study and after 8 weeks (P<0.001) respectively. Molnlycke[14], a Swedish researcher has discovered that many older people are deficient in Vit B12 and he concluded that routine screening for a Vit B12 deficiency is justified in cases of older people.

The findings of this hospital based cross-sectional study suggests that the risk of developing DM is slightly increased in patients with psoriasis as compared with patients without psoriasis and the

risk estimates were higher with psoriasis patients of mixed complications.

Obesity and the metabolic syndrome had been proposed as an explanation for this increased risk[15]. Inflammation could be a biologically plausible mechanism underlying this association; insulin resistance has previously been attributed to inflammation[16]. Alternatively, therapy for psoriasis may promote development of diabetes, esp. if patients were treated with systemic steroids. In this study information on psoriasis related therapy was not available. The topical steroids that are often used in the treatment of psoriasis may be systemically absorbed if they are used on large body surface areas for extended periods[17]. The long term use of topical steroids on large body surface areas could explain the observed increase in risk for diabetes, although adherence with long term topical steroids use is generally low[18].

In this study, individuals with psoriasis were at a slightly increased risk for hyper tension. As mentioned above, psoriasis is a chronic inflammatory disease[19] and inflammation is a risk factor for hyper tension[15]. Metformin therapy prescribed to diabetic patients may reduce the serum B12 level[12] which further raises the serum homocysteine level[20], which is a major risk factor for strokes and other cardio vascular diseases.

Summary & Conclusion

In summary, our data suggests that psoriatic patients must be considered as a group at high risk for becoming diabetic and more prone for cardiovascular disease since psoriasis per se seems to be associated with risk changes in blood glucose level, serum B12 level and we suggest early screening with blood glucose and serum B12 level in psoriasis patients at the time of presentation and follow up for evaluating risk and prevention of the progress of the disease towards severity.

References

1. National Psoriasis Foundation. About Psoriasis: statistics. Available at: http://www.psoriasis.org/about/stats. (last accessed: September 2008).
2. Pearce DJ, Morrison AE, Higgins KB, et al. The comorbid state of psoriasis patients in a university dermatology practice.*J Dermatolog Treat*. 2005;16(5-6):319-323.
3. Sommer DM, Jenisch S, Suchan M, Christophers E, Weichenthal M.Increased prevalence of the metabolic syndrome in patients with moderate to severe psoriasis. Arch Dermatol Res.2006;298:321-8.
4. Savoia C, Schiffrin EL. Vascular inflammation in hypertension and diabetes: molecular mechanisms and therapeutic interventions. *ClinSci (Lond)*. 2007;112 (7): 375-384.
5. Abrar A Qureshi, Hyon K Choi et al. Psoriasis and the risk of Diabetes and Hypertensio. Arch Dermatol 2009; 145(4):379-382.
6. Garden J M, Freinkel R K. Systemic absorption of topical steroids : Metabolic effects as an index of mild hypercortisolism. ArchDermatol. 1986;122(9):1007-10.
7. Henseler T, Christophers E. Psoriasis of early and late onset: characterization of two

types of psoriasis vulgaris. J Am Acad Dermatol 1985;13:450-6.

8. Cohen ADSherf MVidavsky LVardy DA Shapiro JMeyerovitch J Association between psoriasis and the metabolic syndrome: a cross-sectional study. *Dermatology* 2008;216 (2) 152- 155
9. Cobalamin: a critical vitamin in the elderly Wolters M, Ströhle A, Hahn A, Prev Med. 2004
10. Hokin, Bevan D, Terry. Cyanocobalamin (Vit B12) status in vegetarian. America Journal of Clinical Nutrition. 1999(70).
11. L Stankler. The vit B12 level in psoriatic skin and serum. British Journal of Dermatol, 2006(81);911-18.
12. L S Hermann. Vit B12 status of patients treated with Metformin:A cross-sectional cohort study. SAGE Journals.
13. Dr. Marry Ann Gilligan. Diabetes drug linked to Vit. B12 defeciency. Archives of internal medicine, 2002(162);484-85.
14. Molnlycke Sweden, Robert et al. Prevelance and diagnosis of cobalamin deficiency in older people. Jounal of the American Geriatrics Society. 1996(44);1273-74.
15. Wakkee MThio HBPrens EPSijbrands EJ Neumann HA Unfavorable cardiovascular risk profiles in untreated and treated psoriasis patients. *Atherosclerosis* 2007;190 (1) 1- 9
16. Duncan BBSchmidt MIPankow JS et al. Atherosclerosis Risk in Communities Study, Low-grade systemic inflammation and the development of type 2 diabetes: the Atherosclerosis Risk in Communities Study. *Diabetes* 2003;52 (7) 1799- 1805
17. Garden JM Freinkel RK Systemic absorption of topical steroids: metabolic effects as an index of mild hypercortisolism. *Arch Dermatol* 1986;122 (9) 1007- 1010
18. Zaghloul SS Goodfield MJ Objective assessment of compliance with psoriasis treatment. *Arch Dermatol* 2004;140 (4) 408- 414
19. Fitch EHarper ESkorcheva IKurtz SEBlau velt A Pathophysiology of psoriasis: recent advances on IL-23 and Th17 cytokines. *Curr Rheumatol Rep* 2007;9 (6) 461- 467
20. R.S.Wadia, NC Edul et al. Hyper-homocysteinaemia & Vit. B12 defeciency in Ischaemic strokes in India.
21. Cakmak S K, Gul U, Kilic C, Kilic A. Homocysteine, vit B12 and folic acid levels in psoriasis patients. J Eur Acad Dermatol Venerol 2009,23(3);300-03
22. Tomkin GH, Hadden DR, Weaver JA, Montgomery DA. Vitamin-B12 status of patients on long-term metformin therapy. *BMJ* 1971;2:685-7.