

Homocysteine Serum Status in Patients with Psoriasis Vulgaris

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Abstract: Background: Psoriasis is a chronic inflammatory skin disorder affecting 2–3% of population. Associations between psoriasis and higher cardiovascular morbidity and mortality have been reported. **Objective:** Assess serum homocysteine levels in patients with psoriasis vulgaris. **Patients and methods:** The current study was carried out on 80 individuals attending the outpatient clinic of Dermatology, Al-Azhar University Hospitals. Selected individuals were divided into 2 equal groups: **Group I:** Individuals with psoriasis vulgaris. **Group II:** Matched healthy individuals as controls. All patients were subjected to full history taking including detailed history, complete general examination, Complete dermatological examination and evaluation of psoriasis severity in psoriatic patients by (PASI) score. **Results:** There was a statistically highly significant difference between patients and controls as regard serum homocysteine. By comparing the homocysteine level in both groups as regards the age, our results reported significant direct correlation between the age and homocysteine level in patients and controls. By comparing the homocysteine level in group I as regards to the duration, our results reported significant correlation between the duration of psoriasis and homocysteine level. There was statistically significant relation between homocysteine level and sex of both groups as homocysteine level increased in males than in females. By comparing the homocysteine level in Group I in relation to the severity of psoriasis (PASI score), our results showed statistically increase in homocysteine level as regards severity of psoriasis in patients (PASI score). By comparing the homocysteine level in both groups as regards the BMI, our results reported significant direct correlation between the BMI and homocysteine level in patients and controls. **Conclusion:** Psoriatic patients have higher Hcy levels, regardless disease severity, and are associated with increased risk of cardiovascular morbidity. Our study suggests that psoriatic patients should be routinely investigated for CVD by Echo.

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Key words: Homocysteine, Psoriasis Vulgaris, chronic inflammatory, cardiovascular and homocysteine.

1. Introduction

Psoriasis is a common; chronic inflammatory multisystem disease with predominantly skin and joint manifestations results from a polygenic predisposition combined with triggering factors e.g. trauma, infection or medications (**Roberson and Bowcock, 2010**).

Homocysteine is a sulphur-containing amino acid that is not obtained from diet. Instead, it is biosynthesized from methionine, which is one of the essential amino acids that cannot be synthesized de novo and therefore must be supplied in diet. Homocysteine is metabolized by remethylation to methionine via folic acid or by transsulphuration to cysteine via cystathionine (**Selhub, 2011**).

Plasma homocysteine level was found to be directly correlated with psoriasis severity (PASI) and was inversely correlated with plasma folic acid levels, suggesting that patients with psoriasis might have low plasma folate level and a tendency to develop hyperhomocysteinaemia, which might predispose them to higher cardiovascular risk (**Malerba et al., 2006**).

Increased homocysteine level in patients with psoriasis might be due to reduced folic acid absorption from the gut and/or increased folic acid consumption in the skin in cell replication and skin turnover so as homocysteine is metabolized via folic acid to methionine so the level of homocysteine is increased in psoriasis patients (**Refsum et al., 1989**).

Hyperhomocysteinaemia was found to be related with atherosclerotic cardiovascular diseases, stroke, peripheral arterial occlusive disease and venous thrombosis (**Hermann, 2001**).

Dietary improvement or a short-term supplementation with folic acid and antioxidant vitamins might be suggested to psoriasis patients to prevent coronary cardiovascular disease by lowering blood homocysteine levels (**McCully, 2007**).

2. Patients and methods

This study included two groups:

- **Group I: Forty individuals with psoriasis vulgaris.**
- **Group II: Forty ages and sex matched healthy individuals as controls.**

Exclusion criteria:-

- Patients and controls less than 18 years old.
- Pregnancy.
- Menopause.
- Malignancy.
- Chronic hepatic or renal disease.
- Hypothyroidism.
- Systemic lupus erythematosus.
- Patients receiving oral antipsoriatic drugs.
- Patients or controls receiving oral contraceptives.

Each subject was submitted to detailed history, complete general examination, complete dermatological examination, serum sample collection to assess the level of homocysteine and evaluation of psoriasis severity in psoriatic patients by Psoriasis Area and Severity Index (PASI) score (*Fredriksson and Petterson, 1978*).

Serum homocysteine estimated ELISA.

Written informed consent was obtained from all studied subjects after complete description of the study.

Data were analyzed using SPSS software version 20.0. Quantitative data were expressed as mean, standard deviation and median.

Chi-square test, Student t-test, Mann Whitney test, Kruskal Wallis test and Spearman coefficient were applied. The level of significance was taken at $P < 0.05$.

3. Results

This study was conducted on 40 psoriatic patients and 40 healthy age and sex matched controls. The demographic, anthropometric and clinical data of patients and controls were summarized in **Table (1)**.

Table (1): Demographic, anthropometric and clinical data of patients and controls.

| Items | Groups | Patients (N° =40) | Controls (N° =40) | Significant Test | P-Value |
|-----------------------|--------|-------------------|-------------------|------------------|---------|
| Age (years) | | | | | |
| • Range | | 18-75 | 19-70 | t-test=0.270 | 0.787 |
| • Mean ±SD | | 36.30 ± 14.61 | 35.05 ± 13.37 | | |
| Sex | | | | | |
| • Male N° (%) | | 27 (67.5%) | 23 (57.5%) | | 0.356 |
| • Female N° (%) | | 13 (32.5%) | 17 (42.5%) | | |
| BMI (wt/ht) (%) | | | | | |
| • Underweight N° | | 1 (2.5%) | 3 (10%) | Z= 7.997 | 0.042 |
| • Normal N° | | 8 (20%) | 12 (40%) | | |
| • Overweight N° | | 18 (45%) | 18 (45%) | | |
| • Obese N° | | 13(32.5%) | 4 (10%) | | |
| Duration of psoriasis | | | | | |
| • Range | | 2.0 – 30.0 | | | |
| • Mean ±SD | | 10.78 ± 7.14 | | | |

There was a statistically significant higher level of Hcy in Group I compared with Group II ($P < 0.001$) (Table 2).

Table (2): Comparison between patients&control according to homocysteine level

| Homocysteine | Patients (n = 40) | Control (n = 40) | Z | P |
|--------------|-------------------|------------------|--------|---------|
| Min. – Max. | 0.50 – 10.50 | 0.16 – 4.80 | | |
| Mean ± SD. | 4.42 ± 3.13 | 1.24 ± 1.05 | 5.346* | <0.001* |
| Median | 3.85 | 0.90 | | |

By correlating the homocystiene level with the clinical data of patients, there was statistically significant correlation between homocystienelevel and age, BMI, duration of psoriasis and PASI score of the patients(**Table 3**).

Table (3): Correlation between homocysteine level and different parameters in patients (n = 40)

| | Homocysteine level | |
|------------------|--------------------|---------|
| | r_s | P |
| Age (years) | 0.787* | <0.001* |
| Duration (years) | 0.617* | <0.001* |
| PASI score | 0.715* | <0.001* |
| BMI | 0.659* | <0.001* |

4. Discussion

There was higher level of Hcy in psoriatic patients compared with controls in this study (Table 2). In agreement with our result, hyperhomocysteinaemia in psoriasis was reported by several previous studies done by (Tobin et al., 2011; Barzelli et al., 2010; Malerba et al., 2006). On the other hand, studies done by Uslu et al. (2013) did not find any statistically significant difference in Hcy level between psoriatic patients compared to control group. The discrepancy in the result may be attributed to genetic polymorphisms of the enzymes regulating the homocysteine metabolism in the different studied populations.

As regards the age, our results reported higher Hcy level by increasing the age of psoriatic patients (Table 3). This may be linked to the presence of geriatric diseases such as malabsorption disorder, renal diseases, malignancy and rheumatic disease which contribute to impaired folate status as stated by Brazzelli et al. (2010).

Our results revealed higher Hcy level in males than females in both patients and controls (Table 3). Compatible with our findings, Brazzelli et al. (2010) study showed significantly higher Hcy levels in males than in females in psoriatic patients but not in the control group. Homocysteine concentrations were suggested to be higher in men than in women due to larger muscle mass and greater creatine phosphate synthesis in men. Lowering effect of estrogens in women could be additional causes (Giltay et al., 1998).

Furthermore, there was statistically significant positive correlation between Hcy level and both disease severity by PASI score (Table 3) and the duration of the psoriasis (Table 3). This was controversial to the studies done by Uslu et al. (2013), Tobin et al. (2011) and Brazzelli et al. (2010) which showed that there was no statistically significant correlation between Hcy level and either disease severity by PASI score or the duration of the psoriasis. It was in agreement with the studies done by Malebra et al. (2006) who reported that Hcy level positively correlated with PASI score of psoriatic patients.

Also, in the present study, there was direct relation between cardiovascular risk by increased

homocysteine and severity of psoriasis. This result is in agreement with (Gaeta et al., 2013), who showed that patients with severe psoriasis presented with a 28% excess risk of cardiovascular disease as compared with patients with mild psoriasis. But it was controversial with (Gunes et al., 2008) who showed that presence of pulmonary hypertension was not correlated with neither disease duration nor PASI score.

Obesity has been associated with elevated Hcy by lowering folate levels (Kimmons et al., 2006). Also our results show the same correlation between BMI and Hcy levels in agreement with (Kimmons et al. (2006) (Table 3). Contrary, Tobin et al. (2011) did not find any association between obesity and Hcy levels in psoriatic patients.

From above discussion, elevated serum homocysteine level in psoriatic patients was found in this study which had been linked to inadequate status of folate, so dietary supplementation of folate, is essential in psoriatic patients (Malerba et al., 2006).

Conclusion

Psoriatic patients have higher Hcy levels, regardless disease severity, and are associated with increased risk of cardiovascular morbidity. Our study suggests that psoriatic patients should be routinely investigated for CVD by Echocardiography due to increased occurrence of pulmonary hypertension in psoriatic patients.

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