

Serum Ferritin Level in Vitiligo Patients: A Case Control Study

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Vitiligo is a common dermatological problem and the prevalence is more than 8% worldwide. It causes cosmetic disfigurement and psychological problem, which has an impact on person's social and professional life. It also causes sun burn and skin cancer. Increased level of serum ferritin may play a role in the pathogenesis of vitiligo. The present study was carried out to assess serum ferritin level in subjects with vitiligo. This case control study was conducted in the Department of Physiology, Dhaka Medical College, Dhaka from July 2014 to June 2015. For this, 50 subjects with vitiligo aged 20-50 years were considered as the study group (Group B) and 50 age matched healthy subjects were considered as control group (Group A) for comparison. The subjects were selected from outpatient department of Dermatology and Venereology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka and from personal contact from different areas of Dhaka city on the basis of inclusion and exclusion criterias. Serum ferritin level was measured. For statistical analysis unpaired Student's 't' test and Pearson's correlation coefficient (r) test were performed as applicable using SPSS for windows version 22.0. In this study, serum ferritin showed nonsignificantly higher level in cases as compared to control group. From the study results, it is concluded that increased level of serum ferritin may be a precipitating factor in the pathogenesis of vitiligo and indirectly support the autoimmune mediated damage of melanocytes but the mechanism is still unclear. So, further study is recommended.

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Key words: Serum ferritin, vitiligo.

Introduction

Vitiligo is an acquired, idiopathic disorder characterized by depigmented patches in skin due to destruction of melanocytes. People of all ages and both sexes are affected equally. Patients lose their skin color usually in a patchy and progressive manner.¹

Clinically the activity of vitiligo is of two types, progressive and stable. In progressive disease there is enlargement of already present lesion and or the appearance of new lesion within two months and in stable vitiligo there is no change in the lesion within two months.²

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The prevalence of vitiligo is around 1% in the United States and Europe. It ranges from <

0.1% to > 8% worldwide.³ In India, the prevalence ranges from 0.09% to 8%. In

China, Nepal and Srilanka the prevalence of vitiligo are 0.09%, 0.9% and 1.2 % respectively.⁴

Although vitiligo can affect any part of the body but the common sites are the exposed areas (face, neck, eyelids, nostrils, finger tips and toes), body folds (armpits, groin), nipple, lips and genitalia. It starts as multiple pigmented moles that develop a peripheral pigmented zone then gradually become fade and disappear in time. The white patches gradually enlarge over weeks to months. Vitiligo extends rapidly for a few months then stabilizes.⁵

People with vitiligo may be at increased risk of developing social and psychological stress. The main impact of vitiligo is the psychological effect. Vitiligo patients have lower self-esteem, higher levels of perceived stigma and disability, anger, poorer Quality Of Life (QOL) overall and negative impact on sexual relationships.⁶ Beside this, patients may develop skin cancer and sun burn.⁷

The exact cause of vitiligo is unknown but the most probable mechanism is immune mediated damage of melanocytes.⁸ Autoimmune mechanism may play a role in pathogenesis of vitiligo. Recently, ferritin has been accepted as a novel marker for autoimmunity and its level may increase in autoimmune disorders. Ferritin has been reported to exhibit different immunological activities including suppression of antibody, production of lymphocytes, decreasing the phagocytosis of granulocytes and suppression of delayed type of hypersensitivity. All these may be responsible for autoimmune pathogenesis of vitiligo.^{9,10,11}

Aims

To assess serum ferritin level in subjects with vitiligo.

Objectives

1. To estimate serum ferritin level in vitiligo patients.
2. To estimate serum ferritin level in age matched healthy subjects for comparison.
3. To correlate serum ferritin level with duration of vitiligo in the study groups.

Methods

The present study was a case control study and conducted in the Department of Physiology, Dhaka Medical College, Dhaka from July 2014 to June 2015. A total of 100 subjects were selected with age ranging from 20 to 50 years. Among them, 50 subjects with vitiligo were considered as the study group (Group B) and 50 age matched healthy subjects were considered as control group (Group A) for comparison. The subjects were selected from outpatient department of Dermatology and Venereology, BSMMU, Dhaka and from personal contact from different areas of Dhaka city. Subjects with hypertension, diabetes mellitus, renal failure, hypothyroidism, pregnancy, vitamin B₁₂ and folic acid supplementation were excluded from the study. After selection, the aim and benefit of the study was explained to each patient. An informed written consent was taken from all the participants. Study protocol was approved by Institutional Ethics Committee of Dhaka Medical College.

A detailed medical and family history of all subjects were recorded in a preformed questionnaire. Anthropometric measurement of the subjects was done and blood pressure was measured. With all aseptic precautions 5 ml blood from each study subject was collected after an overnight fast (at least 12 hours) to measure serum ferritin level. These parameters were estimated in the Department of Biochemistry, BSMMU, Dhaka by Chemiluminescent Microparticle Immunoassay method. Data were analyzed by

Student's 't' test and Pearson's correlation coefficient (r) test using SPSS for windows version 22.0.

Results

The general characteristics of study subjects and control group are presented in Table I. Both the groups were matched for age and BMI. Serum ferritin level was non significantly higher in group B ($p = 0.191$) in

comparison to those of group A (Table II a). Again, In this study, no significant difference ($p = 0.47$) was observed regarding mean serum ferritin level in group B₂ in comparison to that of group B₁ (Table II b). In group B, serum ferritin level showed negative correlation ($r = - 0.173$) with duration of disease, which was not statistically significant (Table III and Figure 1).

Table I: General characteristics of the subjects in both groups (n=100)

Parameters	Group		p value (A vs B)
	Group-A Healthy subjects (n =50)	Group-B Vitiligo patients (n =50)	
Age	35.00 ± 8.34 (20 - 50)	33.08 ± 6.53 (20 - 50)	0.203 ^{ns}
Sex			
Male	25 (50.0)	25 (50.0)	
Female	25 (50.0)	25 (50.0)	
Height (m)	1.62 ± 0.07 (1.52 – 1.73)	1.62 ± 0.06 (1.55 – 1.73)	
Weight (kg)	61.66 ± 6.09 (50 - 70)	60.52 ± 6.36 (52 - 70)	
BMI (kg/m ²)	23.3 ± 1.5 (20.7 – 27.4)	22.8 ± 1.0 (21.0 – 25.8)	0.095 ^{ns}
Systolic BP (mmHg)	117.80 ± 12.46 (100 - 180)	114.1 ± 7.6 (100 - 125)	
Diastolic BP (mmHg)	75.7 ± 7.0 (60 - 85)	75.8 ± 7.9 (60 - 85)	

Results are expressed as mean ± SD. Figure in parentheses indicate range. Unpaired Student's 't' test was performed to compare between groups. The test of significance was calculated and p value < 0.05 was accepted as level of significance.

n = number of subjects

ns = not significant

Table II (a): Study parameter of the subjects in both groups (n=100)

Parameter	Group		p (A vs B)
	Group-A Healthy subjects (n =50)	Group-B Vitiligo patients (n =50)	
Serum ferritin ($\mu\text{gm/L}$)	99.3 \pm 43.7	110.5 \pm 40.8	0.191 ^{ns}

Results are expressed as mean \pm SD. Figure in parentheses indicate range. Unpaired Student's 't' test was performed to compare between groups. The test of significance was calculated and p value < 0.05 was accepted as level of significance.

n = number of subjects

ns = not significant

*/**/*** = significant

Table II(b): Study parameter in stable and progressive vitiligo patients in study group (n=50)

Parameter	Activity of disease		p B ₁ vs B ₂
	Group-B ₁ Stable vitiligo (n = 26)	Group-B ₂ Progressive vitiligo (n = 24)	
Serum ferritin ($\mu\text{gm/L}$)	114.5 \pm 45.1	106.1 \pm 36.1	0.473 ^{ns}

Results are expressed as mean \pm SD. Figure in parentheses indicate range. Unpaired Student's 't' test was performed to compare between groups. The test of significance was calculated and p value < 0.05 was accepted as level of significance.

n = number of subjects

ns = not significant

*/**/*** = significant

Table III: Correlation of study parameter with duration of disease in study group (n=50)

Study parameter	Group B Vitiligo patients (n = 50)	
	r value	p value
Serum ferritin	-0.173	0.231 ^{ns}

Pearson's correlation coefficient (r) test was performed to compare relationship between parameters. The test of significance was calculated and p value < 0.05 was accepted as level of significance.

n = number of subjects

ns = not significant

*/**/*** = significant

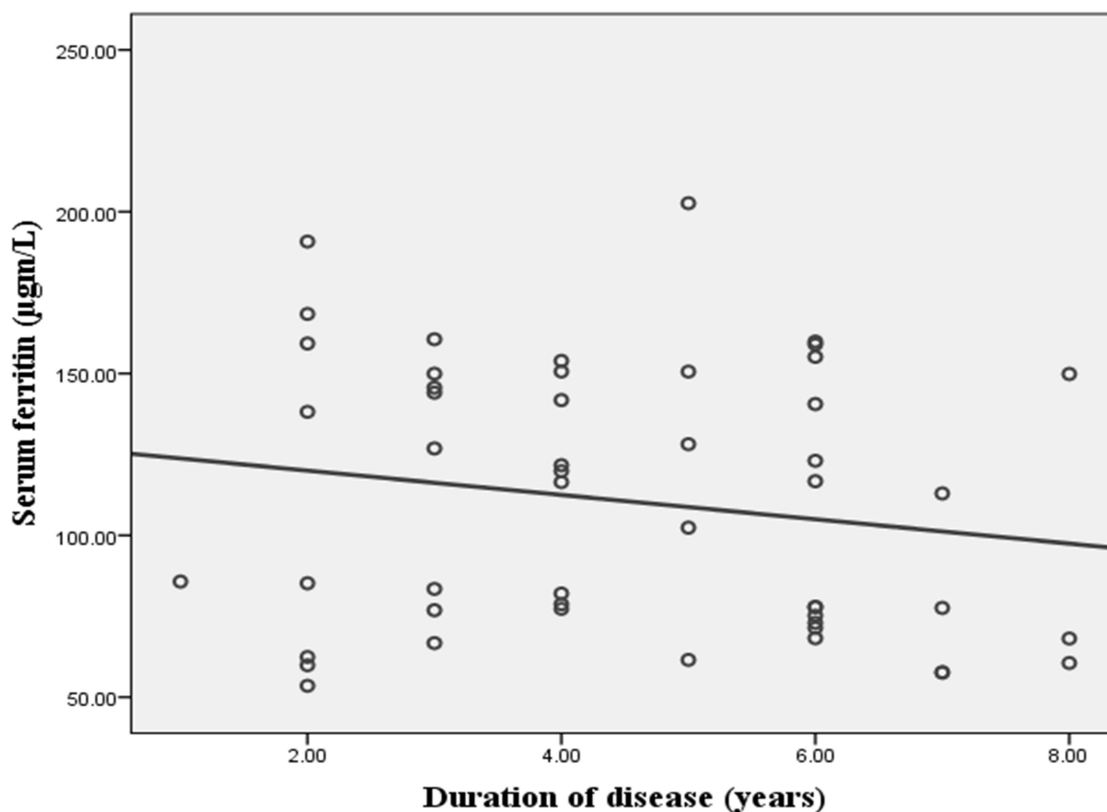


Figure 1. Correlation of serum ferritin level with duration of disease in study subjects (n=50)
 Group B: Study group (vitiligo patients), $r = -0.173$, $p > 0.05^{ns}$
 n = Number of subjects
 ns = not significant

Discussion

In the present study, no significant ($p = 0.191$) difference was observed regarding the mean serum ferritin level in vitiligo patients as compared to healthy controls. This finding was in agreement with the study of many researchers of different countries.^{12,13,14} Again, in the present study, no significant ($p = 0.473$) difference was observed regarding the mean serum ferritin level in progressive vitiligo patients than stable vitiligo patients. But no published data are available in our countries as well as different countries to compare these findings. In the present study, Pearson's correlation coefficient (r) test was done to observe the relationship of serum ferritin level with duration of disease in study group. Serum ferritin level showed negative correlation with duration of disease but the

relationship was not statistically significant. No published data are available in our countries as well as different countries to compare these findings.

Conclusion

In the present study serum ferritin showed nonsignificantly higher level in vitiligo patients as compared to control. The result was nearer to the upper limit of the normal range. Higher level of serum ferritin may also be responsible for autoimmune pathogenesis of vitiligo by different immunological activities including suppression of antibody production by lymphocytes, decreasing the phagocytosis of granulocytes and by suppressing delayed type of hypersensitivity. But in this study melanocyte specific cytotoxic T cell was not assessed to role out the autoimmune

mechanism of melanocyte destruction in vitiligo patients of the study group.

Limitations

The limitations of this study were:

- Sample size was small.
- Time duration was short.
- Sample was collected only from Dhaka city, which does not represent the whole country.
- Melanocyte specific T cell could not be measured due to financial constrains.

Recommendations

To make more conclusive result the following recommendations are proposed for further studies:

- Similar type of study can be done with large sample size.
- Sample can be collected from different parts of the country.
- Detection of melanocyte specific T cell can be done with this study to evaluate the pathogenesis of vitiligo.

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