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Assessment of Microalbuminuria in β-Thalassemia Major Patients

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ABSTRACT

Thalassemia is a genetic blood disease characterized by severe anemia with the accumulation of iron in the body, which results from a failure in the body's functions, including renal dysfunction. The aim of this research is to investigate microalbuminuria among β-thalassemia patients and to inform them. We studied twenty major β-thalassemia patients aged between 18 and 28 years, the mean age of 24.9 was included in the meta-analysis. There was no correlation between (BMI, Blood group, electrophoreses F, Using iron chelating, Frequency Blood transfusion, splenectomy blood transfusion) and concentration of microalbuminuria. There was a positive correlation with age.

Keywords: Microalbuminuria; Renal Dysfunction; Beta-Thalassemia

Introduction

β-Thalassemia major is a common hereditary hematologic disorder characterized by impaired β-globulin synthesis [1]. It is an inherited blood disorder which at least one of the parents must be a carrier of the disorder caused by either a genetic mutation or a deletion of certain key gene fragments. Multiorgan dysfunctions are still a major drawback [2]. Although involvement of other organs such as liver and heart are common in patients with β-thalassemia major, involvement of the kidney is not well documented. Renal proximal tubular dysfunction may occur in children with βthalassemia major without clinical manifestations of renal dysfunction or a decrease in GFR [3], Recent studies on microalbuminuria have demonstrated that microalbuminuria is the early marker of kidney disease in which the damaged kidneys allow traces of albumin to spill into urine [4,5]. In the recent years, few studies have demonstrated early markers of renal dysfunction, but these markers of renal tubular damage are not routinely used in the clinical laboratories and are relatively expensive, thus adding up.

Materials and Methods

A cross-sectional study was carried out on 20 thalassemia patients (13 males, 7 females) aged between 19-37 years with a mean age of 24.8 years, during their follow-up visits to the Thalassemia Center in Damascus. Data was obtained by using a form designed to collect the medical information from patients records and urinary specimen. The present study was approved by the Institutional Ethics Committee of the Al Sham Private University and Damascus Health Directorate, Informed consent was obtained from all study participants and/or their parents. the patient agreed to participate in the study. The investigations included estimation of urinary microalbumin with random specimen.

All patients were subjected to the following:

- Age
- Sex

- Body mass index (BMI)
- Blood group
- Hemoglobin Concentration
- Electrophoreses f
- Using iron chelating
- Frequency Blood transfusion
- Splenectomy.

Statistical Analysis

Mean and standard deviation were worked out to assess the level of urinary microalbuminuria. Pearson's correlation was applied among various parameters under study. SPSS version 20 (IBM SPSS, Armonk, NY, USA) was used for data analysis. Mean was used for quantitative variables, while number and percentage were used for qualitative ones. Chi-Square Test, Phi and Cramer's V test. $P < 0.05$ was considered to indicate significant and highly significant differences respectively.

Result

The mean age of our patients was 24.9, they were 13 males (65%) and 7 females (35%), the mean BMI was for males 18.301 and 19.802 for females, the mean of Electrophoreses f was 44.8 for males and 34.757 for females, the percentage of Frequency Blood transfusion was (52%) for a month, (23%) for 20 days and (19%) for 10 days ,The percentage of taking chelators was(71.42%), while the percentage of non-users was (23.80%), the percentage of splenectomy was for males (77.7%) and (22.2) for females. There was a significant correlation between the concentration of microalbuminuria with the age of patient of the research sample (Table 1), and the correlation value is (R=0.472) which is statistically significant, Where the probability value is (p=0.036).

Table 1: Correlation of microalbuminuria concentration and age, sex, BMI, Blood group, electrophoreses F, Using iron chelating, Frequency Blood transfusion, splenectomy, BMI: Body Mass Index.

Correlation	R-value	P-value
The concentration of microalbuminuria _ age	0.472	0.036
The concentration of microalbuminuria _ sex	0.075	0.753
The concentration of microalbuminuria _ BMI	0.397	0.083
The concentration of microalbuminuria _electrophoresis F	0.047	0.844
The concentration of microalbuminuria _ Blood type	0.097	0.683
The concentration of microalbuminuria _ splenectomy	0.123	0.605
The concentration of microalbuminuria _ Frequency Blood transfusion	0.158	0.505
The concentration of microalbuminuria _ Using iron chelating	0.242	0.303

Discussion

Microalbuminuria is positively correlated with age in our study. Studies have shown that the renal disorders in βthalassemia major patients increase in terms of frequency with age. Renal complications are not routinely encountered in βthalassemia major patients, but it can be easily detected when present by a more cost effective method such as urinary microalbumin. Hence our study emphasizes the need to include microalbuminuria levels into the routine followup of these patients. Thereby, impedance of disease progress will improve the patients' quality of life. The microalbuminuria should be thus incorporated in the routine followup of these patients so as to detect any renal dysfunction at an early stage. About the variable blood transfusion, our study concluded that there is no correlation with the concentration of microalbuminuria, it is maybe attributed to several reasons, including the insufficient frequency of blood, and that the transferred iron accumulates in other parts of the body. However, In a similar study at JSS University, (Doddamani P, et al. [6]) has shown that Microalbuminuria is positively correlated with age, which our study agreed with, and duration of blood transfusion which may be due to increased iron overload with each transfusion. Studies have shown that the renal disorders in β-thalassemia major patients increase in terms of frequency with age, increased duration of blood transfusion and Deferoxamine usage. For Using iron chelator, we conclude that there is no correlation with microalbuminuria concentration maybe due to the irregularity of taking iron chelator or the kind of chelator was not appropriate for the pateint. In our study there was no correlation with splenectomy, electrophoresis F, Blood group, BMI, sex therefor non thalassemia patients could have increased microalbuminuria and would be at risk of renal dysfunction. Limitations of our study were as follows: It involves a smaller study group and the study would be more applicable if we had a bigger study group.

Conclusion

We conclude that there is no correlation between the microalbuminuria concentration and (sex, BMI, Blood group, electrophoreses F, using iron chelating, splenectomy) and there is a positively correlation with age. We conclude that we need to include levels of microalbuminuria in the routine follow-up for both patients with beta thalassemia major and non-thalassemia patients for early detection of kidney injury. Thereby, resist disease progression and improve their quality of life.

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