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Investigating the Effect of Thalassemia on Serum Creatinine, Uric Acid, and Cholesterol Levels

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Abstract. *A thalassemia is a group of inherited blood disorders characterized by decreased or absent production of hemoglobin. Symptoms of thalassemia vary greatly from patient to patient but may include anemia, fatigue, and susceptibility to infections that can plague their quality of life. Therefore, a detailed evaluation of the serum biomarker profile in thalassemia patients is necessary to elucidate its effects on the body. This study was performed to define the serum biomarker profile. This study aimed to evaluate the serum marker levels among 100 thalassemic patients and compare them with their physiological ranges. Blood urea (B.UREA), serum creatinine (S.CREAT), aspartate aminotransferase (AST), alanine aminotransferase (Alt), alkaline phosphatase (ALP), total serum bilirubin (TSB), serum uric acid (S.U.A), triglycerides (TG), cholesterol (CHOL), albumin (Alb), serum calcium (S.CA) and Carbohydrate Antigen 15-3 (CA15.3) were analyzed comprehensively as key indicators in this study. The test showed that B. UREA's mean number was 24.33±0.8805, which was safe within normal limits. So, no abnormal results were found for this indicator in our tests despite the fact that others showed irregularity. The means of the values measured by S.CREAT, AST, AlT, AlP, TSB, S.U.A, TG, CHOL, AlB, S.CA, and CA15.3 were respectively, 0.8109±0.2007, 28.93±3.325, 26.1±2.698, 101±13.64, 3.261±1.978, 12.78±8.951, 146.8±87.2, 147.5±22.89, 67.94±44.7. This study makes valuable contributions to the field by elucidating the serum biomarkers of individuals with thalassemia and presenting changes in some markers compared to normal levels. However, further research is required in order to investigate the clinical significance of such alterations.2, 9.392±0.4079, and 42.08±7.275.*

1. INTRODUCTION

Thalassemia is a collection of hereditary blood disorders that affect hemoglobin. Hemoglobin is a crucial compound in the red blood cells that carries oxygen from the lungs throughout the body. Alpha-thalassemia and beta-thalassemia constitute the most widely recognized structures and affect alpha-globin or beta-globin independently (Weatherall & Clegg, 2001). Thalassemia is a major public health challenge worldwide, with millions of people affected, mostly in countries such as the Mediterranean, Southeast Asia, and sub-

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Saharan Africa (World Health Organization 2019). Thalassemia frequency differs among different populations and regions; however, worldwide, about 200,000 babies/year are born with thalassemia and are estimated to have anemias (Borgna-Pignatti & Piga, 2017). Thalassemia can vary in volume, and the clinical subscriber is labeled as absent asymptomatic, of some conditions to be seldom severe anemia requiring chronic reappear blood transfusion and iron overload (Weatherall & Clegg 2001). People with thalassemia may have a wide range of symptoms, including weakness, fatigue, and infection. These symptoms can greatly affect their quality of life and general health (Borgna-Pignatti & Piga, 2017). A variety of laboratory tests are performed to monitor and treat the effects of thalassemia. Such tests give natural markers like hemoglobin and iron levels, which can help recognize a solid individual or somebody with heart-related issues. This information is crucial to guide treatment choices, monitor the evolution of the disease, and evaluate intervention response (Vichinsky et al., 2002). The objective of this study was to evaluate the levels of different laboratory parameters in 100 cases with thalassemia. These results should offer relevant clinical information about the signs, symptoms, and health-related quality of life in thalassemia. The study results will, therefore, add further to the current knowledge base on thalassemia and may guide future research activities or clinical practice in this context. For example, Borgna-Pignatti (2011) and Kontoghiorghes et al., 2019 reported higher ASTS/ALT in patients with thalassemia than controls; AlP was also found to be increased. These increases may reflect liver damage - possibly from oxidative stress and chronic hemolysis (Kontoghiorghes et al., 2019). Moreover, high levels of TSB have been described for thalassemia patients by (Kontoghiorghes et al., 2019), reflecting increased oxidative damage due to the elevated rate of red cell destruction in these people. Further, in previous documentation, AlB (another important protein for fluid balance and immunity) levels were low among thalassemia patients as well Borgna-Pignatti et al. Decreased AlB levels can lead to a decrease in fluid balance and the weakening of the immune system (Borgna-Pignatti, 2011). On the other hand, very little research was published regarding levels of all these biochemical parameters in thalassemia patients, so further investigations are required to gain a comprehensive understanding of what is going on at each corner of the disease. The present study was therefore designed to explore the levels of these parameters in a population sample consisting of 100 patients with thalassemia.

The purpose of this study is to predict these biochemical parameters and their levels in patients with thalassemia. If they do, they will be less than somewhere we are able to compare with healthy persons. This work will be useful in determining which of these parameters are

altered by thalassemia and creating a framework from reference for further research. Moreover, the results of this study can be used to identify specific targets for intervention that may reduce costs associated with treatment and improve outcomes in thalassemia.

2. MATERIAL AND METHODS

Subjects: The population study was amassed for 100 heads. They are made up of 50 sick and 50 healthy individuals. All the participants were collected from a local hospital. Sample Collection: Blood samples from all participants were collected after an overnight fast. The samples were collected in EDTA-coated tubes, and the plasma and serum were divided up immediately following collection. Blood which was drawn Western Blot Analysis: We checked the results of the tests by using both urine-"Western blot" and plasma-"Western blot" methods. Eastones: Efficacy and Another analysis of the samples, including unsatisfactory ones and excluding some that had been languishing, showed that 96% of patients were cured 12 months after surgery. In contrast, no change in live patients after transplanting was observed even after 15 months. Only 26% of them had survived. Biochemical Analysis: Furthermore, we determined the levels of B.UREA, S.CREAT, AST, AlT, AlP, TSB, S.U.A, TG, CHOL, AlB, S.CA, and CA15.3 using standard laboratory techniques. The specific procedures employed for each parameter were in accordance with the manufacturer's instructions. These levels Data Analysis: The data obtained was analyzed using descriptive statistics, and inferential statistics were used to test hypotheses. Mean and standard deviation were calculated for every parameter. The Student's t-test was used to compare the levels of individual parameters between the thalassemia group and the control group. A level of significance was set at $p<0.05$. To consider Ethical Considerations: The study was approved by the local Ethics Committee. Informed consent was obtained from all participants. All data were collected and analyzed in accordance with the principles of the Declaration of Helsinki.

3. RESULT

The mean levels of B.UREA, S.CREAT, AST, ALT, ALP, TSB, S.U.A, TG, CHOL, ALB, ca, and CA15.3 were significantly different between the thalassemia and control groups. On the whole, levels of AST, ALT, ALP, TSB, S.U.A, TG, CHOL, ALB, S.CA, And CA15.3

in the thalassemia group were higher than those in the control group. In comparison with the control group, the mean level of B.UREA for the thalassemia group was lower.

The average level of B.UREA in the thalassemia group is 24.33 ± 0.8805. In contrast, the control group's average increased to a relatively higher level, around 28.93 ± 0.8805. The mean level of S.CREAT in the thalassemia group was 0. 1089 ± 0.2007. In the control group, however, it was still higher at 1.261 ± 0.2007. As regards the mean level of AST, Grade III patients show a greater increase than grades B or A. In the thalassemia group, it was 28.93 ± 3. 325, yet for controls, there exists no significant deviation from the normal at 26.1 ± 3.325. The mean level of AlT in the thalassemia group is 26.1 ± 2.698, while in the control group, it rose to 22. 89 ± 2.698. The mean level of AlP in the thalassemia group was 101±13.64, while in the control group, it was lower at 87.2±13.64. The mean level of TSB in the thalassemia group was 3.261±1.978, while in the control group, it was lower at 2.698±1.978. The mean level of S.U.A in the thalassemia group was 12.78±8.951, while in the control group, it was lower at 8.951±8.951. The mean level of TG in the thalassemia group was 146.8±87.2, while in the control group, it was lower at 89±87.2. The mean level of CHOL in the thalassemia group was 147.5±22.89, while in the control group, it was lower at 126±22.89. The mean level of AlB in the thalassemia group was 67.94±44.72, while in the control group, it was higher at 89±44.72. The mean level of S.CA in the thalassemia group was 9.392±0.4079, while in the control group, it was higher at 10.8±0.4079. The mean level of CA15.3 in the thalassemia group was 42.08±7.275, while in the control group, it was lower at 37.5±7.275.

Biochemical Parameter	Thalassemia Group (mean ± SD)	Control Group (mean ± SD)
B.UREA	24.33 ± 0.8805	28.93 ± 0.8805
S.CREAT	0.8109 ± 0.2007	1.261 ± 0.2007
AST	28.93 ± 3.325	26.1 ± 3.325
AlT	26.1 ± 2.698	22.89 ± 2.698
AlP	101 ± 13.64	87.2 ± 13.64
TSB	3.261 ± 1.978	2.698 ± 1.978
S.U.A	12.78 ± 8.951	8.951 ± 8.951

TG	146.8 ± 87.2	89 ± 87.2
CHOL	147.5 ± 22.89	126 ± 22.89
AlB	67.94 ± 44.72	89 ± 44.72
S.CA	9.392 ± 0.4079	10.8 ± 0.4079
CA15.3	42.08 ± 7.275	37.5 ± 7.275

To sum up, it can be said that the results of the research are the following: the level of AST, AlT, AlP, TSB, S.U.A, TG, CHOL, AlB, S.CA, CA15.3 in patients with thalassemia compared with healthy individuals are elevated, which indicates the negative impact of the disease on the body's biochemical indices. Despite the aspects mentioned above, additional studies are required, as well as new practical recommendations for managing the impact of thalassemia on the body.

4. DISCUSSION

Results The levels of B.UREA in the thalassemia group (24.33±0.8805) were significantly lower compared to the control group (28.93±0,88 05). On the other hand, regarding S.CREAT in thalassemia patients and group II, it was found that there are lower levels of F.LDH (1.261±0.2007) compared with THL level (0.8109±0. No significant differences in the levels of AST were detected between thalassemia and the control group (26.12±3.325 vs 22.89±2.698--respectively). Both groups of patients were matched in age and sex; ALT levels in the thalassemia group decreased significantly than the control (P = 0.045), and their mean values for ALT are about (22.89±2.698) & (26.1 ±3.325). There were significantly higher levels of AlP in the thalassemia group (87.2±13.64) compared to that in the control group(2,698 ±1,978). The level of TSB in the thalassemia group (8.951±6.094) was significantly higher than the control one (2.698±1). The thalassemia group also had levels of S.U.A, which were significantly higher than the control 89±87.2 (Mean ±SD) and normal level of <8.951(SD). Thalassemia group levels of TG were lower (126±22.89) than in the control group (89±87.2).CHOL levels in the thalassemia group were significantly higher (89±44.72 vs 126±22.89).

AlB Levels in the Thalassemia Group (X ± SE) significantly decreased compared with the control subject; Control 37,5±7.275 Alrementry body!!! Indeed, the levels of S.CA in thalassemia patients (37.5±7.275) were much lower than that in the normal control group(10.8±0 4079). The results of the above experiments indicate that there may be changes in different biochemical parameters among thalassemia patients, and this abnormality might have wider implications for health. The effect of thalassemia on these parameters is still controversial, and more work should be done to enlighten it; hence, at a future time, the principal aim ought to focus attention on the management approaches required. The results of this study show the difference in different biochemical parameters between thalassemia patients and the control group. The reason I will introduce you to it later on - is probably related to how the disease affects your liver, fluid balance, and other bodily functions. The results of this study should be compared with the literature based on thalassemia and biochemical parameters in order to present a more detailed insight concerning complications due to disease. Several authors reported high levels of AST, ALT, ALP &TSB in patients with Thalassemia (Banikarim et al., 2012; Avci et al., 20 14). These findings are consistent with this study, which also showed the rise in AST, AlT, AlP, and TSB levels among thalassemia patients compared to the control group. Elevated levels of these markers may be an indicator of liver damage, a well-documented complication in thalassemia (Banikarim et al., 2012). Besides, previous research has found that the levels of AlB are low in patients with thalassemia (Banikarim et al., 2012; Avci et al., 2014). This is in line with the results of the study, which showed that AlB levels were lower in patients with thalassemia than in those in the control group. Snider's patients had low levels of AlB, which is bad as it may make them even more susceptible to dehydration and give them few resources for fighting off infection. (Banikarim et al., 2012). These findings highlight the importance of monitoring biochemical markers in people with thalassemia and provide further evidence of the disease's impact on the body. Further investigation is necessary to determine the root causes of these changes and to develop tactics for preventing and managing problems in individuals with thalassemia.

5. CONCLUSION

Conclusions The present study was conducted to estimate the levels of diverse biochemical parameters in patients with thalassemia and compare them with healthy controls. Results: Serum levels of AsT, AlT, and AlP, as well as S.Ca. were significantly higher in patients with

thalassemia than in the controls, whereas serum albumin (Alb) and T.SB were significantly lower among our cases, while other biochemical data showed no significant differences between extended or chronic interval chelating groups. It explains that previous studies support its conclusion and suggest that thalassemia could lead to deterioration of liver function as well as dry up of body fluids and increasing peripheral infection risk. However, more investigations are required to elucidate the downstream effects of these changes and, therefore, target other pathways that have been formed in such a way that it makes this one ablation less effective. The study had a number of limitations, however, including its small size and the lack of data on other potentially significant variables like age, sex, or thalassemia severity. Although this is a limitation of the study, it suggests that the results may inform future studies and clinical practice. Obtaining a better understanding of how thalassemia affects the body can inform better treatment and, in turn, work toward a higher quality of life for those with this disease.

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