Lipid status in adult Iraqi Patients with β-Thalassemia Major and Intermedia

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Abstract: β-Thalassemia is hereditary blood disorders characterized by reduced synthesis of the beta chains of hemoglobin resulting to microcytic hypochromic anemia. Hypcholesterolemia is reported in recent studies in other countries. We estimated the level of triglyceride (T.G.), total cholesterol, high density lipoprotein (H.D.L) and low density lipoprotein (L.D.L) for seventy three patients with β-Thalassemia major(TM), (42 male and 31 female) and twenty patients with β-Thalassemia intermedia (TI), (10 Male and 10 Female) with thirty healthy participants (15 Male and 15 Female) as a control in Iraq. Their ages range was 18-30 years. The results show the level of all cholesterol species for TI is significantly decrease as comparison with TM and the last one is significantly decreases as comparison with control group. We found no association of serum lipid profile with age, sex, Hb and platelets.

Keywords: β-Thalassemia, Hypcholesterolemia, cholesterol and triglyceride.

I. Introduction

β-Thalassemia can be defined as a condition in which a reduced rate of synthesis of the beta globin chains leads to imbalanced globin-chain synthesis, defective hemoglobin production, and damage to the red cells or their precursors from the effects of the α-globin subunits that are produced in relative excess [1]. This difference in globin chain synthesis leads to severe hemolytic anemia in which life can only be continued by regular blood transfusions [2]. Thalassemia intermedia is defined a patients with β-thalassemia that have mild clinical symptoms of the disease is somewhere between the β-thalassemia trait and the severe manifestations of β-thalassemia major [3]. Infections such as HBV, HCV, and HIV can be observed due common transfusions in patients with β-Thalassemia major [4]. Different endocrine, cardiac, and hepatic diseases may occur in thalassemia patients as a result from iron overload [5]. In recent study, all specious of cholesterol had been reported decrease in children with β-thalassemia patients with elevating in level of triglyceride [6]. The metabolic bases of this abnormality still unclear and several mechanisms have been suggested as clarification for the lipid abnormalities: anemia, liver dysfunction, iron overload and oxidative stress [7]. In this study, the authors determined serum lipid profile in two groups of Iraqi β-Thalassemia patients (TM and TI) and compared the result between them and also the results of each group were compared with healthy control group. In addition, the authors evaluated the levels of Hb, platelets, to investigate if any association between lipid profile with hematological variables and also match the results with sex and age.

II. Materials and methods

2.1. Subject

The Samples were conducted in (Ibn- Balady Hospital/Baghdad) during the Period from November 2015 to March 2016. They have been classified as the following:

- Group one: β-Thalassemia Major (TM) as pathological they were diagnosed by specialist physicians depending on the laboratory analysis of blood film, Hb-electrophoresis and biochemical iron study. Included 73 patients (42 male and 31 female) their ages range 18-30 with a mean age( 22.99 years).
- Group two: β-Thalassemia Intermedia (TI) as pathological they also were diagnosed by specialist physicians depending on the same laboratory analysis that used in diagnosing of β-Thalassemia Major but they are less than Thalassemia Major in their needing to blood transfer. This group included 20 patients (10 male and 10 female) their age range 18-30 with a mean age (23.6 years).
- Group three: Control group healthy individuals included (15 male and 15 female), their ages range 18-27 years with a mean age (22.93 years) no previous disease which may interfere with the parameters analyzed in this study.

2.2. Blood sampling

Five millimeter of venous blood was withdrawn by disposable syringes with stainless needles, divided into two portions. First portion was transferred to plain tube containing (ethylenediaminetetraacetic acid disodium) salt (EDTA) as anticoagulant for determination of hemoglobin and platelets, the second portion was transferred...
to plain polyethylene tube containing gel as a clot activator for serum separation. The second portion was centrifuged at 4000 rpm for 10 minutes, and the serum was separated immediately and stored at -75 °C and used later to determined lipid profile.

### 2.3. Laboratory assessment

The levels of hemoglobin and platelets count were determined by using hematology auto analyzer (MS®), and the concentration of T.G. and Cholesterol were measured by using enzymatic-colorimetric methods (Randox kits)[8-9]. Measurement of HDL was determined by precipitating LDL, VLDL and chylomicron by addition of phosophstigic acid in the presence of magnesium ions. Low density lipoprotein (LDL) was examined by using the Friedewald equation [10].

### 2.4. Statistical analysis

The inputting and analyzing data were done by using SPSS (20). All results were readout as Mean±SD and ANOVA one step test was used to find out the significance among the studied groups for each parameter. The correlation was calculated by bivariate correlation test.

The table

### III. Results

(1) reveals the levels of hematological parameters and the lipid parameters for the three study groups. The results show high significant decreasing in the levels of Hb in the two patients as compared with control group. The levels of platelets show significant increasing in the two patients groups when compared with control and the level of this parameter in TI patients was higher than TM patients. Triglyceride results reveal high significant increase in two patients groups as compared with control group. The levels of total cholesterol, HDL and LDL are high significantly decreased in TI and TM when compared with control group and it is more decreasing in TI. No correlation of lipid profile to the sex, age and hematological parameters was noticed.

**Table 1:** the result of Hb, platelets and lipid profile in the three studied groups expressed as (mean±SD).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control</th>
<th>TI</th>
<th>TM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb</td>
<td>12.88±1.16</td>
<td>8.15±1.53</td>
<td>8.04±1.49</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Platelets</td>
<td>243.07±38.84</td>
<td>374.6±181.39</td>
<td>364.47±188.7</td>
<td>0.002*</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>92.84±39.009</td>
<td>162.32±72.357</td>
<td>171.56±69.714</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>185.32±40.963</td>
<td>126.97±37.84</td>
<td>144.37±57.621</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>HDL</td>
<td>33.33±9.3026</td>
<td>14.78±5.6494</td>
<td>14.94±6.6979</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>LDL</td>
<td>133.41±36.8666</td>
<td>79.72±34.6976</td>
<td>95.11±32.7646</td>
<td>&lt;0.001**</td>
</tr>
</tbody>
</table>

### IV. Discussion

Lipids are necessary to save life of cells because it is important sources of energy. A lipid profile is determinant of the level of specific lipids in the blood. Two important lipids, cholesterol and triglycerides, are cycled in the blood by lipoprotein compounds. The lipoprotein particles are measured with a lipid profile. It is divided by their density into high-density lipoproteins (HDL), low-density lipoproteins (LDL), and very low-density lipoproteins (VLDL) [11]. Hypocholesterolemia in all phenotype of thalassemia patients has been reported since the beginning of the20th century [12-21]. Our result agree with the study of Hartman et al., that explain TI patients showed significantly lower TC, HDL-C and LDL-C compared with TM, and TM lower than control group. No clear explanation was proposed for the reported lipid abnormalities in TI patients; accelerated erythropoiesis and enhanced cholesterol consumption were suggested as the more acceptable mechanism implicated in the hypocholesterolemia of TI patients [22]. Hypertriglycerideremia in thalassemia patients that’s obtained in our results is in agreement with Al-Quobali and AbouAsali, Seham M. et al. and Hartman et al. They suggested that anemia places the thalassemic patients at risk for decreased extrahepatic lipolytic activity, resulting in high serum triglycerides [23,24].

### V. Conclusion

Lipid profile examination shows significant decreasing in cholesterol levels of the two patients groups when compared with control, the levels of cholesterol in thalassemia intermedia were significantly decrease when compared with thalassemia major patient, the acceleration of erythropoiesis enhanced cholesterol consumption is more acceptable suggestion for these result.

### References

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