Serum Lipid Values in Children with Beta Thalassemia Major

Vefik Arıca*, 1, Şecil Arıca1, Cahit Özer2, Murat Çevik3
1Mustafa Kemal University Medical Faculty, Department of Pediatric, MD, Hatay, Turkey
2Mustafa Kemal University Medical Faculty, Department of Family Medicine, MD, Hatay, Turkey
3Tasmescit Family Health Center, Department of Family Medicine, MD, Çankırı, Turkey

Abstract

Objective: The purpose of the study was to examine the blood lipid profile in children with beta-Thalassemia major, and to determine the factors that affect it.

Material and Method: Files of eighty-five patients between the ages of five and fifteen with beta-Thalassemia major who were receiving regular chelation therapy followed by from paediatric policlinic of our hospital were examined retrospectively. Blood lipid profiles of fifty-five healthy children were taken for use as the control group. A total of 117 children were enrolled and examined in the study.

Findings: Hb and Hct values of the group with Beta-Thalassemia major were significantly lower than the control group (p<0.005). Ferritin values in the group with Beta-Thalassemia major were found to be significantly higher than in the control group (p<0.005). Cholesterol, HDL-cholesterol, LDL-cholesterol levels were found to be significantly lower in patients with Beta-Thalassemia major than in the control group (p<0.001), while the triglyceride level was found to be higher (p<0.001).

Result: We determined a positive correlation between triglyceride and serum ferritin levels. It may indicate excessive iron loading, and changes in blood lipid values in patients with Beta-Thalassemia major.

Keywords: Beta-thalassemia major; Lipid profile; Ferritin

Introduction

Thalassemia is an inherited blood disease characterized by inadequate production of haemoglobin globin subunits, ineffective hematopoiesis, and increased hemolysis [1,2]. Thalassemia is seen as the most frequent monogenic disease in the world. Approximately 5% (270 million) of the world’s population are thalassemic and abnormal haemoglobin carriers. The frequency has increased especially in Mediterranean countries, the Middle East, the Far East, and also in Europe and America due to migration [3]. Carrying thalassemia is observed very frequently in Cukurova, the Mediterranean coast, and the Aegean and Marmara regions in our country. The frequency of carriers of beta-Thalassemia in the healthy Turkish population is 2.1%. There are approximately 1.4 million carriers and about 4.500 patients in Turkey. Between 1995 and 2000, the Ministry of Health and the National Hemoglobinopathy Council collected screening studies performed by 16 centers in Marmara, Aegean, and the Mediterranean regions, and reported the frequency as 4.3% [4].

Infections such as HBV, HCV, and HIV can be observed through frequent transfusions in children with Beta-Thalassemia major (B-TM) [5,6]. Various endocrine, cardiac, and hepatic diseases may occur depending, on excessive iron-loading [7]. The production of free radicals associated with excessive iron-loading is increased in these patients [8]. In recent years, the relationship between the increase in blood lipid levels and atherosclerotic diseases was shown in the performed researches [9-11]. Blood lipid levels were decreased much less in children with Beta-Thalassemia major [8].

This study is very important in terms of the examination of the blood lipid profile in children with thalassemia major in our country, which is a Mediterranean country.

Material and Methods

The files of eighty-five patients (44 males' and-41 females) between the ages of five and fifteen with beta-Thalassemia major who were receiving regular chelation therapy followed from paediatric policlinic of Mustafa Kemal University, Faculty of Medicine, were examined retrospectively. Sixty-two patients (35 males' and-27 females) whose lipid profile was measured in his or her file were enrolled in the study. Blood lipid profiles of 55 healthy children (30 males’ and-25 females) were taken as the control group. A total of 117 children were enrolled in the study and examined. Samples of the blood lipid levels of children were routinely taken on an empty stomach in the morning. HBV, HCV, and HIV results were negative when all of the case files were examined. Chelation therapy has been applied to all children with Beta-Thalassemia major between one and three times per a week (Desferrioxamine, subcutaneous infusion, 2 to 2.5 g). Cholesterol, triglyceride, LDL, and HDL-cholesterol values as the level of blood lipid were measured by using “Olympus System Reagent” kits.

Average values and standard deviations of results were calculated. ANOVA and student t tests were used to compare both groups and p<0.001 values were regarded as statistically significant.

Findings

In Table 1, Hb, Hct, and ferritin values of the test and control groups are displayed. Hb and Hct values of the group with Beta-Thalassemia major were significantly lower than those of the control group (p<0.005). Ferritin values in the group with Beta-Thalassemia major were found as 2372 ± 1455 in males, and 2286 ± 1614 in females. Ferritin values in the control group were 52 ± 26 in males, and 50 ± 25 in females. Ferritin values in the group with B-TM were found to be significantly higher than those of the control group (p< 0.005).

*Corresponding author: Vefik Arıca, M.D. Medical Faculty of the Mustafa Kemal University, 31100, Serinyol, Antakya, Hatay, Turkey, Tel: +90 326 2291000; +90 505 6797877; Fax: +90 326 2455654; E-mail: vefikarica@hotmail.com

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Discussion

Serum lipid values vary in patients with Beta-Thalassemia major. In our particular study, we revealed blood lipid levels of children with B-TM in Turkey. There have previously been very few studies in the literature on this subject [12-18].

In performed studies, cholesterol, HDL-cholesterol, and LDL-cholesterol levels were found to be lower than those of healthy individuals [12-16]. The decrease in total cholesterol, HDL-cholesterol, and LDL-cholesterol levels in our study conform to these results. Whereas the triglyceride level does not exhibit significance in some studies performed in patients with B-TM (13-15), it was determined to be high in some studies [12,16-18]. The data we have obtained are consistent with the study in direction in that triglyceride levels are higher (p<0.001) whereas the triglyceride level does not exhibit significance in some studies performed in patients with B-TM (13-15), it was determined to be high in some studies [12,16-18].

We determined a positive correlation between triglyceride and serum ferritin levels in our study. This also suggest us that it may be effective on blood lipid values as a result of excessive iron-loading due to excessive iron-loading, and decrease the efficacy of chelation therapy or its inadequately application. These results may support the hypothesis that both serum iron and serum triglyceride play role in LDL-C oxidation pathogenesis.

References


