RESEARCH LETTER

Serum Hepcidin Levels in Children with Beta Thalassemia Major

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ABSTRACT

The mean (SD) serum hepcidin levels in 40 thalassemia children [15.8 (2.9) ng/mL] were comparable to those seen in 40 healthy controls [15.1 (3.0 ng/mL] (P=0.3). The hepcidin/ferritin ration in thalassemia children was significantly lower (P<0.001) suggesting that hepcidin levels were not increased in proportion to the iron overload.

Keywords: *Ferritin, Iron overload, Thalassemia Major*.

Hepcidin is the key regulator of systemic iron homeostasis. Ineffective erythropoiesis in beta-thalassemia major (BTM) leads to increased secretion of erythropoietin which stimulates marrow erythroblasts to secrete growth differentiation factor 15 which suppresses hepcidin [1,2]. Low hepcidin levels in turn increase iron absorption. Therefore, estimation of serum hepcidin levels may be useful for the management of iron overload in BTM [3-5]. Thisstudy aimed to determine serum hepcidin levels in children with BTM- and to correlate serum hepcidin with serum ferritin.

In this cross-sectional study 40 children with BTM who received more than 20 blood transfusions were included as cases. Children positive for HBsAg, AntiHCV and AntiHIV antibodies, on with liver and renal dysfunctions were excluded. Forty healthy children were taken as control group for comparison. Ethical clearance and a written consent were obtained. Sampling was done before blood transfusion in the morning. Serum ferritin levels were estimated by Cobas E 411. Hepcidin was measured using ELISA kit from Cloud-Clone Corp.

The mean hepcidin levels in BTM group was 15.7 (± 2.9) ng/mL and that of control group was 15.1 (±2.9) ng/mL (P=0.3). The median ferritin levels in BTM group was 2036.5ng/mL and in control group was 58.4 ng/mL (P<0.001). Hepcidin/ferritin ratio was significantly decreased in BTM group compared to control group (P<0.001) (***Table* I**). There was no statistically significant correlation between serum hepcidin and ferritin levels in BTM group (r=0.034, P=0.83) (***Fig.* 1**).

Hepcidin levels in BTM is controlled by suppressive effects of erythropoiesis and stimulatory effects of iron overload [6]. In BTM erythroid drive takes an upper hand over iron store drive in controlling hepcidin levels [1,6]. In our study, there is no significant difference in hepcidin levels

between BTM and control group, similar to a study from Delhi [1]. Some studies observed lower serum hepcidin levels in BTM [7,8]. In contrary higher hepcidin levels in BTM group was observed in few studies [3-5,9]. Probably several factors might influence the production of hepcidin such as time of transfusion, iron chelation, amount of iron overload [5]. Before transfusion, the active erythropoietic activity suppresses hepcidin. After transfusion, ineffective erythropoiesis partly eases, resulting in increase in hepcidin levels [6,10]. Hepcidin level estimation has been shown to be useful to identify the patients at higher risk of iron toxicity [6,7] and the degree of iron over load [3,4].

The current study showed no significant correlation between hepcidin and ferritin levels in BTM children which is similar to the previous studies [1,7,9]. Hepcidin/ferritin ratio can be used as marker of iron overload and it is an index of appropriateness of hepcidin expression relative to the degree of iron loading and should be approximately one in controls [1,10]. In our study hepcidin/ferritin ratio was significantly decreased in BTM group compared to controls. Similar observations was found in other studies also [1,9].

To conclude, there is no significant correlation between hepcidin and ferritin levels in thalassemia major. Hepcidin/ferritin ratio in thalassemia major was significantly low, indicating hepcidin levels were not increased proportionately to the degree of iron load Probably hepcidin levels in BTM is more affected by other factors like erythropoiesis than by iron overload alone.

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TABLE I DEMOGRAPHIC AND BIOCHEMICAL PROFILE OF BETA-THALASSEMIA MAJOR CASES AND CONTROLS

	Controls (*n*=40)	*Thalassemia Major* (*n*=40)	*P value*
Age (y); Mean (SD)	7.3 (3.8)	7.4 (3.1)	0.9
Male six *n* (%)	24 (60)	24 (60)	1
Hemoglobin (g/dL); Mean (SD)	11.6 (0.6)	7.7 (1.1)	<0.001
Hepcidin (ng/mL); Mean (SD)	15.1 (3.0)	15.8 (2.9)	0.3
Ferritin (ng/mL); Median (IQR)	58.4 (41.2 – 89.0)	2036 (1443.5 – 3291)	<0.001
Hepcidin/Ferritin Ratio; Median (IQR)	0.2639 (0.1492 – 0.3549)	0.0073 (0.0046 – 0.0107)	<0.001

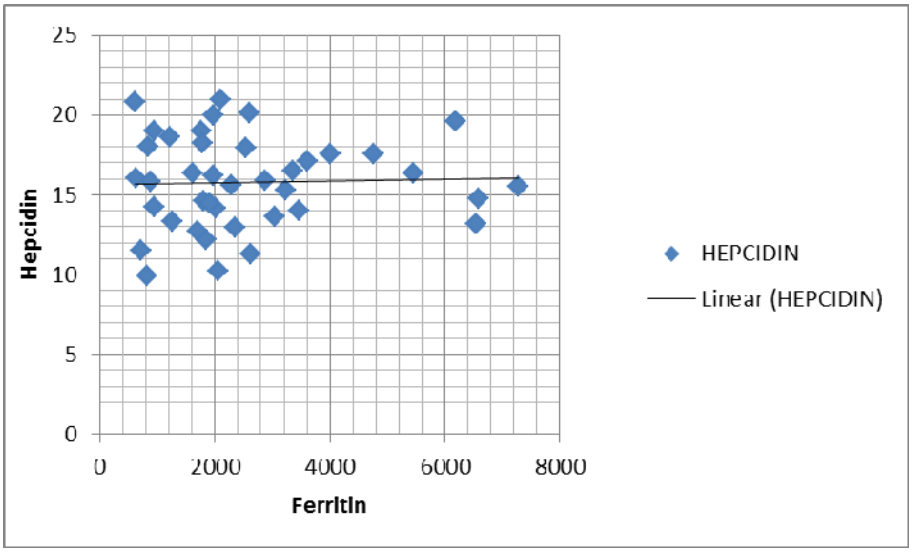

***Fig.* 1**: *Correlation between serum hepcidin and ferritin levels in beta-thalassemia major group.* (r=0.034, p=0.83)