Short Communication
Volume 5:3, 2021

Journal of
Clinical Research

Open Access

Delaying Blood Transfusion in Thalassemic Children with Supplementation of Omega 3 Fatty Acids and Protein: A Novel Strategy

Amol Kumar[1*], Ansh Chaudhary[1] and Bhupendra Chaudhary[2]

[1]*Department of Pathology, Bharati Vidyapeeth Medical College & Research Centre, Pune, Maharashtra, India*

[2]*Department of Clinical Medicine, Jaswant Rai Speciality Hospital, Meerut, Uttar Pradesh, India*

Abstract

Background: Thalassemia is an inherited genetic hemoglobin disorder wherein, afflicted child is born when both parents are carriers for defective alpha or beta hemoglobin gene. The thalassemias are the most common genetic disorder on a worldwide basis. The requirement of frequent blood transfusions in these patients pose a substantial burden on the health care system.

Methods: A prospective observational study was conducted across 6 months (July 2018-December 2018) in a tertiary care hospital, Pune. The present study included 30 registered patient and their past 6 months record of blood transfusion (esp frequency), previous hemoglobin levels, height and weight. All these parameters were compared 6 months after supplementation with omega 3 fatty acids and proteins.

Results: 16 of 28 patient showed that the average durations between two blood transfusions was increased by minimum 01 day to a maximum of 5 days. The average number of blood bag required was less than required blood bags in the period of pre supplementation. 20 of 28 patients showed a rise in hemoglobin level from a range of 0.5 to 1.2 gm/dl.

Conclusion: In a country like India, with the high frequency of hemoglobinopathies, causing increased burden on the society, it is necessary to control the incidence by effective steps. Low cost and easily administered supplementation by omega 3 fatty acid and proteins may reduce the requirement of repeated blood transfusion along with increase in hemoglobin level.

Keywords: Thalassemia • Hemoglobin • Omega 3 fatty acid • Protein • Blood transfusion

Introduction

Being the most common genetic disorder, Thalassemia is an inherited hemoglobin disorder with carrier rate between 5.5 to 9%. The carrier parents for the defective alpha or beta hemoglobin gene give rise to the afflicted child. Thalassemia is a dreaded disease and result in stunted growth, delayed puberty, involvement of liver, heart and bone with life expectancy between second to third decades [1].

Early and regular blood transfusion (every 3-4 weeks) is the cornerstone to decrease the complications and prolong the survival. In developing countries like India with limited resources this pose a significant health burden. The average prevalence of beta thalassemia carrier is 3%-4% which translates to 35-45 million carriers in our multicentric, culturally and linguistically diverse population of 1.30 billion. A need of frequent blood transfusion and its related complications including iron toxicity and related infectious disease can be supported by supplementation by omega 3 fatty acid and protein through milk [2].

Materials and Methods

A pilot study of its kind with 30 registered thalassemic patients (who receive monthly regular blood transfusion) was conducted in department of Pediatrics, Pathology and Bharti Hospital blood bank at Bharat Vidyapeeth Medical College and Research Centre, Pune. The frequency of blood transfusion, Hemoglobin level, weight, height and other anthropometric measures were observed both before and 6-8 months after supplementation of omega 3 fatty Acids and proteins through milk. The fatty acid levels, the frequency and duration of blood transfusion were studied and analyzed over a period of 6 months.

Results

The study revealed that with supplementation by emulsion of omega 3 fatty acid and protein over a study period of six months:

- There was an average 0.5 to 1.5 kg weight gain without much difference in height in the cohort.
- The average no. of days between two blood transfusion was increased by 1-5 days in 16 out of 28 patients with to change in remaining.
- The average blood bag requirement was reduced significantly compared to pre supplementation period.
- An average 0.5 to 1.2 gm/dl hemoglobin rise in 20 out of 28 patients with supplementation, with adequate compliance.

Discussion

The aim of treatment of Thalassemia major by regular blood transfusion is to maintain the hemoglobin level but repeated blood transfusion are associated with hazards of iron overload (toxicity), endocrinal dysfunction and risk of acquiring transfusion related infection like hepatitis [3]. Omega 3 fatty acids (Docosahexenoic acid and eicosapentaeonic acid) have the ability to decrease red blood cell aggregation, their adherence to the endothelium of blood vessel and also interfere with prothrombic activity all together help to increase the hemoglobin level [4]. Protein supplementation would facilitate the growth and overall wellbeing of the child.

***Address for Correspondence:** Amol Kumar, Department of Pathology, Bharati Vidyapeeth Medical College and Research Centre, Pune, Maharashtra, India, Tel: +0891-2666665; E-mail: doctorabpl567@gmail.com*

Received 11 March 2021; **Accepted** 25 March 2021; **Published** 01 April 2021

The study by Sherief et al. demonstrated the significant deficiencies of various nutritional markers (Vit. A, C, E, B12, Zn and Cu) while Abdulrazzaq et al. showed lower plasma and urinary essential amino acids in thalassemic patients which get corrected to a large extent by appropriate dietary supplementation and this represent a promising way to improve the quality of life in them [5,6]. Fuchs et al. contributed that grown failure in younger thalessemic children can be supported with nutritional stunting [7].

Conclusion

In a country like India, with high frequency of hemoglobinopathies causing increased burden on the society, it is necessary to control the incidence by cheap and effective steps. Low cost and easily administered supplementation by omega 3 Fatty Acids and proteins may reduce the requirement of repeated blood transfusion along with increase in hemoglobin level. Implementation of carrier screening program offering genetic counseling and prenatal diagnosis followed by selective termination of affected cases would help in preventing the disease.

Acknowledgements

We are thankful to the incharge, Blood bank registry system of Bharati Hospital and Department of Pediatric and Pathology for their cooperation and also to Dr. Bhupendra Chaudhary for helping in formatting this Manuscript and all authors of references we have cited. We would also like to thank patients and their families for participation and cooperation in this educational study

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How to cite this article: Amol Kumar, Ansh Chaudhary, Bhupendra Chaudhary. "Delaying Blood Transfusion in Thalassemic Children with Supplementation of Omega 3 Fatty Acids and Protein: A Novel Strategy." *J Clin Res* 5 (2021) 127.