Case Report

Spectrum of Hemoglobin E Disorder in a Family

Akter N[1], Hoque MA[2], Choudhury AR[3]

Abstract

We report a Bangladeshi family case of Hemoglobin E (Hb E) disorder. A 50 years old female and three of her family members had hemoglobin E disorder. Which was an incidental findings with nonspecific clinical problem and finally discovered the family pedigree of hemoglobin E disorder in asymptomatic other family members. Herein, we present the laboratory diagnosis and comparative data of the spectrum of Hb E disorders (i.e., heterozygous Hb E trait, homozygous Hb E disease) that was found in our index case and her offspring. Finally, genetic counseling & proper education gave to prevent the transmission of the abnormal gene in their progeny.

Key words: *Hemoglobin E disorder, Nonspecific clinical problem, Family pedigree, Genetic counseling.*

Introduction

Thalassemia is the most common hereditary disorder in the world including Bangladesh. The thalassemias are a major health problem all over the world, but this is particularly in the developing countries where the resources are limited[1,2]. Prevalence of both beta thalassemia trait and Hb E trait is significantly high in Bangladesh and thalassemia will be a major genetic problem in the coming years[3]. As a wide spectrum of clinical phenotypes have been observed in various forms of Hb E disorders, this prompted us to present the clinico-hematological findings of our patient and her family for comparative evaluation[4]. It is also important to know the carrier status of haemoglobin disorder in a country to form the basis for future planning for the control of thalassemia.

Case Report

The patient was a 50- year old Bangladeshi female who presented with symptoms of general malaise and dizziness for the last 5 years and was found mildly anemic and non icteric without any hepatosplenomegaly or lymphedonopathy. She was postmenopausal, normotesive and had normal bowel and bladder habit. Hematological investigations revealed: Hb 8.2 g/dL; mean corpuscular volume (MCV) 57.50fl; mean corpuscular hemoglobin (MCH) 19.0 pg; reticulocytes count <2% and normal erythrocyte sedimentation rate (ESR). Other laboratory findings showed total bilirubin 0.3 mg/dL; LDH & random blood sugar (RBS) values were within normal range. Liver function test, thyroid function test (TFT) & renal function test were all normal. Serum iron and total iron binding capacity were within normal range; Serum ferritin 177.0 ng/mL (normal-06-159 ng/mL). Peripherals blood film (PBF) showed Microcytic hypochromic anemia with target cells, with mature white cell count (WBC) and normal platelet. Hemoglobin electrophoresis was carried by automated capillarys system revealed HbF 8.8%, HbE 88.4%, Hb A2 2.8%; that was suggestive of hemoglobin E disease. Two of her children were studied. Both of them were asymptomatic, found physically normal. Laboratory findings revealed; the daughter found Hemoglobin E trait (normal iron profile; PBF showed microcytic hypochromic anemia). And the son found Hemoglobin E disease (normal iron profile; PBF showed microcytic hypochromic anemia with target cells).

1. Dr. Nazma Akter, Resident Physician, Department of Medicine, MARKS Medical College & Hospital, Dhaka.
2. Dr. Md. Azizul Hoque, Associate Professor, Department of Endocrinology, Shaheed M. Monsur Ali Medical College, Sirajgonj.
3. Prof. Ataur Rahman Choudhury, Professor of Medicine, MARKS Medical College & Hospital, Dhaka.

Correspondence: Dr. Nazma Akter, Resident Physician, Department of Medicine, MARKS Medical College & Hospital, Dhaka, Bangladesh, e-mail: akternazdr@yahoo.com, Mobile: 01714743850

To conclude the pedigree of the family, father of offspring was investigated and found Hemoglobin E trait. He was also clinically asymptomatic. All the hematological indices & electrophoretic findings of our patient and other family members are presented in [Table 1].

Age (Years) /Sex	Case 50/Female	Spouse 62/Male	Daughter 25/Female	Son 22/Male
Presenting features	G eneral malaise and dizziness	Asymptomatic	Asymptomatic	Asymptomatic
Serum bilirubin (mg/dL)	0.3 mg/dL			
Hb (g/dL)	8.2	13.5	13.4	13.10
Hct (%)	36.70	39.2	36.4	38.50
MCV (fL)	57.50	74.3	73.4	59.12
MCH (pg)	19.0	22.4	22.6	20.12
MCHC (g/dL)	33.0	32.50	30.5	34.0
Hb Electrophoresis				
HbA (%)		75.3	75.5	
HbF (%)	8.8			7.2
HbE (%)	88.4	22.2	22.2	90.2
Hb A 2 (%)	2.8	2.5	2.3	2.6
Diagnosis	Hb E disease	Hb E trait	Hb E trait	Hb E disease

Table 1: Clinico-hematological findings of patients and family members

Finally, genetic counseling & proper education gave to prevent giving rise to various combinations of hemoglobinopathies and thalassemias by the transmission of the abnormal gene in their progeny.

Discussion

Hemoglobin E (HbE) is variant hemoglobin with a mutation in the globin gene causing substitution of glutamic acid for lysine at position 26 of the globin chain. HbE is the second commonest abnormal hemoglobin after sickle cell hemoglobin (Hb S). Hb E is common in South East Asia, where its prevalence can reach 30-40% in some parts of Thailand, Cambodia and in Laos. HbE is also found in Sri Lanka, North Eastern India, Bangladesh, Paris, Nepal, Vietnam, and Malaysia[5]. Prevalence of both beta thalassemia trait and Hb E trait is significantly high in Bangladesh and thalassemia will be a major genetic problem in the coming years[3].The chain of HbE is synthesized at a reduced rate compared with that of normal adult hemoglobin (HbA), as the mutation create an alternate splicing site within an exon. Subjects heterozygous for HbE (AE) have an asymptomatic condition with no clinical relevance, except the risk of, transmitting E/? thalassemia if the other parent caries thalassemia[5]. Individuals with the Hb E Trait is usually not anemic and have no symptoms. Hematological investigations of these individuals reveal mild microcytosis, hypochromia and erythrocytosis. However, identification of these individuals is of crucial importance as they may be transmitters of the abnormal gene, giving rise to various combinations of hemoglobinopathies and thalassemias in their progeny. The presentation of Hb E disease is mild to moderate. Most patients show clinical symptoms by the age of 10 years. The most common presentation of Hb E disease is no or mild anemia, jaundice, fever, abdominal pain and gastrointestinal disturbances with or without Splenomegaly. The blood picture shows microcytic hypochromic red cells with or without any evidence of hemolysis[6]. These new insights into the knowledge of these diseases are important because they are gradually becoming global health problems and impart diagnostic challenges to all the experts involved in the treatment of patients with thalassemia.

Conclusion

The main aim is to increase the awareness of this hemoglobin disorder, so that it can be included in the differential diagnosis of patients presenting clinically like thalassemia intermedia or thalassemia major. This awareness may also help in genetic counseling and clinical management. Awareness, mass screening programme and genetic counseling should be started immediately along with facilities for prenatal diagnosis to prevent the births of thalassemic children.

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