

First Observation of Hemoglobin J in Bangladesh

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Introduction

Hemoglobinopathies are one of the major public health problems that cause significant morbidity and mortality in the population. There are hundreds of different variants of hemoglobin caused by structural alteration of alpha, beta or gamma globin chains varying from amino acid replacements, elongated chain, deletions, insertions, or both deletions and insertions. Abnormality of beta-chain or alpha-chain produces most of the clinically significant hemoglobinopathies. The status of zygosity also plays a very important role in the expression and deletion of the disorder. In heterozygous variants the other normal allelic gene produces normal chains which may compensate for the defective gene. In the homozygous state, both allelic genes are affected which results in the production of a large amount of the variants.¹

Haemoglobin J (Hb-J) was first described by Thorup et al² in an African-American patient in 1956 and since then more than 50 variants of Hb-J are identified.¹ Hemoglobin J á mutation is an alpha chain variant found in heterozygous state and presents normal haematological blood picture. Mostly the patients are silent carrier and asymptomatic with this variant of hemoglobin.³ In comparison with mature haemoglobin (Hb), these Hb generally show faster movements than Hb-A on cellulose acetate electrophoresis (i.e. closer to the anode). Hb-J variants correspond with certain single or multiple base changes in haemoglobin alpha or beta chains.⁴ Thalassemia and different types of haemoglobinopathies are commonly reported in Bangladesh, yet this is the first report of existence of such Hb-J variant detected in a 5^{1/2} years old girl.

Case Report

Tasfiya, a 5^{1/2} years old girl, 1st issue of non-consanguineous marriage of healthy parents attended in chamber, had complaints of cough for 1 month, anorexia for 1 month. She had no history of fever, breathing difficulty, contact with tubercular

patient, significant weight loss, prior history of hospitalization or any blood product transfusion or family history of similar type of illness. Her 1 year old younger brother had history of blood transfusion. On examination, patient was mildly pale had no facial dysmorphism or jaundice or organomegaly, anthropometrically she was age appropriate. All systemic examination revealed normal findings.

On routine investigation, CBC revealed microcytic hypochromic anemia. Iron profile study showed raised ferritin 565 ng/ml, low serum iron 39.3 µg/dl and normal TIBC 315.28 µg/dl. Hb-electrophoresis done in hematology lab of Dhaka Shishu (Children) Hospital to rule out thalassemia and report showed Hb-A 74.7%, Hb-A₂, Hb-J 23.4% suggestive of Hb-J alpha mutation. CXR was normal and MT was negative. Further haematological investigation was performed for the whole family. The father's blood picture & Hb-electrophoresis report were completely normal. Her mother and younger brother's blood picture revealed microcytic hypochromic anemia, while clinical examination were normal. Hb-electrophoresis showed that her brother's Hb-electrophoresis was normal while mother's report showed unknown band.



Fig.-1: Patient Tasfiya

Hb-electrophoresis of patient Tasfia was carried out by capillary Electrophoresis (Sebia) which showed proband Hb-J.

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Received: 6 March, 2019

Accepted: 20 June, 2019

Table-II
Hb level and Hb fraction of the patient and her family

	Age (year)	Sex	Hb(g/dl)	Hb-J%	Hb-A%	Hb-A ₂ %	Hb-F %
Patient (proband)	5 ^{1/2}	F	11.5	23.4	74.7	1.9	0
Mother	25	F	11.9	19.8	77.1	1.9	1.2
Father	40	M	14.8	0	97.3	2.6	0.1
Brother	1	M	12.6	0	97.4	1.7	0.9

Discussion

Hb-J is a heterogenous group of fast moving haemoglobin resulting from substitution of a negatively charged amino acid residue in either alpha, beta or gamma globin chains. Fast moving haemoglobin (FMH) of J family revealed about 48 fast moving Hb-J variants. Because of the mutation in the globin genes, these hemoglobin variants have the fast moving nature. FMH predominantly is usually α globin derived.⁵ Thorup et al² had first described Hb-J in 1956 and since then more than 50 variants of Hb-J are identified.¹ Hb J- was also found in two brothers from Bangladesh living in Birmingham, UK.⁶

These is clinically silent and mostly diagnosed accidentally.⁷ Some of Hb-J variants have abnormal properties and affect respective hematologic indices, whilst majority of them do not result in any abnormal clinical manifestation. These variants can be discovered by high performance liquid chromatography (HPLC), electrophoresis and by mass spectrometry and finally can confirmed by DNA analysis to detect mutation.^{8,9}

Hb-J α variant is itself a rare and accidental finding when electrophoresis is done to find out the cause of anemia like our case. Usually the patients are asymptomatic and not require blood transfusion by this hemoglobin variant. So, no specific treatment required for this disease as of our case.

Conclusion

Hb-J is a rare variant of abnormal hemoglobin and not associated with any clinical significance. Hb-electrophoresis and family history is sufficient to detect most of the haemoglobin variants in Bangladesh. Genetic studies are indicated to confirm rare and borderline cases and to detect the silent carrier.

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