CASE REPORT

Co-Inheritance of Sickle cell trait and Beta Thalassemia Trait with Severe Anemia in a patient of Obstructed Labour: A Rare Presentation

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ABSTRACT
Sickle cell disease (SCD) is an umbrella term that defines a group of inherited diseases (including sickle cell anaemia (SCA), HbSC and HbSβ-thalassaemia) characterized by mutations in the gene encoding the haemoglobin subunit β. Beta-thalassemia is described by the absence or reduction in the rate of production of the β-globin chain. It was the first time defined by Cooley and Lee in 1925.It is categorized according to decreased (β+) or absent (β0) globin chain production which might lead to microcytic and hypochromic anemia as well as a wide range of syndromicforms.There are evidences of Co-Inheritance of Sickle cell trait and minor β^{thal} mutation (β^{s}/β^{thal}). A 3rdGravida female from Prevalent Tribal Population was referred from the periphery to AGMC & GBPH with complaint of Non-Progression of labour with Severe Anemia.After that patient was investigated for Anemia& sepsis, these were the findings.The Authors diagnosed the case after evaluating the reports of CBC, Hb Electrophoresis & Clinical History as Co-inheritance of Sickle Cell Trait with Beta Thalassemia Trait. HPLC Chromatogram of the Hemoglobin Electrophoresis showed HbF<0.8%, HbA2 5.8%, S-window 16.3%, Hb A0 67.3% & HbA1c 5%& CBC showed Normocytic Normochromic with Anisocytosis. This much severe Anemia is not usually seen in Sickle Cell Trait. Co-inheritence of these two conditions is in itself rare.Early & proper diagnosis is helpful in managing such patients.

Keywords: Sickle cell disease, Beta-thalassemia, Sickle cell trait, Beta-thalassemia trait, Obstructed labour, Intra Uterine Death, Hb Electrophoresis.

INTRODUCTION

Sickle cell disease (SCD) is an umbrella term that defines a group of inherited diseases (including sickle cell anaemia (SCA), HbSC and HbSβ-thalassaemia) characterized by mutations in the gene encoding the haemoglobin subunit β (*HBB*).A single nucleotide substitution in *HBB* results in the sickle Hb (HbS) allele β^{S}; the mutant protein generated from the β^{S} allele is the sickle β-globin subunit and has an amino acid substitution. Under conditions of deoxygenation (that is, when the Hb is not bound to oxygen), Hb tetramers that include two of these mutant sickle β-globin subunits (that is, HbS) can polymerize and cause the erythrocytes to assume a crescent or sickled shape from which the disease takes its name. SCD is inherited as an autosomal codominant trait; individuals who are heterozygous for the β^{S} allele carry the sickle cell trait (HbAS) but do not have SCD, whereas individuals who are homozygous for the β^{S} allele have SCA. SCA, the most common form of SCD, is a lifelong disease characterized by chronic haemolytic anaemia, unpredictable episodes of pain and widespread organ damage.[1]Beta-thalassemia is described by the absence or reduction in the rate of production of the β-globin chain. It was the first time defined by Cooley and Lee in 1925. The β-thalassemia is a consequence of substitutions of bases on introns, exons as well as on the promoter regions of β-globin genes while α-thalassemia is a consequence of deletions that remove α gene. It is further categorized according to decreased (β+) or absent (β0) globin chain production

which might lead to microcytic and hypochromic anemia as well as a wide range of syndromicforms. Types include Beta-thalassemia major, Beta-thalassemia intermedia, Beta-thalassemia minor. Beta-thalassemia is a congenital autosomal recessive condition. Children are obligate heterozygotes when parents are affected and bring mutation in a single copy of the β globin chromosome. In the beginning, every offspring of heterozygous parentage has a 25% possibility of being unaffected and not a carrier, 25% possibility of being affected, and 50% possibility of being an asymptomatic carrier. [2]The prevalence of sickle cell carriers among different tribal groups varies from 1 to 40 per cent distributed in the states like Madhya Pradesh, Gujarat, Maharashtra, Tamil Nadu and Odisha. Madhya Pradesh has the highest load.[3]The prevalence of β-thalassemia trait in Central India ranged between 1.4 and 3.4%, while 0.94% β-Thalassemia Major was reported among the patients with anemia. In South India, the prevalence of β-thalassemia trait was between 8.50 and 37.90% and β-Thalassemia Major was reported to be between 2.30 and 7.47%. Northern and Western Indian states had a higher thalassemic burden. In Eastern India, tribal populations had a higher prevalence of β-thalassemia trait (0.00–30.50%), β-Thalassemia Major (0.36–13.20%) and other hemoglobinopathies [Hb E (*HBB*: c.79G>A)/β-thal] (0.04–15.45%) than nontribal populations.[4]There are evidences of Co-Inheritance of Sickle cell trait and minor β^{thal} mutation (β^{s}/β^{thal}).[5,6,7]Here too we are showing one case of Co-Inheritance of Sickle cell trait and Beta Thalassemia Trait with Severe Anemia in a patient of Obstructed Labour.

CASE REPORT

A 3rd Gravida Female from Prevalent Tribal Population was referred from the periphery to AGMC & GBPH with complaint of Non-Progression of labour with Severe Anemia. Patient had history of Fever with several occasions of Jaundice in her childhood. After the admission, the patient went into Obstructed labour with Intra Uterine Death for which caesarean section was done. In CS very foul-smellingmeconium-stained liquor was found. Patient had Obstetric history of first 1st Baby born with Low IQ, 2nd Baby was Still Born.

METHODOLOGY

After that patient was investigated for Anemia& sepsis, these were the findings.

Investigating into the cause of the Anemia, Hemoglobin Electrophoresis was done by HPLC method in Biorad D10. Venous blood sample was taken in EDTA vacutainer for Hb Electrophoresis.

It showed the following results.

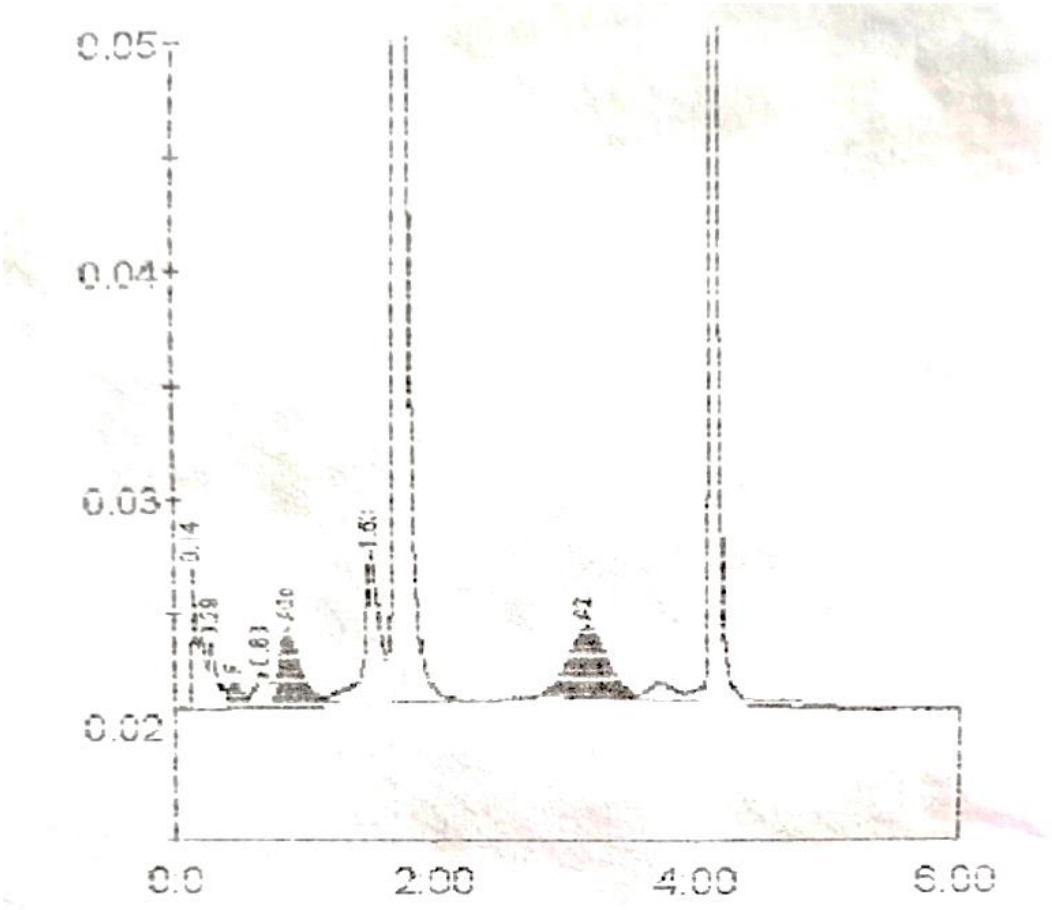

Fig: HPLC Chromatogram of Hemoglobin Electrophoresis

CBC		
	Day 0	**Day 2**
Hemoglobin	**4.6 gm%**	**6.8 gm%**
PCV	**19.4%**	**22.1 %**
Platelet count	2 L	2.2 L
TLC	**24,000 /cu.mm**	**26,000 /cu. mm**
Neutrophil	92%	93 %
Lymphocyte	08 %	06 %
Monocyte	00 %	01 %
Eosinophil	00 %	00 %
Basophil	00 %	00 %
RBC Morphology	Predominantly Normocytic Normochromic with Anisocytosis	Normocytic Normochromic with Anisocytosis
Reticulocyte	5.5%	5.85 %

LFT			
Test Name	**Day 0**	**Day 2**	**Reference Range**
Total Bilirubin	**1.8**	**2.0**	0.2 - 1.2 mg/dL
Conj. Bilirubin	0.2	0.3	0 - 0.30 mg/dL
Unconj. Bilirubin	**1.6**	**1.7**	0.2 - 1.0 mg/dL
SGOT (AST)	**67**	**60**	Upto 40 IU/L
SGPT (ALT)	**42**	**38**	Upto 40 IU/L
ALP	223	230	54 - 369 IU/L
Total Protein	6.8	7	6 - 8 gm/dL
Albumin	3.8	4	3 - 5 gm/dL
Globulin	3	3	2 - 4 gm/dL
A:G Ratio	1.26	1.33	0.9 - 2.5

DISCUSSION

The Authors diagnosed the case after evaluating the reports of CBC, Hb Electrophoresis & Clinical History as Co-inheritance of Sickle Cell Trait with Beta Thalassemia Trait. HPLC Chromatogram of the Hemoglobin Electrophoresis showed HbF<0.8%, HbA2 5.8%, S-window 16.3%, Hb A0 67.3% &HbA1c 5%& CBC showed Normocytic Normochromic with Anisocytosis. But, this much severe Anemia is not usually seen in Sickle Cell Trait.[8]High Total Leukocyte count supports the diagnosis of Sepsis & explains the unresolving fever. Patient's history of several Jaundice is supported with the diagnosis of Sickle cell trait.

CONCLUSION

Although the Co-inheritence of these two conditions is in itself rare. Here patient presented with Severe anemia which is rare & complicate the treatment plans too. So, this kind of patients with undiagnosed anemia should be screened for Thalassemia & other hemoglobinopathies. Patients with these conditions should be treated with Oral Iron supplementation & Blood transfusions & should be checked for the status of their spleen. Early & proper diagnosis is helpful in managing such patients.

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