ORIGINAL RESEARCH PAPER

General Medicine

HEMOGLOBIN SE DISEASE - A RARE CASE REPORT FROM KERALA.

KEY WORDS:
Hemoglobinopathy, HbAIC, Hemoglobin, HbSE

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ABSTRACT

Hb SE double heterozygous state is a rare form of hemoglobinopathy, even though Hb S and Hb E are globally common hemoglobinopathies. An interesting case of a 49 year old male patient with uncontrolled Diabetes came for management of his blood glucose is discussed. There was discordance between his high blood glucose level of 417mg /dl and HbA1c level of 4.6% which was normal. Subsequently on HPLC – variant analysis this patient was found to be doubly heterozygous for HbSE disease.

INTRODUCTION

Two of the world's most common variant hemoglobin's are hemoglobin S (Hb S; HBB Glu6Val) and hemoglobin E (Hb E; HBB Glu26Lys). [1] The prevalence of hemoglobin S and hemoglobin E is found to be geographically divergent. Hemoglobin S is highly prevalent in equatorial Africa and also in Eastern Saudi Arabia and Central India.[2] In sickle cell anemia, due to homozygosity for the Hb S mutation, deoxygenated Hb S polymerizes, leading to multiple symptoms, organ damage, and premature death.[1] Hb E is prevalent in Sri Lanka, Eastern India, Southeast Asia, and Southwest China.[2] Different double heterozygous states for combinations of thalassemia and hemoglobinopathies that are commonly observed include Hb E-β thalassemia, Hb SC disease, Hb SD disease, Hb S-β thalassemia, etc.[3] However, due to the geographic divergence, the prevalence of double heterozygous state of Hb SE disease is a rare entity among hemoglobinopathies which results from the combination of hemoglobin S (Hb S) and hemoglobin E (Hb E) genotypes lead to a few reported case reports.[2,3] Hb SE is a benign condition with mild asymptomatic anaemia.[4] With population migrations and racial intermarriages over the last century, an increased number of individuals who are compound heterozygotes for Hb S and Hb E are found throughout the world, and it is expected that more will be encountered in the future.[1] We present a 49-year-old male patient who presented with uncontrolled diabetes and investigations showed anemia and distal sensory neuropathy. His HbA1c was 4.6% despite of random blood glucose of 417 mg /dl.

LITERATURE REVIEW

1. Gunton JE, McElduff A: Heterozygous Hb Hamadan affects HbA1c assay (Letter). Diabetes Care 22:177, 1999 - Changes in therapy are often based on HbA1c values. Some patients attending out-patient clinics for diabetes management were noted to have HbA1c values that differed from what was expected based on home blood–glucose monitoring (hBGL) results. We have previously reported Hb Hamadan in one of our patients with an unexpectedly low HbA1c value.[5]
2. Jeppsson JO, Jerntorp P, Sundkvist G, Englund H, and Nyland V: Measurement of hemoglobin A1C by a new liquid-chromatographic assay: methodology, clinical utility, and relation to glucose tolerance evaluated. Clin Chem 32: 1867–1872, 1986- The mean age of the subjects was 47 ± 17 years. Two of the patients had type 1 diabetes, 14 patients had type 2 diabetes, and 14 women had gestational diabetes. HbA1c was measured by ion exchange high-performance liquid chromatography (HPLC) using the method of Jeppsson et al.[6]
3. Schnedl WJ, Krause R, Halwachs-Baumann G, Trinker M, Lipp RW, Krejs GJ. Evaluation of HbA1c determination methods in patients with hemoglobinopathies. Diabetes Care. 2000;23:339–344-In managing diabetic patients, knowledge of hemoglobinopathies which influence HbA1c determination methods are essential because hemoglobin variants could cause mismanagement of diabetes resulting from false HbA1c determinations.[7]

CASE REPORT

A 49-year-old male from Pathanapuram Kerala was admitted for diabetic control and presented with complaints of numbness of both feet.

On examination there was no pallor, icterus, cyanosis, clubbing, lymphadenopathy, and pedal edema his vital signs were normal.

His laboratory investigations are given in Table 1

INVESTIGATION	RESULT	NORMAL RANGE
Hemoglobin	11.5	12-17 gm/dl
RBC Count	4.94	4.40-6.00 million
PCV	34.2	42-52 %
MCV	69.2	80-100 fl
MCH	23.3	27-34 pg
MCHC	33.7	31.5-36 g/dl
RDW	14.3	12.10-14 %
TLC	9800	4800-10800/µL
Iron, Total	93.0	70-180 ug/dl
Total Iron Binding Capacity	288.0	255-450 ug/dl
%Saturation (% TSTAT), Serum	32.0	25-75 %

TABLE 1: Initial Laboratory Investigations

His peripheral smear showed hypochromic, microcytic, and occasional sickle celled RBCs and significant anisopoi kilocytosis.

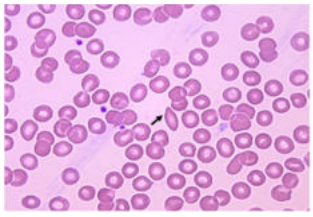

Figure 1: Peripheral Smear

His liver function, kidney function, lipid profile, and serum electrolytes were found to be normal. With the history of elevated blood glucose level and low HbA1C value, hemoglobin variant analysis was sent and it showed the findings in table 2, based on that the patient was diagnosed with HbSE hemoglobinopathy.

HbA	10.2	95-97%
HbA2	24.4	2-3 %
HbF	2.5	<1 %
HbS	53.0	

TABLE 2: High Performance Liquid Chromatography

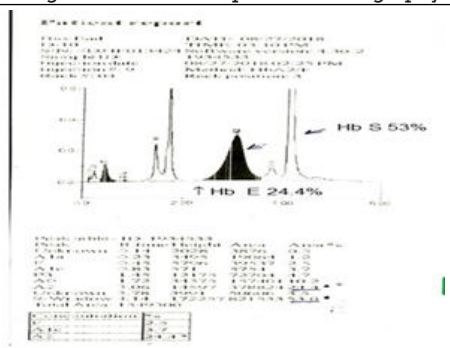

Figure 2: Hplc-variant Analysis

DISCUSSION

Non-enzymatic binding of glucose to the valine residue of chain of the Hb molecule gives rise to glycated hemoglobins like HbA1a, HbA1b & HbA1c. The level of HbA1C reflects ambient blood glucose concentration during the life span of the patient's red cells (half-life about 6-8 weeks) i.e, uncontrolled hyperglycemia results in high HBA1C levels. We should be aware of the potential downfalls of HbA1c as a measure of long-term diabetic control. Apparent discrepancies between glycemic control reflected in day-to-day blood glucose concentration and HBA1C value should be noted and investigated appropriately.

CONCLUSION

Double heterozygous Hb S and Hb E is a rare case of Hb SE disease reported from Kerala, India in a type 2 Diabetes mellitus patient. And there is a gross discordance between random plasma glucose and HbA1c of the patient. Hence this discrepancy is to alert the possibility of hemoglobin variant in the patient with uncontrolled diabetes, so treatment should be targeted on the blood glucose.

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