DETECTION OF HAEMOGLOBIN J IN AN ASYMPTOMATIC DIABETIC PATIENT- A CASE REPORT

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ABSTRACT:

India is an ethnically diverse country with marked regional variation. This diversity is reflected in the presence of different Hb variants in different ethnic groups. Hb J Meerut is one such rare variant detected by HPLC as abnormal peak (25.4%) in P3 window with a retention time of 1.85 minutes. This clinically asymptomatic variant has been reported to interfere with HBA1C estimation in diabetic patients.HBA1C values are routinely done to assess glycaemic control in diabetic patients. HbA1C values may be falsely low due to presence of abnormal HB variants. As HbA1C is based on haemoglobin, both quantitative and qualitative, variants in haemoglobin can affect HBA1C values.Here we report a case of a 45 year old male diabetic patient who had a spuriously low HBA1C value on HPLC with an abnormal peak in P3 window .Hb electrophoresis done to detect variant haemoglobin showed an abnormal peak (25.4%) in P3 window at a retention time of 1.85 minutes. A provisional diagnosis of HBJ Meerut was made which was confirmed by capillary electrophoresis.

Key Words: *HPLC, Haemoglobin J, HbA1C*

INTRODUCTION

India is an ethnically diverse country with marked regional variation. This diversity is reflected in the presence of different Hb variants in different ethnic groups. Many of these abnormal variants are of little clinical significance in heterozygous state, but when combined with other variants, they may give rise to severe disease. Hb J Meerut is one such rare variant detected by HPLC as abnormal peak (25.4%) in P3 window with a retention time of 1.85 minutes. This clinically asymptomatic variant has been reported to interfere with HBA1C estimation in diabetic patients.[9]

HBA1C values are routinely done to assess glycaemic control in diabetic patients. HbA1C values may be falsely low due to presence of abnormal HB variants. As HbA1C is based on haemoglobin, both quantitative and qualitative, variants in haemoglobin can affect HBA1C values.[5]Here we report a case of 45 year old male diabetic patient who had a spuriously low HBA1C value on HPLC with an abnormal peak in P3 window. Hb electrophoresis done to detect variant haemoglobin showed an abnormal peak (25.4%) in P3 window at a retention time of 1.85 min. A provisional diagnosis of HBJ Meerut was made which was confirmed by capillary electrophoresis.

CASE REPORT

A 45 year old male patient came to Sampurna Sodani Diagnostic Clinic for Hb electrophoresis and for other routine investigations .His biochemical and haematological tests including haemoglobin, haematocrit, cell indices and reticulocyte counts were within normal limits.(Table: I).

Table 1: Showing Hematological Parameters of Patient

Investigation	Result	Unit	Reference Range
Haemoglobin	14.3	g/dl	13.5-18.1
RBC	**5.03**	**10^6 /uL**	3.8-4.8
Packed Cells Volume	42.2	%	40-54
Total Leucocyte Count	5.5	10^3 /uL	4.0-11.0
DIFFERENTIAL COUNT			
Neutrophils	55	%	40-70
Lymphocytes	40	%	20-50
Monocytes	01	%	0-10
Eosinophils	04	%	0-6
Basophils	00	%	0-1
MCV	83.9	fl	80-94
MCH	28.4	pg	27-32
MCHC	33.9	g/dl	32-36
Platelet	260	10^3/uL	150-450
RDWCV	13.6	%	11.5-14.5

Serum Iron (68.0 ug/dl), TIBC (352 ug/dl) and saturation Index was 19.3%. Hb electrophoresis by HPLC detected an abnormal peak (25.4%) in P3 region with a retention time of 1.85minutes. (Figure-1) which was further confirmed by capillary electrophoresis (figure2). A diagnosis of HB J Meerut was made.

Peak Name	Calibrated Area %	Area %	Retention Time (min)	Peak Area
P1	---	0.6	0.81	12093
F	0.1	---	1.08	2308
Unknown	---	1.1	1.25	21229
P2	---	3.6	1.37	69879
P3	---	25.4	1.85	498946
Ao	---	66.6	2.52	1310268
A2	2.5	---	3.68	53458

Total Area: 1,968,180

F Concentration = 0.1 %
A2 Concentration = 2.5 %

Analysis comments:

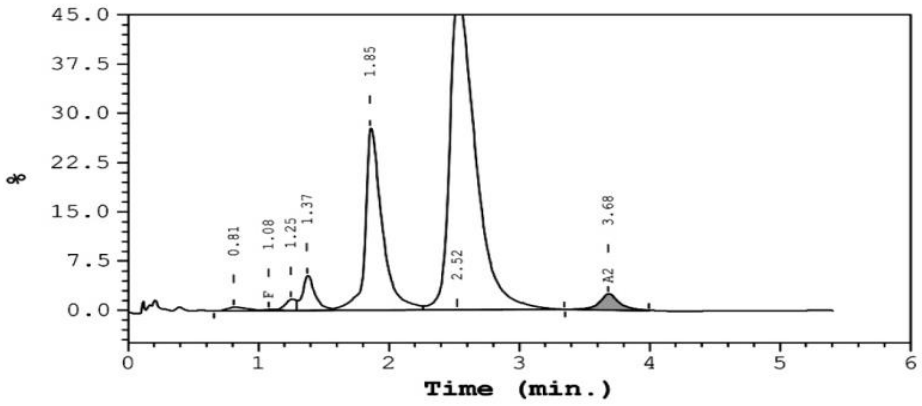

Figure 1: Showing P3 peak in HPLC

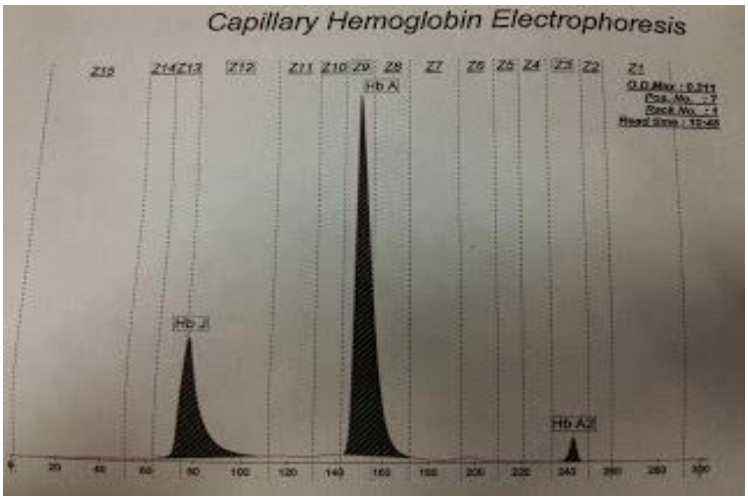

Figure 2: showing Capillary Electrophoresis

On careful history taking, the patient informed that he was a diabetic with a family history of diabetes in his mother. He had his HBA1C done in a different laboratory by HPLC method where the final report was not given because of an abnormal peak observed in HPLC and was advised Hb electrophoresis to rule out an abnormal Haemoglobin. All his previous reports including CBC were normal. Hb electrophoresis of his family members was advised but the patient did not return for follow up. So the status of Hb variants of his family members could not be known. Physical examination did not reveal any relevant findings. Liver and spleen were not palpable.

DISCUSSION

Hb J was first reported in an American Negro family in 1956[1].At present more than 20 Hb variants have been identified that are classifiable as Hb J on the basis of their electrophoretic mobility. These include amino acid substitutions in both alpha & beta chains, with alpha chain abnormalities making up the majority of the known variants. It has also been found in Indonesians, East Indians, French Canadians, Chinese etc.

Hb J is a heterogenous group of fast moving hemoglobins resulting from substitution of a negatively charged amino residue in either α, β or y globin chains.[2] Hemoglobin J Meerut can be differentiated and identified solely on its retention time.[2] The first reported case of this Hb variant was in two sisters from Meerut in India .[3] Worldwide very few case reports of this Hb variant (Hb J Meerut) are available.[2] This incidence is approx. 1 in 4000 cases. Abnormal Hb which produces no hematological symptoms are rarely detected[4].

This abnormal Hb was detected in our patient accidently when his HbA1C by HPLC method showed an abnormal peak for which he was advised Hb electrophoresis. Sachdeva et al diagnosed one case of HbJ On HPLC with an elevated P3 window of 25.4 % and retention time of 1.81 min. whose hematological profile was normal.[6] Bhawna Bhutoria Jain et al described 2 cases of Hb J in rural population of West Bengal.[7] In a study of 2, 22000 blood samples in Canada, 23 cases of Hb J were identified by Li- Yu Tsai et al [8]

As HBA1C is based on Hb, both quantitative and qualitative variations in Hb can affect the HBA1C value [5] If the Hb substitution causes a net change in charge of the Hb, or if Hb variants cannot be separated from HbA/ HbA1c will produce spuriously increased or decreased results by HPLC.[5] Thus knowledge and awareness of the Hb variants affecting HBA1C measurement is essential in order to avoid mismanagement of diabetic patients.[9]

Conflict of Interest: none

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