Molecular Identification of a Rare Haemoglobin Variant: Hb G Coushatta in Malaysia

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Thalassaemia screening programme was conducted to reduce the burden of the disease [1]. Here, we describe one unexpected discovery in a 33-year-old gentleman and also the importance of DNA analysis in detecting the globin gene mutation.

Case report:

A male patient was screened for haemoglobin (Hb) variant after his wife was noted to have beta thalassaemia trait during her antenatal checkup. Otherwise, he was asymptomatic. He had a normal Hb (16.09 g/L), an increased red blood cell (RBC) count (5.91x10^6/µL) with a borderline mean corpuscular volume (80.7 fL) and a borderline mean corpuscular haemoglobin (27.1 pg). The RBCs on peripheral blood smear, appeared hypochromic microcytic. A prominent band was seen at the S region on alkaline Haemoglobin electrophoresis (Fig. 1), which was not showed in the high performance liquid chromatography. Instead, there was a significant increase in Hb A2/E (42.7%), a great reduction in Hb A (45.6%) and normal Hb F value (0.3%).

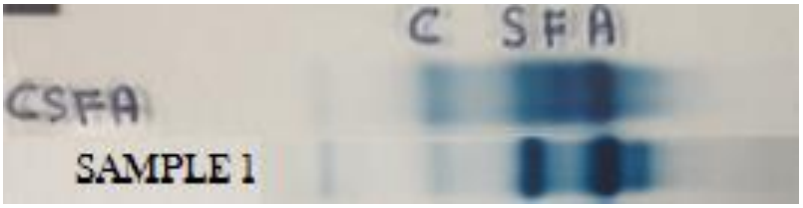

Fig. 1: Hb Gel Electrophoresis. Showing the abnormal prominent band seen at S region.

In capillary electrophoresis, an abnormal peak was observed in Hb D zone (40.8%) with normal Hb A2 (2.6%) The screening methods would indicate Hb E, Hb D or Hb S. But none of these were shown by at least two of the methods. Therefore, beta-globin gene sequencing was carried out, which revealed Hb G Coushatta mutation [β22(B4)(GAA→GCA)] (Fig. 2) .

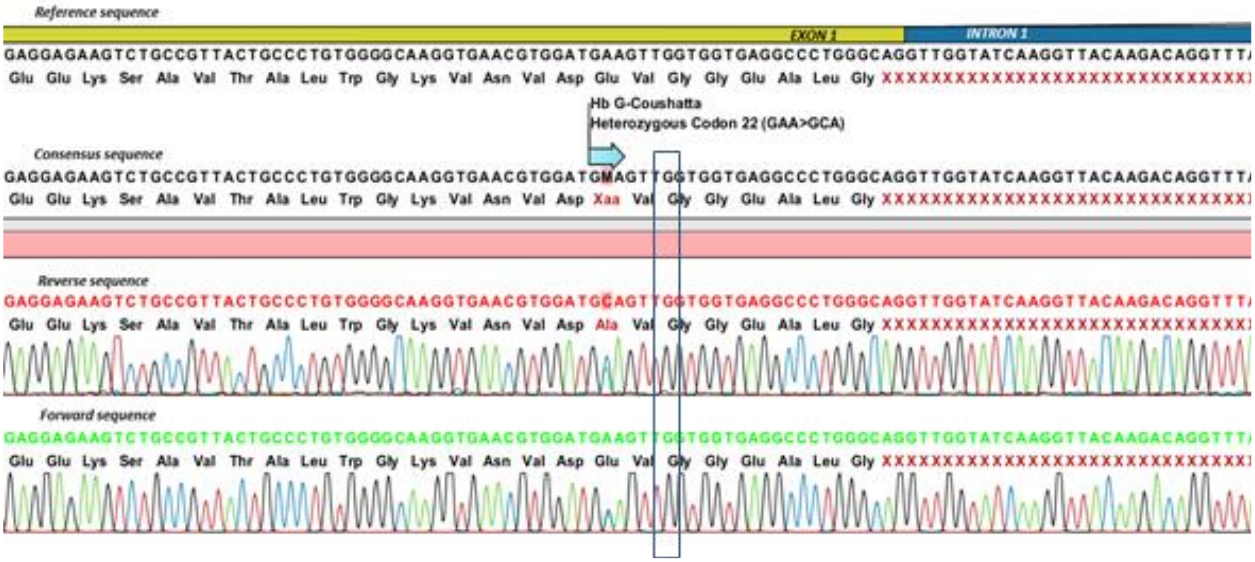

Fig. 2: DNA Analysis of the beta globin genes, containing the mutation is shown. The single glutamic acid (E) to Alanine (A) –heterozygous mutation Hb G Coushatta at codon 22 (GAA>GCA) is enclosed in a vertical line.

Hb analysis may be useful in quantifying the Hb variant. However, definitive diagnosis by molecular analysis is required for identifying the rare mutation such as Hb G Coushatta. Although the variant carries no significance in clinical manifestations [2], it is still important to identify the rare mutation as it can be passed on to the next generation and may evolve to different haplotypes.

Keywords: Haemoglobin variant, Hb G Coushatta, molecular analysis.

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References:

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