Hemoglobin Lepore$_{Boston}$ in a Turkish Family

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ABSTRACT

An abnormal hemoglobin was detected in a Balkan immigrant Turkish family. Erythrocyte morphology was similar to ß-thalassemia trait. Molecular analysis showed that the abnormal hemoglobin was Hemoglobin Lepore$_{Boston}$. All affected family members were in heterozygote state and asymptomatic.

Key Words: Hemoglobin Lepore$_{Boston}$, Turkey.

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INTRODUCTION

Lepore Hemoglobins are the result of unequal crossing over between structural genes coding for d and ß polypeptide chains of human hemoglobin during meiosis[1]. Abnormal hemoglobin is made up of two Lepore (dß) chains and two normal a chains. The abnormal dß chain produced after this crossing over has part of the d chain at its N terminus and the remaining part is similar to the ß chain[2]. Three different types of Lepore Hemoglobins have been identified; namely Hemoglobin Lepore$_{Boston}$, Hemoglobin Lepore$_{Hollandia}$ and Hemoglobin Lepore$_{Baltimore}$. The point of fusion of the two polypeptide chains and the proportion of the d and ß in the dß chain varies in different types of Lepore Hemoglobins. In Hemoglobin Lepore$_{Boston}$ crossing over is somewhere between residue 87 of the d chain and 116 of the ß chain[3-5].

In this article we report the occurence of Hemoglobin Lepore$_{Boston}$ in a Turkish family.

CASE REPORT

The patient was a 20 year old male Balkan immigrant who was suffering from numbness in his right arm. A low mean corpusculer volume (MCV) was noticed during routine laboratory tests. His medical and family history was unremarkable.

Physical examination was normal. Laboratory tests were as follows: Hb: 14.4 g/dL, RBC: 6.2 x 10^{12}/L, MCV: 71 fL, MCH: 23 pg, MCHC: 32%. Leucocyte and platelet count was normal. Blood film examination showed hypochromia, anisocytosis and a few target cells. Serum iron, serum iron binding capacity and ferritin concentration were normal. Hemoglobin electrophoresis in cellulose acetate revealed an abnormal hemoglobin which constituted 13.5% of the total hemoglobin. Proportions of hemoglobin A and A_2 were 83.4% and 3.1%, respectively. Investigation of the patients family showed that his father and brother had similar findings in complete blood count, blood films and hemoglobin electrophoresis (Figure 1). Concentration of the abnormal hemoglobin in his father and brother was 14% and 13.5%, respectively.

Polimerase chain reaction was performed with the primers T46 5' ATG TGG AGA CAG AGA AGA CTC TTG GGT 3' and C27 5' TCA TTC GTC TGT TTC CCA TTC TAA AC 3' with the annealing temperature of 55°C (Ericomp, USA). The pcr product was restricted with Pvu II (Promega, Madison, USA) which restricts only Hemoglobin Lepore$_{Boston}$ if present (Figure 2)[6]. Molecular analysis identified this abnormal hemoglobin as Hemoglobin Lepore$_{Boston}$.

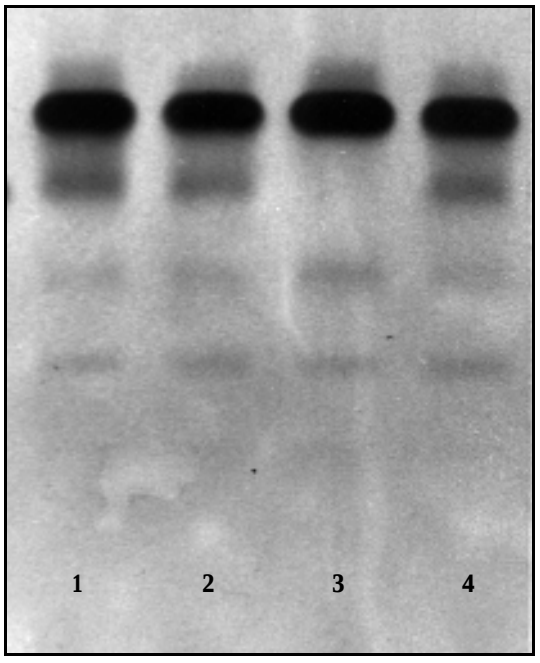

Figure 1. Hemoglobin electrophoresis; 1. The patient, Lepore trait; 2. Brother; 3. Normal; 4. Father.

DISCUSSION

The diagnosis of heterozygote hemoglobin Lepore was made on the basis of the presence of a slow moving hemoglobin with the same mobility of Hb S and Hb D in electrophoresis, a proportion of 13.5%. Negative sickling test and low concentration of the abnormal hemoglobin excluded Hb AS and Hb AD. Hemoglobin Lepore$_{Boston}$ is found in various Meditterenean populations. Heterozygotes have mild anemia resembling thalassemia trait, while homozygotes are severely affected and display a severe ß-thalassemia phenotype[7]. Hemoglobin Lepore$_{Boston}$ was previously reported in Turkey[8,9]. In our patient clinical and laboratory data were consistent with the heterozygote Hemoglobin Lepore$_{Boston}$ cases in the literature.

The gene frequency of ß-thalassemia in Turkish population is 1.66%[10]. In certain regions in the Meditterenean coast of Turkey like Antalya,

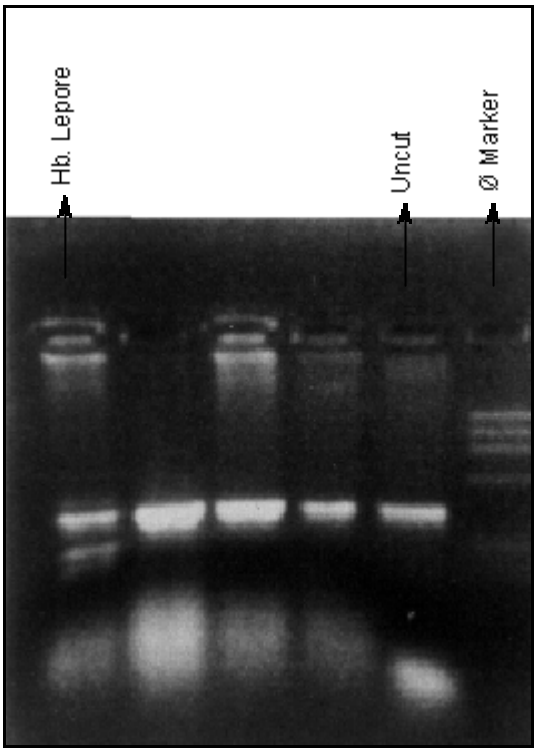

Figure 2. Polimerase chain reaction. Lane 1: Hemoglobin Lepore$_{Boston}$ carrier. Lane 2-5: Normal individuals. Lane 6: ³x marker Hae III cut.

the prevelance of ß-thalassemia trait with increased Hb A2 was 10.2%[11]. As ß-thalassemia and abnormal hemoglobins are frequently encountered in Turkey and clinical features of most Lepore-ß-thalassemia patients resemble those of patients with homozygous ß-thalassemia, partners of heterozygote Lepore Hemoglobins needs to be evaluated for abnormal hemoglobins and especially for ß-thalassemia. If necessary genetic counselling should be offered.

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