

FAST- MOVING HEMOGLOBIN

This type of hemoglobin refers to one that has a higher electrophoretic mobility than hemoglobin A on cellulose acetate electrophoresis at pH 8.4. It may be the result of an α or β globin gene mutation resulting in a structural change in the respective protein chain. The resulting hemoglobin may or may not be unstable.

If the patient is an adult,

... *if Asian*, the patient may have **hemoglobin H disease** due to a deletion of three of the four alpha genes. The fast-moving hemoglobin H consists of all beta chains (β_4). This condition is usually associated with a moderately severe hemolytic anemia, a low MCV, splenomegaly, and susceptibility to oxidant drugs.

... *if not Asian*, the likeliest diagnosis is a mutation of an alpha or beta globin gene. Such mutations are often asymptomatic. However, if the patient is anemic, a test should be done to see if the hemoglobin is unstable*.

If the patient is a newborn a fast-moving hemoglobin could represent:

1. hemoglobin Barts (γ_4),, indicative of **α -thalassemia** 1, 2 or 3-gene deletion type.
2. a hemoglobin variant such as J or N or
3. an artifact of the filter paper blood specimen used to collect the infant's blood.

... *if Asian or black*, it is likely to be hemoglobin Barts. Hemoglobin Barts is a tetramer of gamma chains (γ_4) which form because of a deficiency of alpha chains. Most common is the deletion of one or two alpha genes. In either case, the condition is asymptomatic and the fast-moving hemoglobin is gone by a year of age. If it persists into adulthood, it may be hemoglobin H.

... *if Caucasian*, repeat hemoglobin electrophoresis at one year of age*. If it is gone, it was a fetal hemoglobin mutation. If it is still present, it is an adult hemoglobin mutation. Only if anemia is present at that time is further investigation needed, viz. checking for an unstable hemoglobin.

If the patient is pregnant,

... *and the patient appears to have hemoglobin H disease* (usually Asian), then the partner should be checked for α -thalassemia. If the partner has a fast-moving hemoglobin, this is likely. If the partner has a low MCV but a normal electrophoretic pattern i.e. no fast-moving hemoglobin, iron deficiency should be ruled out. If iron deficiency is not present, α -thalassemia one-or two-gene deletion type is likely. The only method of determining the type of α -thalassemia status definitively is by DNA analysis. This is indicated only if the patient is interested in prenatal diagnosis.

... *and the patient is not Asian*, the partner should have an MCV, a hemoglobin electrophoresis, and a hemoglobin A₂ determination.

There is a significant risk to the child if both parents have an abnormality in the same hemoglobin chain (alpha or beta), but not if their abnormalities are in different chains.

* Blood samples sent for testing for a fast-moving hemoglobin should be kept at room temperature and electrophoresed promptly since a fast-moving hemoglobin may precipitate if stored or placed at 4⁰ C.