IWK Health
Maritime Medical Genetics Service
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The Maritime Medical Genetics Service is no longer accepting referrals for genetic counselling for individual alpha thalassemia carriers (also known as alpha thalassemia trait). We will only accept a referral if BOTH reproductive partners are presumed/confirmed carriers AND are planning a pregnancy/currently pregnant.

We would like to direct your attention to the following resources about alpha thalassemia carriers and hemoglobinopathy carrier screening in Canada:

https://treatment.stjude.org/content/dam/sj-treatment/hematology-resources/alpha-thalassemia-trait.pdf

https://geneticseducation.ca/uploads/POC/POC_carrier_screening_Canada_hemoglobinopathies.pdf

Alpha thalassemia carriers typically do not have symptoms; however, they may have anemia that does not respond to iron supplementation. As being an alpha thalassemia carrier does not typically cause a hematologic disorder on its own, these individuals do not need to be seen by a hematologist in the absence of other concerns.

We suggest consideration of testing in all interested reproductive age first-degree relatives of your patient with a complete blood count (CBC), ferritin level, and hemoglobin electrophoresis. Hemoglobinopathy carrier screening is not indicated in healthy children. If ferritin level is low and iron deficiency is suspected, please initiate treatment, and repeat the above blood work once ferritin levels have normalized. Samples with suggestive findings on a CBC or hemoglobin electrophoresis are typically sent out for genetic confirmation but may require additional communication with the laboratory. The results of this testing will be returned to the provider who ordered the original testing.

BACKGROUND:

We usually inherit four copies of the alpha globin gene from our parents: two from each parent. Unlike most recessive conditions, genetic changes in alpha globin can yield a wider spectrum of outcomes of affected and unaffected individuals as more combinations are possible. Determining the carrier status of reproductive partners will help predict the potential risks to a pregnancy.

Alpha thalassemia carriers come in two types depending on the location and number of non-functioning gene copies:

- Alpha thalassemia silent carriers – 1 non-functioning copy out of 4 alpha globin gene copies. Patients with silent alpha thalassemia often have no symptoms. (αα / α-)
- Alpha thalassemia trait – 2 non-functioning copies out of 4 alpha globin gene copies. The non-functioning copies may be inherited from the same parent (also called a “cis” or “heterozygous” deletion or (αα / - -)) or one from each parent (also called a “trans” or “homozygous” deletion or (α - / α -)). Carriers of alpha thalassemia trait may have mild anemia.

Affected individuals also come in two types, depending on the location and number of non-functioning copies:

- Hemoglobin H (HbH) disease – 3 non-functioning copies out of 4 alpha globin gene copies. (α- / - -)

  HbH disease may be suspected in a child who presents with mild jaundice, hepatosplenomegaly, and mild thalassemia-like bone changes. The spectrum of presentation is broad and may depend on the specific genetic change in the affected individual. Some adults may only be diagnosed when undergoing hemoglobinopathy screening. More severe cases may require blood transfusions with risk of iron overload.

  If an individual is identified through screening to have HbH disease, they should be referred to Hematology for further evaluation.

- Hemoglobin Barts (hydrops fetalis) – All 4 alpha globin gene copies are non-functioning. (- - / - -)

  Hb Barts is the most severe outcome of alpha thalassemia and typically causes stillbirth, death in utero, or early infant death due to lack of sufficient alpha globin production. It is usually detected in pregnancy either by ultrasound or other pregnancy complications. A small number of newborns survive following intrauterine transfusions, with subsequent transfusions after birth if detected early.

Reproductive counselling should be provided to any individual who is an alpha thalassemia carrier by their primary care provider. Hemoglobinopathy screening is recommended for their reproductive partner as outlined above. Hemoglobinopathy screening should be offered prior to pregnancy, when possible.

If your patient AND their partner are presumed/confirmed alpha thalassemia carriers AND they are planning a pregnancy/are currently pregnant, they can be referred to the Maritime Medical Genetics Service for genetic counselling. When placing this referral, please enclose the results of their CBC, hemoglobin electrophoresis, ferritin, and genetic testing (if available) for BOTH individuals.

Referrals in the following scenarios are not accepted by the Maritime Medical Genetics Service:

- Children who are alpha thalassemia carriers
- Adult alpha thalassemia carriers who are not planning a pregnancy
- Adult couples where both partners have been tested and only one is a carrier of a thalassemia/hemoglobinpathy

Provider questions can be directed to the Maritime Medical Genetics Service at 902-470-8754.