Hemoglobinopathy Work-Up Cheat Sheet

Carrier screening for hemoglobinopathies should be offered to any individual who is reproductive age, and who is ***not*** of *Northern* European, Japanese, Korean, Inuit, or First Nations ethnicity. Carrier screening should also be offered to reproductive-age individuals with a family history of hemoglobinopathies or a partner who has or is a carrier of a hemoglobinopathy. **NB: DNA testing will be restricted to genetics and hematology.**

Your Patient	**Recommended Action**	**Reproductive Partner**	**Recommended Action**
(1) Hemoglobinopathy screen abnormal	• If presumptive carrier: Reassure regarding low personal health risks • If ***affected*** or query-affected with hemoglobinopathy: Refer to hematology • Reproductive-age first-degree relatives (siblings, future children) may wish to seek hemoglobinopathy screening	**(a)** None	• Revisit once patient has a reproductive partner
		(b) Not screened	• Offer hemoglobinopathy screen to partner; revisit once screen comes back • If on-going pregnancy, AND partner either not available or declined testing: Refer to genetics
		(c) Hemoglobinopathy screen negative	• Reassure regarding low risks for future children to have clinically-significant anemia (though may not rule out Hemoglobin H disease, which is usually mild)
		(d) Hemoglobinopathy screen abnormal	• Refer BOTH patient and partner to genetics • If partner ***affected*** or query-affected with hemoglobinopathy, refer to hematology
		(e) Low MCV, low ferritin, hemoglobinopathy screen uninterpretable	• Supplement iron • Re-take hemoglobinopathy screen once ferritin normalized • If on-going pregnancy: Refer to genetics
(2) Low MCV, low ferritin, hemoglobinopathy screening uninterpretable	• Supplement iron • Re-take hemoglobinopathy screen once ferritin normalized	**(a)** None	• None
		(b) Not screened	• If on-going pregnancy, AND partner either not available or declined testing: Refer to genetics
		(c) Hemoglobinopathy screen negative	• Reassure regarding low risks for future children to have clinically-significant anemia
		(d) Hemoglobinopathy screen abnormal	• If partner presumptive carrier: Reassure regarding partner's low personal health risks • If partner ***affected*** or query-affected with hemoglobinopathy: Refer to hematology • Partner's reproductive-age first-degree relatives (siblings, future children) may wish to seek hemoglobinopathy screening • If on-going pregnancy: Refer to genetics
		(e) Low MCV, low ferritin, hemoglobinopathy screen uninterpretable	• Supplement iron • Re-take hemoglobinopathy screen once ferritin normalized • If on-going pregnancy: Refer to genetics
(3) Hemoglobinopathy screen negative	Reassure regarding low risks for future children to have clinically-significant anemia		• Hemoglobinopathy screening not needed, but partner can still request if he/she belongs to high-risk ethnicity or has family history of hemoglobinopathy • If partner has abnormal hemoglobinopathy screen, counsel couple as in scenario (1c)

Information About Hemoglobinopathies For Physicians

Hemoglobinopathies, or disorders of hemoglobin, are group of inherited anemias. Most hemoglobinopathies are caused by variations in the *HBA* (alpha globin) or *HBB* (beta globin) genes. **Thalassemias** are a subset of hemoglobinopathies caused by an imbalance in the ratio of hemoglobin subunits (usually due to the underproduction of a subunit). **Hemoglobin variants** are qualitative changes in the structure of the hemoglobin subunit. One of the most well-known hemoglobin variants is hemoglobin S, which causes sickle cell disease.

Signs and symptoms of hemoglobinopathies can be **highly variable** depending on the specific disease in question, ranging from near-asymptomatic to perinatal lethal. Most hemoglobinopathies cause chronic anemia, either hemolytic or microcytic or both. Some may have liver, spleen, and bone involvement, depending on severity. Sickling disorders may cause vaso-occlusive pain crises.

Hemoglobinopathies are usually inherited in an **autosomal recessive** manner. As such, carriers of hemoglobinopathies (also referred to as "**trait**" in some nomenclature) are ***not*** expected to be at-risk for clinically-significant anemia except in exceptional circumstances. If both partners in a couple are carriers for hemoglobinopathies, a referral to genetics would be indicated.

Individuals who are carriers of thalassemias and certain hemoglobin variants (e.g. hemoglobin E) may have low mean corpuscular volume (MCV). However, this is usually ***benign*** and does not require treatment. Iron supplementation is ***not*** required unless there is concurrent iron deficiency. Because of the low MCV and other signs of sub-clinical anemia, some nomenclature uses the term "thalassemia **minor**" to describe carriers of thalassemia.

RECOMMENDATIONS

Counselling for ***carriers*** of a hemoglobinopathy should include:

1) Reassurance about their own personal health risks,
2) Encouragement to share their diagnosis with family members so that reproductive-age relatives can seek carrier screening, and
3) Discussion about carrier screening with their partners to ascertain reproductive risks.

Someone who is ***affected*** with a hemoglobinopathy should be offered a referral to hematology, in addition to the above-mentioned discussions regarding family and partner screening.

If there are concerns regarding clinical management plans for an individual with an abnormal screen, please discuss with hematology.

Patient Resources and Where to Find More Information

Genetics Home Reference: https://ghr.nlm.nih.gov
National Heart, Lung, and Blood Institute: https://www.nhlbi.nih.gov
CDC National Center on Birth Defects and Developmental Disabilities: https://www.cdc.gov/ncbddd/index.html
Cooley's Anemia Foundation (for information on thalassemias and hemoglobin E): www.thalassemia.org
Sickle Cell Disease Association of America (for information on sickle cell disease): https://www.sicklecelldisease.org
We will also upload a patient information sheet about hemoglobinopathies on our program website: http://www.wrha.mb.ca/prog/genetics/