Genetic Insights: quick reference guide for healthcare providers

This guide is intended to facilitate discussion between a provider and their patient.

Genetic Insights test results: **Hereditary thrombophilia**

Key results

The DNA variant c.*97G>A associated with hereditary thrombophilia was found in both copies of the *F2* gene.

Next steps

Clinical recommendations	Resources
Genetic Insights is a screening test and not intended for diagnosis. *Evaluation of personal, family, and other risk factors for thrombosis is warranted for accurate risk assessment.* *If this result was not previously known, consider confirming the result prior to making any medical management decisions based on this result alone.*	**Have questions?** Call **1.866.GENE.INFO** (1.866.436.3463) to speak to a specialized Quest genetic counselor or geneticist available to healthcare providers to discuss test selection and results. **Need to order?** Check with your institution and/or patient's insurance about the preferred testing laboratory. Blueprint Genetics® offers hereditary thrombophilia testing. To confirm this test result, **targeted variant testing** for the variant identified is available. You can order a confirmation test here: Blueprint Genetics/TVT
Consider a referral to a hematologist for discussion of these results.	The American Society of Hematology offers tools to search for a specialist: Hematology.org/Education/Patients/Find-A-Hematologist
Consider referring your patient to a genetic counselor. *Genetic counselors can provide counseling on the implications of this test result and next steps for your patient.*	Your patient can schedule a 1-on-1 remote genetic counseling session through their online Genetic Insights dashboard at no additional cost. To find a genetic counselor practicing in your patient's area for an in-person session, please visit FindAGeneticCounselor.NSGC.org

Patient conversation starters:

Patient conversation starters summarize the preceding information in plain language to support meaningful conversations between you and your patient.

FindAGeneticCounselor.NSGC.org

Your Genetic Insights test is a screening test. If you have other risk factors for blood clots, it might be helpful to speak with a hematologist.

It's also important that you talk with a genetic counselor. Genetic counselors are experts in genetics and can help you understand this result and potential next steps.

You can access a genetic counselor through your online Genetic Insights dashboard at no additional cost to you, and we can discuss a referral to a local genetic counselor.

Visit QuestDiagnostics.com/Genetic-Health-Screening for more information about this test.

What is hereditary thrombophilia?

Hereditary thrombophilia describes a group of inherited conditions that increase susceptibility to venous thromboembolism (VTE), particularly deep vein thrombosis (DVT) or pulmonary embolism (PE).[1]

The most common forms of hereditary thrombophilia are due to DNA variants in the Factor 2 (*F2*) and/or Factor 5 (*F5*) genes. The common DNA variant in the *F2* gene is also known as prothrombin, and the common DNA variant in the *F5* gene is also known as Factor V Leiden.

Most people with DNA variants in these genes are asymptomatic and never experience a thrombotic event, though relative risk is increased compared to the general population.[1,4]

This result indicates 2 variants linked to hereditary thrombophilia. For individuals with 2 variants linked to hereditary thrombophilia, risk of VTE is increased compared to people with only 1 or no variant.[1,2] An individual's risk depends on a combination of genetic, acquired, and other circumstantial factors.[4]

Management depends on clinical history and other VTE risk factors.[1-4]

See the Management options section for more detail.

Patient conversation starters:

Hereditary thrombophilia is caused by a DNA variant in a certain gene.

Hereditary thrombophilia is an inherited condition that can increase the chance that a person may have an abnormal blood clot. The most serious types of blood clots that can happen are called deep vein thrombosis (DVT) and pulmonary embolism (PE). These blood clots can be dangerous.

However, most people with hereditary thrombophilia never develop an abnormal blood clot.

Factors other than genetics can also increase the chance of having an abnormal blood clot, such as being overweight or spending long periods of time sitting, like plane trips.

What this result means for family members

DNA variants linked to hereditary thrombophilia are inherited or passed down in families. In people with DNA variants linked to hereditary thrombophilia, biological parents, siblings, and children are all at risk for having a form of hereditary thrombophilia.

A genetic counselor can help determine the most appropriate testing options.

People with hereditary thrombophilia should consider sharing their results with their at-risk family members so they can speak with their healthcare provider about their own risks for VTE.

Patient conversation starters:

Hereditary thrombophilia runs in families.

That means the DNA variants that cause hereditary thrombophilia can be inherited or passed down from parents to their children.

Since you have DNA variants linked to hereditary thrombophilia, at least 1 of your biological parents likely has a form of hereditary thrombophilia. This also means your siblings and children have a higher chance of having DNA variants linked to hereditary thrombophilia.

Other relatives might also have 1 or both of these DNA variants. Sharing your results with your family members may be helpful so they can talk to their own healthcare providers about genetic testing for hereditary thrombophila.

Management options

Various risk factors interact with genetic predisposition to increase the risk of VTE in individuals with hereditary thrombophilia.[4] The following is a selected list of risk factors that may be considered in asymptomatic individuals with hereditary thrombophilia[4]:

Risk factor	Management or counseling considerations
Age	Present age-specific information and risks
Anti-phospholipid antibody (APLA)	Discuss VTE risks and other management guidelines for those with APLA
Family history of VTE	Family history can inform individual risks and should be assessed
Cancer	Individuals with cancer require prophylactic anticoagulation as indicated, regardless of hereditary thrombophilia
Central venous catheter (CVC)	Routine prophylaxis is not routinely recommended; risks should be discussed
Immobility/ Hospitalization	Discuss risks of VTE; compression devices and/or prophylactic anticoagulation in certain scenarios may be recommended
Surgery/Trauma	Prophylactic anticoagulation may be recommended in certain circumstances regardless of hereditary thrombophilia status
Contraception	Discuss VTE risks associated with estrogen-containing and other contraception
Hormone replacement therapy/Pregnancy	Risks and options should be discussed
Obesity	Obesity may interact with other risk factors for VTE; maintaining a healthy body weight should be discussed
Travel	Low-risk travelers should maintain mobility; high-risk travelers may discuss additional options

Patient conversation starters:

Besides genetics, there are many other factors that can increase the chance someone may have an abnormal blood clot.

People with hereditary thrombophilia who have never had an abnormal blood clot can consider these risk factors and if there are any actions they might take to help lower the chance that a blood clot might happen.

See current guidelines and literature for a complete list of options and recommendations. Options and guidance may change over time. Individuals with a personal or family history of thrombosis should discuss their history with a healthcare provider for specific guidance.

Additional resources

The following patient advocacy groups have additional information and resources about hereditary thrombophilia:

National Blood Clot Alliance: StopTheClot.org

North America Thrombosis Forum: Thrombosis.org

References

1. Kujovich, JL. Factor V Leiden thrombophilia. May 14, 1999. Updated January 4, 2018. In: Adam MP, Ardinger HH, Pagon RA, et al, editors. GeneReviews® [Internet]. University of Washington, Seattle; 1993-2019. www.ncbi.nlm.nih.gov/books/NBK1368/
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3. Stevens SM, Woller SC, Bauer, KA, et al. Guidance for the evaluation and treatment of hereditary and acquired thrombophilia. J *Thromb Thrombolysis*. 2016; 41:154–164. doi:10.1007/s11239-015-1316-1
4. Varga EA, Kujovich JL. Management of inherited thrombophilia: guide for genetics professionals. *Clin Genet*. 2011;81(1):7-17. doi:10.1111/j.1399-0004.2011.01746.x