

NIH News in Health

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Blood Clots Explained Clearing Blockages in the System

Your blood is an amazing, multi-purpose substance. It flows continuously through the body, carrying oxygen and nutrients to your cells. But if you get a scrape or cut, some of this flowing liquid quickly turns to a protective clot.

Clots are tangles of molecules and blood cells that clump together. They help prevent blood loss when the skin breaks open. They also help stop infections from getting inside the body. But when clotting happens inside a blood vessel, it can be dangerous.

Clots can form on the blood vessel walls to help them heal if they get damaged. Afterward, the clots usually dissolve. But sometimes a clot doesn't get broken down as it's supposed to. Clots may also form when they're not needed.

Sometimes, clots break off a vessel wall and travel through the blood to other parts of the body. They may cause a lot of damage, depending on where they block blood flow. Blood clots can potentially harm the brain, heart, lungs, or other organs.



But researchers have made great progress over the last few decades in managing blood clots. They continue to develop new ways to treat and prevent such blockages.

Clogs in the System • Three main things can lead to dangerous blood clots, explains Dr. Mitchell Elkind, an expert on stroke at Columbia University. “One is an abnormality in the blood that makes it more likely to clot. For example, **genetic** causes, cancer, or damage from smoking,” he says. “The second is when blood doesn’t flow properly.” This can be a side effect of diseases and disorders of the heart or blood vessels.

The third is damage to the lining of blood vessels. One cause of such damage is cholesterol buildup in the blood. Cholesterol is a waxy, fat-like substance that can clump together to form plaques. If a plaque breaks apart, it can damage the blood vessel.

Blood clots can happen to anyone,

at any age. But some people are at increased risk. These include older adults and those with certain heart conditions.

Major surgery or a serious injury also add risk. Obesity, being physically inactive, and some medications can boost the chance of a dangerous clot, too.

“And once you’ve had one blood clot, you’re at high risk

of another one,” notes Dr. Nigel Key, an expert on blood disorders at the University of North Carolina.

Some infections may also increase the risk of blood clotting. Recent studies have shown that the virus that causes COVID-19, SARS-CoV-2, can cause blood clots in some people.

Symptoms of a Clot • Blood clots can occur anywhere in the body. That makes it difficult to find them before they cause a problem, Elkind explains. The symptoms of a blood clot depend on where they are.

A clot blocking blood flow to the

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Definitions

Genetic

Having to do with genes. Genes are stretches of DNA you inherit from your parents. They define features like your risk for certain diseases.

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brain can lead to a stroke. Strokes can cause sudden difficulty seeing, speaking, or walking. They can also make you feel weak, numb, dizzy, or confused.

A clot that blocks blood flow to the heart can cause a heart attack. The most common signs are crushing chest pain and difficulty breathing. Others range from cold sweats to arm or shoulder pain.

A clot in the lungs can cause shortness of breath, pain when breathing deeply, or even coughing up blood. A clot in a vein deep within the body is called a deep vein thrombosis, or DVT. Symptoms include swelling, pain, warmth, or red or discolored skin. These usually happen in your legs. Long periods of inactivity can increase your risk.

“Compared with a heart attack or stroke, there’s low awareness of the symptoms of deep vein thrombosis,” Key says. Many symptoms overlap with less dangerous conditions, such as a muscle sprain.

If you have symptoms of a blood clot, call your health care provider or 911 immediately. You may need to go to the hospital to have blood or imaging tests.

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Busting Blockages • Treatment depends on where a clot is and how long you’ve had symptoms. Certain drugs can break up and dissolve some types of clots. But they have to be given within a few hours of when symptoms start.

A type of surgery called a thrombectomy can be used to remove clots in large blood vessels. It can be used even if people don’t get to the hospital in time to receive clot-busting drugs. “That’s been a huge benefit for patients,” says Dr. Waleed Brinjikji, an expert on stroke at the Mayo Clinic.

This technique has also let researchers study what clots are made of after they’re removed. “We’re starting to realize how different clots can be,” says Brinjikji.

Different types of clots might benefit from different removal techniques or drugs. So Brinjikji’s team is now testing ways to identify the type of clot before it’s removed. That way they can start to test which treatments work best.

Stopping a Clot • If you have a clot that’s forming, certain medications may help shrink it or stop it from growing. These drugs are called anticoagulants. They’re more commonly known as blood thinners.

Sometimes, people with certain heart conditions are given blood thinners to prevent blood clots from forming. But blood thinners can have side effects, including an increased risk of bleeding. So doctors don’t give them to everyone.

Elkind’s team has been researching which heart conditions may benefit from this type of preventive treatment.

Recent research has shown that blood thinners may help in COVID-19. They might reduce the risk of blood clots and organ damage in people hospitalized with COVID-19.



Wise Choices Reduce Your Risk of Blood Clots

- **Eat a heart-healthy diet.** Eat more fruits, vegetables, and whole grains. Limit salt and red meat. Find more tips at www.nhlbi.nih.gov/DASH.
- **Be physically active.** Experts recommend adults get at least 150 minutes of moderate-intensity activity per week.
- **Aim for a healthy weight.** Excess weight can increase your chances of developing health conditions linked with blood clots. Healthy eating and physical activity can help prevent excess weight.
- **Manage stress.** Stress can contribute to high blood pressure and other heart disease risk factors. Find tips for lowering stress at go.usa.gov/xsHzE.
- **Quit smoking.** Get free help to quit smoking at smokefree.gov, 1-800-QUIT-NOW (1-800-784-8669), or by texting QUIT to 47848.
- **Control high blood pressure, high cholesterol, and diabetes.** Talk with your doctor about how to manage these conditions.

More work is underway to figure out how best to prevent and treat blood clots for those with the disease.

This work will also help researchers better understand how other viruses can affect the blood, Elkind explains. “I think we’re going to learn a lot about how other infections also trigger clotting from studying COVID-19,” he says.

There are many things you can do to decrease your risk of harmful blood clots. See the Wise Choices box for tips. ■



Web
Links

For more about blood clots, see “Links” in the online article: newsinhealth.nih.gov/2021/05/blood-clots-explained

Childhood Arthritis

When Joint Pain Affects Kids

Arthritis causes pain, swelling, and stiffness of your joints, the connections between bones. Arthritis is most common in adults. But it can also affect children. This is called juvenile arthritis.

“Arthritis is particularly a problem for children because their bones and joints are developing and growing,” says Dr. Michael Ombrello, who specializes in treating joint diseases at NIH.

There are many types of juvenile arthritis. “Juvenile idiopathic arthritis” is the most common. It’s a group of seven arthritic conditions.

Juvenile idiopathic arthritis can affect any joint in the body. But it frequently affects children’s knees and joints in the hands and feet.

Juvenile arthritis is usually an autoimmune disorder. That’s when the body’s **immune system** attacks some of its own healthy cells and tissues. This causes **inflammation**, the body’s response to injury and outside harm.

Scientists are studying the causes of juvenile arthritis. Right now, these aren’t well understood. A child’s **genes** can make them more likely to get arthritis. But something in their day-to-day life, such as a virus, may set off the condition.

Diagnosing juvenile arthritis can be tricky. Doctors may suspect arthritis if a child has joint pain or

swelling that won’t go away. Symptoms can also include unexplained skin rashes or fever.

To diagnose juvenile arthritis, health care providers perform a physical exam. They may order lab or blood tests and X-rays. They’ll also ask about family health history.

Juvenile arthritis can take both a physical and emotional toll. Pain and fatigue can make doing schoolwork harder. Symptoms can make it tougher to take part in after-school or social activities.

Luckily, there have been major advances in treatment over the last two decades. A class of drugs called “biologics” has been very helpful for some children with severe arthritis.

“Biologics have really changed the face of juvenile arthritis,” Ombrello says. These drugs have helped many children avoid the most severe effects of the condition, he explains. Fewer children get to the point where they need crutches or wheelchairs.

Biologics can also help reduce the use of other medications. That includes drugs called corticosteroids. These reduce inflammation but can cause serious side effects when used long term. Researchers are working to develop better drugs with fewer side effects.

Physical therapy can also be an important part of treatment. It helps reduce pain and maintain full movement of the joints.

“You want to try to help your child maintain activities to stay active and to not lose the use of their joints because of inactivity or pain,” Ombrello explains. For more tips, see the Wise Choices box. ■



Wise Choices

Caring for Kids With Juvenile Arthritis

- **Get the best care possible.** Find a specialist called a pediatric rheumatologist. Help your child follow the doctor’s instructions.
- **Learn as much as you can about the disease and its treatment.** What works for one child may not work for another.
- **Encourage exercise and physical therapy.** Ask your health care provider about exercises and activities they recommend.
- **Talk with your child.** Let them know you’re there to listen and help in any way you can.
- **Work closely with your child’s school.** Educate teachers and classmates about the condition.
- **Work with therapists or social workers.** They can help your child adapt to the lifestyle changes juvenile arthritis may bring.

Definitions

Immune System

The system that protects your body from microscopic threats.

Inflammation

Heat, swelling, and redness caused by the body’s protective response to injury or infection.

Genes

Stretches of DNA you inherit from your parents that define features like your risk for certain diseases.



Web Links

For more about childhood arthritis, see “Links” in the online article: newsinhealth.nih.gov/2021/05/childhood-arthritis



Health Capsules

For links to more information, please visit our website and see these stories online.

Drug Delays Onset of Type 1 Diabetes

A study found that the drug teplizumab helped people at risk for type 1 diabetes. The drug delayed the average time to the start of the disease. Some who were treated in the trial have yet to develop symptoms.

People with type 1 diabetes need to take insulin to control their blood sugar. Insulin is a hormone that helps blood sugar enter the body's cells, where it's used for energy. If not well managed, type 1 diabetes can cause serious health complications. It's usually diagnosed in kids

and teens, but can develop at any age.

The study included 76 people at high risk of developing type 1 diabetes. Each had a relative with the disease and blood tests suggesting they might develop it within a couple of years. Half were given the drug. The other half received an inactive placebo. Researchers then followed the participants for several years.

People given the drug were diagnosed with type 1 diabetes more than two and a half years later than the others. Half of those treated with

the drug never developed the disease during the study. In contrast, 22% of the placebo group did not develop it.

Insulin production improved in people given the drug. The results suggest that a single course of the drug may have long-lasting benefits. If approved, it would be the first drug to delay or prevent type 1 diabetes.

"Any time without diabetes is important, but particularly so for those children who might have a chance to grow up without it," says Dr. Kevan Herold at Yale University. ■

How Are Vaccines Tested?

COVID-19 vaccines are a key part of overcoming the pandemic. Fully vaccinated people can start doing some of the things they had to stop. This includes visiting friends and loved ones who are also fully vaccinated.

You might still have questions about vaccines. How do they work? How do scientists know they're safe? It's important to know these answers and share them with others. Vaccines are the best protection against many serious diseases. They teach your body to recognize and fight off things like viruses and bacteria. Learn more

about what a vaccine is at youtu.be/qWG5dou7vW4 (or in Spanish at youtu.be/cubsrWFw87M).

The COVID-19 vaccines were developed with amazing speed. But they're still safe and effective. These vaccines were held to the same standards used to ensure the safety of any approved vaccine. Before a new vaccine is given to people, a lot of testing is done in a lab. Then, it's tested in people in clinical trials to make sure it's safe and effective.

There are three phases of clinical trials. Phase 1 is done in a small group

of people. Scientists first determine if the vaccine is safe and test different doses. If it passes this phase, it moves on to phase 2. Phase 2 tests the vaccine in more people to see if it works. Researchers look at how the body responds to it and track any side effects. Finally, in phase 3, the vaccine is tested in thousands of people. This rigorous process ensures that any approved vaccine is safe and effective. Learn how vaccines are tested at go.usa.gov/xH4uP (video at youtu.be/KQ7iIt_4VTM or in Spanish at youtu.be/7LC-IEhbqFw). ■

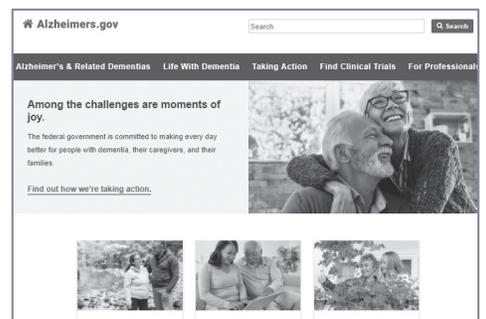


Featured Website

Alzheimer's Portal
alzheimers.gov

There's a new website for information on Alzheimer's disease and related dementias. Find resources for people

living with dementia and their caregivers. You can also read about new research. And find out how to participate in studies.



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