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# Arteriovenous Malformations

**Also called:** AVM

## What are arteriovenous malformations (AVMs)?

Arteriovenous malformations (AVMs) are defects in your **vascular system** [<https://medlineplus.gov/vascular diseases.html>] . Your vascular system is your body's network of blood vessels. It includes your:

- **Arteries**, which carry oxygen-rich blood from your heart to your tissues and organs.
- **Veins**, which carry the blood and waste products back to your heart.
- **Capillaries**, which are tiny blood vessels that connect your small arteries to your small veins.

An AVM is an abnormal tangle of arteries and veins. They are connected to each other, with no capillaries between them. Without the capillaries, the blood flow from the arteries goes directly into the veins at a faster rate than normal. Because of this, the nearby tissue does not get all the oxygen it would normally get. This lack of oxygen can lead to tissue damage and the death of nerve cells and other cells. The fast rate of blood flow can also increase the blood pressure inside the arteries and veins. This can weaken the arteries and veins. A weakened artery or blood vessel could burst or leak blood.

## What causes arteriovenous malformations (AVMs)?

AVMs are rare. The cause of AVMs is unknown. Most of the time, people are born with them. But sometimes they can appear shortly after birth or later in life.

## What are the symptoms of arteriovenous malformations (AVMs)?

The symptoms of AVM will depend on where the AVM is located. They can happen anywhere in the body, but they are more common in the brain or spinal cord. Most people with brain or spinal cord AVMs have few, if any, major symptoms. But if a weakened blood vessel bursts, it can spill blood into the brain (called a hemorrhage). Severe hemorrhages can cause a **stroke** [<https://medlineplus.gov/hemorrhagicstroke.html>] and brain damage.

If an AVM is causing symptoms, they can include:

- Seizures [<https://medlineplus.gov/seizures.html>]
- Headache [<https://medlineplus.gov/headache.html>]
- Pain in the area where the AVM is located
- Vision problems
- Muscle weakness
- Problems with movement [<https://medlineplus.gov/movementdisorders.html>] and speech [<https://medlineplus.gov/speechandcommunicationdisorders.html>]
- Confusion
- Dizziness [<https://medlineplus.gov/dizzinessandvertigo.html>]
- Loss of consciousness

## How are arteriovenous malformations (AVMs) diagnosed?

To find out if you have an AVM, your health care provider:

- Will ask about your symptoms and medical history.
- Will do a physical exam. This may include listening for a bruit. A bruit is whooshing sound caused by the rapid blood flow through the arteries and veins of an AVM.
- May order imaging tests [<https://medlineplus.gov/diagnosticimaging.html>] , such as a CT scan [<https://medlineplus.gov/ctscans.html>] , MRI [<https://medlineplus.gov/mriscans.html>] , ultrasound [<https://medlineplus.gov/lab-tests/sonogram/>] , or cerebral angiography. For a cerebral angiography, you are injected with a special dye that helps the blood vessels in your brain show up on x-rays [<https://medlineplus.gov/xrays.html>] .

## What are the treatments for arteriovenous malformations (AVMs)?

Treatments for AVMs will depend on factors such as:



- Where the AVM is located
- Its size
- Your symptoms
- Your overall health
- Your risk of bleeding

The treatment options may include:

- **Monitoring** for any signs that may mean you have an increased risk of hemorrhage.
- **Medicines** to help with the symptoms from AVMs.
- **Surgery**, which may be done if you have a higher-than-usual risk of bleeding. There are a few different types of surgery for AVMs. In some cases, you may have more than one type. Surgery can be risky, especially when it's done on the brain or spinal cord. So you and your provider will need to discuss the risks and benefits of doing the surgery before you make a decision.

*NIH: National Institute of Neurological Disorders and Stroke*

## Start Here

- Arteriovenous Malformations (AVMs) [<https://www.ninds.nih.gov/health-information/disorders/arteriovenous-malformations-avms>]  (National Institute of Neurological Disorders and Stroke)
- What Is an Arteriovenous Malformation? [<https://www.stroke.org/en/about-stroke/types-of-stroke/hemorrhagic-strokes-bleeds/what-is-an-arteriovenous-malformation>] (American Stroke Association)
- When Blood Vessels Grow Awry: Understanding Vascular Malformations [<https://newsinhealth.nih.gov/2024/07/when-blood-vessels-grow-awry>]  (National Institutes of Health)  
Also in Spanish [<https://salud.nih.gov/recursos-de-salud/nih-noticias-de-salud/cuando-los-vasos-sanguineos-se-deforman>]

## Diagnosis and Tests

- Catheter Angiography [<https://www.radiologyinfo.org/en/info/angiocath>]  
 (American College of Radiology; Radiological Society of North America)  
Also in Spanish [<https://www.radiologyinfo.org/es/info/angiocath>]
- CT Angiography (CTA) [<https://www.radiologyinfo.org/en/info/angiact>]  
 (American College of Radiology; Radiological Society of North America)  
Also in Spanish [<https://www.radiologyinfo.org/es/info/angiact>]
- MR Angiography (MRA) [<https://www.radiologyinfo.org/en/info/angiomr>]  
 (American College of Radiology; Radiological Society of North America)  
Also in Spanish [<https://www.radiologyinfo.org/es/info/angiomr>]
- Ultrasound -- Vascular [<https://www.radiologyinfo.org/en/info/vascularus>]  
(American College of Radiology; Radiological Society of North America)  
Also in Spanish [<https://www.radiologyinfo.org/es/info/vascularus>]




## Treatments and Therapies

- Catheter Embolization [<https://www.radiologyinfo.org/en/info/cathembol>]  
(American College of Radiology; Radiological Society of North America)  
Also in Spanish [<https://www.radiologyinfo.org/es/info/cathembol>]
- Intracranial Vascular Treatments [<https://www.radiologyinfo.org/en/info/IntracranialVasc>]  
(American College of Radiology; Radiological Society of North America)  
Also in Spanish [<https://www.radiologyinfo.org/es/info/IntracranialVasc>]

## Specifics

- Arteriovenous Fistula [<https://www.mayoclinic.org/diseases-conditions/arteriovenous-fistula/symptoms-causes/syc-20369567?p=1>] (Mayo Foundation for Medical Education and Research)  
Also in Spanish [<https://www.mayoclinic.org/es/diseases-conditions/arteriovenous-fistula/symptoms-causes/syc-20369567?p=1>]
- Brain AVM (Arteriovenous Malformation) [<https://www.mayoclinic.org/diseases-conditions/brain-avm/symptoms-causes/syc-20350260?p=1>] (Mayo Foundation for Medical Education and Research)  
Also in Spanish [<https://www.mayoclinic.org/es/diseases-conditions/brain-avm/symptoms-causes/syc-20350260?p=1>]

## Genetics

- Capillary malformation-arteriovenous malformation syndrome: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/capillary-malformation-arteriovenous-malformation-syndrome>]  
 (National Library of Medicine)
- Hereditary hemorrhagic telangiectasia: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/hereditary-hemorrhagic-telangiectasia>]  (National Library of Medicine)
- Parkes Weber syndrome: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/parkes-weber-syndrome>]  
 (National Library of Medicine)

## Clinical Trials


- ClinicalTrials.gov: Arteriovenous Malformations [<https://clinicaltrials.gov/search?cond=%22Arteriovenous+Malformations%22&aggFilters=status:not%20rec>]  (National Institutes of Health)

## Journal Articles

References and abstracts from MEDLINE/PubMed (National Library of Medicine)

- Article: Endovascular Treatment of Extracranial Arteriovenous Malformations: A Retrospective Monocentric Case-Series Study. [<https://www.ncbi.nlm.nih.gov/pubmed/40710893>]
- Article: Modeling Aberrant Angiogenesis in Arteriovenous Malformations Using Endothelial Cells and Organoids... [<https://www.ncbi.nlm.nih.gov/pubmed/40710334>]
- Article: A retrospective analysis of the characteristics of acquired uterine arteriovenous malformations... [<https://www.ncbi.nlm.nih.gov/pubmed/40145702>]
- Arteriovenous Malformations -- see more articles [<https://pubmed.ncbi.nlm.nih.gov/?term=%22Arteriovenous+Malformations%22%5Bmajr%3Anoexp%5D+AND+humans%5Bmh%5D+AND+english%5Bla%5D+AND+%22last+1+Year%22+%5Bedat%5D+NOT+%28letter%5Bpt%5D+OR+case+reports%5Bpt%5D+OR+editorial%5Bpt%5D+OR+comment%5Bpt%5D%29+AND+free+full+text%5Bsb%5D+>]

## Find an Expert

- National Institute of Neurological Disorders and Stroke [<https://www.ninds.nih.gov/>] 

## Children

- Arteriovenous Malformations (For Parents) [<https://kidshealth.org/en/parents/arteriovenous-malformations.html>]  
(Nemours Foundation)

Also in Spanish [<https://kidshealth.org/es/parents/arteriovenous-malformations.html>]

## Patient Handouts

- Cerebral angiography [<https://medlineplus.gov/ency/article/003799.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003799.htm>]
- Cerebral arteriovenous malformation [<https://medlineplus.gov/ency/article/000779.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/000779.htm>]
- Hereditary hemorrhagic telangiectasia [<https://medlineplus.gov/ency/article/000837.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/000837.htm>]
- Klippel-Trenaunay syndrome [<https://medlineplus.gov/ency/article/000150.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/000150.htm>]
- Pulmonary arteriovenous fistula [<https://medlineplus.gov/ency/article/001090.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/001090.htm>]



## MEDICAL ENCYCLOPEDIA

Cerebral angiography [<https://medlineplus.gov/ency/article/003799.htm>]

Cerebral arteriovenous malformation [<https://medlineplus.gov/ency/article/000779.htm>]

Hereditary hemorrhagic telangiectasia [<https://medlineplus.gov/ency/article/000837.htm>]

Klippel-Trenaunay syndrome [<https://medlineplus.gov/ency/article/000150.htm>]

Pulmonary arteriovenous fistula [<https://medlineplus.gov/ency/article/001090.htm>]

Stereotactic radiosurgery - discharge [<https://medlineplus.gov/ency/patientinstructions/000131.htm>]

## Related Health Topics

Hemorrhagic Stroke [<https://medlineplus.gov/hemorrhagicstroke.html>]

## National Institutes of Health

The primary NIH organization for research on *Arteriovenous Malformations* is the National Institute of Neurological Disorders and Stroke [<http://www.ninds.nih.gov/>]

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