



Pathophysiology of Arteriovenous Malformation and its Symptoms

Valer Cetz*

Department of Medical Science, University of Turin, Turin, Italy

ARTICLE HISTORY

Received: 02-Jan-2023, Manuscript No. JCMEDU-22-87770;
Editor assigned: 06-Jan-2023, Pre-QC No. JCMEDU-22-87770 (PQ);
Reviewed: 20-Jan-2023, QC No. JCMEDU-22-87770;
Revised: 27-Jan-2023, Manuscript No. JCMEDU-22-87770 (R);
Published: 03-Feb-2023

Description

An arteriovenous malformation is an abnormal connection between arteries and veins that bypasses the capillary system. This vascular anomaly is widely known because it occurs in the central nervous system (usually a cerebral Arteriovenous Malformation), but it can occur in any location. Although many Arteriovenous Malformations are asymptomatic, they can cause intense pain or bleeding or lead to other serious health problems. Arteriovenous Malformations are usually congenital and belong to RASopathies. Patterns of genetic transmission of Arteriovenous Malformations are incomplete, but genetic mutations are known (eg, in the epithelial lineage, the tumor suppressor gene PTEN) that can lead to an increased incidence throughout the body.

Pathophysiology

Arteries and veins are part of the vascular system. Arteries carry blood away from the heart to the lungs or the rest of the body, where blood passes through capillaries and veins return blood to the heart. An Arteriovenous Malformation disrupts this process by creating a direct connection between arteries and veins. Arteriovenous Malformations can cause intense pain and lead to serious health problems. Although Arteriovenous Malformations are often associated with the brain and spinal cord, they can develop in other parts of the body. Normally, the arteries in the vascular system carry oxygen-rich blood, with the exception of the pulmonary artery. Structurally, the arteries divide and divide repeatedly until they finally form a spongy capillary bed. Blood moves through capillaries, giving up oxygen and taking in waste products, including CO₂, from surrounding cells. Capillaries gradually connect to form veins that carry blood away. The heart works by pumping blood through the arteries and collecting venous blood. Be-

cause an Arteriovenous Malformation lacks the dampening effect of capillaries on blood flow, an Arteriovenous Malformation can gradually enlarge as the amount of blood flowing through it increases, forcing the heart to work harder to keep up with the extra blood flow. This also causes the surroundings to be deprived of the functions of capillaries, removing CO₂ and delivering nutrients to cells. The resulting tangle of blood vessels, often called a nidus (Latin for “nest”), has no capillaries. It can be extremely fragile and prone to bleeding because of the abnormally direct connections between high-pressure arteries and low-pressure veins. The resulting sign, audible with a stethoscope, is a rhythmic hissing sound caused by blood flowing too quickly through the arteries and veins. It was given the name “bruit”, French for noise. In some cases, a brain Arteriovenous Malformation patient may be aware of noise, which can compromise hearing and disrupt sleep, in addition to causing psychological distress.

Symptoms

Symptoms of an Arteriovenous Malformation vary depending on the location of the malformation. About 88% of people with Arteriovenous Malformations are asymptomatic, often the malformation is discovered as part of an autopsy or during treatment for an unrelated disorder (called an “incidental finding” in medicine); in rare cases, its expansion or microbleeding from an Arteriovenous Malformation in the brain can cause epilepsy, neurological deficit, or pain.

The most common symptoms of a brain Arteriovenous Malformation include headaches and seizures, with more specific symptoms occurring that normally depend on the location of the malformation and the individual. Such possible symptoms include:

- Difficulty coordinating movement, including muscle

Valer Cetz

weakness and even paralysis

- Vertigo (dizziness)
- Difficulties with speech (dysarthria) and communication such as aphasia
- Difficulty with daily activities such as apraxia

- Abnormal sensations (numbness, tingling or spontaneous pain)
- Problems with memory and thinking, such as confusion, dementia or hallucinations.