CONDITION

Cerebral amyloid angiopathy

Learn how cerebral amyloid angiopathy affects brain blood vessels, including possible symptoms, diagnosis, bleeding risks, treatment, and follow-up care.

WHAT IT IS
Amyloid buildup in brain blood vessels

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Sudden weakness, speech trouble, vision loss, seizures

WHAT CAUSES IT
Usually unknown, rarely inherited

HOW IT IS DIAGNOSED
Microscopic examination of brain tissue

MAIN TREATMENT
Risk reduction and supportive care

CAN IT BE CURED?
No, treatment cannot remove amyloid

IS IT AN EMERGENCY?
Sometimes, with sudden neurologic symptoms

LONG-TERM OUTLOOK
Risk of recurrent bleeding, disability, and cognitive decline

Overview

Cerebral amyloid angiopathy, often shortened to CAA, is a condition in which a protein called amyloid builds up in the walls of small and medium-sized blood vessels in the brain. Over time, affected vessels may become fragile and more likely to leak or break.

CAA mainly affects vessels near the brain's outer surface, known as the cortex. Bleeding in these areas is called a lobar intracerebral hemorrhage . This means bleeding within the brain tissue, usually in the frontal, parietal, temporal, or occipital lobes.

CAA may also cause very small areas of bleeding called cerebral microbleeds . These are often visible only on special magnetic resonance imaging, or MRI, sequences. Blood products may also collect along the brain's surface, a finding called cortical superficial siderosis .

The condition becomes more common with older age. Some people have no noticeable symptoms and learn about possible CAA after brain imaging for another reason. Others come to medical attention after a brain hemorrhage, brief neurologic symptoms, seizures, or changes in memory and thinking.

CAA is related to Alzheimer's disease because both involve amyloid protein, but they are not the same condition. In Alzheimer's disease, amyloid collects mainly in brain tissue. In CAA, it collects in blood vessel walls. A person may have either condition or both.

CAA matters because it can increase the risk of bleeding in the brain. It may also affect thinking, walking, and independence. Diagnosis and treatment focus on understanding a person's bleeding risk, controlling factors such as high blood pressure, and making careful decisions about medicines that affect blood clotting.

Symptoms

Symptoms depend on where bleeding or other blood vessel damage occurs. CAA can be present without symptoms, especially when it is found through MRI findings such as microbleeds.

A larger brain hemorrhage may cause symptoms that begin suddenly. These can include:

These symptoms require emergency evaluation. Call emergency services rather than driving to the hospital. Rapid brain imaging is needed to determine whether the cause is bleeding, a blocked artery, or another condition. Symptoms alone cannot make that distinction.

CAA may also cause brief episodes known as transient focal neurologic episodes , sometimes called "amyloid spells." A person may experience spreading tingling, numbness, weakness, or unusual visual symptoms that last for minutes. Symptoms may move from one body area to another or happen repeatedly in a similar pattern.

These episodes can resemble a transient ischemic attack, or TIA, which is caused by temporarily reduced blood flow. However, treatment can differ because some medicines commonly considered after a TIA may increase bleeding risk in a person with CAA. New or repeated episodes need prompt medical assessment.

Some people develop gradual changes rather than sudden symptoms. These may include slower thinking, difficulty planning or organizing tasks, memory problems, or changes in walking. Such symptoms have many possible causes and do not by themselves establish that someone has CAA.

- Weakness, numbness, or loss of movement, often on one side

- Trouble speaking or understanding speech
- Loss of vision or a new visual disturbance
- Problems with balance, walking, or coordination
- Confusion, unusual sleepiness, or loss of consciousness
- A severe new headache, sometimes with nausea or vomiting
- A seizure

Causes and risk factors

CAA usually develops when amyloid-beta protein is not cleared normally from blood vessel walls in the brain. Researchers do not fully understand why this happens in an individual person.

Older age is the main risk factor for the common, sporadic form of CAA. Sporadic means that the condition develops without a known inherited mutation. CAA is not caused by an infection, and it is not contagious.

Certain forms of the APOE gene are associated with a higher likelihood of CAA-related vessel damage or bleeding. APOE is involved in carrying fats and processing amyloid. Having a particular APOE form does not prove that a person has CAA or predict with certainty what will happen. Genetic testing is not routinely needed for typical late-life CAA.

Rare inherited forms can affect families and may begin earlier in life. Genetic counseling may be considered when several relatives have had similar brain hemorrhages, when symptoms begin unusually early, or when another inherited disorder is suspected.

High blood pressure does not directly explain the amyloid deposits, but it can add stress to already fragile blood vessels. Managing blood pressure is therefore an important part of reducing the overall risk of brain hemorrhage.

CAA may occur alongside Alzheimer's disease and other causes of small-vessel brain damage. A history of head injury, ordinary physical activity, or routine emotional stress does not by itself mean that someone has developed CAA.

Diagnosis

No single routine test confirms CAA in every living person. Doctors combine the medical history, neurologic examination, age, pattern of symptoms, and brain imaging.

A computed tomography, or CT, scan is often the first test when sudden stroke symptoms occur. CT can quickly show fresh bleeding and its location. A lobar hemorrhage may raise concern for CAA, particularly in an older adult, but other causes must also be considered.

MRI provides more detail. Blood-sensitive sequences can detect old microbleeds, cortical superficial siderosis, and evidence of previous hemorrhages. The number and location of these findings are important. Bleeding limited mainly to the brain's outer regions supports CAA more strongly than bleeding in deep structures, which is more often associated with long-term high blood pressure.

Clinicians may use the Boston criteria, a research-based set of clinical and MRI features, to classify CAA as possible or probable without surgery [1]. "Probable CAA" means that the pattern strongly supports the diagnosis; it does not mean that future bleeding is certain.

Other tests may be used to rule out different causes of hemorrhage. These may include imaging of the brain's arteries and veins, blood tests for clotting problems, and a review of medicines and substance exposure. Amyloid positron emission tomography, or PET, and spinal fluid testing may provide additional information in selected cases, but they generally cannot establish CAA on their own.

Examining brain tissue under a microscope can provide a definite diagnosis. However, a brain biopsy is rarely needed for typical CAA because it is invasive and often would not change management.

A small group of people develop inflammation around amyloid-affected vessels. This is called CAA-related inflammation . It may cause headache, seizures, cognitive decline, behavior changes, or patchy neurologic problems. MRI often shows swelling. Doctors may consider spinal fluid tests or, occasionally, biopsy because treatment differs from that of non-inflammatory CAA.

Treatment and management

There is currently no standard treatment that removes amyloid from affected blood vessels or reverses established CAA. Management aims to prevent additional injury, respond quickly to new symptoms, and support function and quality of life [2].

Blood pressure control is an important part of care, including for people whose readings are only mildly elevated. A clinician can help set an appropriate goal and review home measurements. Treatment should be individualized because age, dizziness, falls, kidney function, and other health conditions may affect the plan.

Medicines that reduce clotting require careful review. These include antiplatelet medicines,

such as aspirin, and anticoagulants like warfarin or apixaban used for conditions such as atrial fibrillation or blood clots. CAA can increase bleeding risk, but stopping these medicines may increase the risk of an ischemic stroke or another serious clot.

People should not start, stop, or change a blood-thinning medicine on their own. Decisions may involve a neurologist, cardiologist, primary care clinician, and sometimes a blood-clotting specialist. The team may consider previous hemorrhages, MRI findings, the reason for treatment, and alternatives where appropriate [2,3].

A brain hemorrhage requires emergency hospital care. Treatment may include close monitoring, careful blood pressure management, reversal of anticoagulant effects when indicated, seizure treatment, and management of pressure inside the skull. Neurosurgery is helpful in selected cases, depending on the hemorrhage's location, size, symptoms, and the person's overall condition [3].

Rehabilitation can help after a hemorrhage. Physical therapy may address strength, balance, and walking. Occupational therapy can support daily activities, while speech-language therapy may help with communication, swallowing, memory, or problem-solving.

If seizures occur, clinicians may prescribe an anti-seizure medicine based on the person's symptoms and test results. Preventive anti-seizure treatment is not automatically appropriate for everyone with CAA.

CAA-related inflammation is managed differently. Specialists may use corticosteroids or other medicines that reduce immune-system activity. This treatment requires monitoring and should not be assumed to help ordinary, non-inflammatory CAA.

Some anti-amyloid medicines used for early Alzheimer's disease can cause imaging changes known as amyloid-related imaging abnormalities, or ARIA. These can involve brain swelling or bleeding. A person with suspected CAA, microbleeds, or a previous brain hemorrhage should discuss these findings with the prescribing specialist before considering such treatment.

Day-to-day care generally includes regular physical activity suited to the person's abilities, avoiding tobacco, and managing diabetes, cholesterol, and sleep problems. These steps do not remove vascular amyloid, but they support overall brain and cardiovascular health. Activities with a high likelihood of serious head injury may need to be discussed individually, especially when a person also takes a blood-thinning medicine.

Complications

The main complication is bleeding within the brain. A person who has had one CAA-related lobar hemorrhage may remain at risk for another, although individual risk varies.

Small areas of bleeding can accumulate over time. Along with other small-vessel changes, they may contribute to difficulties with memory, attention, planning, mood, balance, or walking. Not every MRI abnormality causes noticeable symptoms.

Other possible complications include seizures, disability after stroke, swallowing problems, falls, and loss of independence. Emotional effects such as anxiety or depression may follow a hemorrhage and deserve treatment.

CAA-related inflammation can cause worsening brain swelling or neurologic symptoms if it is not recognized. Unlike ordinary CAA, it may improve substantially with appropriate immune-suppressing treatment.

Follow up

Routine follow-up may involve primary care and a neurologist with experience in stroke or cognitive disorders. Visits often include blood pressure review, medication reconciliation, questions about new neurologic episodes, and assessment of memory, walking, mood, and daily function.

Repeat brain imaging is not required on the same schedule for everyone. It may be considered after new symptoms, to monitor CAA-related inflammation, or when imaging results could affect a treatment decision. This includes decisions about anticoagulants or anti-amyloid treatment.

Contact a clinician promptly for new brief episodes of tingling, weakness, altered vision, speech difficulty, unusual headaches, seizures, or a meaningful decline in thinking or walking. Even if symptoms resolve, they may need timely assessment.

Seek emergency care for sudden weakness, facial drooping, trouble speaking, severe new headache, major vision loss, a first seizure, repeated seizures, loss of consciousness, or rapidly increasing confusion. These may indicate a stroke or another urgent brain condition.

Sources

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