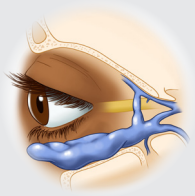
Carotid-Cavernous Fistula (CCF)

What is a Carotid-Cavernous Fistula?

A Carotid-Cavernous Fistula is an abnormal communication between the carotid artery (the arteries that run up your neck to your brain) and the cavernous sinus (complex collection of veins) located behind your eyes. Because the carotid arteries have a greater pressure of blood flow than veins, the rush of blood prevents the veins that serve the eyes from draining properly. If one of these arteries tears or develops a hole near the veins in the cavernous sinus area, a fistula (channel or shunt) develops. CCFs are a rare but potentially devastating cause of orbital symptoms, visual loss, and periocular disfigurement.

Direct CCF (High Flow): This type of fistula is often the result of trauma that causes the carotid artery to tear and develop symptoms rapidly.

Indirect CCF (Low Flow): This occurs when there is an irregular connection between the carotid artery and the cavernous sinus. This is usually associated with atherosclerosis (hardening of the arteries caused by plaque build-up), hypertension (high blood pressure) and collagen vascular disease (when the body's immune system attacks itself).



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Symptoms of a CCF

A CCF can increase the pressure in the cavernous sinus and affect nearby nerves that control eye movements and some sensations in parts of your head and face. The veins that drain from the eyes may also be impacted. Common symptoms include:

- Deteriorating and/or double vision
- Eye pain or pressure
- Conjunctivitis (pink eye) symptoms
- A red or bulging eye that may pulse
- Ringing in the ears
- Drooping eyelid

Treatment of a CCF: Early and efficient treatment is necessary for symptomatic, high-flow, direct CCFs in order to avoid substantial morbidity and mortality. Endovascular embolization, a minimally invasive treatment that blocks blood flow to the problem area is the treatment of choice for CCFs. In this procedure, a catheter (tube) is inserted through an incision in the femoral artery at the groin and passed through the fistula into the cavernous sinus and coils and/or embolic agents are placed in the cavernous sinus. The goal is to completely occlude the fistula while maintaining normal blood flow in the Internal Carotid Artery.

CCF Embolization

How a CCF May Affect the Brain

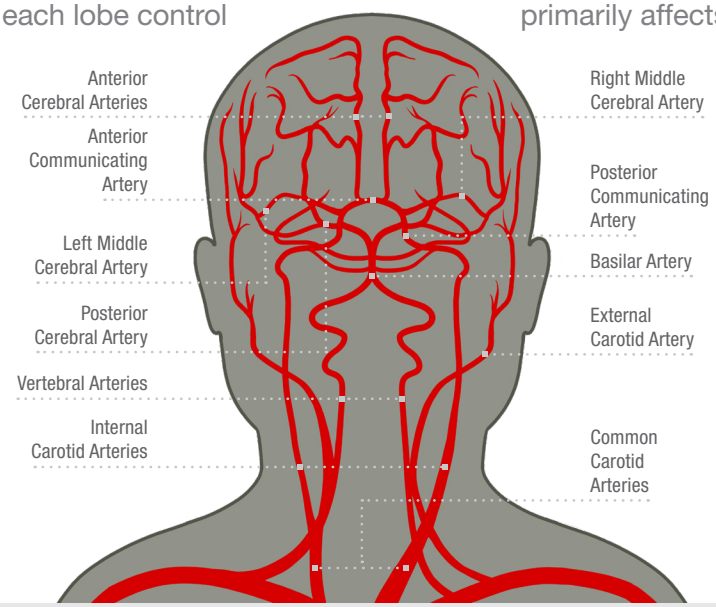
The brain is divided into two nearly identical halves called hemispheres (left and right), with each hemisphere consisting of four lobes (frontal, temporal, parietal, and occipital). Areas within each lobe control different mental and/or physical functions. Damage to the left side of the brain primarily affects the right side of the body, while damage on the right side of the brain primarily affects the left side of the body.

LEFT BRAIN FUNCTIONS

- Control of right side of the body
- Problem solving, knowledge, facts
- Numbers and letters
- Understanding words

EFFECTS OF CCF

- Weakness on right side of the body
- Problems seeing objects to the right
- Communication problems
- Slow, cautious behavior
- Memory loss
- Behavior changes



RIGHT BRAIN FUNCTIONS

- Control of left side of the body
- Creativity, imagination, intuition
- Shapes and symbols
- Recognizing emotions

EFFECTS OF CCF

- Weakness on left side of the body
- Problems seeing objects to the left
- Problems with depth perception
- Difficulty with concentration
- Impulsive behavior and poor judgment

Sources: NCBI and AHA.