



CEREBRAL ANEURYSM

A cerebral aneurysm, an abnormal dilation or ballooning of a brain artery, can be discovered in several ways. The abnormal dilated wall of aneurysms is weaker than the normal artery wall and aneurysm rupture is one of the more common and unfortunate presentations of cerebral aneurysms. When a cerebral aneurysm ruptures, it typically bleeds into the area surrounding the brain (subarachnoid space) to cause a subarachnoid haemorrhage (SAH).

CAUSE

Cerebral aneurysms were once thought to be a congenital (from birth) abnormality. While this may be true in some cases, studies have shown that aneurysms can be caused by a number of factors. Very often, aneurysms develop from a weakening in the structural layer of an artery which allows the growth of an aneurysm. High blood pressure (hypertension) and atherosclerosis (lipid build up in the artery wall) can promote aneurysm growth and rupture. Certain infections in the blood can cause a special kind of aneurysm called a mycotic aneurysm. Although we have an understanding of some of the factors which cause aneurysms, it is usually not possible to determine a single cause for a given patient's aneurysm.

About 20% of patients with cerebral aneurysms have more than one aneurysm. Patients with multiple aneurysms can have the other aneurysm(s) near or far from the original aneurysm, often at a similar location on the opposite side of the head ("mirror" aneurysm). The decision whether and when to treat multiple aneurysms are based on many factors and are individualized for each patient.

There has been several studies demonstrating that some cerebral aneurysms (perhaps 10%) can have a genetic component. Although the nature of hereditary aneurysms is not fully understood, several centres are actively studying this area. Cerebral aneurysm patients who have current or past relatives with known or suspected cerebral aneurysms are encouraged to contact us.

SIGNS AND SYMPTOMS

Unruptured aneurysms

These are most commonly discovered incidentally when a head CT or MRI scan, or cerebral angiogram is performed for some other reason. Other times unruptured cerebral aneurysms may be discovered when they cause neurological symptoms which depend on the location and size of the aneurysm.

These can include:

- Headaches
- Double vision
- Difficulty walking
- Seizures

Ruptured aneurysms (SAH)

There is a range of symptoms associated with a ruptured aneurysm. The classic presentation of a ruptured aneurysm is a sudden and severe explosive headache, usually the worst headache the patient has ever had.

There may also be:

- Nausea/vomiting
- Visual disturbance
- Neck stiffness, light and sound intolerance
- Loss of consciousness or confusion
- Seizures
- Coma or death.

Occasionally there is a large intracerebral haematoma associated with a SAH and this can cause stroke-like symptoms of weakness, numbness, paralysis and speech disturbance.

Subarachnoid haemorrhage can cause the development of vasospasm which is abnormal constriction of arteries in the brain usually occurring a week or two after surgery. Vasospasm can cause strokes or other neurological damage, often more severe than the original haemorrhage.

INVESTIGATIONS

A number of tests are performed in the diagnosis of a cerebral aneurysm and SAH:

- Blood tests - these do not diagnose a SAH but give important information pertaining to the subsequent treatment of a SAH.
- FBE and clotting profile prior to planning neurosurgical intervention
- Electrolytes including calcium and magnesium to monitor the fluid status
- ECG - this may demonstrate irregular heart beats, or early signs of ischaemia and is an important investigation prior to any neurosurgical intervention.
- Lumbar puncture – this is occasionally performed in suspected cases of a SAH when the CT head is negative for a SAH and will demonstrate blood in the CSF.
- Radiological tests:
 - CT head – this will demonstrate blood in the subarachnoid spaces. If the aneurysm is large and calcified it may identify a mass lesion.
 - CT angiogram – this may be performed at the same time of a CT head to give high resolution pictures of the blood vessels and provide a diagnostic tool for aneurysms
 - MRI/MRA – this may occasionally be performed to demonstrate flow in the cerebral blood circulation and diagnose aneurysms. With the progression of CT angiogram technology this is becoming less commonly used.
 - Digital subtraction angiogram (DSA) – this is the gold standard currently in diagnosis of cerebral aneurysms. It gives good definition of the entire cerebral blood vessels and allows treatment by intravascular techniques (ie coiling, glueing) if suitable.

Occasionally a multiple DSAs are needed in the presence of a SAH to fully demonstrate the aneurysm, or to diagnose and treat developing vasospasm.

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