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Left Atrial Appendage Occlusion (LAAO)

This publication provides information about left atrial appendage occlusion (LAAO); a treatment designed to lower the risk of stroke in some patients with atrial fibrillation (AF).

What is the risk of stroke in patients with atrial fibrillation?

Atrial fibrillation (AF) is a very common heart rhythm disorder which is present when the heart's two upper chambers, the left and right atria, beat in a fast and irregular manner.

AF is present in approximately 2.5% of the adult population overall, although AF is highly prevalent with a lifetime risk of about 1 in 3-5 people over the age of 45 years. AF is more common if other forms of heart and vascular disease are present (e.g. hypertension, coronary artery disease, heart valve disease, and heart failure).

Some patients may find that AF causes uncomfortable symptoms such as palpitations or shortness of breath, but some patients have no symptoms at all.

As a rule, people with untreated AF will have a five times greater risk of stroke and two fold greater risk of dying, as compared to similar people without AF.

How can atrial fibrillation cause a stroke?

A history of AF is associated with stroke, particularly in patients with other risk factors. Stroke can be caused by clots forming in the left atrial appendage (LAA).

If a blood clot is pumped out of the heart to the brain, it could block the flow of blood in small vessels and cause a stroke (see Figure 1).

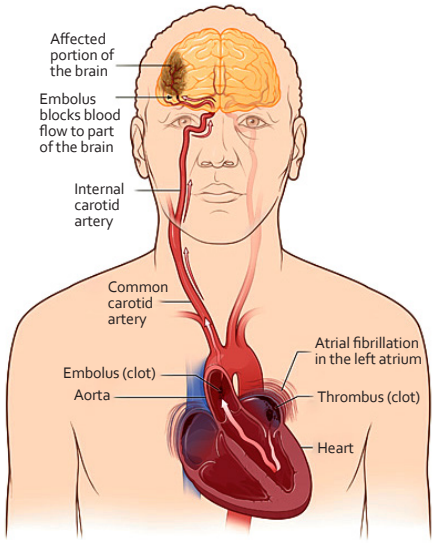

Figure 1. Stroke caused by atrial fibrillation

What is the most common treatment for preventing AF-related stroke?

The risk of an AF-related stroke in a patient depends on a number of factors, including age, a history of high blood pressure, heart failure, diabetes, and previous stroke or mini-stroke. Based on these factors, the doctor will be able to assess an individual's risk of stroke, and recommend an anticoagulant (sometimes referred to as a blood thinner) to reduce the blood's ability to clot. The antiplatelet medication aspirin is significantly less effective than anticoagulants for patients with AF who are at an increased risk of stroke, and for this reason it is no longer recommended by NICE for AF-related stroke prevention.

What is the left atrial appendage (LAA)?

The LAA is a muscular pouch connected to the left atrium of the heart. A review of studies has shown that in the majority of patients with AF almost all clots form within the appendage.

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The LAA contributes to the heart's pumping action during the normal rhythm and produces a hormone that helps control the fluid content of the body, but it loses these functions during AF. The LAA is sometimes removed during heart surgery without causing any problems.

What is left atrial appendage occlusion (LAAO)?

Unfortunately, some patients at high risk of stroke are either unable or unwilling to take anticoagulants because of associated risks, or side effects.

Another approach for patients with AF at high risk of stroke is to close off the appendage with a medical closure device (see Figure 2).

The device is designed to close the left atrial appendage (which is known to be the main source of blood clots in patients with AF), preventing clots from forming in the LAA, or breaking free from it and travelling to the brain.

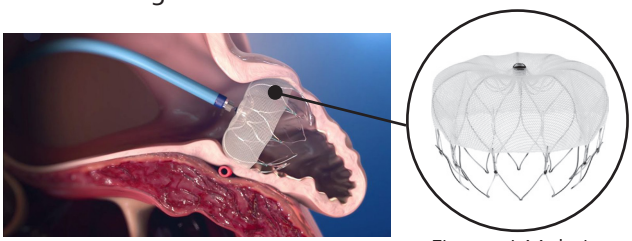


Figure 2. LAA device

How is the LAAO procedure carried out?

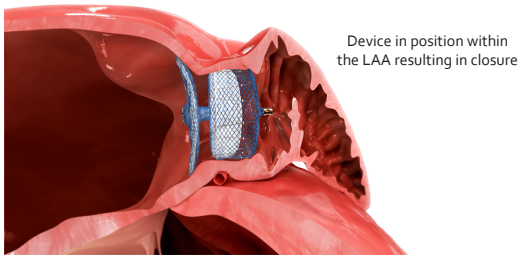
LAAO is carried out in a cardiac catheterisation laboratory, or in an electrophysiology laboratory, specially equipped cardiology rooms where patients with heart rhythm disorders are examined and treated. The procedure lasts about 45-90 minutes.

The procedure is often done under general anaesthesia (but may also be done under sedation in some instances).

During the procedure, a cardiac ultrasound (or echo) examination is undertaken (to get clear pictures of the heart) by placing an echo probe in the oesophagus.

A small cut (or incision) is made in the groin and through this opening a small plastic tube (catheter) is inserted into a vein in the leg. This catheter contains the compressed umbrella shaped or champagne cork like device which is used to close the opening of the LAA (see Figure 3).

Using X-rays and ultrasound images, the catheter is guided into the heart. The device is passed through the catheter and into position within the LAA. As the compressed device is pushed from the end of the catheter tip it expands, thereby blocking the mouth of the LAA.



Device in position within the LAA resulting in closure

Figure 3. Position of the LAA device

The patient may need to return to their doctor for periodic follow-up visits over the next year. The doctor will also advise the patient when normal daily activities can be resumed. Typically all strenuous activity should be avoided for one week following the procedure. If the patient experiences shortness of breath or chest pain, they should seek medical help immediately.

What happens after the procedure?

Recovery following the procedure will take about 24 hours. After recovery from anaesthesia and with adequate bed rest the patient should be able to sit up and walk around. Before leaving the hospital, tests such as an echocardiogram (ultrasound scan of the heart) may be performed to make sure the device is still positioned correctly. As the procedure is minimally invasive, the recovery process is likely to be quick and easy. There may be a bandage used in the groin where the sheath was inserted. The patient may also have a sore throat due to the use of the imaging probe (trans-oesophageal echo).

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What medication will the patient need to take?

Before leaving the hospital, the doctor will provide advice on medication. The doctor may prescribe warfarin or a direct oral anticoagulant for some time before and after the procedure. Once the warfarin is discontinued, the patient may be required to take clopidogrel or an equivalent antiplatelet medicine ,with or without aspirin. In some centres, oral anticoagulants are not used. The decision of how long the patient should take this medication is at the discretion of the doctor. During this time, the body will form a new layer of natural tissue over the device, sealing it into place.

What are the benefits of LAAO?

The main benefit of this procedure is that it potentially eliminates the need to take long-term anticoagulants.

During this time the body will form a new layer of natural tissue over the device, sealing it into place.

What evidence is there to support this procedure?

Several LAAO devices are approved and available today.

Strong clinical evidence has been published on the Watchman and Amulet devices showing that Watchman LAAO is at least as good as warfarin in terms of reducing stroke risk. Recent long term data on this device even support an improved efficacy compared to warfarin at four and five years. Results from major trials comparing the value of these devices to direct oral anticoagulants are expected soon. A range of other devices are now being carefully studied and some are available for clinical use.

The doctor may also take into account a patient's LAA anatomy to choose the most suitable device.

Are there any risks associated with the procedure?

No medical procedure is entirely without risk. It is important to remember that a doctor will not recommend this procedure if he/she did not believe the potential risks were outweighed by the likely benefits to the patient's health.

Most of the complications are rare but some are serious. The doctor will discuss the risks with the patient.

The most common complications from this procedure include, but are not limited to:

- Bleeding or bruising in the area of the groin where the catheter was inserted
- Device malposition or embolisation
- Bleeding around the heart
- Clotting on the device
- Infection
- Oesophageal damage

All complication are very uncommon and stroke may rarely occur.

Are some patients not suitable for LAAO?

Individuals with blood clots in their heart (intracardiac thrombus) are not usually eligible to have the LAAO procedure.

If a patient has an active infection producing bacteria in the blood they may receive the device only after the infection is gone.

Other specific contraindication will be explained by the doctor.

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