

Popliteal Artery Aneurysm Stenting

What is this operation?

A Popliteal artery aneurysm (PAA) refers to an abnormal dilatation of the artery behind the knee that conveys blood from the leg to the foot. Stent insertion into this artery involves the placement of a covered metal scaffold (stent-graft) into the aneurysm that seals above and below the abnormally dilated portion thereby preventing blood from entering into the aneurysm. (See figures 1 & 2) This is done remote to the aneurysm typically through the groin artery. A good analogy is the relining of a leaking water pipe in one's driveway by extruding a new pipe into the old pipe from within via a manhole cover away from the leakage.

Why is this operation being offered?

This operation is being offered to prevent complications associated with popliteal artery aneurysms (see popliteal artery aneurysm). There are two main techniques for repairing popliteal artery aneurysms: open surgery in the form of a bypass and endovascular stent-graft insertion. The most widely utilised technique is open surgery treatment which aims to exclude the aneurysm from the circulation by ligating (tying off) the artery above and below the aneurysm whilst re-routing the blood flow around the aneurysm with a leg bypass.

For some clients, in who open surgery poses a higher risk than normal or for personal preference, we offer a minimally invasive endovascular repair which involves placing a stent-graft through the PAA thereby excluding it from the circulation. Only certain shapes and sizes of PAAs are suitable for endovascular repair and being a relatively new technique there is little long-term data relating to the long-term durability of stent-graft insertion.

At the circulation clinic we offer all our clients the choice between the different treatment options outlining thoroughly the risks and benefits of each option.

What happens before your operation?

Before you undergo a popliteal artery aneurysm stenting procedure (sPAA) a number of essential investigations and assessments are performed to assess the suitability of your popliteal artery anatomy for stent insertion as your overall fitness.

These may include:

- Blood tests
- CT angiography
- Duplex Doppler ultrasound examination of the leg arteries
- ECG

Once the decision has been made to proceed to sPAA an admission date will be agreed between yourself and your surgeon. A pre-admission visit may be required to complete paperwork and undertake blood tests or other allied tests required prior to undergoing a general anaesthetic. Please bring all your medications to your pre-admission review.

What happens on the day of admission?

You will usually be admitted the morning of surgery and your surgeon will visit you and ask you to sign a consent form for your operation. Depending on the technique being used (see below) you may also be visited by your anaesthetist. The side of the operation will be marked with indelible pen: please do not wash this off prior to the operation

Please do not stop any of your normal medications unless specifically instructed to by your surgeon

If you smoke, we strongly encourage you to stop as soon as possible to reduce the risk of peri-operative complications.

What do I need to bring when I come into hospital?

You should bring the following items with you at the time of admission:

- All your normal medication
- Nightwear & slippers
- Toiletries
- A set of comfortable clothes for discharge
- A good book

What happens during the operation?

Popliteal artery aneurysm stent insertion can be performed under local anaesthetic or general anaesthetic. Whilst this is often indicated by a client's personal preference in our experience clients prefer and find it more comfortable to undergo the procedure under general anaesthesia. Furthermore; for some clients the vessel through which access to the popliteal artery is gained may not be appropriate for local anaesthetic access e.g. is very heavily calcified, and it would be safer to expose the artery with an open surgical technique under general anaesthesia. Your surgeon will discuss this with each client in more detail prior to the operation.

Once the remote artery has been accessed a wire is inserted into the artery and progressed towards the popliteal artery aneurysm. This wire is then manipulated past the aneurysm into normal artery beyond. Using this wire as a guide the stent-graft is passed into the aneurysm such that it covers the aneurysm whilst sealing in normal artery above and below; the stent-graft is then deployed. A completion angiogram is then performed to confirm exclusion of the aneurysm from the circulation. Occasionally more than one stent-graft is required to adequately exclude the aneurysm. (See figures 1 & 2)

Any wounds required for remote artery access are repaired in layers with stitches. Where the stenting procedure has been performed entirely as a percutaneous procedure i.e. no surgical incision, a closure device will be used to repair the artery access site.

What are the risks?

The advantages of sPAA compared to open surgical repair are clear: it is less invasive, associated with fewer major complications and a shorter hospital stay than open surgical repair, whilst simultaneously achieving comparable outcomes in the immediate post-operative period (<6 months). However, there remains concern that due to the continued flexion and extension of the stent with knee joint movement long-term outcomes, in particular stent patency rates, are inferior to those following open surgical repair. However, a recent multi-institutional analysis suggests the overall outcome for sPAA is comparable to open surgical repair, but that a greater number of re-interventions are required to achieve this juxtaposition.

Complications of sPAA can broadly be categorised according to when they occur (during the hospital admission (early) or following discharge (late)). Some possible complications of leg bypass surgery include but are not limited to:

- Early
 - Local or stent related:
 - Wound complications:



- Infection
- Collection
- Bleeding
- Arterial Thrombotic (clot) complications
- Stent-graft occlusion requiring re-intervention
- Embolisation (clot going into arteries beyond the artery treated) requiring re-intervention
- Blood clot in leg veins (deep vein thrombosis)
- Limb loss (very rare)
- Systemic (<5%)
 - Heart related
 - Heart attack
 - Irregular heart rhythm
 - Lung related
 - Pneumonia
 - Fluid on the lungs
 - Clot on the lung (pulmonary embolus)
 - Kidney related
 - Kidney failure that may require temporary dialysis
- Late complications (After discharge)
 - Leg swelling
 - The majority of clients will have some degree of leg swelling following surgery. This rarely causes significant morbidity.
 - Stent-related
 - Stent-graft blockage: ~20% of sPAA will block after 3 years of the index operation
 - Stent-graft fracture requiring re-intervention
 - Continued perfusion of the popliteal artery aneurysm (endoleak) requiring re-intervention

All these potential complications are understandably concerning to our clients, but rest assured the vast majority of our clients suffer no major morbidity or mortality. When complications do occur, we pride ourselves in dealing with them rapidly and appropriately.

What happens after the operation?

The majority of clients remain in hospital for <3 days in total. During this period of convalescence, you will begin to mobilise the same day as surgery and by the time of discharge you will be able to walk independently and perform your daily ablutions unaided. Sometimes, clients require further rehabilitation and will remain in hospital for longer to regain strength, particularly if they have undergone a general anaesthetic or a complex stenting procedure.

You will be discharged on both aspirin and clopidogrel drug therapy to reduce the risk of stent clot formation; you should continue on these two drugs for three months. Thereafter you will be asked to continue clopidogrel lifelong unless otherwise advised by your surgeon.

We advise you to not bend your knee beyond 90 degrees for longer than 5 minutes and to avoid it wherever possible as this puts considerable pressure on the stent-graft.

What happens when I go home?

Although at the time of discharge we ensure you are safe to go home we ask that there is a responsible adult with you for the first few days following discharge.

You will be able to have a shower at 48 hours post-surgery, but we ask you to refrain from bathing until any wounds are fully dry.

For the first few weeks post-surgery there may be discomfort, leg swelling and leakage from any wounds.

The majority of clients are able to return to work within 2 weeks of discharge, but this does depend on the nature of your employment and how well you recuperate from your surgery. If in any doubt, please wait until you have been reviewed in clinic by your surgeon.

When Will I be able to drive?

You are able to drive when you are able to perform an emergency stop and are able to concentrate fully on driving. Overall we advise you to not drive a car for the first 2 weeks post-surgery or until you have pain free movement of leg and are able to stamp your foot on the ground. Different rules apply for different 'Group' license holders and we recommend contacting the DVLA and your car insurance company for further advice.

Will I need to see the surgeon again?

We review all clients following sPAA in clinic approximately 6 weeks following surgery.

All sPAA will require yearly surveillance with a duplex Doppler ultrasound scan after the first year and more regularly during the first-year post-surgery.



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