Popliteal Artery Entrapment Surgery

What is this operation?

Popliteal artery entrapment (PAE) release involves open surgery to: a) re-establish normal musculature anatomy behind the knee, and b) repair any chronic damage to the popliteal artery that has resulted from abnormal muscle insertions.

Why is this operation being offered?

This operation will be offered to our clients in who popliteal artery entrapment syndrome has been identified as the underlying cause for their presenting symptomatology.

What happens before your operation?

Before you undergo PAE release a number of investigations and assessments will have been performed to confirm the diagnosis. Once the decision has been taken to proceed towards corrective surgery further investigations may be required to assess your overall fitness to undergo open surgery, as well as to identify a suitable leg/arm vein for use in the reconstruction of the popliteal artery. These may include:

- Blood tests
- ECG
- Duplex Doppler ultrasound assessment of the proposed vein graft.

Once the decision has been made to proceed to surgery 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 day of surgery and your surgeon will visit you and ask you to sign a consent form for your operation. You will also be visited by your anaesthetist. Any planned vein graft will be pre-operatively marked with indelible pen under ultrasound guidance: 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 you normal medication
- Nightwear & slippers
- Toiletries
- A set of comfortable clothes for discharge: these should include a pair of shorts as your surgeon may elect to place your leg in plaster to facilitate recuperation.
- A good book

What happens during the operation?

The first part of your operation involves giving you an anaesthetic. Popliteal artery entrapment release surgery is performed under general anaesthesia (with you asleep).

Once you have been anaesthetised the anaesthetist may wish to insert a small tube into an artery in your wrist to enable accurate measurement of your blood pressure during your operation; this will have been discussed during your meeting with your anaesthetist pre-operatively. Once the necessary monitoring equipment has been connected you will be positioned on your front (prone) onto the operating table and your surgery will commence

To access your popliteal fossa (concave area behind your knee) the surgeon places a 10-15cm ‘lazy-S’ vertical incision behind the knee crossing the knee crease. The incision is then deepened into the popliteal fossa to identify the muscles, arteries, veins and nerves that make up this anatomical fossa. The course of the medial head of the gastrocenemius muscle is followed and resected from its abnormal origin. Where there is a significant portion (>50%) of the muscle the muscle origin is reconstructed by suturing it to the medial femoral condyle (thigh bone). The artery is then examined to assess for narrowing; if your surgeon suspects there is an intrinsic

popliteal artery narrowing they will reconstruct the artery either with a short vein bypass or with a vein patch to widen the diseased segment. Which of these options is used depends on the extent of disease affecting the popliteal artery. The pre-marked vein is used for both of these treatments. Once the muscle anatomy has been reconstructed and there is restoration of flow through the popliteal artery or bypass the popliteal entrapment reconstruction is complete.

The wound is repaired in layers with stitches and a drain may be inserted to drain excess fluid that can accumulate in the immediate (24-48hrs) post-operative period. If the medial head of the gastrocnemius has been reattached to the femoral condyle your surgeon may elect to place you in a plaster back slab for 6 weeks to protect the muscle as it heals in its new position.

What are the risks?

The majority of patients undergoing popliteal artery entrapment related surgery are young adults and thus the risk from serious complication (heart, lung or kidney damage) is extremely low. However, all surgery performed under a general anaesthesia is associated with an element of risk no matter how fit and active the individual is.

Complications following PAE surgery tend to be related to the effects of operating within the popliteal fossa. The popliteal fossa is a confined space behind the knee through which not only does the popliteal artery and vein traverse but also the nerves to the lower leg. Nerves are very susceptible to inadvertent damage or bruising through their mobilisation leading to leg weakness or/and numbness. Recovery may be prolonged as nerves heal at a much slower pace to other tissues. Very rarely nerve damage is permanent and can result in a foot drop requiring the individual to wear a supportive foot splint.

Possible local complications of PAE surgery include;

- Early complications:
  - Local
    - Wound related (rare)
      - Bleeding
      - Infection
      - Wound breakdown
      - Fluid collection
    - Injury to surrounding structures
      - Nerve damage causing numbness, pain or weakness in the leg.
        - Foot drop is a very rare complication

        - Sural nerve dysfunction following this surgery is relatively common and most often noticed by the individual as either pins and needles or numbness around the outer ankle region immediately following the surgery. This is caused by the mobilisation of this small nerve to gain access to underlying structures and will often fully resolve with time.
        - Lymphatic leak causing leakage from the wound, collection or leg swelling. (rare)
    - Graft complications (rare):
        - Bleeding or blockage requiring re-operation.
        - Graft infection (rare)
    - Blood clot in leg (deep vein thrombosis) (rare)
    - Limb loss (very rare)

- Systemic
    - Systemic complications are rare as the majority of our clients with a popliteal entrapment are young adults.

- Late complications

    - Graft narrowing (stenosis) requiring re-intervention:
        - Because the graft is relatively short compared to other leg bypass grafts re-intervention rates for vein graft narrowing are relatively infrequent.
    - Graft blockage
        - Graft occlusion rarely occurs as these short grafts undergo structural changes (arterialisation)such that they have the appearance of a normal artery after 6 months of construction.
    - Leg swelling
        - The majority of clients will have some degree of leg swelling following leg bypass surgery. This rarely causes significant morbidity.
    - Chronic pain
        - Rarely clients may suffer with pain at the site of their healed incisions which requires ongoing pain relief treatment.
    - Scarring
        - Because the incision crosses a joint line the width of scar may be more pronounced than in other non-joint related surgery.
        - Patients with dark skin are more prone to exaggerated healing (hypertrophic) and larger scars (keloid).

The vast majority of patients undergoing PAE surgery do not suffer any significant complications.

What happens after the operation?

The majority of clients remain in hospital for 2-3 days. During this period of convalescence, you will initially be able to mobilise such that by the time of discharge you are able to walk independently and perform your daily ablutions unaided. Clients who have been placed in a plaster will require the usage of crutches for 6 weeks post-surgery. Throughout this period of recuperation there will be discomfort at the site of the operation which we treat with pain medication.

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 the wounds are fully dry.

For the first few weeks post-surgery there is often muscle discomfort, leg swelling and wound leakage.

The majority of clients are able to return to work within 4 weeks of discharge, but this does depend on the nature of your employment, the type of reconstruction you have had and how well you recuperate from your surgery. If in any doubt please wait until you have been reviewed in clinic by your surgeon.

Clients who have had a formal reconstruction of their medial head of gastrocnemius will require physiotherapy upon removal of their plaster. This is aimed at gradually strengthening your newly positioned muscle and returning you to full fitness.

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 4 weeks post-surgery or until you have pain free movement of your foot and knee, 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?

You will be reviewed in clinic approximately 6 weeks following discharge.

All clients who have undergone a bypass as part of their surgery are entered into a graft surveillance programme to help prevent graft failure through early identification of graft or native artery narrowing.