1. INDICATIONS FOR PRACTICE

Femoral artery sheath insertion is needed to perform diagnostic and interventional cardiac catheterisation. The radial artery approach is the preferred site for catheterisation, although a femoral or brachial artery approach may also be used.

2. AUTHORISED PERSONNEL/TRAINING REQUIRED

- Femoral artery puncture is performed in the Cardiac Catheter Labs by trained cardiology specialist registrars and consultants.
- Arterial sheath removal is undertaken by trained cardiology specialist registrars, consultants and registered nurses who have completed their cardiology core competency pack.

3. PROCEDURE

**FEMORAL ARTERY SHEATH REMOVAL**

- **Angioseal™** VIP (St Jude Medical) vascular closure device.
  - Is generally used to achieve haemostasis. (Femoral angiogram might be needed to assess the positioning of the sheath).
  - Angioseal creates a mechanical seal by sandwiching the arteriotomy between a bioabsorbable anchor and collagen sponge, which dissolve within 60 to 90 days.
  - Post procedure, recovery time is 2 hours bed rest sitting up 45⁰.

- **Manual pressure** is used if Angioseal is not appropriate.
  - Before femoral artery sheath removal using manual pressure, ensure additional nursing staff and femstop are available.
  - If heparin is used during the procedure, activated clotting times (ACT) should be lower than 150 seconds. If bivalirudin used, sheath can be removed 2 hours after infusion is completed unless the operator has requested individual patient instructions.
  - Assess femoral site for presence of haematoma or bleeding, assess pedal pulses, colour and temperature.
TITLE: FEMORAL ARTERY PUNCTURE MANAGEMENT

- Obtain vital signs. Elevated blood pressure can make applying pressure on femoral artery more difficult.
- Position the patient flat with hips straight, may slightly laterally rotate the leg for ease of access to the arterial site.
- Perform hand wash, wear gloves and protective equipment.
- Explain procedure to the patient (see patient information).
- Place index finger approximately 2cm proximal and slightly medial to the skin puncture site on the arterial pulse. This should allow compression of the arterial puncture site. The middle and ring fingers will compress the artery proximal (upstream) to the arterial puncture site. Continue to apply manual pressure proximal (upstream) to the skin insertion site (over the arterial pulse) for at least 10 minutes or until haemostasis is achieved.
- If arterial and venous sheath in situ, they should be removed separately to minimize the risk of arterial-venous fistula formation.
- Bed rest for 1 hour flat with affected leg straight and 2 hours sitting up 45°.
- Inform patient of activity restrictions. (See patient information).

OBSERVATIONS:

- Blood pressure, heart rate, respiratory rate, oxygen saturations should be completed and documented ½ hourly for 2 hours then hourly for 2 hours.
- Assess and document pedal pulse and colour, warmth, movement and sensation of affected leg and foot ½ hourly for two hours and then hourly for two hours.
- Observe puncture site for bleeding, haematoma, pain, tenderness (see complications).

Femstop is used when angioseal and manual pressure fail.

- Follow the steps and position the patient as per manual pressure.
- Place belt under and around the patient’s hips pulled up equally on both sides and directly in line with the puncture sites.
- Open the Femstop package maintaining sterility of the dome until placed on the patient. Insert belt through the arch beginning on the opposite side of the puncture site. Press the lever and insert the belt through the arch leaving the belt slightly loose.
- Note the small circle in the centre of the dome. Place the circle approximately 2cm superior and slightly medial to the skin puncture site after removing the plastic cap. Thread other side of the belt through the holder.
- Tighten both sides of the belt, making sure both sides of the belt are even so that when the device is inflated, the arch sits squarely and does not tilt. The belt should hold dome securely but should not exert any pressure on the groin until the dome is inflated.
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- Attach pump to inflatable dome.
- Making sure the position of the dome is correct, increase the pressure to 10-20 mmHg above the patient’s blood pressure. Maintain this pressure for about 3 minutes.
- After 3 minutes reduce the pressure down until pedal pulse is palpable to obtain optimum compression pressure (approximately a value between systolic and diastolic blood pressure). Maintain this pressure for about 15 minutes.
- Then gradually reduce about 20-30 mmHg of pressure every 2-3 minutes until removal.
- Check puncture site for hematoma or bleeding, BP and pedal pulses throughout the procedure.
- Femstop can remain at a low pressure (30 mmHg) if necessary in case of bleeding or GP IIb/IIIa inhibitor medication is used.
- Bed rest flat with the affected leg straight during femstop. After device removal keep bed rest for one hour and then two hours sitting up 45°.

INFORMATION FOR PATIENT

- the patient should be instructed to:
  ✓ keep leg straight and head down on the pillow – 1 hour post arterial haemostasis and two hours bed rest sitting up 45°.
  ✓ report ooze, swelling, redness or discomfort
  ✓ keep the site clean and dry for one week (no bath only quick shower)
  ✓ no heavy lifting, pushing, pulling for one week (no hard gardening, vacuum cleaning, playing golf etc.)
  ✓ no driving for 48 hours

(A patient information leaflet (discharge plan following coronary angiogram or balloon angioplasty and coronary artery stenting) should be given to the patient containing the above information.

- Following discharge, if bleeding or haematoma occurs, the patient should be advised to lie down flat, apply manual pressure at puncture site and call for help. In case of uncontrolled arterial bleeding dial 999.

- **Angioseal** - patient is:
  ✓ given Angioseal card
  ✓ informed about keeping this card with him/her at all times during period of 90 days while collagen is going to be completely absorbed
  ✓ informed about possibility to feel small (pea size) lump in puncture site
DOCUMENTATION

- Ensure nursing and medical notes are available, especially:
  - Check in list, Care plan, Observation chart, Drug chart

- Ensure on Care Plan is documented:
  - Complications in puncture site prior to sheath removal
  - Contraindications for sheath removal (for example amount of anticoagulation administered) and follow up plan
  - The time of sheath removal and name of professional removing the sheath
  - Technique used to achieve haemostasis and timing
  - Complications post sheath removal and their management
  - Time haemostasis was achieved
  - Plan regarding mobilisation of patient;

- If Angioseal is used, ensure information card is given to the patient

4. FURTHER INFORMATION/EXCEPTIONS

COMPLICATIONS

Vasovagal reaction

- Pressure on a large artery and pain can stimulate the vagus nerve
- Early signs include pallor, nausea and/or yawning, slowing of the heart rate before blood pressure drops.
- IV atropine and IV fluids should be administered as ordered
Bleeding

- Superficial bleeding from soft tissue may appear as slight ooze. To determine whether it is arterial or superficial, briefly occlude the femoral artery with manual pressure. If it is superficial, the ooze will not stop. Apply manual pressure, pressure bag or femostop on maintenance pressure if bleeding persistent.
- A Retroperitoneal bleed manifest as severe back pain, hypotension and bruising around the puncture site. Needs to be reported immediately.
- Arterial bleeding – apply manual pressure as per arterial sheath removal protocol, call for help.

Haematoma

- Is a result of bleeding in the soft tissue surrounding the vessel puncture site
- Feels firm and have defined boundaries, there may also be swelling and localised pain.
- If unsure whether a haematoma is present, the puncture site should be compared with the other side.
- Can cause obstruction of blood flow and femoral nerve could be compressed (deficits in movement & sensation)
- Potential to develop into Pseudoaneurysm (false aneurysm) - is a result of blood leaking from the artery into the surrounding tissue with persistent communication between the originating artery and the terminating blood filled cavity. A pseudoaneurysm can be detected by physical examination and palpation of a pulsatile femoral mass, as well ultrasound. The patient may report back pain and moderate localised tenderness.
- Management of haematoma: apply manual pressure immediately (see appropriate sheath removal) to stop haematoma developing further, call for help. If possible excavate haematoma by manually pressing it out. Monitor blood pressure every 5 to 15 minutes until haemostasis achieved.

Ischaemic Limb / Arterial Occlusion

- Caused by clot forming in the femoral arterial system.
- Diminished pulses, coolness or pallor as well as changes in sensation.
- Any changes in neurovascular observations should be reported to the cardiology team and requires immediate intervention.

Infection

- May develop in the days following sheath removal.
TITLE: FEMORAL ARTERY PUNCTURE MANAGEMENT

- Signs of redness, warmth, discomfort or drainage from or around the puncture site should be reported.