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| Clinical Standard Operating Procedure (SOP) **LOWER LIMB ARTERIAL DUPLEX** | |
| **SETTING** | Trustwide |
| **FOR STAFF** | All clinical vascular scientists |
| **PATIENTS** | All patients referred for a lower limb arterial duplex |
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| **STANDARD OPERATING PROCEDURE** | |

1. Read the patient referral and check any relevant sources that could aid in the investigation (e.g. VSU database, CDS, ICE open net, PACS or NBT radiology).
2. Ensure the room is ready for the assessment, the appropriate equipment is in the room and the patient’s details have appeared on the worklist.
3. Collect the patient from the waiting area, introduce yourself and confirm patient identifiers against the referral and machine worklist
4. Explain the test and the purpose of the patient visit.
5. Gain patient consent.
6. Ask the patient to describe their symptoms (characteristics, onset and duration) and take a clinical history and relevant risk factors (smoking, diabetes, hypertension, angina, previous MI). Ask the patient if they have had any previous intervention
7. Unless specifically stated the aorta, iliac, femoral, popliteal and crural vessels should all be scanned
8. Ask the patient to remove shoes and trousers. Position the patient in a supine position on the bed and cover them over with a sheet or towel.

**Iliac Arteries**

1. Select the LEA pre-set for the curvilinear probe.
2. Using B mode, colour Doppler and spectral Doppler assess the aorta, common iliac artery (CIA), internal iliac artery (IIA) (origin) and external iliac artery (EIA) for presence of disease (atheroma, calcification, stenosis, occlusion, aneurysm, dissection).
3. Sample the velocity and waveform of the aorta, CIA, IIA and EIA.
4. If a stenosis is seen then take appropriate PSV measurements to enable grading of the stenosis (PSVR) :
   1. a pre-stenosis measurement
   2. a point of maximum velocity measurement
5. Measure the AP diameter of the abdominal aorta (inner-to-inner).
6. If an aneurysm is seen measure the AP diameter of the artery in TS and LS (inner-to-inner).
7. Save representative images of the aorta, EIA, IIA and CIA.

**Femoral- TPT arteries**

1. Select the LEA pre-set for the linear probe.
2. Using B mode, colour Doppler and spectral Doppler assess the common femoral artery (CFA), profunda femoris artery origin (PFA) superficial femoral artery (SFA), popliteal artery (POPA) and tibial peroneal trunk (TPT) for the presence of disease (atheroma, calcification, stenosis, occlusion, aneurysm, dissection).
3. Sample the velocity and waveform of the CFA, SFA, PFA origin and POPA. Sample the SFA at least every 5cm. Sample the above knee, knee level and below knee POPA.
4. If a stenosis is seen then take appropriate PSV measurements to enable grading of the stenosis (PSVR) (see appendix 1):
   1. a pre-stenosis measurement
   2. a point of maximum velocity measurement
5. If an aneurysm is seen measure the AP diameter of the artery in TS and LS (inner-to-inner).
6. Save representative images of the CFA, PFA origin, SFA and POPA.

**Calf Vessels**

1. The calf scan can be carried out with the patient in a number of different positions depending on preference.

Option 1: Patient remains lying on the bed with the knee bent upwards at 90 degrees

Option 2: Patient sits on the edge of the bed with their legs dependent

Option 3: Patient remains lying on the bed with the hip externally rotated

Option 4: Patient lies on their front to scan the PTA and PerA.

1. Using B mode, colour Doppler and spectral Doppler assess the posterior tibial atery (PTA), peroneal artery (PA) and anterior tibial artery (ATA) for the presence of disease (atheroma, calcification, stenosis, occlusion)
2. Describe each of the vessels appearance and sample the velocity and waveform in the distal and proximal section of the vessels.
3. If a stenosis is seen then take appropriate PSV measurements to enable grading of the stenosis (PSVR)
4. Save representative images of the PTA, PA and ATA.

**Reporting**

1. Complete a lower limb arteria schematic; write report on CRIS and Vascular Science Database. Add the schematic to the CRIS report, transfer folder and patient folder. Inform clinician that scan has been completed and where to find the report.
2. Any poor views, limitations or incidental findings should be clearly stated in the report.

**Additional Information**

Lower Limb Arterial Clinical protocol

Vascular Science generic protocol

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| **Table A** | |
| **REFERENCES** |  |
| **RELATED DOCUMENTS AND PAGES** | Lower Limb Arterial Clinical protocol  Vascular Science generic protocol |
| **AUTHORISING BODY** | Vascular Science |
| **SAFETY** | If there are unusual or unexpected safety concerns (to staff or patients) which you would wish to draw users’ attention to, add them here. |
| **QUERIES AND CONTACT** | Vascular Science Unit  A225  Bristol Royal Infirmary  Upper Maudlin Street  Bristol, BS2 8HW  Tel: 0117 342 7530  Email: VSU@UHBristol.nhs.uk |

**Appendix 1: Grading criteria**

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|  | Degree of stenosis | Peak systolic velocity ratio (PSVR) |
| Minimal-Mild | <50% | <2:1 |
| Mild-Moderate | ~50 | 2:1 |
| Moderate | 50%-75% | >2 but <4 |
| Severe | >75% | >4:1 ratio |
| Trickle flow | Sub-occlusion | Very low flow Pre-occlusive vessel |
| Occluded | Occluded | No Doppler signal, Colour or Power Doppler |