**Reporting Protocols**

Change History:

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| --- | --- | --- | --- |
| Version Number | Reason for Change | CRN | Effective Date |
| 01 | New issue | n/a | 06/03/2011 |
| 02 | Annual review | n/a | 06/03/2012 |
| 03 | Change layout | 51 | 06/03/2013 |
| 04 | Popliteal aneurysm addition | 100 | 13/01/2014 |
| 05 | Overhaul | 104 | 26/02/2014 |
| 06 | Carotid/ABPI/Venous section addition | 108 | 25/07/2014 |
| 07 | Toe pressures addition | 119 | 19/03/2015 |
| 08 | Carotid Units/Subclavian signal | 123 | 10/04/2015 |
| 09 | Lower limb arterial stenosis grading update | 226 | 27/02/2018 |
| 10 | AAA ML measurement update | 237 | 20/07/2018 |
| 11 | Units amendment | 243 | 11/02/2019 |

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| Prepared By | Date | Approved by | Date |
| R.Pole | 06/03/2011 | IVS Board | 06/03/2011 |

**Reporting Protocols.**

1.**Carotid & subclavian duplex**

* 1. Internal plaque morphology and percentage stenosis should always be included in the comments even if normal
  2. Disease in any other arteries (except externals) 50% or greater should be included in the comments
  3. If the internal has a greater than or equal to 60% stenosis the length of disease into the internal should be measured and included in the report.
  4. Except at Wythenshawe, when the internal is greater than 60% stenosis the location of the bifurcation should be measured from the medial head of the clavicle and included in the report.
  5. With internal disease greater than 50% stenosis for non-vascular consultants – “Suggest Vascular surgical opinion if appropriate” should be included the report.
  6. Scan limitations should always be included in the comments ‘calcification’, poor visualisation’ etc.
  7. In large arteries with significant plaque morphology and percentage diameter reduction should be taken e.g ‘peak velocities indicate a x% stenosis but on greyscale image there is a diameter reduction of x%’
  8. Carotid outcomes should classed as:

Mild disease" - disease up to and including <50% stenosis.

Moderate stenosis" - 50-59% and 60-69% stenoses.

Severe stenosis" - 70-79% stenosis and above.

* 1. Units of cm/s are used on printed reports for CCA, ICA and ECA.
  2. The Subclavian artery “Distal Signal” parameter now reads “Good signal” rather than “Good Volume” as it is not a volume measurement.

2. **Trans-Cranial Doppler**

a**.** MCA velocity needs to be recorded throughout the operation/procedure

b. % oximetery needs to be recorded throughout the operation

c. The report needs to include whether a shunt has been used

d. Any incidents of hyperperfusion need to be recorded.

e. Number of emboli can be recorded.

**3**. **Peripheral Arterial and waveform assessment**

a. Waveforms need to be recorded in the bilateral Common femoral, popliteal, posterior tibial and anterior tibial arteries.

b. Record brachial and ankle pressures to calculate ABPI and where appropriate, Toe pressures.

c. Arm/ankle ratio should always be performed unless:-

Four layer bandaging – no one to replace bandaging (with other dressings – pressures should be taken)

Calcified arteries on a previous assessment

d. If ankle pressures cannot be taken for above reasons, toe pressures should be attempted, reports should record that a toe pressure is not abnormal unless the toe pressure ratio is less than 0.6.

If you do not take a pressure you must record the reason why. Do not rely on pressures taken by doctors in clinic or on the ward

e. If abnormal results obtained then recommend “Vascular Surgical Opinion Recommended”

**4. Lower limb arterial duplex**

* + 1. If the Common femoral waveform is reduced – an aorto-iliac scan should be performed (comments below are applicable to aorto-iliac scan).
    2. Waveforms should be completed on the result (not just the comments section).
    3. Always comment on the common femoral, profunda origin, SFA origin even if it is normal (normal, mild, moderate disease). You do not have to record all the velocities in the report unless there is a significant increase (i.e.>2x increase)
    4. SFA – always measure disease from the medial malleolus and record in the comments box.
    5. Record the position and length of disease for any greater than 2 fold increase in velocity, unless 50% or more of the SFA has multiple stenosis in which case simply state ‘SFA is diseased along its length’

The following criteria must be used to classify lower limb arterial disease level:

|  |  |  |
| --- | --- | --- |
| Classification  (diameter reduction) | Velocity Ratio | Disease level |
| 0-49% | <2.0 | Mild |
| 50-74% | ≥2.0 | Moderate |
| 75-99% | ≥4.0 | Severe |

* + 1. If absolute velocities are stated - for example when views are obscured. Then using the mean velocity as V1, we can use the same ratio criteria to stratify the severity of disease, e.g. ≥4 would indicate severe disease.
    2. Always measure the length of any significant disease.
    3. Always comment on the SFA in the adductor canal even if it is normal.
    4. Occlusions – always measure length and proximal position from the medial malleolus and always state whether the SFA reforms above or below the knee
    5. Always comment on the Popliteal even if it is normal.
    6. Always state how many run-off arteries can be seen into the proximal calf. For all three run-off arteries, if you can clearly see the veins filling but no artery then state ‘probably occluded’. If you cannot identify the veins then state ‘not viewed’
    7. If the Popliteal artery is occluded always perform calf artery scan and comment on patency as in 8.
    8. If you perform a calf artery scan - comment on patency as in 8.
    9. Arm/ankle ratio should always be performed unless:-

Four layer bandaging – no one to replace bandaging (with other dressings – pressures should be taken)

Calcified arteries on a previous assessment

If you do not take a pressure you must record the reason why. Do not rely on pressures taken by doctors in clinic or on the ward

* + 1. If you don’t perform an exercise test – document the reason.

**5. Lower Limb venous duplex**

* + - * 1. Always comment on common femoral phasicity and Valsalva response.
        2. Always comment on whether or not there is evidence of a previous DVT

DVT

* + - * 1. Always state whether deep veins are compressible or not.
        2. Comment when veins are not viewed, especially in the calf. If you cannot identify a vein state ‘cannot fully exclude a calf DVT’

Varicose veins

* + - * 1. Always comment on location of major branches and perforators
        2. Always ask the patient which veins give the most trouble and try to trace back to the proximal junction – state if you cannot identify proximal junction
        3. If the short saphenous vein is incompetent comment on the SPJ distance proximal to the knee crease and estimate position with respect to the mid-line.
        4. If the SSV is incompetent, always look for any perforators distal to the SPJ and measure from the knee crease
        5. If SSV is incompetent, always comment on popliteal vein competency proximal and distal to the SPJ

**6. Transvaginal ultrasound**

If possible please use the following proforma. Otherwise include all the measurements in the report.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Diameter in cm*  *Reflux time in s* |  |  |  |  | **Ovarian Vein** | | **Internal Iliac Vein** | |
|  |  |  |  |  | **Right** | **Left** | **Right** | **Left** |
| **Diameter in LS (cm) Supine** | | | | |  |  |  |  |
| **Max Reflux time Supine - during spontaneous breathing** | | | | |  |  |  |  |
| **Max Reflux time in Supine – during Valsalva** | | | | |  |  |  |  |
| **Max Reflux time in Supine – during thigh squeeze** | | | | |  |  |  |  |
| **Diameter in LS (cm) semi-standing** | | | | |  |  |  |  |
| **Max Reflux time in Semi-standing – during spontaneous breathing** | | | | |  |  |  |  |
| **Max Reflux in Semi-standing – during Valsalva** | | | | |  |  |  |  |
| **Max reflux in Semi-standing – during thigh squeeze** | | | | |  |  |  |  |
| **Report:**  Please describe any obvious pelvic varices, communications to the upper thigh or elsewhere. | | | | | | | | |

**7. Ambulatory Venous Pressure measurement**

Report is automatically generated by the database.

**8. Aortic/CFA/ Popliteal Aneurysm Screen**

* + 1. LS – AP and TS – AP measurements should be taken. ML measurements should be taken if the aneurysm is irregular in shape or if the ML dimension is larger than the AP.
    2. If an AAA is confirmed, popliteal arteries should always be assessed unless they were normal on a previous scan.
    3. For all aneurysms, a comment should be made on plaque morphology/mural thrombus and measure the % diameter reduction. State if there is no significant plaque morphology/mural thrombus.
    4. Popliteal aneurysms –
       1. Always state whether or not the trifurcation is involved. Measure the extent of the popliteal aneurysm above and below the knee crease.
       2. Report about the tortuosity of the vessel, whether aneurysmal or not.
    5. EVAR - Contrast enhanced US/3D
       1. Note type and date of previous imaging – Angiogram, CTA, 2D CEUS, 3D CEUS or no previous imaging.
       2. State maximum dimensions of sac
       3. Patency of stent limbs including waveforms and PSV in cm/s
       4. Patency of EIA including waveforms and PSV is cm/s
       5. State presence/absence of endoleak and if seen on 2D, 2D CEUS and 3D CEUS
       6. State the type of endoleak
       7. Any additional comments
    6. The following criteria must be used to classify lower limb arterial disease level:

|  |  |  |
| --- | --- | --- |
| Classification  (diameter reduction) | Velocity Ratio | Disease level |
| 0-49% | <2.0 | Mild |
| 50-74% | ≥2.0 | Moderate |
| 75-99% | ≥4.0 | Severe |

**9. Visceral**

Patient should be assessed supine, after an overnight fast. PSV should be recorded using a 1.5mm sample volume and less than 60 degree of insonation.

1. State the patency of the abdominal aorta and record the PSV in proximal abdominal aorta
2. State the patency of the SMA, recording PSV at its origin and distally to exclude the possibility of fibromuscular dysplasia.
3. State the patency of the Coeliac axis, Hepatic artery and Splenic artery, recording the PSV.
4. State the patency of the IMA if identified recording the PSV
5. State the patency of the right and left renal arteries, ideally recording PSV and acceleration time at the origin, mid-section and distal renal artery
6. Record Parenchyma velocity and kidney length

**10. Upper Limb Duplex**

* + - * 1. Arterial

Record all pressures and waveforms, brachial, radial and ulnar arteries

Always perform a post-exercise challenge.

Always perform a thoracic outlet assessment

If there is TOS check subclavian artery – comment on any plaque morphology, intimal damage and any dilatation. If the subclavian is widely patent – you must state ‘normal calibre and widely patent’

Always report on the vertebral artery status

If radial arteries are going to be used as a conduit – please record patency and vessel diameter.

The following criteria must be used to classify upper limb arterial disease level:

|  |  |  |
| --- | --- | --- |
| Classification  (diameter reduction) | Velocity Ratio | Disease level |
| 0-49% | <2.0 | Mild |
| 50-74% | ≥2.0 | Moderate |
| 75-99% | ≥4.0 | Severe |

* + - * 1. Venous

Always comment on whether or not there is evidence of a previous DVT

Always state whether deep veins are compressible or not

**11. Arterio-venous Fistulas**

Record volume flow information for fistula inflow and outflow vessels (forearm and upper arm depending on type of fistula).

1. INFLOW:

i. Comment on subclavian artery (widely patent or stenosed).

* + - 1. Comment on brachial & radial arteries (widely patent, calcified, stenosed, note any tortuosity, if significantly kinked comment on velocity increase and mark the distance from the elbow crease or wrist). Comment on any anatomical variation i.e. high bifurcation of the brachial artery. Include waveforms in brachial and radial artery, recording volume flow data for both (see standard template).
      2. Comment on AV anastomosis (widely patent or stenosed) and record LS diameter (cm)

1. OUTFLOW:

i. Comment on cephalic vein (widely patent, stenosed, tortuosity). If stenosed, include velocity increase (PSV/EDV), luminal reduction and if there is any visible hyperplasia – stating distance of stenosis proximal to the wrist or elbow crease. If peri-anastomotic then state as such, and state the maximum velocity obtained and comment on luminal reduction.

ii. Comment on any large aneurysmal segments including pseudoaneurysms (usually at puncture sites) measuring AP diameter and noting any mural thrombus. If thrombus is present record luminal diameter reduction and any velocity increase.

iii. Valve sites causing significant increase in velocity (>3) should be recorded, as should the presence or absence any luminal diameter reduction (measurements should be recorded as proximal to the wrist/elbow crease).

iv. Comment on any large concomitant cephalic veins in the forearm, recording volume flow measurement and state orientation i.e. medial or lateral.

v. With forearm fistulas always comment on the presence or absence of median cubital vein. Comment on the basilic vein (widely patent or stenosed).

vi. Comment on the cephalic vein confluence with subclavian vein (widely patent or stenosed).

v. Always comment on subclavian vein (widely patent or stenosed).

**12. DIEP**

1. Vessels are labelled by number and there location at the point they cross the fascia is recorded in relation to the proximal tip and the mid line of the umbilicus.
2. The width of the vessel at the point it crosses the fascia is recorded
3. The PSV in the perforator at the point the perforator crosses the fascia is noted
4. The length of the vessel within the abdominus rectus is measured as accurately as possible although this is often an estimate as the full length of the vessel cannot be seen in one single plane.
5. The number and approximate location of any branches on each perforator need to be noted.
6. Any large veins need to be mentioned.

**13. Abnormal lesions/soft tissue masses**

* 1. Clearly state the site and dimensions of lesion and any descriptive information – shape (regular or irregular), vascularity, ?well defined borders, echogenicity, homogenous, ?fluid filled.
  2. State that images are saved to PACs
  3. Suggest radiological review of image and if appropriate further imaging

**Reporting Administration**

**Changes:**

If required to change a report always refer to the paper hardcopy of the report to confirm the correct investigation was carried out e.g correct leg scanned. In addition contact the staff member who performed the scan for any further verification. If a mistake is verified then change the report accordingly and applying the changes. The corrected report should be then sent to the ward/referring consultant.

**Time frames**

It is standard policy to issue a report as soon as possible after the completion of the report. Reports from all patients are issued either in an electronic or paper format within 8 hours of completion of the vascular ultrasound report. If inpatient or Red Flag patient the vascular ultrasound report is placed in the notes or placed electronically on the host Trust wide reporting system within 10 minutes. If a Red Flag patient then the report will be immediately faxed to the consultant with a follow up phone call to ensure that is has arrived.

Date of issue: 06/03/2011 Signed: 

Date reviewed: 19/03/2015 Signed: 

Date of future review: 19/03/2020