## **Department of Vascular Surgery**

## **Broomfield Hospital Vascular Lab**

## [**Mid Essex Hospital Services NHS Trust**](http://www.meht.nhs.uk/)

## **Carotid Duplex Protocol to be utilised by all Sonographers/Scientists trained in Carotid Duplex imaging and reporting.**

## **History Taking:**

## 1.Confirm referral details and Identification with the patient prior to the start of the examination. Confirm patients symptoms and take any additional relevant information that you may require e.g. Diabetes, smoking, previous PVD, Heart/stroke history, blood pressure, cholesterol, medication Aspirin etc.

## 2. Inform patient of examination that you are going to undertake and ask for removal of any garments that you will require.

## **Patient preparation:**

## 1.Removal of garments around the neck and surrounding area to be assessed.

## 2.Patient supine on the couch with a pillow for head support, can be sat up slightly if need to be due to respiratory disorders/musculoskeletal complaints. The chin elevated and the head turned away from the side to be scanned first. Paper towel inserted into the patient’s collar area to avoid gel transfer to patient’s clothes.

## 3. Appropriate carotid scanning preset on the ultrasound machine and a linear 8-4 MHz probe selected. Gel should be applied to the area to be scanned or on the probe. Alternatively in a large or slim patient a lower or higher frequency probe can be utilised.

**Protocol:**  
  
1.Initiate the examination with a greyscale survey of the CCA, bifurcation, ICA, and ECA along the entire sonographically accessible segments in transverse and longitudinal views. Close attention should be paid to vessel course, site(s) of plaque, and plaque characteristics (location, amount, echotexture, and surface).  
  
2.Using colour Doppler, examine the CCA, bifurcation, ICA, and ECA. Attention should be paid to areas of narrowing, increased Doppler shifts, aliasing, and [turbulence](http://www.pear.co.nz/asum/glossary.php?glossaryID=25) in longitudinal and transverse views as needed.

3.If required record colour Doppler views of CCA, bifurcation, ICA, and ECA. Flow-separation (area of non-pathologic [turbulence](http://www.pear.co.nz/asum/glossary.php?glossaryID=25)) is often observed in the proximal ICA.   
  
4.[Spectral Doppler](http://www.pear.co.nz/asum/glossary.php?glossaryID=46) sampling may be performed at 60 degree angles or less in the distal CCA (approximately 2-5 cm from the bifurcation), proximal ICA, mid ICA, distal ICA, and proximal ECA relative to the patency of the vessels.

5.Identification of the ICA and ECA can safely be made based on visualization of vessel branches (ECA), and spectral waveform differences. In difficult cases, temporal tap of the ECA is a useful indicator.

6.Take care to record the highest velocity for each of the above sample sites. (PSV and EDV). Velocity and ratio criteria as per the SVT national consensus are utilised to grade disease in the ICA, see attached table.

Note: In extremely high-grade critical stenosis (such as trickle flow), the below interpretation criteria may fail due to very low flow velocities. Careful review of the stenosed vessel using Colour Doppler or [Power Doppler](http://www.pear.co.nz/asum/glossary.php?glossaryID=47) usually confirm the presence of trickle flow.

7.Subclavian and vertebral artery sampling is also routinely performed when symptoms indicate it necessary to do so. Vertebral artery reversal (complete or partial) are indicative of subclavian steal syndrome. Careful attention should be paid to the vertebral artery if the subclavian artery demonstrates signs of [stenosis](http://www.pear.co.nz/asum/glossary.php?glossaryID=32) such as loss of triphasicity, high [PSV](http://www.pear.co.nz/asum/glossary.php?glossaryID=8), or [turbulence](http://www.pear.co.nz/asum/glossary.php?glossaryID=25)

8.Note: In case of unilateral ICA occlusion, the contralateral ICA velocities may demonstrate compensatory elevation. Over-estimation of the contralateral ICA disease may therefore occur.

9. Record all images with velocity readings on required to support an online written report on CRIS/ICE system.

10. Any critical/unusual findings should be reported immediately and the referring consultant informed so as the next management step can be expedited.

11. Disclosure of results to the patient is permitted if appropriate to do so.

**References**

Duplex Scanning in Vascular Disorders  
Author:Strandness, D.E.

SVT IPEM Carotid Textbook