CL1.3

3.Extra-cranial carotid/ brachio-cephalic/ subclavian/ vertebral assessment

Probe types – 12 - 3MHz

Measurements – Velocities in centimetres per second (cm/s), diameter (transverse; anterior-posterior, medial-lateral) in centimetres (cm) (if dilated/pre-op), length of disease (longitudinal) in cm.

Patient positioning and scanning approach – patients can be scanned supine or in a sitting position. A supine approach with the vascular scientist sat behind the patient's head allows easy access to the neck and reduces the risk of RSI (repetitive strain injury) as the operator can rest their arm on the pillow or on the head of couch. The patient extends the neck and turns the head in the opposite direction to the side being assessed. Both sides of the neck are always assessed[1].

The carotid arteries can be viewed from a lateral or antero-lateral approach using the sternocleidomastoid muscle as an acoustic window[2].

B-mode assessment

Intimal B-mode assessment is performed to achieve an accurate picture of the anatomy and identify the location of the carotid bifurcation as well as the presence of any plaque morphology[2, 3].

Using B-mode, the common carotid artery (CCA) should be imaged in cross-section (transverse plane) and traced proximally to the clavicle until the subclavian artery is visualised. The distal brachio-cephalic artery may be visualised on the right side of the neck. On the left side, the origin of the CCA and subclavian arteries will not be visualised due to depth. The CCA should then be scanned along its length to the level of the bifurcation where the internal carotid artery (ICA) and external carotid artery (ECA) are visualised from their origins as far distal as possible.

The same method should then be repeated in longitudinal plane[2].

Colourflow assessment

Using the Colourflow modality, the CCA is scanned longitudinally where it is traced from the proximal section at the level of the clavicle to the distal section where the bifurcation, ICA and ECA are visualised as far distal as possible.

Colour should be used to identify ECA branches, filling defects, occlusion and velocity changes/ turbulence, although diagnosis should not be made using colour Doppler alone[2,3].

Grading plaque morphology – greyscale echogenicity

Switching to the greyscale imaging mode, a note can be made of the site, type and extent of plaque morphology.

The subclavian is visualised along its length in longitudinal section. The CCA, ICA and ECA are then viewed in cross-section and longitudinally. As soft plaque has the same echogenicity as blood, colourflow is the best modality for identification.

Soft plaque – associated with higher lipid content or thrombus. May have an anechoic or echolucent appearance similar to that of blood/fluid[2,3]
Mixed plaque – variable/ heterogenous appearance of mixed or random echoes with some echogenic and some echolucent areas[2,3].
Dense plaque – homogenous appearance of bright white echoes[4].
Calcified plaque – acoustic shadowing cast from the hardened plaque[2,3].
Irregular – broken or irregular luminal surface but not generally an indication of ulceration[16].
Ulcerative – an area of mixed plaque forming a 'crater' of at least 2mm depth. May be seen in cross-section as a 'hook' of mixed plaque surrounding soft plaque, or with blood visibly swirling within the crater[2,3].

Doppler assessment
In the absence of significant disease, peak systolic velocity (PSV) measurements are taken from the CCA (1-2cm proximal to bifurcation) [1, 2], ICA and ECA. If the peak velocities are raised above 1.3m/s then the end-diastolic velocity (EDV) is also measured.
If significant plaques have been identified using B-mode and colour flow Doppler then further spectral Doppler samples are taken to investigate velocity increases and analyse the degree of stenosis in particular vessel. Stenosis in the ICA is graded using the criteria explained below. Atypical waveform profiles should also be noted[2, 3].

In cross-section, the CCA is traced proximal towards the clavicle and the transducer is angled beneath the clavicle until the subclavian artery is viewed in longitudinal section. The subclavian is traced as far proximal and distal as possible making note of areas of turbulence or narrowing. The PSV is measured using Doppler ultrasound. A second Doppler reading is taken as far distal as possible and the waveform characteristics are recorded (e.g. triphasic, biphasic, monophasic, turbulent, damped etc.).

Velocities in kinked arteries are less reliable as vessel tortuosity can raise velocities[17]. Care must be taken to ensure that the angle is correct to blood flow rather than the vessel[3]. In reporting, it will be stated 'peak velocities indicate x% - y% stenosis but no plaque morphology noted.

<u>Grading degree of carotid stenosis</u>

Normal Velocities:

ICA:

- average (avg) PSV = 54 – 88cm/s (distal to bulb)[4]
- avg PSV = 74cm/s, avg EDV = 29cm/s (distal to bulb)[5]
- velocity slightly elevated if patient hypertensive[6]
- maximum PSV noted in normal = 115cm/s[7]

ECA:

- avg PSV ~=77cm/s (normally <115cm/s)[4]
- avg PSV = 84cm/s, avg EDV = 16cm/s [5]
- ECA velocities can be elevated by an ipsilateral ICA occlusion[4]

CCA:

- avg PSV = 60 – 100cm/s[8]
- avg PSV = 108 +/- 18 cm/s (mean +/-S.D.)[9]
- avg PSV = 78-108 cm/s [7]
- avg PSV = 99cm/s, avg EDV = 27cm/s [5]
- on average, PSV in L CCA exceeds PSV in R CCA by 5cm/s [9]
- velocity slightly elevated if patient hypertensive[6]

Carotid Criteria

Diameter Stenosis	Morphology	ICA PSV (cm/s)	ICA EDV (cm/s)	PSVica/ PSVcca	St Mary's ratio
<25%	Normal	<125	<40		
<30%	Intimal Thickening	<125	<40		
<30%	Plaque	<125	<40		
<40%	Plaque	<125	<40		
<50%	Plaque	<125	<40	<2	<8
50-59%	Plaque	>125	<40	<3.2	8.0-10
60-69%	Plaque	>125	40-110	3.2-4.0	11-13
70-79%	Plaque	>230	110-140	>4.0	14-21
80-89%	Plaque	>230	>140	>4.0	22-29
90-95%	Plaque	>400	>140	>5.0	>30
96-99%	Plaque	Trickle flow			Variable
100%	Plaque	Absence of flow			N/A

Sidhu and Allan. Ultrasound Assessment of Internal Carotid Artery Stenosis. Clinical Radiology, (1997) 52, 654-658. (Developed using data from Moneta et al. 1993, 1995).
CP Oates et al. Joint recommendations for Reporting Carotid Ultrasound Investigations in the UK. EurJ Vasc Endovasc Surg (2008) 20, 1-11.

Criteria are only reliable for internal carotid artery stenosis[3].

ICA peak systolic velocities are less reliable in the presence of CCA disease and ratios should be used. The use of the ICA: CCA PSV ratio normalises ICA PSV measurements[2 3].
Elevated velocities can be produced in the CCA, ICA[19] and ECA in the presence of contralateral CCA or ICA stenosis or occlusion.
A significant proximal (CCA origin or brachio-cephalic) ipsilateral stenosis can reduce velocities in the CCA, ICA and ECA.

Aortic stenosis can reduce the velocities in the CCA only.
Peak systolic velocities from large carotid bulbs may be unreliable, estimate degree of stenosis using grey scale and diameter/area reduction measurement.

Doppler Waveforms:

1. CCA waveform has a low-resistance pattern (most of the CCA flow goes to the brain). Note that a small amount of post systolic flow reversal (giving rise to a triphasic waveform) is normal; reversal of flow evident for more than 50% of the duration of diastole should be regarded as abnormal (see point 5 below)[10].

2. Normal ICA waveform has low-resistance pattern (all of the ICA flow goes to brain)[18].

3. Normal ECA waveform has a high-resistance pattern (vessel supplies a high resistance vascular bed). Note the prominent dicrotic notch, which represents closure of the aortic valve and the onset of diastole[10].

4. Severe proximal stenosis (innominate artery, CCA origin, aortic valve) produces a damped waveform ("tardus-parvus", where tardus infers the pulse is slow to rise and fall and parvus infers a small pulse.)[4, 8]. Essentially, the acceleration time to systole is increased, hence the slope of the systolic upstroke is reduced, and there is blunting and smoothing of the sharp peak representing a reduction in waveform pulsatility[9]. This effect is usually most prominent in the CCA, but is also sometimes seen in the ICA & ECA. Note that in the case of aortic valve disease or diminished cardiac output, damping is symmetrical (seen in both CCAs)[4].

5. Severe aortic incompetence with or without the presence of significant aortic stenosis often produces either a bisferious (two systolic peaks, well separated from the dicrotic notch, with the second peak being the same height as or higher than the first) waveform[10], or persistent reverse diastolic flow in the CCA, or both. Note that these effects are not usually seen in the ICA, but are evident in both the CCA & ECA.

6. Significant stenosis or occlusion of the distal CCA or the ICA causes a high-resistance ipsilateral CCA waveform; reverse flow is evident and often there is complete loss of end diastolic flow. Note that significant ECA disease does not usually impact on the CCA waveform due to its relatively low flow volume[4].

External Carotid Artery Assessment

From searching the literature (pubmed, medline, science direct, quest) there is no evidence of a radiologically validated method for grading ECA disease using a velocity criteria.
There is normally little requirement for the grading of ECA disease due to its highly branched vascular network and non-cerebral involvement[13,15]. In cases where a patient experiences cerebral or ocular symptoms in the presence of ipsilateral ICA occlusion it may be useful to grade and characterise ECA disease as a possible cause of emboli and transient ischaemic attack (TIA). There is much published evidence extolling the

benefit of surgical or radiological intervention for the treatment of ECA disease where there is ipsilateral ICA occlusion and a thorough examination of disease is important in these cases[13,14,15].

At present staff use a visual estimation and/or use of electronic callipers to measure degree and extent of stenotic disease.

In the presence of an ICA occlusion, electronic callipers should be used in the transverse and longitudinal planes to measure degree of ECA stenosis. Length of stenosis, plaque characterisation and degree of turbulence should also be recorded in the report.

Vertebral artery assessment

The vertebral artery (VA) can be viewed if the transducer is angled posterior. The flow direction should be the same as the carotid flow direction and is checked using the colourflow, **but more** importantly the Doppler sample volume. Vertebral flow is graded as orthograde, oscillatory (i.e. reversed in either systole or diastole alone) or retrograde[2,3]. If no colourflow is identified within the vessel lumen – use spectral or power Doppler to investigate as it is more sensitive than colourflow[4].

NORMAL VELOCITIES:

- avg PSV = 20-40 cm/s[2,3]
- PSV<10cm/s should be regarded as potentially abnormal[4]
- Higher velocities may be normal in the dominant VA of an asymmetric pair.[2,3]
- Higher velocities may be normal with contralateral VA occlusion. [2,3]
-

DOPPLER WAVEFORMS:

1. Normal VA waveform has a low-resistance pattern (supplying the brain), with cephalad flow throughout the cycle[2,4].

2. If the VA has a high-resistance, antegrade (cephalic) flow pattern, there is probably a significant obstruction distal to the site of examination. (The second most common site of VA atheroma is intracranially, just beyond the C1 arch)[3].

3. Severe proximal stenosis produces a damped waveform; note that the most common site of VA atheroma is the VA origin, although this can be difficult to image as it originates from the posterior aspect of the subclavian artery[3].

4. Subclavian artery origin stenosis can have varying effects on the VA waveform shape and the direction of flow, dependent on the degree of stenosis and the presence of other collateral pathways.

Pre-operative carotid assessment.

Staff must follow additional criteria when performing a pre-operative scan for carotid endarterectomy.

1.Length of disease from the bifurcation, into the ICA, must be documented.

2.Bifurcation needs to be marked on the skin surface – the image of the bifurcation is obtained then the probe is moved until the bifurcation is just off the leading edge of the probe, marks are made on the skin surface in transverse and longitudinal section. Where these lines transverse is the position of the bifurcation and an arrow should be drawn to mark the tip.

3.Take a picture of the disease and keep with our hardcopy.

4.Mark MCA signal – see TCD section

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Reason	Stroke
Outcome	Stenosis severe, Occlusion, Thrombus

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.66	0.28	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Internal			0.79	0.40	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 1.2**		**Pk ICA/End CCA = 2.8**	
External			0.68		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.53		**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Mixed				
Disease length from BIF					
Internal			*		**= 100%**
Plaque	Soft				
Disease length from BIF		**Pk ICA/Pk CCA = 0.0**			
External			0.70		**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods. **If marked * ALWAYS read full notes.**
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

RIGHT
Mixed plaques identified in the right internal carotid artery forming a less than 30% stenosis.

LEFT
Large volume of echolucent material ?soft plaque ?thrombus identified in the left ICA with small areas of colour flow noted in the proximal to mid vessel suggestive of a 96-99% stenosis. Where seen, high resistant 'thump' flow noted, PSV 26cm/s, indicative of a more distal occlusion. Unable to visualise distal extent of

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disease.

Suggest alternative imaging modality to confirm.

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Right

		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.87	0.17	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.60	0.15	**< 30%**
Plaque	Mixed				
Disease length from BIF			**Pk ICA/Pk CCA = 0.7**	**Pk ICA/End CCA = 3.5**	
External			1.08		**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence		Good Signal	Triphasic	Widely Patent

Left

		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			1.11	0.21	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.51	0.15	**< 30%**
Plaque	Dense Mixed				
Disease length from BIF			**Pk ICA/Pk CCA = 0.5**	**Pk ICA/End CCA = 2.4**	
External			1.18		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence		Good Signal	Triphasic	Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right internal carotid artery forming a less than 30% stenosis.
Mixed an dense plaques identified in the left internal carotid artery forming a less than 30% stenosis.

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Reason TIA clinic

Outcome Stenosis moderate, Occlusion, Thrombus

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.74	0.15	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Mixed				
Disease length from BIF					
Internal			1.01	0.24	**50% - 59%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 1.4**		**Pk ICA/End CCA = 6.7**	
External			1.06		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.53		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Mixed				
Disease length from BIF					
Internal			*		**= 100%**
Plaque	Dense Mixed Soft				
Disease length from BIF		**Pk ICA/Pk CCA = 0.0**			
External			1.25		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods. **If marked * ALWAYS read full notes.**

Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

RIGHT

Smooth mixed plaques identified in the right internal carotid artery with no raised velocities, however direct diameter reduction imaging suggests a 50-59% stenosis. Total disease length ~1.71cm including the bifurcation. Distal ICA appears patent.

LEFT

The left internal carotid artery is occluded with mixed and dense plaques and some echolucent material

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?Soft plaque ?Thrombus with no flow identified using colour, spectral and power doppler for ~3.69cm. Some areas of very weak monophasic flow identified in the distal vessel, PSV 11cm/s ?Collateral reform ?Artefact.

SUGGEST VASCULAR SURGICAL OPINION.
SUGGEST ALTERNATIVE IMAGING

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:49 am

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Reason Stroke

Outcome Stenosis moderate, Stenosis severe, Occlusion, Calcified, Thrombus

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			1.33	0.38	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**60% - 69%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			6.07	3.26	**90% - 95%**
Plaque	Dense Mixed				
Disease length from BIF	1.40cm	**Pk ICA/Pk CCA = 4.6**		**Pk ICA/End CCA = 16.0**	
External			2.96		**< 40%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			1.00	0.17	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**50% - 59%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			*		**= 100%**
Plaque	Dense Mixed Soft Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 0.0**		**Pk ICA/End CCA = 0.0**	
External			4.16		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods. **If marked * ALWAYS read full notes.**

Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

RIGHT

Mixed, dense and calcified plaques identified in the right carotid bifurcation forming a 60-69% stenosis based on direct diameter reduction imaging. Mixed and dense plaques extend into the right internal carotid artery forming a 90-95% stenosis. Total disease length ~1.4cm including the bifurcation. Distal ICA appears patent.

LEFT

Assessed by Jack Wilson

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Mixed, dense and calcified plaques identified in the left carotid bifurcation forming a 50-59% stenosis based on direct diameter reduction imaging. The left internal carotid artery appears occluded with mixed, dense and calcified plaques and some echolucent material ?Soft plaque ?Thrombus. No flow identified using colour, spectral and power doppler.

SUGGEST VASCULAR SURGICAL OPINION.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:46 am

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Reason	TIA clinic
Outcome	Calcified, disease - mild

Right

		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			1.01	0.19	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			0.53	0.18	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.5**		**Pk ICA/End CCA = 2.8**	
External			1.21		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left

		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.93	0.21	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.70	0.24	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 3.3**	
External			1.20		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right and left internal carotid arteries, forming a less than 30% stenosis, bilaterally.

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Reason	Stroke
Outcome	Stenosis mild, disease - mild

Right

		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			1.20	0.26	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.89	0.15	**< 30%**
Plaque	Mixed				
Disease length from BIF			**Pk ICA/Pk CCA = 0.7**	**Pk ICA/End CCA = 3.4**	
External			0.99		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence		Good Signal	Triphasic	Widely Patent

Left

		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			1.04	0.23	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**40% - 49%**
Plaque	Mixed				
Disease length from BIF					
Internal			1.00	0.27	**< 40%**
Plaque	Mixed				
Disease length from BIF			**Pk ICA/Pk CCA = 1.0**	**Pk ICA/End CCA = 4.3**	
External			1.29		**50% - 59%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence		Good Signal	Biphasic	Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right internal carotid artery forming a less than 30% stenosis.
Mixed plaques identified in the left carotid bifurcation forming a 40-49% stenosis. Plaques extends into the left internal carotid artery forming a less than 40% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:45 am

Checked by _____

Reason	TIA clinic
Outcome	disease - mild

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.66	0.20	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.45	0.13	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.7**		**Pk ICA/End CCA = 2.3**	
External			0.60		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.70	0.21	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.55	0.19	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 2.6**	
External			0.59		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right and left internal carotid arteries, forming a less than 30% stenosis, bilaterally.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:45 am

Checked by _____

Reason	TIA clinic
Outcome	Intimal thickening

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			1.15	0.32	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Internal			0.75	0.36	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF		**Pk ICA/Pk CCA = 0.7**		**Pk ICA/End CCA = 2.3**	
External			1.22		**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence		Good Signal	Triphasic	Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			1.30	0.34	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Internal			0.88	0.32	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF		**Pk ICA/Pk CCA = 0.7**		**Pk ICA/End CCA = 2.6**	
External			1.33		**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence		Good Signal	Triphasic	Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Intimal thickening identified in the right and left internal carotid arteries, forming a less than 30% reduction in luminal diameter, bilaterally.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:43 am

Checked by _____

Reason TIA clinic

Outcome Calcified, disease - mild

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.90	0.24	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.75	0.26	**< 40%**
Plaque	Dense Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 3.1**	
External			0.21		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.77	0.21	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			0.58	0.17	**< 40%**
Plaque	Dense Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 2.8**	
External			1.07		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.

Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed and dense plaques identified in the right and left internal carotid artery forming a less than 40% stenosis, bilaterally.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:36 am

Checked by _____

Reason TIA clinic

Outcome Calcified, disease - mild

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.83	0.19	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.57	0.20	**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 0.7**		**Pk ICA/End CCA = 3.0**	
External			1.27		**< 30%**
Plaque	Dense Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.76	0.19	**< 30%**
Plaque	Dense Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.91	0.31	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 1.2**		**Pk ICA/End CCA = 4.8**	
External			0.93		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed, dense and calcified plaques identified in the right internal carotid artery forming a less than 40% stenosis.
Mixed plaques identified in the left internal carotid artery forming a less than 30% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:35 am

Checked by _____

Reason	Stroke
Outcome	Calcified, disease - mild

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.70	0.13	**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.54	0.16	**< 40%**
Plaque	Dense Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 4.2**	
External			1.02		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.63	0.11	**< 30%**
Plaque	Dense Mixed				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.66	0.16	**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 1.0**		**Pk ICA/End CCA = 6.0**	
External			0.71		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Biphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed and dense plaques identified in the right internal carotid artery forming a less than 40% stenosis. Mixed, dense and calcified plaques identified in the left internal carotid artery forming a less than 50% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:34 am

Checked by _____

Reason	TIA
Outcome	Calcified, disease - mild

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.70	0.23	**< 30%**
Plaque	Dense Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.72	0.12	**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 1.0**		**Pk ICA/End CCA = 3.1**	
External			0.82		**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.78	0.17	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.58	0.21	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.7**		**Pk ICA/End CCA = 3.4**	
External			1.45		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed, dense and calcified plaques identified in the right internal carotid artery forming a less than 40% stenosis.
Mixed plaques identified in the left internal carotid artery forming a less than 30% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:42 am

Checked by _____

Reason	TIA clinic
Outcome	Stenosis mild, Calcified, disease - mild

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.93	0.24	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**40% - 49%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			1.12	0.27	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 1.2**		**Pk ICA/End CCA = 4.7**	
External			1.02		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.75	0.21	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.64	0.21	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.9**		**Pk ICA/End CCA = 3.0**	
External			1.01		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed, dense and calcified plaques identified in the right carotid bifurcation forming a 40-49% stenosis. Mixed plaques extend into the right internal carotid artery forming a less than 30% stenosis.

Mixed plaques identified in the left internal carotid artery forming a less than 30% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:41 am

Checked by _____

Reason	TIA clinic
Outcome	disease - mild

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.59	0.18	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			0.50	0.19	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 2.8**	
External			0.97		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.63	0.23	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			0.47	0.18	**< 30%**
Plaque	Dense Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.7**		**Pk ICA/End CCA = 2.0**	
External			0.80		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right internal carotid artery, forming a less than 30% stenosis.

Mixed and dense plaques identified in the left internal carotid artery, forming a less than 30% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:39 am

Checked by _____

Reason	Pre-op
Outcome	Calcified, disease - mild

Right

		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.71	0.17	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			0.57	0.20	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 3.4**	
External			1.05		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left

		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.75	0.18	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.75	0.21	**< 30%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 1.0**		**Pk ICA/End CCA = 4.2**	
External			0.98		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right and left internal carotid arteries forming a less than 30% stenosis, bilaterally.

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:35 am

Checked by _____

Reason TIA clinic

Outcome Calcified, disease - mild

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			1.06	0.14	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.90	0.18	**< 40%**
Plaque	Dense Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 6.4**	
External			1.36		**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.73	0.11	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			0.95	0.19	**< 40%**
Plaque	Dense Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 1.3**		**Pk ICA/End CCA = 8.6**	
External			1.10		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed and dense plaques identified in the right and left internal carotid arteries forming a less than 40% stenosis, bilaterally.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:51 am

Checked by _____

Reason TIA

Outcome Calcified, disease - mild

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.69	0.13	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.77	0.21	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 1.1**		**Pk ICA/End CCA = 5.9**	
External			0.66		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Biphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.63	0.17	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.88	0.24	**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 1.4**		**Pk ICA/End CCA = 5.2**	
External			0.75		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Biphasic		Widely Patent

Stenosis based on NASCET methods.

Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right internal carotid artery forming a less than 30% stenosis.
Mixed, dense and calcified plaques identified in the left internal carotid artery forming a less than 40% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:27 am

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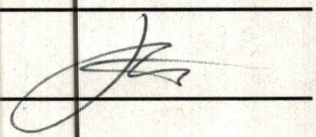

Reason	Pre-op
Outcome	Calcified, disease - mild

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.71	0.17	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			0.57	0.20	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 3.4**	
External			1.05		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.75	0.18	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.75	0.21	**< 30%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 1.0**		**Pk ICA/End CCA = 4.2**	
External			0.98		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right and left internal carotid arteries forming a less than 30% stenosis, bilaterally.

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:35 am

Checked by _____

Reason	Pre-op
Outcome	disease - mild

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			1.09	0.26	**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.76	0.23	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.7**		**Pk ICA/End CCA = 2.9**	
External			1.82		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.87	0.22	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			0.54	0.18	**< 30%**
Plaque	Dense Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 0.6**		**Pk ICA/End CCA = 2.5**	
External			1.70		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed plaques identified in the right internal carotid artery, forming a less than 30% stenosis.

Mixed and dense plaques in the left internal carotid artery, forming a less than 30% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:31 am

Checked by _____

Reason TIA

Outcome Calcified, disease - mild

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.75	0.18	**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.53	0.13	**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 0.7**		**Pk ICA/End CCA = 2.9**	
External			0.75		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.76	0.11	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			0.57	0.16	**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 5.2**	
External			0.73		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Mixed, dense and calcified plaques identified in the right and left internal carotid arteries forming a less than 40% stenosis, bilaterally.

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:29 am

Checked by _____

Reason	TIA clinic
Outcome	Stenosis moderate, Stenosis severe, Calcified

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.80	0.18	**< 40%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Bifurcation					**40% - 49%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			2.12	0.44	**60% - 69%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 2.7**		**Pk ICA/End CCA = 11.8**	
External			3.19		**50% - 59%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.82	0.20	**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Bifurcation					**60% - 69%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Internal			5.96	1.71	**90% - 95%**
Plaque	Dense Mixed Calcified				
Disease length from BIF		**Pk ICA/Pk CCA = 7.3**		**Pk ICA/End CCA = 29.8**	
External			1.60		**< 50%**
Plaque	Dense Mixed Calcified				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN
RIGHT
Mixed, dense and calcified plaques identified in the right internal carotid artery forming a 60-69% stenosis. Total disease length ~2.10cm. Distal ICA appears patent.
LEFT
Mixed, dense and calcified plaques identified in the left carotid bifurcation forming a 60-69% stenosis based on diameter reduction imaging. Plaque extends into the left internal carotid artery forming a 90-95% stenosis. Total disease length ~2.41cm. Distal ICA appears patent.
SUGGEST VASCULAR SURGICAL OPINION

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:37 am

Checked by _____

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:37 am

Checked by _____

Reason	TIA clinic
Outcome	Thrombus

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			0.84	0.26	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed Soft				
Disease length from BIF					
Internal			0.81	0.25	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 1.0**		**Pk ICA/End CCA = 3.1**	
External			5.46		**70% - 79%**
Plaque	Soft				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Biphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			1.02	0.29	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.98	0.27	**< 30%**
Plaque	Mixed				
Disease length from BIF		**Pk ICA/Pk CCA = 1.0**		**Pk ICA/End CCA = 3.4**	
External			2.04		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN
RIGHT
Mixed plaques identified in the right internal carotid artery forming a less than 30% stenosis.
Mixed and dense plaques with some echolucent material ?Soft plaque ?Thrombus identified in the right carotid bifurcation forming a less than 40% stenosis, echolucent material extends into the right external carotid artery forming a 70-79% stenosis.
LEFT
Mixed plaques identified in the left internal carotid artery forming a less than 30% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:40 am

Checked by _____

Reason	TIA clinic
Outcome	Intimal thickening, disease - mild

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			1.06	0.27	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Internal			1.03	0.35	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF		**Pk ICA/Pk CCA = 1.0**		**Pk ICA/End CCA = 3.8**	
External			0.90		**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			1.00	0.24	**< 30%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.76	0.25	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 3.2**	
External			1.34		**< 25%**
Plaque	Normal				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Intimal thickening identified in the right internal carotid artery forming a less than 30% reduction in luminal diameter.
Mixed plaques identified in the left internal carotid artery forming a less than 30% stenosis.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:40 am

Checked by _____

Reason	TIA clinic
Outcome	Intimal thickening, disease - mild

Right		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			1.17	0.29	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Internal			0.70	0.25	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF		**Pk ICA/Pk CCA = 0.6**		**Pk ICA/End CCA = 2.4**	
External			1.44		**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		**Diameter (cm)**	**PSV (m/s)**	**EDV (m/s)**	**Stenosis**
Common			1.01	0.31	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Bifurcation					**< 30%**
Plaque	Mixed				
Disease length from BIF					
Internal			0.77	0.27	**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF		**Pk ICA/Pk CCA = 0.8**		**Pk ICA/End CCA = 2.5**	
External			0.99		**< 30%**
Plaque	Intimal Thickening				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN

Intimal thickening identified in the right and left internal carotid arteries, forming a less than 30% reduction in luminal diameter, bilaterally.

Assessed by Jack Wilson

Printed on 16/11/2021 at 9:40 am

Checked by _____

Reason TIA clinic

Outcome Stenosis moderate, Stenosis severe, Intimal hyperplasia, Thrombus

Right		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			0.83	0.14	**< 30%**
Plaque	Dense Mixed				
Disease length from BIF					
Bifurcation					**< 50%**
Plaque	Soft				
Disease length from BIF					
Internal			2.76	0.81	**70% - 79%**
Plaque	Soft				
Disease length from BIF	3.00cm	**Pk ICA/Pk CCA = 3.3**		**Pk ICA/End CCA = 19.7**	
External			1.39		**< 30%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Left		Diameter (cm)	PSV (m/s)	EDV (m/s)	Stenosis
Common			1.56	0.23	**< 50%**
Plaque	Mixed				
Disease length from BIF					
Bifurcation					**< 40%**
Plaque	Dense Mixed				
Disease length from BIF					
Internal			2.70	0.80	**60% - 69%**
Plaque	Dense Mixed Soft				
Disease length from BIF	1.40cm	**Pk ICA/Pk CCA = 1.7**		**Pk ICA/End CCA = 11.7**	
External			1.56		**< 40%**
Plaque	Mixed				
Disease length from BIF					
Vertebral	Open Orthograde				
Subclavian	No Turbulence	Good Signal	Triphasic		Widely Patent

Stenosis based on NASCET methods.
Disease within large diameter carotid bulb is measured using direct diameter methods as recommended in Oates et al (2009).

Notes

CAROTID DUPLEX SCAN
*Previous right carotid endarterectomy.

RIGHT
Intimal hyperplasia and echolucent material ?Soft plaque ?Thrombus identified in the right internal carotid artery forming a 70-79% stenosis based on velocity grading criteria and direct diameter reduction imaging. Total disease length ~3.0cm. Distal ICA appears patent.

LEFT

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:48 am

Checked by _____

Mixed and dense plaques with some echolucent material ?soft plaque ?Thrombus identified in the left internal carotid artery forming a 60-69% stenosis based on velocity grading criteria and direct diameter reduction imaging. Total disease length ~1.4cm. Distal ICA appears patent.

SUGGEST VASCULAR SURGICAL OPINION.

Assessed by Jack Wilson

Printed on 16/11/2021 at 8:48 am

Checked by _____