

***The Society for Vascular Technology of
Great Britain and Ireland***



Vascular Technology

Syllabus 2012

A. Gross Anatomy (10 %)

Cerebral Arterial System

- ❑ Anterior circulation (carotid)
 - Subclavian / aortic arch / brachiocephalic
 - Common carotid
 - Internal carotid (cervical, petrous, cavernous cerebral)
 - External carotid (including 8 branches - superior thyroid, lingual, facial, occipital, posterior auricular, ascending pharyngeal, temporal, internal maxillary)
- ❑ Posterior circulation (vertebro-basilar)
 - Vertebral (including branches)
 - Basilar
- ❑ Intracranial circulation (circle of Willis)
 - Anterior cerebral
 - Anterior communicating
 - Middle cerebral
 - Posterior communicating
 - Posterior cerebral
 - Basilar
 - Internal carotid
 - Ophthalmic
- ❑ Peri-orbital circulation
 - External carotid
 - Temporal artery (including branches)
 - Supra-orbital
 - Ophthalmic from internal carotid
 - Central retinal artery and other branches

Central and Peripheral Arterial System

- ❑ Aortic arch
 - Common carotid right and left
 - Subclavian
 - Brachiocephalic
 - Ascending aorta
 - Descending aorta
 - Heart
- ❑ Upper extremities
 - Subclavian
 - Thoraco-acromial
 - Axillary
 - Subscapular
 - Profunda brachial
 - Brachial
 - Ulnar
 - Radial
 - Interosseus
 - Palmar arch
 - Deep palmar arch
 - Superficial palmar arch
 - Digital & metacarpal arteries
 - Collateral possibilities
- ❑ Thoracic and abdominal arteries
 - Aorta
 - Coeliac
 - Splenic
 - Hepatic

- Superior Mesenteric
- Renal, including basic structure of the kidney
- Gonadal
- Inferior mesenteric
- Common iliac
- Internal iliac
- External iliac
- Lower extremity arteries
 - Aorta
 - Common iliac
 - External iliac
 - Internal iliac
 - Common femoral
 - Lateral and medial circumflex
 - Profunda femoral
 - Superficial femoral
 - Popliteal
 - Tibio-peroneal trunk
 - Anterior tibial
 - Anterior tibial recurrent
 - Posterior tibial
 - Peroneal
 - Pedal arch
 - Dorsalis pedis
 - Lateral plantar
 - Medial plantar
 - Plantar arch
 - Metatarsal

Venous System (including anatomical variations)

- Central veins
 - Vena cava
 - Superior vena cava
 - Inferior vena cava
 - Brachiocephalic
 - Internal jugular
 - Subclavian
- Portal, mesenteric and renal veins
 - Superior mesenteric
 - Splenic
 - Hepatic
 - Renal
- Lower extremity veins (origins, termination, venous valves, number of valves)
 - Deep veins
 - Inferior vena cava
 - Common iliac
 - External iliac
 - Internal iliac
 - Common femoral
 - Superficial Femoral
 - Profunda femoral
 - Popliteal
 - Calf veins incl. anterior tibial, posterior tibial, peroneal, soleal and gastrocnemius
 - Giacomini veins
 - Superficial veins
 - Long saphenous

- Short saphenous
 - Perforators
 - Venous sinuses
- Upper extremity veins (including anatomic variants)
 - Deep veins
 - Superior vena cava
 - Brachiocephalic
 - Subclavian
 - Internal jugular
 - Axillary
 - Brachial
 - Radial
 - Ulnar
 - Deep palmar arch
 - Superficial veins
 - Cephalic
 - Basilic
 - Median cubital
 - Median

Microscopic Anatomy, Microcirculation

- Microcirculation (capillaries)
- Arterial wall
- Venous wall
- Venous valves
- Atheromatous plaque

B. Test Validation (3%)

- Statistics
 - Sensitivity*
 - Specificity*
 - Positive and negative predictive value*
 - Accuracy*
 - Observer variance
 - Physiological variation
- Measurement of Stenosis
 - Diameter reduction*
 - Area reduction*

*Candidates will be expected to perform basic calculations in the theory exam

C. Peripheral Arterial Disease (28%)

Epidemiology of Peripheral Arterial Disease

- Epidemiology of atherosclerosis and peripheral arterial disease

Aetiology of Peripheral Arterial Disease

- Atherosclerosis
 - Definition
 - Natural history of atherosclerotic lesions
- Embolism
 - Definition
 - Arterial embolism

- Emboli to lower extremity
- Emboli to upper extremity
- Thrombosis
 - Definition
 - Acute arterial thrombus
 - Thrombosis

Patient History and Physical Examination

- Symptoms
- Skin changes
- Palpation
- Pulses
- Auscultation

Risk Factors and Contributing Diseases

- Age
- Sex
- Race
- Family history
- Smoking
- Diabetes
- Hypertension
- Hyperlipidaemia
- Renal disease
- Combination of risk factors and contributing diseases

Duplex Imaging

- Patient positioning, technique, interpretation, capabilities and limitations
- B-mode – including plaque morphology
- Pulse wave Doppler – including normal & pathological values
- Colour Doppler
- Power Doppler
- Quantitative interpretation
 - Pulsatility index
 - Resistive index
 - Transit time
 - Acceleration time / systolic rise time

Lower Limb Arterial Disease (duplex examination, epidemiology, aetiology, risk factors, patient history, physical examination, treatment)

- Chronic arterial occlusive disease
- Assessment of leg ischaemia
 - Pathologic physiology, symptoms
 - Claudication
 - Intermittent claudication, pain
 - Exercise testing
 - Specific clinical problems
- Ischaemic rest pain
- Critical leg ischaemia
- Tissue loss / necrosis
- Healing of ulcers and amputations
- Acute arterial occlusion – thrombosis, emboli, trash foot
- Aneurysms
- Cystic degeneration of the popliteal artery
- Popliteal entrapment

Upper Limb Arterial Disease (duplex examination, epidemiology, aetiology, risk factors, patient history, physical examination, treatment)

- ❑ Acute & chronic upper limb arterial disease
- ❑ Subclavian steal
- ❑ Thoracic outlet syndrome & other neurovascular compression syndromes
- ❑ Arterial occlusive diseases of the upper extremity
- ❑ Trauma, dissection, vasospasm, vibration, thermal injury
- ❑ Upper extremity aneurysms

Abdominal Arterial Disease (duplex examination, epidemiology, aetiology, risk factors, patient history, physical examination, treatment)

- ❑ Abdominal aortic and iliac artery aneurysms
 - Dissection
 - Thrombosis
- ❑ Renovascular hypertension
 - Renal artery stenosis & hypertension
 - Duplex evaluation of native renal vessels, inferior vena cava and renal transplants
- ❑ Mesenteric ischaemia
 - Superior Mesenteric artery
 - Other mesenteric arteries
 - Occlusive diseases

Global Arterial Diseases (duplex examination, epidemiology, aetiology, risk factors, patient history, physical examination, treatment)

- ❑ Non-atherosclerotic lesions
- ❑ Fibromuscular dysplasia
- ❑ Young patients with claudication
- ❑ Arteritis
- ❑ Vasospastic disorders
- ❑ Raynaud's syndrome and other vascular syndromes related to environmental temperature
- ❑ Cold sensitivity testing
- ❑ Digital ischaemia and vasospastic disease
- ❑ Dissection -intimal, medial, spontaneous, traumatic
- ❑ Entrapment syndromes
- ❑ Arterial syndromes, e.g. Buerger's, Takayasu's
- ❑ Arteriovenous fistulae
 - Malformations
 - Renal patients

Pressures

- ❑ Lower extremity
 - Segmental
 - Resting ankle
 - Stress test
 - Toe pressures
- ❑ Upper extremity
 - Arm pressures
 - Digital pressures
- ❑ Penile pressures – impotence, varicoele

Other Non-invasive Tests (patient positioning, technique, interpretation, capabilities, limitations)

- ❑ Doppler velocimetry
 - For upper & lower extremity (audible, analogue, waveforms & spectral analysis- capabilities, limitations)
 - Technique and qualitative interpretation
- ❑ Plethysmography (venous occlusion technique, volume pulse measurements - techniques, interpretation, capabilities, limitations)

- Upper extremity
- Lower extremity
- Digits

Other Methods of Investigation (methods, interpretation, limitations)

- ❑ Computed Tomography (CT)
- ❑ Magnetic Resonance Imaging (MRI) & Magnetic Resonance Angiography (MRA)
- ❑ Angiography & Digital Subtraction Angiography (DSA)

Therapeutic Intervention

- ❑ Medical therapy
 - Treatment of risk factors
- ❑ Surgical therapy
 - Endarterectomy
 - Bypass grafts
 - Aneurysm repair including pseudoaneurysm – Open & EVAR
- ❑ Non-surgical intervention
 - Angioplasty - balloon and laser
 - Atherectomy
 - Stents

D. Cerebral Arterial Disease (28%)

Epidemiology of Cerebro-Vascular Disease

- ❑ Incidence & severity

Patient History and Physical Examination

- ❑ Symptoms
- ❑ Neurological
- ❑ Bruits
- ❑ Pulses
- ❑ Transient symptoms
- ❑ Stroke

Risk Factors and Contributing Diseases

- ❑ Age
- ❑ Sex
- ❑ Race
- ❑ Family History
- ❑ Smoking
- ❑ Diabetes
- ❑ Hypertension
- ❑ Hyperlipidaemia
- ❑ Renal disease
- ❑ Combination of risk factors and contributing diseases

Aetiology of Cerebro-Vascular Disease

- ❑ Stenosis
 - Atherosclerosis
 - Site
 - Ulceration
 - Haemodynamic significance
- ❑ Embolism
 - Atrial fibrillation
 - Mitral stenosis

- Prosthetic heart valves and other causes
- ❑ Thrombosis
- ❑ Subclavian steal
- ❑ Dissection / fibromuscular dysplasia
 - Site
 - Mechanisms and causes
 - Age group
- ❑ Vasospasm
 - Link with subarachnoid haemorrhage

Duplex imaging (B-mode image, Doppler, colour, power, patient positioning, history, reporting, transducers, image orientation)

- ❑ Plaque
- ❑ Morphology and ulceration
 - Echogenicity
- ❑ Stenosis
 - Measurement (to include grading criteria)
 - Appearance
- ❑ Occlusion
 - Appearance
- ❑ Stents
- ❑ Post-operative imaging

Transcranial Doppler (patient positioning, technique, interpretation, capabilities, limitations, indications)

- ❑ Intraoperative monitoring
- ❑ Closure of patent foramen ovale (PFO)
- ❑ Sickle cell anaemia and STOP criteria

Other Non-invasive Vascular Tests (patient positioning, technique, interpretation, capabilities, limitations, indications)

- ❑ Indirect tests
 - Periorbital Doppler
 - Pressure ocular plethysmography
- ❑ Direct tests
 - Continuous wave Doppler (audible, analogue, waveforms, spectral waveforms)
 - Pulsed Doppler (audible, spectral waveforms)

Other Methods of Investigation (methods, interpretation, limitations)

- ❑ CT
- ❑ MRI & MRA
- ❑ Angiography & DSA

Therapeutic Intervention

- ❑ Medical therapy
- ❑ Surgical therapy
 - Endovascular therapy

E. Venous Disease (28%)

Epidemiology of Venous Disease

- ❑ Incidence

Aetiology of Venous Disease (Upper and Lower Limb)

- ❑ Valvular incompetence (superficial and deep)
- ❑ Thrombosis (superficial and deep)

Patient History / Signs and Symptoms (Upper and Lower Body)

- Acute deep vein thrombosis
- Chronic venous insufficiency

Risk factors

- Age
- Cancer
- Immobility
- Pregnancy
- Lifestyle
- Intravenous drug use
- Clotting disorders
- Previous deep vein thrombosis
- Trauma
- Acute paraplegia
- Cardiac insufficiency
- Body habitus

Physical Examination

- Varicose veins
- Skin changes
- Venous ulcers / mixed with arterial disease
- Lymphoedema
- Deep vein thrombosis (upper & lower limb)

Duplex Imaging (Upper & Lower Limb)

- Patient positioning, technique, interpretation, capabilities and limitations
- B-mode
- Pulse wave Doppler
- Colour
- Power
- Differential for DVT (Baker's cyst, branchial cyst, haematoma, popliteal aneurysm)

Pre-Operative Marking

- For vein to use in arterial bypass
- Prior to varicose vein surgery

Other Non-invasive Tests (patient positioning, technique, Interpretation, capabilities, limitations)

- Hand held Doppler examination
 - Upper limb
 - Lower limb
- Plethysmography
 - Strain gauge
 - Impedance
 - Photo
 - Air

Other Methods of Investigation (methods, interpretations, limitations)

- Venography
- CT scanning
- MRI
- Pulmonary embolism diagnosis
 - Nuclear medicine (V-Q scans)
 - D-dimer tests

Therapeutic Intervention

- ❑ Medical therapy
- ❑ Surgical therapy
- ❑ Non-surgical intervention
- ❑ Endovenous treatments
 - Venous ulcer dressing
 - Support stockings
 - Sclerotherapy, ablation techniques, ultrasound-guided foam sclerotherapy
- ❑ Lifestyle changes

F. Other Conditions (3%)

- ❑ Arteriovenous fistula
 - Traumatic
 - Congenital
 - Vascular access
- ❑ Trauma
- ❑ Compartment syndromes
- ❑ Carotid body tumours
- ❑ Carotid aneurysms
- ❑ Congenital vascular abnormalities
 - Klippel-Trenaunay syndrome
- ❑ Sickle cell anaemia
- ❑ Blood clotting disorders
- ❑ False aneurysms