

HST Training Programme and Curriculum

Vascular Surgery

SAC Malta

Contents:

Definition of Specialty

Programme Outline and Objectives

Annual Review of Competence progression

Completion of Training

The Syllabus

Definition of Vascular Surgery: The clinical and scientific discipline concerned with the diagnosis, treatment and prevention of diseases affecting arteries, veins and lymphatics excluding coronary arteries.

Programme outline and objectives

The purpose of the programme is to produce trained vascular surgeons who will have the knowledge, surgical expertise, and professional skills required for vascular consultant practice in Malta.

The programme consists of 2 parts over a period of 8 years (2 BST+6HST). This document focuses on the 6 HST training years. The main teaching hospital for this programme is Mater Dei University Hospital Malta. The trainees should spend 4 to 5 years at Mater Dei Hospital and 1 to 2 years must be spent in a high volume region in Europe or in any other prospectively approved centre in other countries outside Europe. This should allow adequate training and exposure to the appropriate number of specialized procedures preferably within an established training programme and which includes interventional radiology training. The trainee will be exposed to endovascular interventions during training in Malta including purely endovascular procedures as well as combined endovascular/open procedures such as Endovascular abdominal aortic aneurysm repair, arm loop fistula thrombectomy and angioplasty, common femoral endarterectomy with on table iliac stenting or SFA angioplasty, combined infrainguinal bypass surgery and distal angioplasty etc.

The syllabus below defines the requirements of the training programme in vascular surgery. It identifies distinct topics within the specialty and defines the competencies within each area at each level of training.

This is a trainee led program i.e. the amount of time the trainee spends in each section will depend on how much time he/she needs to complete the program within the provided environment.

The Structure of the Programme

The curriculum is competence based. It focuses on the trainee's ability to demonstrate the knowledge, skills and professional behaviours that they have acquired in their training through observable behaviours. Since it is competence based, it is not time defined and accordingly it allows these competences to be acquired in different time frames according to the ability of the trainee and the structure of the programme. The time points used are merely indicative.

Overview and Objectives of the Vascular Surgery Curriculum

Trainees in vascular surgery will complete BST 1 and 2 followed by a period of 6 years of higher specialist training. The objective of training is to ensure that at the end of training the trainee can work independently at the level of Consultant or equivalent. The syllabus includes elective and emergency Vascular Surgery topics which need to be completed by all trainees.

The syllabus also includes competences relating to upper and lower gastrointestinal surgery which are important for the management of intra-abdominal vascular conditions and their complications including aortic aneurysm and mesenteric ischaemia. These will normally be acquired during one year spent in General Surgery at HST 1 or 2 levels. Some highly specialised vascular and endovascular interventions are practised only in highly specialised centres and therefore it would not be required of the trainee to master these techniques but the trainee needs to be aware of these interventions to allow him/her to refer appropriately.

Vascular Surgery as a specialty

Vascular Surgery is a relatively new specialty which arose from General Surgery. Malta has a Vascular Surgery Specialist Register. The main areas of interest in Vascular Surgery are the following:

Aortic

Carotid

Limb Salvage

Venous

Vascular Access

Renovascular

Other less well developed areas in Vascular Surgery include:

Vascular Surgery of Trauma

Vascular Surgery of Childhood

Vascular Medicine

Academic Vascular Surgery

There is significant shared practice with other specialists including diabetologists, cardiologists and cardiac surgeons, interventional radiologists, nephrologists, geriatricians, neurologists, transplant surgeons and others.

Annual Review of Competence progression:

The progression of each trainee will be assessed towards the end of each year in the programme in order to establish whether the required level has been achieved and to certify that the trainee can progress to the next year of training. The following tools will be used to assess competence:

Directly observed procedures

Case based discussions

CEX – Clinical Examination

PBAs – Procedure based assessments

Training supervisor's reports

ARCP – every 6 months

Logbook

Knowledge and skills will be partly assessed via

FEBVS (Fellow of the European Board in Vascular Surgery) and/or Intercollegiate Specialty Examination in Vascular Surgery

Trainees would be able to sit this examination in their 5th or 6th year of training.

Academic participation:

Research and publications – including in peer reviewed journals

Presentation – national and international meetings

Teaching – informal ward based and in formal teaching

Service:

Audit and service improvement

Other managerial responsibilities as needed

The following are the possible outcomes of the review:

1. Trainee is achieving progress and competencies at the expected rate
2. Development of specific competencies required – additional training time not required
3. Inadequate progress by the trainee – additional training time required
4. Released from training programme with or without specified competencies
5. Incomplete evidence presented – additional training time may be required.
6. Gained all required competencies; will be recommended as having completed the training programme and for an award of a CCT. This review meeting will be used to outline the plan for the next training year and offer guidance accordingly.

Completion Of Training The Certificate for Completion of Specialist Training (CCST) is awarded by the Specialist Accreditation Committee (SAC) of Malta after recommendation by the Association of Surgeons of Malta following the advice of the postgraduate training personnel in the Department of vascular surgery. Eligibility for accreditation depends on achieving ALL of the following three requirements :

Confirmation of competence in the curriculum described below by the training consultants and/or lead clinician of the Department of Vascular Surgery.

Presentation of logbook

Exit Examination: EBSQ (Vasc) or Intercollegiate Specialty Exam in Vascular Surgery

The Syllabus

Contents of training

1. Basic sciences

Vascular and Endovascular Surgeons are expected to have a knowledge and

understanding of:

- Embryology, with particular emphasis on the causes and embryologic mechanisms

leading to common problems in vascular and endovascular practice;

- Anatomy, to understand the basic anatomy and competently recognise the applied anatomy in both clinical and operative settings relevant to individual surgeons practice;
- Physiology and biochemistry, to understand the effects of common surgical disease and injuries upon the normal structure and function of the various systems of the body, and including the physiological principles of fluid balance and nutrition of vascular surgical patients;
- Pathology including the principles of immunology and microbiology relevant to vascular surgical practice;
- Pharmacology including actions and toxic effects of drugs commonly used in perioperative and intraoperative care and in the management of critically ill vascular surgical patients;
- Epidemiology and statistics, to allow for critical appraisal of publications, reviews and audit programs.

2. Professional skills and attitude

Communication and behaviour

Clinical contact with the patient

Ability to take a history and carry out a clinical examination of a vascular patient.

Acquire counselling and communication skills

Ability to counsel parents / carers, patients and health professionals in the many varied situations in clinical PS such as information about prenatally diagnosed malformations, psychological effects of surgery and hospitalisation - particularly if prolonged - on the child development, and in stressful circumstances e.g. critically ill and dying patients.

Knowledge of transcultural communication, including informing patients and carers via

an interpreter.

Understand the role of staff management and of referral in particularly complex vascular surgical disorders

Knowledge of the role of allied medical and surgical specialties in the management of

Complex vascular surgical disorders; recognition of the complex conditions occurring beyond the limits of the experience and expertise gained by the trainee at the end of the training. Indications for appropriate referrals to Colleagues with specific expertise or to international designated centres for specified rare conditions.

3. Management

Acquire management skills in running a Vascular and Endovascular Surgery Unit

Some knowledge of management skills, including strategies for minimising intervention, costs, as well as avoiding unnecessary investigations.

Understand the socioeconomic and legal aspects of vascular surgical patients

Direct contact with the medical social worker and other groups involved in the postoperative care and discharge from hospital. Ability to deal with medical / legal ethics and medico-legal aspects of Vascular and endovascular surgery will also be required.

4. Teaching and research

Acquire teaching experience

Demonstrate the ability to teach medical and paramedical staff by experience and attending specific courses.

Develop research experience

Training in the analysis of data and an understanding of the principles and practice of clinical research, literature research and review.

5. Quality control

Understand the value of Audit Methodology and Specific Outcome Measures and Quality management

Recognising the values of audit and outcome measures and risk management, and ability to analyse results and participate in audit relevant to VES.

6.1 General Surgery

Surgical Infections and their Prevention

Surgically important micro-organisms; pathophysiology of the body's response to infection; septic shock; sources of surgical infection-prevention and control; principles of asepsis and antisepsis; aseptic techniques; sterilisation; antibiotic prophylaxis and therapy of infections.

Hepatitis and HIV carriers-special precautions; avoidance of infections transmitted by blood and body fluids.

Surgical Technique and Technology

Skin preparation; incisions and their closure; suture and ligature materials; patients' positioning; dressings; disorders of coagulation and haemostasis; diathermy-principles and precautions, alternative energy sources; lasers-principles and precautions; pathophysiology of wound healing; classification of surgical wounds; principles of wound management; scars and contracture; wound dehiscence; excision of cysts and benign tumours of skin and subcutaneous tissues; principles and techniques of biopsy and cytological sampling; modalities of tissue probe sampling for frozen section and paraffin histology, cytology and bacteriology; sampling of body fluids and/ or body

excretions for laboratory investigation, interpretation of results; drainage of superficial abscesses; basic principles of bowel, urinary tract and blood vessel anastomosis.

Organ Transplantation

The knowledge of the problems related to organ transplantation and vascular disease, and the use of allografts.

6.2 Vascular Anaesthesia

Anaesthesiology Techniques

Basic understanding of the different techniques of general anaesthesia; their indications and contra-indications; local and regional anaesthesia; explosive hazards relating to general anaesthesia and endoscopic surgery; central venous catheterisation; fluid replacement, infusion therapy and parenteral alimentation; blood transfusion and serology; blood coagulation disorders and substitution measures; blood gas analysis and acid base balance.

6.3 Critical Surgical illness and Intensive Care Medicine

The applied basic science relevant to the clinical assessment of critically ill vascular patients and to the understanding of disorders of function caused by haemorrhage, shock and sepsis: posttraumatic, preoperative, perioperative and postoperative intensive care medicine; cardiopulmonary and pharmacological resuscitation; single organ failure (heart, liver, kidney); multiple system organ failure (pathophysiology and treatment); respiratory failure, pulmonary oedema “shock lung”, acute respiratory distress syndrome; septic inflammatory response syndrome; malignant hyperthermia.

6.4 Vascular and EndoVascular Surgery

Vascular and Endovascular Surgical core activity covers elective and emergency procedures and their pre-, peri- and postoperative aspects.

VES includes surgical pathologies of the arterial, venous and lymphatics systems.

Within the domain of VES specific skills in the areas above written in italics are not included in the core curriculum in some European Countries; basic understanding of the principles of these subspecialties is nevertheless required.

6.5 Preoperative and postoperative care

Screening programs

Knowledge of the AAA screening

Laboratory tests

Knowledge of the haematological, immunological, biochemical and histo-pathological changes that accompany vascular surgical diseases. Ability to interpret and relate such knowledge and results to clinical scenarios.

Imaging

Knowledge of the indications for, and basic interpretation of, imaging techniques such as conventional X-rays, sonography, Doppler sonography, CT / MRI / PET scans and radio-isotope techniques in the investigation of the vascular surgical diseases.

Understanding of security measures in Radiology. Knowledge of radiation-sparing indications for X-ray investigations.

Endoscopic techniques

Knowledge of the indications and technical skills required for employing various endoscopic techniques such as gastrointestinal, for diagnostic and therapeutic purposes.

Handling of endoscopes and hygiene measures. Exposure to the opportunity of gaining

knowledge and experience of evolving technological methods.

6.6 Emergency Surgery

Care of critically ill vascular patient with underlying conditions including coordinated multidisciplinary management; clinical assessment of more or less severely injured vascular patient and to the understanding of disorders of function caused by trauma, thermal injuries, haemorrhage and shock.

Principles of pre-hospital care; clinical assessment of critically ill and severely injured vascular patient - scoring systems; management of the unconscious vascular patient; monitoring of vital functions in critically ill or severely injured vascular patient; initial management of surgical patients with multiple trauma; resuscitation and haemodynamic support; haemorrhage and shock; maintenance of airway in severely injured and unconscious patients; management of cranial, thoracic, abdominal and pelvic trauma; management of soft tissue trauma.

6.7 Abdominal Aortic Aneurysms

Basic Science

To describe the anatomy, physiology, pathology and natural history of diseases which affect the abdominal aorta and their subsequent effects.

Diagnostic Evaluation, Screening and Imaging

To understand the incidence and prevalence of aneurysmal disease according to age, co-morbidity and familial history.

To understand the natural history of abdominal aortic aneurysms.

To understand the genetic distribution of the disease.

To discuss the place and role of national screening programme for AAA

To understand the roles of ultrasound, angiography, CT and MRI/MRA in screening and in planning surgery.

Treatment

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the blood pressure control, renal function, subsequent cardiovascular events and patient survival

To describe the surgical management of complex aortic aneurysms (including horseshoe kidneys, aortocaval and aorto duodenal fistulae, mycotic, inflammatory and associated intraabdominal malignancy)

To have knowledge of both the immediate and long-term outcomes of surgery for aortic aneurysmal disease (including symptomatic, asymptomatic, thoracoabdominal, juxtarenal, infrarenal and recurrent)

To describe the management and prevention of surgical complications including spinal cord ischaemia, distal embolisation, myocardial infarction, acute renal failure, and graft infection

6.8 Peripheral Vascular Occlusive Disease (Acute and Chronic)

Basic Sciences (Acute and Chronic)

To describe the anatomy, physiology, pathology and natural history of diseases which affect the lower limb and upper limb arterial system and their subsequent effects.

To describe the mechanism of early and late graft failure, fibro-intimal hyperplasia and progression of disease.

Diagnostic Evaluation, Screening and Imaging

Acute Peripheral Ischaemia

To describe the signs and symptoms characteristic of acute arterial ischaemia and the differential diagnosis.

To discuss the role of IA DSA, MRA, CT and duplex imaging in the assessment of acute peripheral ischaemia.

To develop a management plan based upon the clinical history, blood investigation and imaging.

Diagnostic Evaluation

Chronic Peripheral Vascular Ischaemia

To describe the characteristic signs and symptoms of chronic peripheral vascular ischaemia relative to the patient's history and physical examination.

To discuss the various roles of imaging studies.

To describe the basis of the ankle brachial index and its use in the assessment of patients chronic peripheral vascular ischaemia

To develop a management plan based upon the clinical history, blood investigation and imaging.

Treatment

Acute Peripheral Vascular Ischaemia

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the management of acute peripheral vascular ischaemia including graft patency, limb salvage rates and overall patient survival

Treatment

Chronic Peripheral Vascular Ischaemia

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the

outcomes in terms of the management of chronic peripheral vascular ischaemia including graft patency, limb salvage rates and overall patient survival

Renal Artery Disease

Basic Sciences

To describe the anatomy, physiology, pathology and natural history of diseases which affect the renal arteries and their subsequent effects on renal function

Diagnostic Evaluation, Screening and Imaging

To describe the indications and limitations of imaging studies for renal disease:

To describe the role of renal protective agents in preventing contrast induced nephropathy

Treatment

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the blood pressure control, renal function, subsequent cardiovascular events and patient survival

Visceral Ischemia

Basic Sciences

To describe the anatomy of the mesenteric blood supply and the various pathological processes which result in acute and chronic disease.

Diagnostic Evaluation Acute Mesenteric Ischaemia

To describe the signs and symptoms of acute mesenteric ischaemia.

To develop a management plan based upon the clinical history, blood investigation and imaging.

Chronic Mesenteric Ischaemia

To describe the signs and symptoms of chronic mesenteric ischaemia.

To develop a management plan based upon the clinical history, blood investigation and imaging.

Treatment Acute Mesenteric Ischemia

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the management of intestinal necrosis, long term nutritional support and overall patient survival

Chronic Mesenteric Ischemia

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (patient survival, vessel patency, freedom from restenosis).

6.9 Carotid Artery Disease

Basic Sciences

To describe the anatomy, embryology and pathology of the arch, great vessels, and intracranial arteries.

Diagnostic Evaluation, Screening and Imaging

To describe the signs and symptoms of (i) transient ischemic attack (TIA), (ii) reversible ischemic neurologic deficit (RIND), (iii) stroke in evolution and (iv) completed stroke.

Treatment

To develop a management plan based upon the clinical history, blood investigation and imaging.

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the

outcomes (complications, stroke rate, restenosis and patient survival).

Innominate, Subclavian and Vertebrobasilar Arterial Disease

Basic Sciences

To describe the anatomy of the innominate, subclavian and vertebral arteries

To describe the embryology of the above and relate the common anomalies to the embryology.

To describe the pathophysiology of atherosclerosis, trauma, dissection, arteritis and radiation as it applies to the innominate, subclavian and vertebrobasilar arteries.

Diagnostic Evaluation, Screening and Imaging

To describe the symptoms and signs of brain ischaemia and that of the upper extremity

To describe the role of non-invasive tests in the identification of these lesions. of the innominate, subclavian and vertebrobasilar arteries and how these tests may preclude

Define the most appropriate diagnostic steps for the evaluation and for the choice of treatment of these conditions. or indicate arteriography.

To discuss the value and shortcomings of CT and MRA/MRI imaging techniques in the diagnosis of these entities.

Treatment

To discuss the options for (a) medical treatment, (b) surgical repair or (c) endovascular repair and the outcomes (complications and patient survival).

6.10 Thoracic Outlet Syndrome

Basic Sciences

To describe the anatomy of the thoracic outlet, including the anatomic variations in bones, muscles, and cervical ribs.

Diagnostic Evaluation, Screening and Imaging

To describe the symptoms associated with thoracic outlet syndrome (arterial, venous, neurogenic).

To discuss the role of imaging in TOS

To develop a management plan based upon the clinical history, blood investigation and imaging.

Treatment

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, stroke rate, restenosis and patient survival).

6.11 Diabetic Foot

Basic Sciences

To define the normal arterial and venous anatomy of the circulation of the foot.

To demonstrate an understanding of the aetiology of the underlying problems of the diabetic foot.

To outline factors that can affect blood glucose levels in the peri- and postoperative period

Diagnosis, Screening and Imaging

To demonstrate an understanding of the presenting signs and symptoms of the diabetic foot:

To discuss the role of non-invasive and invasive imaging in the diabetic foot

To develop a management plan based upon the clinical history, blood investigation and imaging

Treatment

To discuss the indications for treatment and the various options including medical

management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, graft patency, limb salvage and patient survival).

6.12 Management of Vascular Trauma and Iatrogenic Injuries

Basic Sciences

To describe the mechanism of vascular injury and sequelae thereof to the upper extremity, thoracic aorta, abdominal aorta and its branches, and lower extremities.

Diagnostic Evaluation and Imaging

To describe the characteristic signs and symptoms of acute vascular (arterial and venous) compromise secondary to trauma .

To describe the role of imaging in the management of vascular trauma, and associated fractures and neurological injuries.

To develop a management plan based upon the clinical history, blood investigation and imaging.

Treatment

To discuss the indications for treatment of acute arterial and venous injuries and complications thereof including nerve and bony injuries, AVF and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, graft patency, limb salvage and patient survival).

6.13 Chronic Venous Disease

Basic Sciences

To describe the normal venous anatomy of the lower and upper limbs

To describe the embryology of venous development and the important variants.

To describe the physiology and common pathological conditions which affect the venous systems.

Diagnostic Evaluation, Screening and Imaging

To describe the "CEAP" classification system of chronic venous insufficiency: Clinical condition, aetiology, anatomic distribution and pathophysiology.

To discuss the aetiologic categories of venous dysfunction:

To discuss the role of noninvasive and invasive evaluation of the venous system including ascending & descending venography, photoplethysmography, air plethysmography, and duplex scanning.

treatment

To discuss the indications for treatment of acute and chronic venous disease including the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, graft patency, limb salvage and patient survival).

To describe the types of available therapy for superficial venous insufficiency (varicose veins) including elastic stockings, elevation, sclerotherapy, laser treatment, stab avulsion, stripping.

6.14 Lymphoedema

Basic Sciences

To describe the anatomy of the adult lymphatic system from the level of the terminal lymphatics to the cisterna chyli

To describe physiological determinants of lymph flow, including intrinsic contractility of lymph vessels, increased interstitial pressure, muscular activity, arterial pressure, respiratory pressure, and gravity.

To discuss the consequences of the loss of chyle into body cavities or through a chylocutaneous fistula.

Diagnostic Evaluation, Screening and Imaging

To describe clinical classifications of lymphoedema

To discuss the role of imaging in patients with lymphoedema

To develop a management plan based upon the clinical history, blood investigation and imaging.

Management of Chronic Lymphoedema

To discuss the indications for treatment of chronic lymphoedema including the various options including medical management, open surgery (including approaches) and the outcomes (complications, graft patency, limb salvage and patient survival).

6.15 Endovascular Therapy

To understand the basic principles of interventional radiological techniques.

To demonstrate a working knowledge of the equipment, techniques, technical problems, troubleshooting and recovery techniques.

To demonstrate a working knowledge of the physical properties of devices including wires, catheters, balloons, coils, stents, stent-grafts, filters and delivery systems.

Imaging Modalities

To understand radiation physics, safety, risks, cellular effects, somatic effects, dose responses, monitoring, shielding and variations in x-ray equipment as they relate to both patients and personnel including preventative measures for safety.

To understand the basic principles and equipment used for fluoroscopy and arteriography.

To demonstrate a working knowledge of contrast media, road-mapping, imaging techniques, measurement techniques, parallax, hand and power injection techniques and film sequencing.

To demonstrate a working knowledge of magnetic resonance imaging, computerized axial tomography including helical techniques with 3 dimensional reconstructions and angiography.

Basic Techniques

To obtain a working knowledge of basic endovascular techniques including the use of needles, catheters, guidewires, dilators and introducer techniques, balloons, stents and intrarterial drugs

To have a working knowledge of adjunctive interventional procedures required as retrieval, recovery or "bail out" procedures in endovascular surgery including endovascular and open techniques.

6.16 Miscellaneous

6.16.1 Cardiac Disease

To discuss association of coronary artery and peripheral vascular disease.

To understand the risk factors predictive of perioperative myocardial infarction or cardiac death.

To describe the frequency of severe CAD in patients with symptomatic peripheral vascular disease.

To describe the early and late cardiac mortality figures following major vascular surgery.

Anatomy and Pathophysiology

To describe normal coronary artery anatomy and the pathophysiology of angina, heart failure and valvular pathologies.

Diagnosis

To understand the signs and symptoms of chronic stable angina, unstable angina, myocardial infarction and congestive heart failure.

To describe the risks of operation in a patient with a recent myocardial infarction, unstable angina, or poorly compensated congestive heart failure.

To describe the current methods for screening for coronary artery disease, and their limitations.

To identify which patients should undergo a preoperative test for coronary artery disease

To discuss the need for coronary angiography prior to vascular surgery.

To discuss the operative approach in relation to the patients known cardiac risk.

To understand when patients are most at risk of a perioperative MI.

Treatment

To recognise the need for close peri-operative monitoring, the management of Non ST elevation myocardial infarction and the need for risk factor modification in the long term.

To discuss the indications for CABG prior to peripheral vascular surgery.

6.16.2 Pulmonary Disease

To describe the relationship between poor lung function and prolonged vascular procedures, intra-abdominal and thoracic incisions, and poor left ventricular function.

To understand that cardiac and other co-morbid conditions are more important in determining postoperative pulmonary complications than pre-existing pulmonary

disease

Diagnosis

To describe the risk factors for pulmonary disease,

To describe and demonstrate the signs and symptoms of COPD.

To understand the limited role of clinical assessment in predicting which patients will have a postoperative pulmonary complication.

To understand the role of preoperative pulmonary function studies in identifying the aetiology and treatment alternatives.

Treatment

To describe how to reduce the pulmonary risk of a vascular operation by the choice of operation and anaesthesia.

To describe which pulmonary conditions may benefit from the perioperative use of steroids, bronchodilators, antibiotics and inhalers.

To describe the causes and treatment of the adult respiratory distress syndrome (ARDS)

6.16.3 Coagulation Disorders

To be familiar with the commonly used drugs (heparin, LMWH, warfarin and antiplatelet drugs) in vascular surgery including their complications (Heparin-induced Thrombocytopenia (HIT), excessive bleeding and the need for blood products.

To be familiar with the common hypercoagulability syndromes, the investigation and treatment thereafter.

Premature atherosclerosis

To identify possible premature atherosclerosis and decide on consultation with a vascular internist / angiologist where appropriate.

To analyze possible causes of premature atherosclerosis / vascular occlusions

(vasculitis, cardiolipine antibodies, antilupus, etc.

6.16.4 Vascular Access

Anatomy and Pathophysiology

To describe the arterial and venous anatomy of the common arteriovenous fistula of the upper and lower extremities.

To describe the haemodynamic and physiologic effects of creating an arteriovenous fistula. To discuss the anatomic and physiologic aetiologies for arterial steal,

Diagnostic Evaluation, Screening and Imaging

To develop a management plan based upon the clinical history, blood investigation and imaging.

Treatment

To discuss the indications for primary and secondary vascular access and complications and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, graft patency, limb salvage and patient survival).

6.16.5 Sympathectomy

Basic Science

To describe the anatomy of the autonomic nervous system and the relationship between the sympathetic fibers and the abdominal aorta and iliac vessels.

To describe the functions of the sympathetic nervous system and the pathologic conditions resulting from abnormal sympathetic activity.

To describe the potential beneficial effects of sympathetic ablation and possible adverse side effects.

Diagnostic Evaluation and Imaging

To develop a management plan based upon the clinical history, blood investigation and imaging.

Surgical Technique

To discuss the indications for upper and lower limb sympathectomy and complications and the various options including open and closed techniques of sympathectomy .

6.16.6 Diagnosis and Management of Miscellaneous Vasculogenic Problems

These include Raynauds, Causalgia/Reflex Sympathetic dystrophy, arteritis, popliteal entrapment, cystic adventitial disease, fibromuscular disease, mycotic disease, vasospastic disorders, arteriovenous malformations, intravenous drug abuse.