

Curriculum

For
(Residency Program)
Master of Surgery (Vascular Surgery)
Phase A



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(BSMMU)
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1. Introduction:

Vascular Surgery is a new surgical specialty that has evolved out of the specialty of general surgery. During recent years, and in common with many other disciplines, there has been a trend towards further specialisation within general surgery. This has led to the development of Vascular Surgery as a separate stand alone specialty. The major areas of special interest associated with the specialty of Vascular Surgery are Aortic, Carotid, Limb salvage, Venous Vascular Access, Renovascular, Each involving the acquisition of both open and endovascular/endovenous competencies to include relevant imaging skills. In addition to these clearly defined disease-based areas of special interest there are others that are less well developed within the syllabus but represent substantial areas of practice like Vascular Surgery related to trauma, The Vascular Surgery of Childhood, Academic Vascular Surgery, Vascular medicine. The variations in the scope of practices within the specialty are highly variable and largely shaped by local circumstances, the needs of the service and the personal development of the surgeons delivering those services. During 600 to 800 B.C. Indian surgeon Shushruta wrote the first surgical text book and control haemorrhage. The first vascular reconstruction was Hallowells closure in 1759. The first direct vascular anastomosis was nicol Eck's lateral anastomosis performed in 1877. The principle of modern vascular anastomosis was established by Alexis carrel and Guthrie. All vascular surgeons will be given the opportunity to develop an area of special expertise and some will then go on to include that area as a major part of their consultant practice as their individual careers develop. There is also significant shared practice with other specialties and subspecialties such as interventional radiology, cardiology, cardiothoracic surgery, diabetic medicine, care of the elderly medicine, renal medicine, skin and VD, transplant surgery and stroke medicine

2. Objectives of vascular surgery:

2. 1.General Objectives:

The educational and training process aims to produce vascular surgeons who:

- Can address all aspects of the healthcare needs of patients and their families having vascular problems and have acquired and developed leadership and team working skills, especially with other healthcare professional, to deliver patient centered care.
- Are able to act as safe independent practitioners whilst recognizing the limitation of their own expertise and are able to recognize their obligation to seek assistance of colleagues where appropriate.
- Should be aware of the procedures and able to take appropriate action, when things go wrong, both in their own practice and in that of others.
- Can take advantage of information technology to enhance all aspects of patient care and can develop management plans for the "whole patient" and maintain knowledge in other areas of medicine which impinge on their specialty of practice.
- Apply appropriate knowledge and skill in the diagnosis and management of patients.
- Establish a differential diagnosis for patients presenting with medical problems by the appropriate use of the clinical history, examination and investigations and are competent to perform the core investigations and procedures required in their specialties.
- develop clinical practice which is based on an analysis of relevant clinical trials and to have an understanding of their research methodologies
- Are able to apply the knowledge of biological and behavioral sciences in clinical practice and have developed the skills of an effective teacher.
- acquire sufficient theoretical knowledge (the “core” knowledge defined in the syllabus) and will be able to take full history and be competent in performing a full physical examination and formulate a working diagnosis
- decide whether the patient requires ambulatory care or hospitalization or referral to other health professionals
- become competent in interpreting and evaluate the presenting symptoms and physical signs and be able to interpret and evaluate the laboratory reports lying with the patients
- to know the cardinal features of disorders commonly encountered in clinical practice and plan investigations and interpret them
- formulate management plan for common surgical condition and decide and implement suitable treatment along with maintaining follow up of patients
- Maintain records of patients and present the patient’s clinical data in both detailed and salient form highlighting the problem(s).
- competent and confident enough to handle common emergencies and common chronic conditions including rehabilitation

- develop skill of good prescribing and establish appropriate doctor-patient relationship
- be able to maintain the ethical and professional standard
- be able to advise the community on promoting health and preventing illness and well conversant with commonly prescribed drugs

2.2. Specific Objectives:

Vascular surgeons treat patients with peripheral vascular disease i.e. vascular disease affecting the vessels of the neck, trunk and limbs. It is characterised by a high volume of urgent and emergency admissions and the requirement for an extensive supporting infra structure from interventional radiologists, cardiothoracic surgeons, cardiologists and ultrasonographers.

There is a close relationship between vascular surgical practice and vascular medicine and interventional radiology. Endovascular procedures are often performed jointly by surgeons and radiologists. The interface between the provision of vascular surgical services and renal transplantation, especially with regard to access for haemodialysis, has always been close and is likely to remain so.

Most vascular consultants will develop areas of special interest either as a part of their training or following appointment to post. These may include-

- Superficial venous disease
- Deep venous disease
- Lower limb ischaemia (acute and chronic)
- Upper limb ischemia (acute and chronic)
- Aortic aneurysmal disease
- Peripheral artery aneurysms
- Vascular access
- Renovascular disease
- Carotid artery disease
- Mesenteric vascular disease
- Vascular trauma
- Hyperhidrosis
- Lymphoedema
- Endovascular surgery
- Thoracic outlet syndrome
- Vascular anomalies
- Vasospastic disorders and
- Vasculitis

3. The programme outline:

3.1. Entry criteria:

Candidates for MS course must have-

- Bachelor of Medicine and Bachelor of Surgery (MBBS) degree or its equivalent recognized by the Bangladesh Medical and Dental Council and Bangabandhu Sheikh Mujib Medical University.

- At least one year full time internship in Medical College or Institutions recognized by BSMMU.
- Candidates having FCPS (Surgery) / MS (Surgery) or equivalent qualification will be enrolled directly in phase B.

3.2. Selection procedure :

- Admission test will be conducted by BSMMU for the selection of the candidate (both from home and oversea).
- Written admission test will be taken on MCQ type questions set on basic medical science and surgical science.
- Candidates having FCPS (Surgery) / MS (Surgery) or equivalent qualification will be enrolled directly in phase B through a separate admission test.
- A committee of BSMMU will select foreign student.

4. Curriculum structure:

Specialized training in vascular surgery consists of core general and higher speciality training. The residency training in vascular surgery is underpinned by three components (Curriculum) which guide the nature, scope and direction of vascular surgery training. They are-

- Core general specialty training: Phase A
- Higher cardiology subspecialty training: Phase B
- Generic Skills: Phase A and Phase B

4.1. Phase A: Core Speciality Training: (2 years)

Provides foundation training in broad specialties which include components of educational and training programme in relevant fields of Basic Medical and Life Sciences and General (Internal) surgery. This training program will focus on developing core skills and knowledge, introducing relevant disciplines of surgery and providing a foundation for consolidation and further study within advanced training.

The aim of the Phase A Training program is to produce Trainees capable of entering the specialty training program in vascular surgery (Phase B). Such Trainees are differentiated from others by high level of medical basic science knowledge and generic skills development.

They will have:

- the ability to diagnose and manage all common acute surgical presentations and refer as appropriate skills, including communication and working as a team, in the management of complex and chronic medical conditions
- a good breadth of competence and some depth of competence across different medical specialties

4.2. Phase B: Advanced Speciality Training: (3 years)

In-depth speciality-specific educational and training programme in this phase will make the resident competent and prepare them for the speciality qualification. It will provide educational programme covering the speciality of vascular surgery and its sub-specialities, Biostatistics, Research Methodology and Medical Education along with rotation specific clinical training.

5. Learning and Teaching:

Adult learning by –

- reflecting and building upon their own experiences
- identifying what they need to learn
- being involved in planning their education and training
- evaluating the effectiveness of their learning experiences

For vascular surgical trainees to maximize their learning opportunities, it is important that they work in a good learning environment. This includes encouragement for self-directed learning as well as recognizing the learning potential in all aspect of day to day work. There should be a positive attitude to training with learning form peers being encouraged. There should be active involvement in group discussion as this is an important way for doctors to share their understanding and experiences. A supportive open atmosphere should be cultivated and questions welcomed. The bulk of learning occurs as a result of clinical experiences (experimental learning, on-the-job learning) and self-directed study. The degree of self-directed learning will increase as trainees became more experienced. Lectures and formal education sessions make up only a small part of the postgraduate training in vascular surgery. Some of the learning opportunities are listed below:

- Experiential learning opportunities
- Training in practical procedures
- Small group learning opportunities
- One-to-one teaching
- Formal training
- Personal study
- Teaching others

6. Research:

Development of research competencies forms an important part of the Residency Programme curriculum as they are an essential set of skills for effective clinical practice. Undertaking research helps to develop critical thinking and the ability to review medical literature. Clinical research also allows development of particular expertise in one area of vascular surgery allowing more in depth knowledge and skills and helping to focus long tern career aims and interests. It is therefore likely that many residents with the

appropriate aptitude and desire will wish to take the opportunity to do clinical research.

This residency training programme requires in-training clinical research leading to a Thesis. To enable the residents in clinical research and thesis writing the programme has included an educational domain of biostatistics and research Methodology.

7. Assessment:

Assessments will be supported by structural feedback for trainees. The integrated assessment system comprises workplace-based assessments and knowledge-based assessment. Assessment tools will be both formative and summative and will be selected on the basis of their fitness for purpose.

7.1. Assessment system:

- Assessment will be done for judgment of competency and certification.
- There will be both formative and summative assessments for successful completion of the program.
- Formative assessment is an assessment 'for' learning and is conducted throughout the training phases.
- Formative assessment will be carried out for tracking the progress of residents, providing feedback, and preparing them for final assessment (Phase completion exams)
- Summative assessment will be carried out at the completion of each phase. Phase B examination will be considered as exit examination.
- Phase completion examinations will have three components: written, clinical and oral.
- A Thesis must be completed to be eligible for appearing Phase B examination.
- After evaluation of the Thesis by internal and external experts, the Resident has to appear before a Board of Examiners to defend the thesis.

7.2. Assessment Methods:

The following assessment methods are used in the integrated assessment system:

7.2.1. Formative assessment:

Formative assessment will be conducted throughout the training. It will be carried out for tracking the progress of residents, providing feedback and preparing them for final assessment (phase completion exams).

Continuous (day-to-day) formative assessment in classroom and workplace settings provides guide to a residents learning and faculty's teaching/learning strategies to ensure formative lesson/training outcomes.

Periodic formative assessment is quasi-formal and is directed to assessing the outcome of a block placement or academic module completion. The

contents of such examination include block units of the training curriculum and Academic Module units of the academic curriculum.
 End of block Assessment (EBA) is a periodic formative assessment and is undertaken after completion of each training block, assessing knowledge, skills and attitude of the residents.

7.2.2. Summative (Phase-A final) examination:

Phase A final examination will be common for surgery and allied and will have following components:

- Written examination (SAQ/SEQ)
- Clinical examination:
 - ♣ Long case (1)
 - ♣ Short case (4)
 - ♣ Structured clinical assessment (SCA-10)

7.2.3. End Block Examination sheet:

Category of assessment	Assessment scale (Score/Grade)	Score/Grade achieved
Written examination	Total marks 50	
Clinical examination	Total marks 100	
Medical record view	Satisfactory : 80-100% Satisfactory completed Unsatisfactory: <80% Satisfactory completed	
Log book assessment	Complete : 80-100% of the task were satisfactorily completed Recoverable : 60-79% of the task were satisfactorily completed Irrecoverable: <60% of the task were satisfactorily completed	
Portfolio assessment	Up to date: 80-100% completed and satisfactory Deficient : <80% completed and satisfactory	
Resident work-based competence		

assessment: Clinical competency Communication skill Scholarship Professionalism	Average Rating scale 1 to 10	
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8. Supervision:

All elements of work in training rotation must be supervised with the level of supervision varying depending on the experience of the trainee and the clinical exposure and case mix undertaken. Outpatient and referral supervision must routinely include the opportunity to personally discuss all cases. As training progresses the trainee should have the opportunity for increasing autonomy, consistent with safe and effective care for the patient. Trainees will at all times have a named Supervisor, responsible for overseeing their education.

9. Appraisal

A formal process of appraisals and reviews underpins training. This process ensures adequate supervision during training provides continuity between rotations and different supervisions and is one of the main ways of providing feedback to trainees. All appraisals should be recorded in the portfolio.

10. Rotations for the Residents of MS (Vascular Surgery)-Phase A :

Total duration: 24 months

Block	Department	Duration
01	Vascular Surgery	3 months
02	General Surgery	3 months
03	General Surgery	3 months
04	A. Cardiology	1 month
	B. Hematology	1 month
	C. Vascular catheter laboratory	1 month
05	A. Nephrology	1 month
	B. General ICU	1 month
	C. Cardiac Surgery	1 month
06	A. Orthopedic emergency	1 month
	B. Plastic surgery	1 month
	C. Pediatric surgery	1 month
07	A. Endocrine medicine	1 month
	B. Radiology and Imaging	1 month
	C. Skin and VD	1 month

08	Protected (Preparation Examination)	time for	3 month
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11. Outline of core syllabus:

Basic science:

♣ Applied anatomy:

- Development and embryology
- Gross anatomy of the organs and other structures
- Imaging anatomy
- Basic genetics about chromosome and understand protein synthesis

This will include anatomy of thorax, abdomen, pelvis, perineum, limbs, spine, head and neck as appropriate for surgical operations that the trainee will be involved with during core training.

♣ Physiology:

General physiological principles including:

- Homeostasis
- Thermoregulation
- Metabolic pathways and abnormalities
- Blood loss and hypovolaemic shock
- Sepsis and septic shock
- Fluid balance and fluid replacement therapy
- Acid base balance
- Bleeding and coagulation
- Nutrition

This will include the physiology of specific organ systems relevant to surgical care including the cardiovascular, respiratory, gastrointestinal, urinary, endocrine and neurological systems.

♣ Pharmacology:

- The pharmacology and safe prescribing of drugs used in the treatment of surgical diseases including analgesics, antibiotics, cardiovascular drugs, antiepileptic, anticoagulants, respiratory drugs, renal drugs, drugs used for the management of endocrine disorders (including diabetes) and local anaesthetics.
- The principles of general anaesthesia
- The principles of drugs used in the treatment of common malignancies

♣ Pathology:

General pathological principles including:

- Inflammation
- Wound healing
- Cellular injury
- Tissue death including necrosis and apoptosis
- Vascular disorders
- Disorders of growth, differentiation and morphogenesis
- Surgical immunology
- Surgical haematology
- Surgical biochemistry
- Pathology of neoplasia
- Classification of tumours
- Tumour development and growth including metastasis
- Principles of staging and grading of cancers
- Principles of cancer therapy including surgery, radiotherapy, chemotherapy, immunotherapy and hormone therapy
- Principles of cancer registration
- Principles of cancer screening
- The pathology of specific organ systems relevant to surgical care including cardiovascular pathology, respiratory pathology, gastrointestinal pathology, genitourinary disease, breast, exocrine and endocrine pathology, central and peripheral, neurological systems, skin, lymphoreticular and musculoskeletal systems

♣ Microbiology:

- Surgically important micro organisms including blood borne viruses
- Soft tissue infections including cellulitis, abscesses, necrotising fasciitis, gangrene
- Sources of infection
- Sepsis and septic shock
- Asepsis and antisepsis
- Principles of disinfection and sterilization
- Antibiotics including prophylaxis and resistance
- Principles of high risk patient management
- Hospital acquired infections

♣ Imaging:

- Principles of diagnostic and interventional imaging including xrays, ultrasound, CT, MRI. PET, radionuclide scanning

Block-01: Vascular Surgery:

The trainees will be able to:

- Understand the importance of history-taking and physical examination in the overall assessment of the surgical patient
- Understand the significance of a structured format for history-taking
- Enumerate the components of vascular surgery.
- Recognize symptoms relevant to vascular diseases, identify salient points and understand their significance.
- Use the information to formulate initial diagnosis and evaluate the severity of the likely disease process.
- Identify confounding symptoms of similar nature produced by non-vascular diseases.
- Obtain history of the patients pertinent to the evaluation for operation or information that would militate against operative interventions or dictate the choice of therapy.
- Understand the significance of observational signs, such as skin colour and texture, swelling, gangrene and ulcers.
- Detect and evaluate peripheral pulses, bruits, thrill, skin temperature, edema, tissue turgor and vascular dimensions.
- Develop the skills necessary to palpate the abdomen, neck and the extremities in order to localize sites of tenderness, recognize the presence of masses and abnormal pulsations
- Interpret physical findings, understand how they contribute to the diagnosis and recognize their limitations and be aware of other diseases that might mimic the findings.
- State the clinical examination of the vascular system.
- Understand the contribution of ankle-brachial index.
- Understand the incidence and prevalence of vascular diseases.
- Develop a working knowledge of equipments, technical problems, trouble shooting and recovery techniques in technologies used in vascular and endovascular surgery.
- Understand the physical properties of the devices including their clinical applications, implantations, biocompatibility, and tissue reactions and over all use in treatment of vascular diseases.
- Understand the indications, application, complications, management and results of imaging modalities including ultrasound, angiogram, CT scan, MRI.
- Understand the techniques used for pre operative, intra operative and post operative vascular imagings.
- Understand the accuracy, utility, limitations and clinical implications of each modalities of imaging techniques.

A. Duplex Scan:

The trainees will be able to:

- Explain the biophysics of ultrasound.
- understand the physiologic basis of vascular ultrasounds and their limitations
- Understand the basic principles of duplex scan, colour flow imaging and endovascular ultrasound.
- Develop a working knowledge of B-mode imaging, color flow and imaging
- Familiar with Doppler frequency spectral analysis.
- Interpret duplex scans.
- familiar with the intra-operative use of duplex scan

B. Arterial diseases :

♣ The trainees will be able to-

- Describe the presentations and diagnosis of acute arterial disease like thrombo-embolic disease, athero-embolic disease, systemic complication of reperfusion injury, compartment syndrome, burst of arterial aneurysm, arterial dissection.

♣ The trainees will have idea about chronic arterial diseases-

i. Arterial occlusive disease:

These includes-

a. Atherosclerotic arterial occlusive disease:

The students will be able to:

- Define atherosclerosis
 - Mention the risk factors of atherosclerosis.
 - Explain the pathophysiology of atherosclerosis.
 - Describe the systemic effects and clinical presentations of atherosclerosis and its treatment
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- Describe the clinical presentations and diagnosis of aorto-iliac disease, combined aorto-iliac and infra-inguinal occlusive disease, failing arterial bypass graft.
 - be familiar with endovascular options for the treatment of aorto-iliac disease
 - Understand the necessity for post revascularization non-invasive haemodynamic assessment and criteria for reintervention for a failing or failed bypass.

b. Obliterative endarteritis:

The trainees will be able to:

- Describe the clinical presentations and diagnosis of obliterative endarteritis.

c. Thromboangitis obliterans(Burgers disease):

The trainees will be able to-

- Describe the clinical presentations and diagnosis of Burgers disease.

ii. Arteritis of different pathology i.e. Giant cell arteritis, Takayasu arteritis, temporal arteritis:

The trainees will be able to-

- Describe the clinical presentations and diagnosis of arteritis of different pathology.

iii. Juvenile obliterative aortitis:

The trainees will be able to-

- Describe the clinical presentations and diagnosis of Juvenile obliterative arteritis.

iv. Diabetic angiopathy

The trainees will be able to:

- Describe the natural history and pathophysiology of Diabetic angiopathy.
- Describe the pathophysiology of ischemia, neuropathy and infection in diabetic foot

v. Vasospastic disease i.e. Raynauds phenomenon and Raynauds disease:

The trainees will be able to-

- Describe the clinical presentations and diagnosis of vasospastic disease.

vi. Aneurysm

The trainees will be able to:

- Define aneurysm
- Classify aneurysms.
- Describe the incidence and prevalence of aneurysm according to age.
- Explain the natural history of abdominal aortic aneurysms.
- Describe the genetic distribution of the aneurysm disease and the role of aging and atherosclerosis in aortic enlargement.
- Understand the roles of ultrasound, angiography, CT-scan and MRI in screening and planning management of aneurysm.
- Describe the presentations and diagnosis of aortic and iliac artery aneurysms, venous aneurysms, extra-cranial carotid aneurysms, splanchnic and renal artery aneurysm, thoraco-abdominal aortic aneurysms, thoracic aortic aneurysms.

vii. Vascular neoplasm

The students will be able to:

- Classify vascular neoplasms.
- Describe pathophysiology of vascular neoplasms.
- Classify Hemangioma
- Explain clinical importance of Kaposiform hemangioendothelioma, Kasabach-Merritt syndrome and PHACE syndrome.
- Describe the clinical presentations, diagnosis and management of hemangiomas and vascular malignancies.

viii. Carotid artery occlusive Disease

The trainees will be able to:

- Define hemispheric and non-hemispheric symptoms.
- Differentiate among transient ischemic attack (TIA)
- Describe the arterial and neurologic examination and their importance in caring for patients with carotid artery disease
- Describe the relationship between carotid artery atherosclerosis and the clinical syndrome of vertebro-basilar insufficiency.
- Describe the normal Doppler signals in the internal and external common carotid arteries.
- Discuss the risk and benefits of relying on duplex ultrasound and eliminating angiography.
- Describe the presentations and diagnosis of atherosclerotic carotid artery occlusive disease, carotid artery fibromuscular dysplasia, carotid artery coils and kinks, carotid artery radiation injury, ischemic stroke, spontaneous carotid artery dissection.

ix. Carotid body tumor

The trainees will be able to-

- Describe the clinical presentations and diagnosis of carotid body tumor
- Management of carotid body tumor

C. Venous disease:

♣ Acute venous conditions:

The trainees will be able to describe the presentation and diagnosis of-

- i. Venous injury
- ii. Deep vein thrombosis
- iii. Thrombophlebitis

♣ Chronic venous conditions:

The trainees will be able to describe the presentation and diagnosis of-

- i. Venous malformation
- ii. Varicose vein
- iii. Klippel trnaunay syndrome
- iv. Saphena varix

♣ Chronic venous disease:

The trainees will be able to:

- Classify Chronic Venous Disease (CVD).
- Mention the causes of chronic venous disease.
- Mention the CEAP classification of chronic venous insufficiency.
- Mention the Well's risk factor grading of chronic venous insufficiency.
- Describe the presentations and diagnosis of varicose vein.

D. Lymphatic disorder:

The students will be able to describe the presentation and diagnosis of-

- a. Lymphoedema
- b. Cystic hygroma
- c. Lymphangioma circumscriptum
- d. Lymphorrhea

E. Thoracic outlet syndrome

The trainees will be able to:

- Describe the presentations and diagnosis of arterial complications of thoracic outlet syndrome.
- Describe the presentations and diagnosis of venous complications of thoracic outlet syndrome.
- Describe the presentations and diagnosis of neurological complications of thoracic outlet syndrome.

F. Vascular trauma

The trainees will be able to:

- Describe the presentations and diagnosis of vascular trauma.
- Describe the presentations and diagnosis of iatrogenic vascular trauma.

G. Vascular malformations

The students will be able to:

- Classify birthmarks.
- Classify vascular malformations.
- Describe pathophysiology, natural history, clinical presentations and diagnosis of vascular malformations
- Explain the overgrowth syndromes involving vascular system

H. Arterio-venous fistula:

The trainees will be able to diagnose and manage-

- a) Congenital arteriovenous fistula
- b) Acquired arteriovenous fistula

The trainees will also be able to

- State the principles of vascular access surgery
- mention the types of arterio- venous fistula

I. Medical treatment in vascular diseases:

The trainees will be able to:

- Describe the strategies, options and anticipated results of medical management for various vascular lesions.
- Appreciate the limitations and complications associated with medical management of various vascular lesions.

J. Pre-operative assessment of vascular surgical patient:

The trainees will be able to:

- Describe the routine investigations in vascular surgery.
- State the operative fitness of the vascular surgical patients.
- Describe the patient counseling.
- State informed written consent from patient/guardian.
- Assess cardiac functions.
- Assess renal functions.
- Assess pulmonary functions.
- Assess liver functions.
- Assess coagulation status of the patient.
- Interpret ECG and echocardiography.
- Interpret lung function tests.
- Interpret liver function tests.

K. Post--operative monitoring of vascular patients:

The trainees will be able to:

- Describe the components of post-operative monitoring.
- Describe the post-operative fluid and electrolyte requirements.
- Describe the post-operative analgesia.

Basic contents for the surrogate residents during rotations :

Block-02-(General surgery):

Basic Principles and techniques of surgery.

1. Basic procedures :

- a. I/V canulation
- b. NG tube placement
- c. Urinary catheterization
- d. Wound dressing
- e. Stitch removal
- f. P/R and P/V procedures
- g. Venesection

2. Basic preparatory surgical skill:

- a. Hand washing technique
- b. Gloves wearing
- c. Gown & mask-cap wearing
- d. identification of instruments and suture materials

- e. Preparation of operation field
- f. Draping
- g. Assisting minor to major surgeries
- h. Surgical incisions Opening of operative field
- i. Closure of operative field, / principle of wound closure

3. Basic concept on operation theatre and instruments :

- a. Modern operation theatre
- b. Basic principles of using diathermy
- c. Basic principles of using laser
- d. Swabs and packs. Implant materials. Ligature, sutures. staples and clips
- e. Knowledge about general surgical instruments
- f. Knowledge about laparoscopic instruments

4. Communication & information sharing with colleagues. patient and staff

5. Resuscitation of a patient in accident and emergency department (RTA. mass casualty) :

- a. Preliminary knowledge about ICU care
- b. Knowledge about tracheostomy
- c. Principles of Burn management

6. Fluid-electrolytes, acid-base. blood transfusion, blood substitutes :

- a. Fluid and electrolyte balance & fluid regimens before and after surgery
- b. Acid-base balance and treatment of disturbances
- c. Blood component therapy in surgery
- d. Adverse consequence of blood transfusion and Massive blood transfusion

7. Perioperative care Preoperative care of a patient:

- a. Preoperative preparation for surgery
- b. Preoperative assessment, workups and anesthesia.
- c. Basic concept of local. regional and general anesthesia
- d. Informed consent for surgery, consent taking
- e. Enteral and parenteral nutrition before and after surgery

7.1. Pre-operative assessment of patient :

The trainees will be able to:

- Describe the routine investigations in surgery.
- State the operative fitness of the surgical patients.
- Describe the patient counseling.
- state informed written consent from patient/guardian
- Assess cardiac functions and interpret ECG and echocardiography.
- Assess renal functions.
- Assess pulmonary functions and interpret the function tests.
- Assess liver functions and interpret liver function tests
- Assess coagulation status of the patient.

7.2. Surgery in patient with co-morbidities :

The trainees will be able to:

- Describe the complications of surgery in diabetic patients.
- Explain protocol for diabetic control in patients being prepared for surgery.
- describe the protocol for surgery in patient having hypertension,
- Bronchial asthma, hepatic insufficiency. Renal insufficiency or in patient having heart disease or coagulation disorder.

7.3. Per-operative care :

- a. antibiotic Prophylaxis
- b. Surgical access and incisions
- c. Knot tying/suture materials
- d. surgical dissection
- e. Precautions against loss of instruments or swab
- f. Principles of wound closure
- g. Principles of skin closure
- h. Principles of skin cover
- i. Knowledge about flaps and Graft
- j. Basic knowledge of swab/pack/ligature/ Tourniquet k) Suture materials

7.4. Postoperative care :

- a. Postoperative care including maintenance of 1/0 chart. Diabetic chart. Dietary chart, and medication chart.
- b. operation note writing
- c. Postoperative fluid and electrolytes plan
- d. d)Management of postoperative pain Q
- e. Management of different surgical drain
- f. Prevention and management of general postoperative complication
- g. Principles of wound management
- h. Surgical dressing
- i. Wound infection/surgical infection

- j. Biopsy/ histopathology/ cytopathology I frozen section

7.5. Post--operative monitoring and care:

- a. Explain and manage the post-operative hemorrhage.
- b. Manage the post-operative infection.
- c. Explain acid-base balance.
- d. describe the correction of electrolyte imbalance
- e. Describe the pulmonary embolism.
- f. Explain the pulmonary edema.
- g. Describe the multi-organ failure.
- h. Understand the use of the inotropes & chronotropes.
- i. Describe the cardio-pulmonary resuscitation (CPR).
- j. Explain acute renal failure.
- k. Explain the cardiac arrhythmias & cardiac arrest.
- l. Resuscitation and intensive care of the unconscious patient.

8. Basics for surgical patients :

- a. DIC
- b. ARDS
- c. MOF
- d. Minimal access surgery
- e. care of Terminal illness
- f. Genetic aspect of surgery
- g. Screening for surgical disease
- h. Surgical audit
- i. Basic principles of transplant surgery

9. Miscellaneous :

- a. Waste product disposal in OT
- b. Radiology / imaging (x-ray/USG/CT/MRI/MRCP)
- c. Postoperative complication-management
- d. Sinus / fistula / ulcer / swelling/abscess / gangrene / cyst / hemorrhage/blood transfusion reaction / tumor/ Hamartomas / scar / keloid
- e. Principles of laparoscopic / endoscopic surgery / (indication /contraindication/ complications)
- f. Writing preoperative order; operation note, postoperative order

Block-03: General Surgery

i. Abdominal surgery:

The trainees will be able to:

- Describe the abdominal incisions, Thoraco-abdominal incisions, Upper abdominal incisions, Endoscopic incisions.
- Explain the acute abdomen.
- Describe the abdominal drain placement approaches.
- Explain complications of abdominal surgery and their management.

ii. Surgery in patient with co-morbidities

The trainees will be able to:

- Describe the complications of surgery in diabetic patients.
- Explain protocol for diabetic control in patients having surgery.
- Describe the protocol for surgery in patient having hypertension, bronchial asthma, hepatic insufficiency, renal insufficiency, heart disease, coagulation disorder.

iii. Skin incisions:

The trainees will be able to:

- mention indications of skin incisions
- describe steps of skin incisions
- make of skin incisions
- mention complications of skin incisions

iv. Suture, knotting and surgical stapling:

The trainees will be able to:

- mention types of surgical sutures
- describe properties of different surgical sutures
- mention types of surgical knots
- make surgical knots
- make surgical stapling
- describe principles and procedure removal of sutures/stapling pins

v. Wound closure:

The trainees will be able to:

- Mention types of wound closure

- Explain principles of wound closure
- Describe steps of wound closure
- Perform wound closure

vi. Post--operative monitoring of patients:

The trainees will be able to:

- Describe the post-operative monitoring.
- Describe the post-operative fluid and electrolyte requirements.
- Describe the post-operative analgesia.

vii. Post-operative care:

The trainees will be able to:

- Explain and manage the post-operative hemorrhage.
- Manage the post-operative infection.
- Explain acid-base balance.
- Describe the correction of electrolyte imbalance.
- Describe the pulmonary embolism.
- Explain the pulmonary edema.
- Describe the multi-organ failure.
- Understand the use of the inotropes & chronotropes.
- Describe the cardio-pulmonary resuscitation (CPR).
- Explain acute renal failure.
- Explain the cardiac arrhythmias & cardiac arrest.
- Resuscitation and intensive care of the unconscious patient.

viii. Gastrostomy and Jejunostomy:

The trainees will be able to:

- Describe the steps of gastrostomy and jejunostomy operations.
- Describe the complications of gastrostomy and jejunostomy operations.

ix. Surgery in portal hypertension:

The trainees will be able to:

- Describe the surgical procedures in portal hypertension.
- Mention the complications of hepatic surgery.

x. Transplantation:

The trainees will be able to understand:

- Immunological basis of allograft rejection.
- Principles of immunosuppressive therapy.
- Side effects of non-specific immune-suppression.
- Major issues concerning organ donation.
- Main indications for organ transplantation.
- Surgical principles of organ implantation.
- Causes of graft dysfunction.
- Likely outcomes after transplantation.

Block- 04: (Cardiology, Hematology and Vascular catheterization Lab)

4. A. Cardiology:

The trainees will be able to:

- Take appropriate and focused history of patients with chest pain.
- perform a reliable and appropriate physical examination of patients with chest pain
- Take appropriate and focused history of patients with hypertension.
- perform a reliable and appropriate physical examination of patients with hypertension
- carry out assessment of patients with hypertension
- Take appropriate and focused history of patients with palpitation.
- Perform a reliable and appropriate physical examination of patients with palpitation.
- Take appropriate and focused history of patients with ventricular extrasystole.
- Perform a reliable and appropriate physical examination of patients with ventricular extrasystole.
- Carry out assessment of patients with ventricular exstrasaystole.
- Take appropriate and focused history of patients with arrhythmia.
- perform a reliable and appropriate physical examination of patients with arrhythmia
- carry out assessment of patients with arrhythmia
- Take appropriate and focused history of patients with syncope.
- Perform a reliable and appropriate physical examination of patients with syncope.
- carry out assessment of patients with arrhythmia
- Take appropriate and focused history of patients with angina.
- Perform a reliable and appropriate physical examination of patients with angina.
- Carry out assessment of patients with angina.
- classify lipid disorders
- Describe pathophysiology of lipid disorders.
- Carry out investigations of patients having lipid disorders

- know the basic principles of ECG
- Know the ECG machine.
- Use ECG data in determining the diagnosis of a disease and its severity and clinical decision making.
- know the basic principles of echocardiography
- use echocardiography data in determining the diagnosis of a disease

Block 4.B. Hematology:

The students will be able to:

- classify anemia
- enumerate the causes ,clinical presentation , diagnosis and treatment of iron deficiency anemia,megaloblastic anemia, hemolytic anemias,Sickle cell anemia,aplastic anemia
- Classify blood group antigens and anti bodies.
- enumerate the pre-transfusion tests
- Explain the hazards of blood transfusion and describe the management of blood transfusion reactions.
- describe the characteristics of cryo precipitate ,platelet, fresh frozen plasma (FFP) and clinical responses of its transfusion
- enumerate the plasma derivatives
- describe intrinsic and extrinsic pathways of coagulation
- Classify coagulopathy and haemorrhagic disorders.
- Describe the role of platelets in primary and secondary hemostasis, in pathologic thrombosis.
- Describe the structure of platelet and function of its zones.
- Describe the sequence of platelet activation including the knowledge of glycoprotein complexes and the role of von Willebrand's factor.
- Understand the relevant historical information in patients with a bleeding disorder.
- Explain the importance of ecchymosis and petechiae.
- Describe the specific clinical presentation, genetic transmission and factor deficiency in hemophilia A, hemophilia B and von Willebrand's disease.
- Understand the purpose of bleeding time, significance and common causes of an abnormal test.
- Understand how to evaluate intrinsic coagulation cascade and what drugs and factor deficiencies affect it.
- Describe the role of anti thrombin III and heparin on thrombin and factor Xa.
- Be familiar with the hematologic and non-hematologic complications of anticoagulant.
- Understand the incidence of HIT, thrombotic complications and the mortality rate in patients receiving heparin.
- Understand how and when to reverse anticoagulation in patients with and without hemorrhage.
- Understand how to manage patients having hemorrhagic disorders requiring surgery.

- Understand the need for thromboembolism prophylaxis in various acute phase reactions such as trauma including operations.
- explain the indications of testys of coagulation
- understand the reports of PT, APTT, ACT, TT,BT, ECLT, Fibrinogen test, TEG test
- mention causes of thrombocytosis,thrombosis-embolism
- explain the pathophysiology of thrombosis
- explain the natural history of thrombosis and embolism
- Describe the thrombosis prophylaxis.
- Describe the presentations, diagnosis and management of deep venous thrombosis, arterial thrombosis-embolism
- Describe the principles of anticoagulation in thrombo-embolic disease.
- Mention the endogenous inhibitors of coagulation and fibrinolysis
- classify anticoagulants
- Describe the mechanism of action, drug interactions, adverse reactions and principles of therapy of Heparin.
- Understand the role of antithrombin III and the dual action of Heparin on thrombin and factor Xa (IXa and XIa).
- Familiar with half life, route of administration and uses of Heparin both in terms of prevention of thrombosis and in treatment of thrombotic conditions.
- Familiar with hematologic and non-hematologic complications of Heparin.
- Understand the mechanism of action and complication of Protamine sulfate.
- Understand the rational for development and advantages of low molecular weight Heparin (LMWH) over unfractionated Heparin.
- Understand the different mechanism of action of unfractionated Heparin compared to fractionated Heparin.
- understand the clinical application of LMWH
- Describe the mechanism of action, drug interactions, adverse reactions and principles of therapy of Warfarin.
- Understand why heparin should be continued with initial Warfarin treatment.
- understand the medical conditions, foods and common drugs that affect Warfarin`s anticoagulant activity.
- Understand how to minimize the complications of Warfarin therapy.
- Understand the ACCP guideline recommendations of appropriate INR levels.
- Mention causes, types, pathophysiology, natural history,risk factors associated with development of Heparin induced thrombocytopenia
- mention the types, pathophysiology, understand, risk factors associated with development of HIT
- Explain differences between type I and type II HIT and management of HIT.

Block 4.C. vascular catheter laboratory:

The trainees will be able to:

- Familiar with the equipments of a **vascular catheter laboratory**.
- understand the difference between fixed-mount versus portable radiographic equipments
- describe the basic concepts of radiographic image recording (cut film, video radiography, cineradiography
- Understand the limitations of cut film radiography.
- Classify, understand the basic principles, enumerate the indications, and enumerate the contra-indications of **angiography**.
- enumerate the guide wires and catheters used in different types of angiogram
- Understand the limitations of angiography.
- explain the sources of error with angiography
- enumerating the risk factors of angiographic contrast agents
- mention the hazards of ionizing radiation in angiography,
- mention the means of minimizing hazards of unavoidable exposure to ionizing radiation of angiography,
- Familiar with the set of equipment used in Seldinger technique
- describe the steps of Seldinger technique
- enumerate the complications of Seldinger technique
- classify contrast agents used in angiography
- describe the typical contrast injection volumes, methods, and rates for various vascular regions
- understand the advantages of low-osmolar/isoosmolar and nonionic contrast agents
- describe the adverse effects of contrast agents used in angiography
- enumerate the risk factors of **angiographic contrast agents**
- Develop a working knowledge of **peripheral angiography** including angiogram of thoracic aorta, abdominal aorta, carotid arteries, iliac arteries, mesenteric arteries, arteries of extremities and different venous segments.
- Enumerate the relative indications for immediate diagnostic angiography versus urgent surgical exploration.
- understand the arteriographic findings characteristic of different etiologies and appreciate the diagnostic imaging options like, CT Scan, magnetic resonance imaging (MRI)
- Describe the invasive and non-invasive types of angiography (conventional angiography, digital subtraction angiography, computed tomographic angiography, magnetic resonance angiography) and lymphangiography
- Be highly skilled in the interpretation of angiograms of all arterial and venous segments.
- Understand the limitations, inherent risks and complications of angiography and be aware of the sources of error and know how to minimize complications.
- Familiar with the management of complications of angiography.

- Recognize the risks involved in angiography relative to the contrast agents used and their amount, the approach used and the pharmacologic and technical maneuvers employed.
- be adept at obtaining and interpreting intraoperative arteriograms
- perform percutaneous vascular access procedure
- Appreciate the characteristic angiographic finding with patients with common pattern of peripheral vascular occlusions as well as the importance of assessing available collateral.
- Understand the importance of completion angiography following peripheral arterial reconstruction.
- classify **digital subtraction angiography**
- mention the merits of fixed (floor or ceiling mounted) units with remote power generators and portable self-contained digital subtraction angiography units
- describe the procedure of digital subtraction angiography
- understand the advantages of intra-arterial digital subtraction angiography over intravenous digital subtraction angiography
- understand the difference between Ingle-Injection Multiple Linear Fields and Rotational Digital Subtraction Angiography
- classify **venography**
- Understand the basic principles of venography.
- Enumerate the indications of venography.
- Enumerate the contra-indications of venography.
- Understand the limitations of cut film venography.
- Explain the complications of venography.
- describe the venographic categories of deep venous reflux

Block-05: (Nephrology, General ICU & Cardiac Surgery)

5. A : Nephrology:

The trainees will have core clinical knowledge about signs and symptoms of renal disease-

- Acid-base balance
- Urinary tract infection
- Chronic kidney disease/ CRF
- Diaysis
- Renal transplantation
- Nephrotic syndrome
- Renal calculi
- Glomerulonephritis
- Renal tract malignancies
- Renal tubular acidosis
- Congenital urinary tract abnormalities
- Urinary tract obstruction
- Enlargement of prostrate

- Polycystic kidney disease

The trainees will have knowledge about emergency management of-

- Acute kidney injury/ARF
- Acute retention of urine

5. B. General ICU:

The trainees will be able to:

- Explain and manage the hemorrhage.
- Describe the multi-organ failure.
- Describe the pulmonary embolism.
- Explain the pulmonary edema.
- Explain acid-base balance understand the use of the inotropes and chronotropes.
- Explain acute renal failure.
- Explain the cardiac arrhythmias and cardiac arrest.
- describe the management of shock
- resuscitation and intensive care of the unconscious patient
- ensure airway, breathing and circulation
- monitor blood pressure, pulse , oxygen saturation, pain, temperature, central venous pressure and urine output
- watch for complications associated with monitoring systems (Air embolism, Phlebitis, Finger necrosis)
- describe the nutritional requirements in the critically ill patient
- explain different methods of providing nutritional support and their complications
- describe the causes and consequences of malnutrition in the critically ill patient
- mention the indications of total parenteral nutrition (TPN)
- describe the principles of total parenteral nutrition (TPN)
- describe the fluid and electrolyte requirements in the critically ill patient
- describe the methods of correction of fluid and electrolyte imbalance
- mention the indications of mechanical ventilation
- describe the principles of mechanical ventilation
- explain the biophysics of ventilator
- develop a working knowledge of operating a ventilator
- interpret blood gas analysis report
- describe the indications and steps of withdrawal from mechanical ventilation
- mention the complications in a bed ridden patient
- mention the risk factors for DVT
- mention the risk factors for bed sore
- describe the principles of thrombo-prophylaxis
- describe the principles of physiotherapy in a bed ridden patient
- describe the principles of cardiopulmonary resuscitation
- describe steps of cardiopulmonary resuscitation

5. C. Cardiac surgery:

i. Cardiopulmonary bypass:

The trainees will be able to:

- Describe the basic principles of cardiopulmonary bypass
- Enumerate the indications of cardiopulmonary bypass.
- Mention the complications of cardiopulmonary bypass.

ii. Thoracic Incisions and surgical approaches:

The trainees will be able to:

- Describe the Thoracotomy, Sternotomy, and the Endoscopic thoracic incisions used in cardiac surgery.
- Mention the cardiac surgical procedures done through these thoracic surgical approaches.

iii. Congenital cardiac lesions:

The trainees will be able to:

- Name the congenital cardiac lesions.
- Describe the presentations and diagnosis of ASD, VSD, TOF, pulmonary stenosis and transposition of great vessels.

iv. Pericarditis:

The trainees will be able to:

- Enumerate the causes of pericarditis.
- Describe the presentations and diagnosis of pericarditis.

v. Patent ductus arteriosus (PDA) :

The trainees will be able to:

- explain the patho-physiology of patent ductus arteriosus
- describe the presentations , diagnosis and management of patent ductus arteriosus

vi. Coarctation of aorta:

The trainees will be able to:

- enumerate the types of coarctation of aorta
- describe the presentations , diagnosis and management of coarctation of aorta

vii. Aneurysm of thoracic aorta:

The trainees will be able to:

- enumerate the types of aneurysm of thoracic aorta
- describe the presentations , diagnosis and management of aneurysm of thoracic aorta

Block- 06: (Orthopedic emergency, Plastic surgery and Pediatric surgery)

6. A. Orthopedic emergency:

The trainees will be able to:

- Understand the importance of time in trauma management
- Describe how to assess and respond to a trauma problem
- Identify the sequence of priorities in the early assessment of the injured patient
- Understand the value of planning in trauma management
- Respond to the evolving condition of the patient
- Describe the principle of triage in immediate management of the injured patient
- Understand the concepts of injury recognition prediction based on the mechanism and energy of injury
- Describe the principles of primary and secondary surveys in the assessment and management of trauma
- Describe the techniques for the initial resuscitative and definitive care aspects of trauma
- Explain the necessary protocols to allow early stabilization of the patient leading on to definitive care
- Describe the steps in the Advanced Trauma Life Support (ATLS) philosophy
- Describe the ABCDE of trauma care

6. B. Plastic surgery:

The trainees will be able to:

- understand the principles of plastic surgery (Optimizing wound by adequate debridement or resection,Wound or flap must have a good blood supply to heal,Placing scars carefully – ‘lines of election’,Replacing defect with similar tissue – ‘like with like’,Observing meticulous surgical technique)
- understand the scope of plastic surgery
- explain the use of plastic surgery to manage difficult and complex tissue loss
- understand the spectrum of plastic surgical techniques used to restore bodily form and function
- describe the relevant anatomy and physiology of tissues used in reconstruction
- Skin grafts
- Local flaps and free flap
- Lymphedema

6.C. Pediatric surgery:

The trainees will have idea about-

- Common pediatric diseases
- Preparing paediatric surgery
- Special features of surgical technique in children
- Pediatric trauma
- Malformations
- Vascular neoplasms

Block 7: (Endocrine medicine, Radiology & Imaging and Skin & VD)

7. A. Endocrine medicine:

The students will be able to:

- understand hormone secretion, hormone action, and principles of feedback control
- familiar with hormone measurements and endocrine testing
- explain paracrine and autocrine control
- familiar with causes of endocrine hyperfunction disorders (Neoplastic ,hyperparathyroidism, autonomous thyroid or adrenal nodules, Ectopic secretion,Multiple endocrine Neoplasia, Autoimmune, Iatrogenic, Cushing's syndrome,hypoglycemia, Infectious/inflammatory,receptor mutations etc.)

- Familiar with the causes of endocrine hypofunction disorders (Autoimmune, iatrogenic, Infectious/inflammatory, Hormone mutations, Enzyme defects, Neoplastic, Hormone resistance, Receptor mutations, Signaling pathway mutations etc.)
- describe screening and assessment of common endocrine disorder
- understand physiologic hormone replacement
- identify common disease of Pituitary gland, Thyroid gland, Adrenal gland, Diabetes Mellitus and Lipoprotein metabolism

7. B. Radiology & Imaging:

Trainee will have knowledge about-

♣ Non invasive procedures:

- a. X-ray
- b. Ultrasound
- c. Duplex Scan
- d. MRI
- e. CT-Scan

♣ Invasive:

- a. Angiogram
- b. Magnetic resonance angiogram (MRA)
- c. CT- angiogram (CTA)
- d. DSA
- e. Magnetic resonance venogram (MRV)
- f. CT- venogram (CTV)

7. C. Skin & VD :

The trainees will be able to:

- define primary skin lesions (macule, papule, plaque, vesicle, bulla, pustule, abscess, weal, papilloma, petechiae, purpura, ecchymosis, burrow, comedone, telangiectasia)
- define secondary skin lesions (scale, excoriation, crust, ulcer, sinus, scar, atrophy, erosion, fissure, stria)
- mention the investigation of skin disorders
- describe the principles of diascopy
- describe the principles of skin swabs
- describe the principles of skin biopsy
- familiar with different topical medicine preparations

The trainees will have knowledge about-

- Pruritus
- Urticaria
- Blisters
- Leg ulcers
- Eczema (Dermatitis)
- Common skin infections and infestations
- Pressure Sores
- Skin tumours
- Chronic Venous disease (CVD)
- Birthmarks

Lectures in Basic Subjects on different topics related to vascular surgery are to be covered in this phase.