

M.Ch VASCULAR SURGERY
program

Division of Vascular Surgery
Department of CVTS

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1. Aims and objectives:

- To know and learn about diseases afflicting the human body except inside pericardium and calvarium.
- The purpose of training programmes in the specialty of Vascular Surgery is to produce competent individuals, who are able to meet the health care needs of the Society related to vascular illnesses.
- Vascular surgical skills and endovascular skills being different from general surgical skills, they have to be imparted at the basic level first in wet labs and simulation labs before the trainees are exposed to real patients.

Competence expected at the end of training

- To perform elective and emergent vascular surgery procedures – e.g. femoral embolectomy, peripheral vascular grafts, repair of abdominal aortic aneurysm.
- To know the indications, techniques and limitations of endovascular treatment of aneurysmal and occlusive aortic, arterial and venous diseases.
- To have scientific approach to vascular illness to be able to decide on optimal therapeutic strategy ranging from the risk factor modifications, medical intervention and surgical/**endovascular** options appropriately.
- To be able to develop interdisciplinary partnership with neurologist, cardiologist, radiologist, nephrologist etc.
- To have a broad background regarding vascular medical conditions e.g. deep venous thrombosis, pulmonary embolism etc.
- To train specialists to handle common vascular illness, including emergencies, at respective institution so as to avoid serious delay and hardship to patients.

2. Syllabus: Theoretical knowledge to be acquired at 18 months training and at 36 months training

PART - I

1) Applied Anatomy

Regional and developmental - of Aorta and arteries and branches. Exposure of blood vessels at every body part in the chest, abdomen, and neck, Veins in extremities and inferior vena cava.

2) Applied Physiology

Blood pressure, Cardiac output, regional circulation especially those of subsystem and peripheral in the extremities, carotid arteries and cerebral circulation.

3) Applied Pathology

Pathology of diseases of Aorta, Arteries, Pathology of Deep Venous thrombosis, and AV malformation.

4) Applied Bacteriology

Infection in Vascular Surgery, prosthetic graft infection, primary and secondary aorto-enteric fistula

5) Vascular prosthesis and Tissue engineering for development of small diameter vascular grafts.

PART II

1. Clinical vascular surgery

2. Endovascular intervention

3. Recent advances in Vascular & Endovascular Surgery

Clinical and operative surgery of Aorta, all arteries, veins, inferior vena cava.

Endo Vascular intervention like Angioplasty, Stenting, and Endo Vascular stent graft repair of aneurysm of arteries and abdominal aorta.

Vascular medicine including prophylaxis, treatment of deep vein thrombosis and pulmonary embolism

Practical / Clinical / Laboratory experience to be imparted at year I, year II, Year III

To detect early signs and symptoms of vascular diseases and to streamline management protocols.

To update recent knowledge and to keep in pace with rapid advances in the progress of vascular Surgery and endovascular techniques.

To sensitize the trainee to newer learning methods and research tools & to encourage clinical research.

To plan and execute mass screening programmes and organize preventive methodologies.

To publish. papers in indexed journals e.g., Article, short papers, short case reports, clinical reviews, research papers during the training period.

- To expose the trainee to diagnose and work-up outpatients cases.
- To plan and prepare inpatients for major surgical procedures.
- To conduct interactive ward rounds and to assess the trainee with regard to clinical skills.
- Objective in the operating room is to infuse confidence and impart surgical skills in a graded manner.
- The first year candidate would be exposed to operate on minor surgical procedures.
- The second and third year candidates would be trained to assist critical procedure and finally to independently operate major procedure under supervision of Senior Professors and faculty.

Towards the conclusion of this period, the candidate shall have carried out a minimum 50 vascular procedures.

Exposure to vascular and endovascular procedures-

Candidates would be familiarizing indexed and complex open as well as endovascular procedures performed in their respective centers and one or two centers they will be visiting as part of outstation **postings for a period of 4-6 weeks**

Following procedures are mentioned, although from center to center, clinical practice and case volume would vary.

1. Embolectomy
2. Femoro-popliteal bypass
3. Aorta-femoral bypass
4. Femoro-distal bypass
5. Aorta-renal bypass
6. Aorta-visceral bypass
7. Repair of abdominal aortic aneurysm & Thoraco-abdominal aortic aneurysm
8. Repair of popliteal artery aneurysm
9. Carotid endarterectomy
10. Decompression of thoracic outlet syndrome
11. AV access surgery
12. Repair of arteries and veins (Trauma)
13. Extra-anatomic bypass
14. Thrombectomy/ Re-do procedures.
15. Surgical and non-surgical management of Varicose veins
16. Angioplasty with or without stenting of FP, Iliac, aortic stenosis
17. Carotid stenting
18. Iliac vein stenting
19. Endovascular repair of AAA, Thoracic aortic aneurysm, peripheral aneurysms
20. Thrombolysis

Procedures to be performed by Senior Residents at minimum in 3 years

1. AV Fistula:	30
2. Exposure of peripheral arteries:	30
3. Embolectomy:	5
4. Femoro-Popliteal / Aorta-Femoral graft:	10
5. Abdominal Aortic aneurysm:	3
6. Carotid Endarterectomy:	10
7. Peripheral arterial aneurysms:	2
8. Hybrid / Endovascular Aortic Aneurysm Repair:	2
9. Vascular graft anastomosis:	20
10. Thoracotomy (to facilitate exposure of Descending Thoracic Aorta)	5
11. Saphenous vein harvest	20
12. Femoral / Aortic Cannulation	5

2) Recommendations of Texts and journals

- Text book of Vascular Surgery – By Robert B. Rutherford.
- Text book of Vascular Surgery – By Henry Haimovici
- Text book of Vascular Emergencies - By Henry Haimovici
- Moore, Wesley S. Vascular and Endovascular Surgery: A Comprehensive Review. 7th edn. Philadelphia. Saunders Elsevier. 2006.
- Text book of Vascular Surgical Emergencies – John J. Bergen & James S. I. Yao.
- Investigation of Vascular Diseases – By Andrew N. Nicolaides & James Yao.

- Rob & Smith Operative Surgery Text book of Vascular Surgery – James Deeweese.
- Comprehensive Vascular Exposures – By Ronald J. Sloney & David J. Effeney
- Wylie’s Atlas of Vascular Surgery& Organ Transplantation – Wayne Flye
- Atlas of Vascular Surgery – Rutherford
- CVS & Vascular diseases of the Aorta
- **JOURNALS:**
 - a. Journal of Vascular Surgery
 - b. Annals of Vascular Surgery
 - c. Journal of Vascular and Endovascular Therapeutics

3. CURRICULUM

Basic sciences curriculum

1. Embryology of the Vascular System
2. Molecular Biology
3. Physiology and pathophysiology of blood vessels
4. Hemodynamics and Atherosclerosis
5. Peptide growth factors
6. Endothelial cells
7. Vascular smooth muscle cells
8. Macrophages
9. Platelets
10. Response of the arterial wall to injury and Intimal Hyperplasia
11. Atherosclerosis: Theories of etiology and pathogenesis
12. Histopathologic features of Nonarteriosclerotic diseases of the Aorta and arteries
13. Regulation of Vasomotor tone and Vasospasm
14. Venous system of the Lower extremities: Physiology and Pathophysiology

15. Structure and function of the Lymphatic system
16. Diabetic vascular disease
17. Plasma Lipoproteins and Vascular disease
18. Cigarette smoking and Vascular diseases
19. Coagulation and disorders of Hemostasis
20. Blood Rheology and the microcirculation
21. Drugs in Vascular disease
22. Scientific basis for Balloon Angioplasty
23. Basic principles underlying the function of Endovascular devices
24. Vascular grafts
25. Statistics for the Vascular Surgeon

Clinical Curriculum

1. Aneurysmal disease
2. Peripheral vascular occlusive disease
3. Renal artery disease
4. Visceral ischemia
5. Carotid artery disease
6. Innominate, subclavian and vertebrobasilar arterial disease
7. Thoracic outlet syndrome
8. Acute arterial occlusion
9. Complications of vascular therapy
10. Management of vascular trauma
11. Venous thrombo-embolic disease, chronic venous insufficiency
12. Diagnostic techniques
13. Vascular grafts
14. Endovascular therapy in management of peripheral vascular disease

15. Endovascular therapy for aneurismal disease
 - a. Basic evaluation and concepts of Endovascular Aneurysm Repair
 - b. Techniques and specifications at various aortic avenues
 - c. Complications, long term surveillance of Endovascular repair of Aneurysms
16. Risk stratification and risk factors
17. Coagulation disorders, anticoagulants, anti platelets
18. Miscellaneous vasculogenic problems
19. Diagnosis and management of Non atherosclerotic vasculogenic problems
20. Arteriovenous malformations and arteriovenous fistulae
21. Varicose vein - Endovenous laser /RF ablation for varicose veins – concepts & Techniques
21. Vascular access
22. Diabetic foot problems
23. Lymphodema
24. Sympathectomy
25. Amputation
26. Tissue engineering - current status

4. CLINICAL TRAINING

The training programme shall aim to provide sound knowledge in the diagnostic and investigative aspects of vascular surgery for the candidate. It will provide practical training in clinical and operative vascular surgery. In addition to the exposure to vascular surgery at the institute, the candidate will also receive an opportunity during the training period to spend a period up to **6 weeks** in other similar advanced centers for enriching his experience in Vascular Surgery.

Current minimally invasive surgery popularised as endo-vascular intervention is also addressed along the changing trends world over. Medical (pharmacological) management including control of risk factors and graded exercises forms the first line treatment followed by endo vascular intersections and lastly the open surgical reconstruction for most vascular disorders. The recently popularised Endo vascular stent graft repair also will be introduced to the candidate, procedure primarily being Radiological intervention.

1. During the training period, the candidate shall work on full time resident basis under the head of the Division of Vascular Surgery. He shall take part in all activities of the department including participation in seminars, conferences, teaching assignments, operating sessions, experimental surgery and other duties that may be assigned to him by the head of the division of Vascular Surgery.

2. Schedule of postings

The training programme shall aim to provide sound knowledge in the diagnostic and investigative aspects of vascular surgery for the candidate. It will provide practical training in clinical and operative vascular surgery. In addition to the exposure to vascular surgery at the institute, the candidate will also receive an opportunity during the training period to spend a period of two months in other similar advanced centers for enriching his experience in vascular surgery. Current minimally invasive surgery popularized as endovascular intervention is also addressed along the changing trends world over. Medical (Pharmacological) management including control of risk factors and graded excercises forms the first line treatment followed by endovascular intersections and lastly the open surgical reconstruction for the most vascular disorders. The recently popularized Endovascular stent graft repair also will be introduced to the candidate, procedure primarily being radiological intervention.

During the training period, the candidate shall work on full time resident basis under the head of the department of Vascular surgery. He shall take part in all activities of the department including participation in seminars, conferences, teaching assignments ,

operating sessions, experimental surgery and other duties that may be assigned to him by the head of the division of vascular surgery.

1. The programme of training will be divided as follows

- a) 11 months: During this period, the candidate shall act as first assistant to the head of the department, and other senior surgeons in major/minor open vascular reconstructions. He will receive progressively greater responsibility for assisting in performance of major surgical procedures. He will be responsible for preparation of operation notes and postoperative intensive care. Clinical work in inpatient and outpatient section: Methods of workup and follow up in vascular surgery.
- b) 1 month in the department of vascular radiology to learn basis of vascular imaging including Duplex scan , CT scan, Magnetic resonance and digital subtraction angiogram, to absolve minimal access endovascular intervention like angioplasty, stenting, thrombolysis etc.
- c) 9.5 months back in the division of vascular surgery, to concentrate more in operation room maneuvers including suturing technique, control of aorta, blood vessels and graft /Vein anastomosis to bypass diseased artery/repair of aneurysm.
- d) 1 month in Radiology (2nd year)
- e) 1.5 months at outside advanced institutes to consolidate and learn from practices outside our institute and to familiarize vascular medicine practice.
- f) 1 month in radiology(3rd year)- In Radiology , to familiarise with indications, endovascular techniques, and post procedural management and also to enhance imaging techniques and their interpretation and state of art advances in technology.

- g) 1 month in CVTS and cardiology respectively to learn principles of cardiology and open-heart surgery strategies in order to be acquainted with cannulation and bypass techniques.
- h) 9 months in Vascular surgery-To obtain sufficient exposure to open procedures like lower limb revascularisations, carotid, renal endarterectomy and bypass procedures and repair of thoracic , abdominal aortic and peripheral arterial aneurysms. To take up increasing responsibility in selection and postoperative management

Note: The exact duration of postings for a particular activity will be decided by the division of academic affairs in consultation with the HOD at the commencement of each year. As far as possible postings for research and visit to other center, will be made towards the second half of second year of training.

5. EVALUATION

The structure and role of academic program committee

Head of the Division

Programme – in – charge

Programme Coordinator

CREDITS FOR THE ENTIRE COURSE IS AS FOLLOWS

Operating room	50
Clinical work	30
Case presentations	18
Seminars	25
Journal club	10
Internal exam (6 monthly)(6x4)	24
Thesis	20
Publications/submission	5
Conference presentations	5
Biostatistics	5

BMT	3
Outstanding performance	5
<u>TOTAL CREDITS</u>	<u>200</u>

NOTE: Every academic activity of the candidate during the 3 years is included in the modules. 1.academic presentations by the candidate as well as his attendance to all academic programs, 2.Clinical / Laboratory / multi disciplinary programs through which the candidates progresses over the duration of the program. Mode of evaluation for each module, so as to assign marks for each module, depending on the weightage or credit assigned to the module is provided. The marks will then be converted to grades.

I. Monthly academic programs that are conducted by department for curriculum implementation.

- A. Seminars
- B. Journal club
- C. Case presentations
- D. Presentations on
 - Guidelines
 - Trials
 - Studies

Interdepartmental meetings:

- E. Neurology – Stroke Meet once a week at 4-5 pm on **Fridays**
- F. Interventional Radiology- combined Vascular & Endovascular meet once a week at 8-9 am on Friday every week
- G. Surgical Audit – Once a month on Saturdays at 3-4 pm
- H. Cardiology – Twice a month

- I. Mandatory courses and fixed credits
 - 1. BMT orientation (**CREDITS: 3**)
 - 2. Biostatistics (**CREDITS: 5**)

- J. The candidate is expected to undertake a mandatory research project for thesis submission. The projects should be presented for approval from technical advisory committee within 6 months of joining the programme. The regular progress of research work should be presented at 3-monthly research meetings in the department. The completed research work should be presented at completion of 26 months of residency. The completed thesis will be sent for external evaluation to examiner or expert from the panel and evaluation may be completed within two months.
An article of 2500- 3000 words in manuscript format Viz, abstract, introduction, materials and methods, results, discussion, limitations, conclusion and reference with relevant tables and figures must be submitted along with thesis submission for publication purpose. **(CREDITS: 20)**

- K. Conference participation and presentation is mandatory **(CREDITS: 5)**

- L. Publication-**The residents should have at least one clinical paper submitted in a peer-reviewed journal indexed in "Index Medicus" prior to appearing the final examination. (CREDITS: 5)**

- M. Internal evaluation by the Academic division including theory papers with limited syllabus will be done at 6 months, 12 months, 24 months and 30 months **(24 CREDITS)**

- N. Senior resident will maintain E-portfolio and logbook

- O. Academic activity and scores for performance will be included in E- portfolio for the candidate as he/she progresses through the training program.-

- P. Outstanding performance **(5 credits)**. International journal publication, awards, quality research etc.

Assessment of the candidates performance is mandatory and the credits will be assigned as follows

Operating room	50
Clinical work	30
Case presentations	18
Seminars	25

Journal club	10
Internal exam (6 monthly)(6x4)	24
Thesis	20
Conference presentation	5
Biometrics	5
BMT	3

Publication	5
Outstanding performance	5

- Q. Appraisal committee including the head of department / guide / mentor will help the candidate to make updating if any
- R. Student feed back at 6 monthly intervals and its evaluation and implementation of relevant suggestions.- Students suggestions will be analysed and implementation will be performed as and when deemed necessary
- S. Re-appraisal meetings to evaluate the progress at 6 monthly intervals- Re-appraisal meetings will be done to evaluate the progress at 6 monthly intervals
- T. Total marks for internal evaluation =200. This will be derived from the marks scored in the academic activities . Each academic activity's mark will be based on the credit assigned to the activity. This will be finally converted to a score out of 200, which will be converted also to grade. Pass requirement 50%. A senior resident obtaining less than 40% cannot appear for the final exams and will repeat course for 6 months to make up for the deficiency.
- U. i). Total marks for external evaluation= break up (200 for part I theory (2 papers), 200 marks for part II theory (2 papers). 50% required for pass

ii). Part II: clinicals and practicals

Long case 120 x 1 =	120
Short case 60 x 3 =	180
X-rays, CT, Angiograms =	25
Instruments & Operative procedures =	50
Ward rounds =	25
TOTAL =	400 (to get 50% marks for pass)

Distribution of total marks / credits for M.Ch (Vascular Surgery)

Internal assessment	200
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Part I (theory) - 200

Part II (theory) - 200

Practicals – Final 400

GRAND TOTAL 1000

6. EVALUATION FORMS

EVALUATION OF SEMINAR/SHORT TOPIC / PROBLEM ORIENTED CASE DISCUSSION / MORTALITY PRESENTATIONS (CREDIT: 25)

Name of the student:

Name of the Faculty / Observer:

Date:

Sl. No.	Items of observation during Presentation	Poor 1	Below average 2	Average 3	Good 4	Very good 5
1	Whether all relevant publications consulted					
2	Understanding of the subject					
3	Completeness of the preparation					
4	Clarity of presentation					
5	Current concepts coverage					
6	Ability to answer the questions					
7	Time scheduling					
8	Appropriate use of Audio – Visual aids					
9	Overall performance					
10	Any other observation					
	Total Score					

EVALUATION OF JOURNAL REVIEW PRESENTATIONS (CREDITS: 10)

Name of the Student:

Name of the Faculty / Observer:

Date:

Sl. No.	Items of observation during Presentation	Poor 1	Below average 2	Average 3	Good 4	Very good 5
1	Extent of understanding of scope & objectives of the paper of the candidate					
2	To critically evaluate methods, analysis and interpretations of study					
3	Whether cross references have been consulted					
4	Whether other relevant publications consulted					
5	Ability to respond to questions on the paper / subject					
6	Ability to defend the paper					
7	Clarity of Presentation					
8	Audio – Visual aids used					
9	Ability to propose new research ideas based on study discussed					
	Total Score					

**EVALUATION FORM FOR PATIENT ASSESMENT & MANAGEMENT /
CLINICAL PRESENTATION (CREDITS:18)**

Name of the student:

Name of the Faculty / Observer:

Date:

Sl. No.	Items of observation during Presentation	Poor 1	Below average 2	Average 3	Good 4	Very good 5
1	Completeness of history					
2	Accuracy of clinical signs					
3	Clarity of Presentation					
4	Assessment of problem and investigational plan					
5	Treatment plan					
6	Ability to defend diagnosis and plan					
7	Knowledge of the current and past literature					
	Grand Total					

EVALUATION OF CLINICAL WORK IN WARD / OPD (CREDIT: 30)

Name of the student:

Name of the Faculty / Observer:

Date:

Sl. No.	Items of observation during presentation	Poor 1	Below average 2	Average 3	Good 4	Very good 5
1	Regularity of attendance and punctuality					
2	Presentations of cases during rounds					
3	Maintenance of case records					
4	Investigations work up					
5	Interaction with colleagues and supporting staff					
6	Teaching and training junior colleagues					
7	Bedside Manners					
8	Rapport with patients and family					
9	Counseling Patient's relatives for blood donation or postmortem and case follow up					
10	Overall quality of clinical work					
	Total Score					

Evaluation of Clinical / Practical work in Operating Room (Credits:50)

Sl. No	Items of observation during presentation	Absent 0	Below average 1	Average 2	Good 3	Excellent 4
1	<i>Patient work up</i>					
2	Pre-op discussion/Planning					
3	Procedural data					
4	Preparation of devices/gadgets					
5	Surgical skills					
6	Tissue respect					
7	Technique for asepsis/Haemostasis					
8	Attention to closure					
9	Alertness in O R					
10	Post op surveillance					

Credit Points for Publications and research (CREDIT: 5)

	Non Indexed journal	Indexed		Conference presentation		
		Impact factor < 2	Impact factor > 2	State	National	International
Case report/ Letter to Editor	1	1.5	2	1	2	4
Images	1	1.5	2			
Review article	1.5	2	4			
Original article	1.5	2	5			

INVASIVE AND INTERVENTIONAL LAB (ENDOVASCULAR SUITE)

Name of the student:

Name of the Faculty / Observer:

Date:

Sl. No	Items of observation during presentation	Poor 1	Below average 2	Average 3	Good 4	Very good 5
1.	Understanding of clinical problem					
2.	Evaluation of pre-procedural data					
3.	Safety of performing					
4.	Operative skills					
5.	Accuracy of reporting					
6.	Ability to derive diagnosis and plan of management					
7.	Post procedure recognition / management of complications					
	Grand Total					

LOG BOOK

Table 3: Diagnostic and Operative procedures performed

Name:

Admission Year:

Date	Name	I D No.	Procedure	Category O, A, PA, PI*

Key:

O -Washed up and observed

A -Assisted a more senior surgeon

PA - Performed procedure under the direct supervision of a senior surgeon

PI -Performed independently

LOG BOOK: Table 4: Non-invasive (Diagnostic) procedures performed

Name:

Admission Year:

Date	Name	I D No.	Procedure	Performed independently / under supervision

MODEL OVERALL ASSESSMENT SHEET

MCh Vascular Surgery:

Academic Year:

Sl. No.	Particulars	Name of the student and Mean score									
		A*	B*								
1	Journal Review presentations										
2	Seminars										
3	Clinical work in wards										
4	Clinical Presentation										
5	Teaching skill practice										
	Total Score										

Note: Use separate sheet for each year.

The above overall assessment sheet used along with the log book should form the basis for certifying satisfactory completion of course of study, in addition to the attendance requirement.

MCh Vascular Surgery

Module List (Credit)

Academic Presentation (35)

Publications and Conference Attendance (10)

BMT wing postings (3)

Outstanding activities (5)

Internal Evaluation (24)

Operating room (50)

Clinical work (30)

Biometrics (5)

Case presentation (18)

General (20)

Activity List under Each Module (Credit)

- Academic Presentation (35)
 - Seminars/Symposium (25)
 - Journal club (10)
- Publications and Conference Attendance (10)
 - Publication (5)
 - Conference Presentation (5)
- BMT wing postings (3)
 - General (3)
- Outstanding activities (5)
 - General (5)
- Internal Evaluation (24)
 - General (24)

- Operating room (50)
 - General (50)
- Clinical work (30)
 - General (30)
- Biometrics (5)
 - General (5)
- Case presentation (18)
 - General (18)
- General (20)
 - Thesis (20)

Year wise credit list

Module	I-Year	II-Year	III-Year	Other
Academic Presentation (35)	11	11	13	
Publications and Conference Attendance (10)				10
BMT wing postings (3)				3
Outstanding activities (5)				5
Internal Evaluation (24)	8	8	8	
Operating room (50)	15	15	20	
Clinical work (30)	10	10	10	
Biometrics (5)				5
Case presentation (18)	6	6	6	
General (20)				20
Total	50	50	57	43

Grand Total : 200