



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

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(with effect form 2023-24 Batches)

Curriculum for M.Ch. Neuro Surgery

Amended as per AC-49/2024, Dated 25/04/2024

Amended History

1. Amended as per AC-49/2024, [Resolution No. 4.43], Dated 25/04/2024

Resolution No. 4.43 of Academic Council (AC-49/2024):

- i) Resolved to approve the syllabus and list of standard books proposed for M.Ch. Neurosurgery from the academic year 2023 -24 onwards . It was further resolved that the goal , program outcomes , competencies , rotation postings, assessment strategy and recommended reading needs to be clearly defined in the said syllabus and needs to be re-submitted for approval.
- ii) BOS Chairperson re-submitted the revised syllabus of M.Ch. Neurosurgery through Dean Faculty.
- iii) Hon'ble VC Approved.

SUBJECT SPECIFIC LEARNING OBJECTIVES

Clinical Objectives

At the end of postgraduate training, the PG student should be able to: -

1. Diagnose and appropriately manage common Neurosurgical ailments in a given situation.
2. Provide adequate preoperative, post-operative and follow-up care of Neurosurgical patients.
3. Identify situations calling for urgent or early surgical intervention and refer at the optimum time to the appropriate centres.
4. Counsel and guide patients and relatives regarding need, implications and problems of surgery in the individual patient.
5. Provide and coordinate emergency resuscitative measures in acute Neurosurgical situations including trauma.
6. Organize and conduct relief measures in situations of mass disaster including Triage.
9. Discharge effectively medico-legal and ethical responsibilities and practice his Specialty ethically.
8. Must learn to minimize medical errors.
9. Must update knowledge in recent advances and newer techniques in the management of the patients.
10. Must learn to obtain informed consent prior to performance of operative procedure.
11. Perform surgical audit on a regular basis and maintain records (manual and/or Electronic) for life.
12. Participate regularly in departmental academic activities by presenting seminar, Case discussion, Journal club and Topic discussion on weekly basis and maintain Logbook.
13. Demonstrate sufficient understanding of basic sciences related to his specialty.
14. Plan and advise measures for the prevention and rehabilitation of patients belonging to his specialty.



Research:

The student should:

1. Know the basic concepts of research methodology, plan a research project and know how to consult library.
2. Should have basic knowledge of statistics.

Teaching:

The student should learn the basic methodology of teaching and develop competence in teaching medical/paramedical student.

Professionalism:

1. The student should show integrity, accountability, respect, compassion and dedicated patient care. The student should demonstrate a commitment to excellence and continuous professional development.
2. The student should demonstrate a commitment to ethical principles relating to providing patient care, confidentiality of patient information and informed consent.
3. The student should show sensitivity and responsiveness to patients' culture, age, gender and disabilities.

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. Cognitive domain

1. Demonstrate knowledge of applied aspects of basic sciences like applied Anatomy, Physiology, Biochemistry, Pathology, Microbiology and Pharmacology.
2. Demonstrate knowledge of the bedside procedures and latest diagnostics and therapeutics available.
3. Describe etiology, pathophysiology, principles of diagnosis and management of common Neurosurgical problems including emergencies, in adults and children.

4. Demonstrate the theoretical knowledge of general principles of Neurosurgery.
5. Demonstrate the theoretical knowledge to choose, and interpret appropriate diagnostic and therapeutic imaging including Ultrasound, CT scan, MRI, DSA.
6. Demonstrate the knowledge of ethics, medico-legal aspects, communication skills and leadership skills. The PG student should be able to provide professional services with empathy and humane approach.

B. Affective domain

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports, obtain a proper relevant history and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.
4. Obtain informed consent for any examination/procedure and explain to the patient and attendants the disease and its prognosis with a humane approach.
5. Provide appropriate care that is ethical, compassionate, responsive and cost effective and in conformation with statutory rules.

C. Psychomotor domain

1. Perform a humane and thorough clinical examination including internal examinations and examinations of all organs/systems in adults and children
2. Write a complete case record with all necessary details.
3. Arrive at a logical working diagnosis / differential diagnosis after clinical examination.
4. Order appropriate investigations keeping in mind their relevance (need based).
5. Choose, perform and interpret appropriate imaging in trauma - CT scan

6. Perform minor operative procedures and common Neurosurgical operations independently and the major procedures under guidance.
7. Provide basic and advanced life saving support services in emergency situations
8. Provide required immediate treatment and comprehensive treatment taking the help of specialist as required.
9. Perform minimally invasive neurosurgery in appropriate clinical settings. Must have undergone basic training in transnasal, intraventricular and spinal endoscopy and basic training in neurovascular intervention.
10. Undertake complete patient monitoring including the preoperative and post operative care of the patient.
11. Write a proper discharge summary with all relevant information.

Syllabus

Course Content.

The syllabus provided below is a brief outline of the topics in the field of neurosurgery that the candidates should be acquainted with for the theory and practical examinations for the examination of M.Ch. (Neurosurgery). Candidates must have read standard textbooks as well as national and international peer reviewed journals on the subject of neurosurgery. A provisional list of such literature is appended below. The examination shall also evaluate knowledge of recent advances that is available in literature.

Basic Neurosciences

The candidate is expected to be conversant with the following broad fields with special reference to their application in Neurosurgery. These include General Principles of the basic neurosciences. A wide coverage of Basic Sciences like Anatomy, Physiology, Biochemistry, Pathology, Microbiology, Pharmacology, Immunology, etc pertaining to the nervous system, the cranium vertebral column and its contents.

A brief outline is as follows:

1. Neuroanatomy and embryology
2. Neurobiology
3. Neurophysiology

4. Neuropathology & Microbiology
5. Neurochemistry and Neuropharmacology

Basic Science For The Neurological Surgeon

1. Surgical Anatomy of the Brain
2. Neuroembryology – development of the central nervous system
3. Neurons and Neuroglia
4. Astrocytes
5. Cerebral metabolism and the pathophysiology of Ischemic brain damage
6. The Blood Brain Barrier
7. Physiology of the cerebro spinal fluid and intracranial pressure
8. Cellular and molecular mechanism mediating injury and recovery in the nervous system.
9. Electrophysiology properties of the Central Nervous System
10. Neuropathology of brain tumors, Immunohistochemistry, Electron microscopy
11. Neurosurgical epidemiology and outcomes assessment
12. Human genome and gene therapy, Stem Cell therapy in CNS

Clinical Science

History Of Neurosurgery

Approach To The Patients.

1. History and physical examination.
2. Differential diagnosis of altered states of consciousness.
3. Neuroophthalmology
4. Neuro Otology
5. Neuro Urology
6. NeuroPsychological assessment of the neurosurgical patient
7. Brain death
8. Legal issues

Fundamentals Of Radiology

1. Radiology of the skull
2. Computed Tomography
2. Magnetic Resonance Imaging of the Brain, Functional MR, MR Perfusion, Spectroscopy
3. Molecular Imaging of the Brain with Positron Emission Tomography

4. Radiology of the Spine

5. Angiography modalities: Digital Subtraction Angiography, CT Angiography, MR

Angiography

Perioperative Evaluation And Treatment.

1. Neuroanesthesia; Preoperative Evaluation

2. Complication Avoidance in Neurosurgery

3. Neurosurgical Intensive Care Management

Surgical Exposures And Positioning

1. General principles of operative positioning, microneurosurgery instruments

2. Surgical positioning and exposures for cranial procedures

3. Surgical exposures and positioning for spinal surgery

4. Peripheral nerves

5. Operating Microscope, Cavitronic Ultrasonic Aspirator, Intraoperative

Electrophysiology monitoring, Neuronavigation – image guided, Intraoperative MR and DSA,

Lasers in Neurosurgery

6. Stereotaxy Procedures

Basic Science Of Neuro Oncology

1. Brain tumors ; general considerations

2. Histopathology classification of brain tumors

3. Central Nervous system immunology

4. Proliferation Marker in Evaluation of Gliomas

5. Molecular Genetics and development of Targets for glioma therapy

6. Growth factors and brain tumors.

7. Tumor suppressor Genes and genesis of brain tumors.

8. Molecular and Cytogenetic techniques

9. Invasion in Malignant glioma.

10. Angiogenesis and brain tumors.

11. Brain Edema and Tumor Host Interactions

12. Brain tumors : Population based epidemiology, Environmental risk factors,
and Genetic and Hereditary syndromes.

13. Principles of Gene Therapy

14. Clinical features and Neurology of Brain tumor and Paraneoplastic syndromes.

15. Radiologic features of Central Nervous System tumors.
16. Endovascular techniques for brain tumors.
17. Brain tumor during pregnancy
18. Principles of Chemotherapy
19. Aspects of Immunology applicable to brain tumor pathogenesis and treatment
20. Basic principles of Cranial surgery for brain tumors
21. Basic principles of skull base surgery
22. Surgical complications and their avoidance.
23. Surgical Navigation for brain tumors.

Intraaxial Tumors.

1. Low grade gliomas : Astrocytoma, Oligodendroglioma and Mixed Gliomas
2. Malignant gliomas : Anaplastic astrocytoma, GlioblastomaMultiforme, Gliosarcoma, Malignant Oligodendroglioma.
3. Primitive Neuroectodermaltumors.
4. Pineal tumors
5. Medulloblastoma.
6. Ependymoma
7. Haemangioblastoma
8. Lymphoma
9. Metastatic brain tumor

Extraaxial Tumors.

1. Meningioma
2. Meningeal Haemangiopericytoma
3. Meningeal sarcoma
4. Acoustic neuroma
5. Pituitary tumors : Functioning and non functioning
6. Craniopharyngoma in the Adult
7. Epidermoid, DermoidAndNeuroenteric Cyst
8. Neoplastic meningitis – Diagnosis and Treatment.

VENTRICULAR TUMORS.

1. Ependymoma
2. Neurocytoma
3. Subependymal Giant Cell Astrocytoma

SKULL BASE TUMORS

1. Chordoma and Chondrosarcoma.
2. Glomusjugulare tumors.
3. Neoplasms of paranasal sinuses
4. Esthesioneuroblastoma.
5. Trigeminal Schwannoma
6. Juvenile Angiofibroma
7. Osseous tumors
8. Orbital tumors.
9. Skull tumors
10. Scalp tumors.

NON NEOPLASTIC DISORDERS MIMICKING BRAIN TUMORS.

1. Pseudotumor cerebri
2. Sarcoidosis, Tuberculosis and Xanthogranuloma
3. Multiple Sclerosis.

VASCULAR

1. Cerebral blood flow and metabolism
2. Acute Medical Management of Ischemic disease and Stroke
3. Anesthesia in Cerebrovascular disease
4. Intraoperative Cerebral protection
5. Deep Hypothermic Circulatory Arrest
6. Transcranial Doppler ultra sonography
7. Neurosonology
8. Xenon computed tomography
9. Magnetic Resonance Angiography
10. Positron Emission Tomography

Occlusive Vascular Disease

Carotid occlusive Disease, Carotid Endarterectomy, Angioplasty, Stenting, Traumatic Carotid Injury, Vertebral Artery disease, Intracranial arterial disease, MoyaMoya, Cerebral Venous and Sinus Thrombosis

INTRA CEREBRAL HEAMORRHAGE

Spontaneous Intracerebral Hemorrhage; Non Arteriovenous Malformation, Non Aneurysm

HEMMORRHAGIC VASCULAR DISEASE; ANEURYSMS

1. Genetic of Intracranial aneurysm.
2. Natural History of Unruptured Saccular Cerebral aneurysm.
3. Management of Subarachnoid hemorrhage
4. Cerebral vasospasm
5. Surgical approaches for anterior circulation aneurysm
6. Treatment of Intracavernous and Paraclinoid Internal Carotid Artery Aneurysm
7. Aneurysms of Anterior Communicating Artery, Anterior Cerebral Artery, Distal Anterior Cerebral Artery And Middle Cerebral Artery Aneurysms.
8. Posterior circulation aneurysms, including the Vertebral, Basilar and PICA aneurysm.
9. Endovascular Treatment of aneurysm.
10. Giant Aneurysm.
11. Infectious intracranial aneurysm.
12. Revascularization techniques for complex aneurysm and skull base tumors

ARTERIO VENOUS MALFORMATION

1. Natural History of intracranial vascular malformations
2. Classification and treatment, surgical and radiosurgical
3. Endovascular management of AVM
4. Surgical Treatment
5. Dural AVMs

CAVERNOUS MALFORMATIONS

Epidemiology and Natural History, Genetics, Surgical management of Intracranial Cavernous Malformation.

Cavernous Carotid Fistulas.

Spinal AVM

Classification, Endovascular Treatment, Surgery.

Reference check list for operative procedures

Each resident is expected to complete the minimum number of procedures listed below during his residency program.

Surgical procedures	Observe/First assistant	Perform Under supervision	Perform Independently
GENERAL NEUROSURGERY INCLUDING TRAUMA			
Craniotomy for extradural haematoma	05	05	10
Craniotomy for subdural haematoma	05	05	05
Burr-holes for subdural haematoma/hygroma	02	03	10
Elevation of depressed fracture			
Fixation of facial/mandibular fractures	R		
Decompressive craniectomy	02	03	05
ICP monitoring	02	02	01

CEREBROVASCULAR SURGERY

Cerebral Angiography	05	05	
Craniotomy and clipping of intracranial aneurysm	15		
Craniotomy and excision of AVM	05		

Craniotomy for Spontaneous ICH (supratentorial)	03	02	
Craniotomy for Spontaneous ICH (infratentorial)	02	02	
Carotid Endarterectomy	03		

NEUROONCOLOGY			
Craniotomy for lesion of frontal lobe/ temporal lobe/ parietal lobe/occipital	15	5	5
Craniotomy for lesions of suprasellar area/ insula/eloquent area	10		
Craniotomy for lesion of cerebellum	10	2	
Craniotomy for lesions involving the brain stem	03		
Craniotomy for lateral ventricular lesions	03		
Craniotomy for anterior third ventricle lesions	05		
Craniotomy for posterior third ventricular lesions/pineal lesions	03		
Craniotomy for fourth ventricular lesions	10	02	
Craniotomy for lesion at other site including cisterns/CSF fissures	02		
MENINGEAL TUMOURS/LESIONS			
Excision of meningioma- convexity	05	03	02
Excision of meningioma high convexity /falx/parasagittal	05	02	
Excision of meningioma-skull base	05		

NERVE SHEATH TUMOURS/LESIONS -CRANIAL			
Craniotomy for excision of skull base schwannomas	10		
Microvascular decompression of cranial nerves	03		
Hypoglossofacial anastomosis	R		
ORBITAL TUMOURS/LESIONS			
Transcranial excision of orbital tumours	03		
Lateral orbitotomy for excision of orbital tumours	02		
Anterior /anteromedial approach for orbital tumours	R		
Optic nerve fenestration	R		
SKULL VAULT /BASE OF SKULL LESIONS/TUMOURS			
Surgery for tumours/lesions of the skull vault including craniostenosis	02		
Surgery for bony lesions involving base of skull	02		
ENDOSCOPIC PROCEDURES			
Endoscopic third ventriculostomy	10	3	02
Endoscopic CSF rhinorhea repair	02		
Endoscopic resection of sellar/basal skull lesions	05		
Endoscopic resection/decompression of intraventricular lesions	02		
Endoscopic septostomy and shunt	02	02	01
TRANSPHENOIDAL SURGERIES			
Transphenoidal decompression of pituitary tumours	10	03	

INFECTION			
Image guided drainage of intracranial abscess	03	02	
Craniotomy for excision of intracranial abscess	02		
Craniotomy for drainage of subdural empyema	03	02	
CSF DIVERSION PROCEDURES			
Insertion of ventriculoperitoneal shunt and revision	5	5	5
Insertion of syringoperitoneal shunt	R		
Insertion/revision of lumboperitoneal shunt	02	03	
Insertion of Omay reservoir	R		

Insertion of external ventricular drain	02	03	05
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CSF FISTULAS			
Transcranial repair of CSF rhinorhea	03		
Repair for CSF otorrhea	R		
SPINAL TUMOURS			
Decompression/biopsy of intramedullary spinal cord lesion	03		
Excision of intradural extramedullary spinal tumours	03	02	01
Excision of extradural spinal tumours	02	02	01
Surgery for spinal dysraphism	03		
Verteberoplasty	02		
CRANIOVERTEBRAL JUNCTION AND UPPER CERVICAL SPINE			
Foramen magnum decompression	03	02	01
Transoral excision of odontoid	02		
Decompressive Laminectomy/laminoplasty	03		
Anterior cervical discectomy/corpectomy single level/multiple level with/without	03	02	
Dorsal Cervical foraminotomy Occipito/C1- C2 stabilisation using instrumentation	02		
Upper cervical spine stabilization & instrumentation	03		

THORACIC SPINE			
Posterior Decompressive laminectomy/laminotomy Thoracic	02		
Other (anterolateral/posterolateral) thoracic Decompression with Surgery for thoracic disc/degen disease (+/- Instrumentation)	02		
LUMBAR SPINE			
Surgery for lumbar disc/degenerative disease +/-Instrumentation)	03	02	01
Lumbar decompressive laminectomy +/-stabilization with instrumentation	02	01	
Endoscopic disc surgery	02		
PERIPHERAL NERVE			
Wound repair and secondary neurolysis	02		
Brachial plexus injury repair	02		
Other peripheral nerve anastomosis/graft	R		
Muscle/nerve transposition and other corrective procedures	R		
Carpel tunnel decompression	05	02	01
Other peripheral nerve decompression	R		
Radiofrequency ablation	03		

TEACHING AND LEARNING METHODS

The three year program consists of fundamental clinical evaluation, neurosurgical training and research to allow for acquisition of graduated experience in all aspects of neurological surgery and develop the following skills

A. Clinical and theoretical skills: knowledge based on texts/journals/departmental academic activities. Clinical skills include the ability to take discerning history, perform relevant clinical examination, decide the appropriate investigations and derive the management plan.

B. Surgical and procedural skills: The candidate should be able to perform basic neurosurgical procedures independently, and should have a firm grasp on many others.

To assure this, each resident is expected to assist and independently perform a minimum number of procedures.

C. Communication skills: The candidate is expected to develop into an effective communicator to the patients, their family, colleagues and students.

D. Research aptitudes: The curriculum is intended to provide essential skills in conducting medical research, and to get them presented in scientific forums and published in peer-reviewed journals.

ACADEMIC SCHEDULE

Ward Rounds

Teaching rounds will be held daily by the consultants in rotation.

Grand rounds: Detailed teaching rounds will be held every Saturday led by the Head of the department and all the consultants.

Preoperative discussion

The resident posted for an elective surgery should examine and write in detail a preoperative assessment. He should discuss the operative plan with the attending consultant the day prior to the planned surgery

Neuroradiology discussion

Held every Saturday from 9.30 to 10.30 am . The cases for discussion will be decided by Thursday evening. The Senior resident concerned should discuss the case in detail with a neuroradiology consultant before presenting the same on Saturday. Brevity and clarity in presentation will be expected

Case discussion

Clinical Case discussion will be held twice every week – on Mondays and Fridays from 9am to 10am. Residents will be assigned the schedule well in advance

Journal Club

Journal club will be conducted every Thursday from 2.30 pm to 3.30 pm. The schedule for the same will be distributed in the first week of January. The assigned resident needs to get the articles approved by the Head of the Department well in advance.

Seminars

Seminars will be held every Saturday from 1 pm to 2 pm. The schedule for the same will be distributed in the first week of January. The assigned resident needs to discuss the topic with the consultant in charge (moderator) before making the final presentation

IP WARDS

1. Independent ward duties will be performed only after 1 month of joining the MCh course. Until then, the new resident would be attached with his senior colleagues.
2. Each resident will be assigned a ward; each ward will be under the care of two residents – one junior and one senior.

New admissions

3. The junior resident is responsible for getting investigations done and receiving reports regarding the various biochemical, endocrine, hematological and radiological tests that may be required for patient management. Report should be collected and duty entered in the patient file in the investigation report section.
4. The day after a routine admission the entire case sheet should be written completely with the work up plan. The case sheet will be cross checked and findings clarified by the consultant on rounds. The senior resident in charge of the ward is responsible for the same . He should discuss with the consultant regarding the management plan for each patient and carry out the same with the help of the junior resident.
5. Any seriously ill patient admitted through priority basis should be informed to the

consultant on duty and the head of the department.

6. Any urgent bedside procedures or maneuvers such as placement of cervical traction, EVD, LP, shunt aspiration etc has to be performed in a timely manner .
7. Ward duty Residents should periodically monitor all patients and enter the progress in the progress charts in file.
8. All attempts are to be made such that any patient admitted on a routine basis from the OPD and waiting in the ward for many days, does not get cancelled from the next days OT list due to investigation not being performed/not adequate/result not available or abnormal lab parameters.
9. The resident in charge of the ward should daily (during visiting hours) communicate with the relatives of the patient and keep them informed about the management plans and progress of the patient.

Discharges

10. Patients should be informed at least one day in advance about the plan for discharge. Discharge summary and all discharge related documents should be ready before 11 am on the day of discharge. Residents should ensure that the patients for discharge leave the ward before 12 noon to facilitate early admission of new patients

Ward Rounds

11. The junior and senior resident in charge of the ward should take independent ward rounds well before the consultant rounds. They should discuss all patient related problems with the consultant on rounds

OUT PATIENTS DEPARTMENT

1. Two residents will be assigned OPD duty on a given day. The junior resident among the two will assist the consultant in charge of new cases and admissions. The senior resident will assist the consultant in charge of review patients.
2. No resident should leave the OPD until all the new cases have been worked up, dates given for all patients, and all necessary formalities completed.
3. Residents are expected to give dates for admission (in consultation with the OPD consultant) , fill up of investigation forms, medical certificates etc with a careful explanation of the procedure to the patients and attendants. In case of any doubt or lack of clarity in instruction, they should always contact the concerned faculty.
4. Patients in the OPD who require wound-care procedures, drainage of collections, LPs, stitch removal, sinus exploration, dressings etc. will be referred to the

neurosurgery ward where the same will be attended to by the resident on ward duty.

INTENSIVE CARE UNIT (ICU)

1. Independent ICU duties will be performed only after 3 month of joining the MCh course. Till then the new resident would be attached with his senior colleagues.

2. It is the primary response of the ICU Senior Resident to: continuously monitor all patients in the ICU and enter progress in the charts in the case sheets. Timely performance of investigation such as CT, ABG Electrolyte levels, Chest radiographs etc as decided or as per urgency and need. Timely therapy and procedures for various situations arising in these patients should be given. In case of any deterioration in the condition of any patient, the faculty on call as well as the patient's attendants should be informed. Report of ICU patients should be given in a polite and concise yet comprehensive manner at least once every day (twice – in case of critically ill patients).

□ Take over the ICU duty has to be performed by 7.30 a.m in the morning and both the residents (resident on previous night duty as well as the resident on duty on the same day) should be present for the morning rounds.

OPERATING THEATRES

Residents will assume responsibilities in the theatre on a graded basis and under constant supervision. First year residents will be generally allowed to observe or scrub in as a second assistant. During their second year and final year residents will be gradually allowed to perform surgeries once the seniors are confident of their ability. To assure this, each resident is expected to assist and independently perform a minimum number of procedures which is listed. The resident assigned to assist/perform a surgery should write a detailed preoperative assessment and should present the same in the preoperative session. Post surgery he should write a detailed operative note with relevant diagrams. He should enter the same on the OT register. He should also ensure that all specimens are neatly labelled and despatched to the respective laboratories

DUTY SCHEDULE

There shall be two residents on duty after routine working hours and on holidays.- One resident on duty and the other resident "on call". In case of any emergency the HOD may insist on more number of doctors to stay back on duty.

DUTY RESIDENT

The duty doctor will be responsible for all the ICU and ward patients after routine duty hours.

In addition his duty consists of

1. Taking late night and early morning rounds of all the inpatients along with duty consultant
2. Inform the Head of the Department about all problems in the ICU and ward daily evening
3. Inform the faculty on call / operating surgeon in case of any problem
4. Perform urgent therapeutic intervention e.g twist drill, ventricular tap, tracheostomy or such emergency procedure, which should be done promptly without any delay

First on Call duty

The duty consists of:

- To respond all the casualty references immediately.
- Evaluating and informing the consultant on duty about the patients seen in the casualty.
- For patients who are referred to other Hospitals, to make sure that this takes place in a timely manner.
- To inform the duty resident anytime a patient is admitted to the Ward /ICU
- To inform duty neuroanesthetist, and OT Nursing Staff each time any patient is admitted for emergency Surgery.
- Assist the duty consultant for all emergency surgery procedures
- To arrange for all urgent blood investigations, CT, Cardiology or other consultation etc or whatever is required before admission and operation.
- To make sure that the patient promptly reaches the OT, ICU or ward from the Casualty as the case may be.
- In case of any ward hazard the resident should inform the duty consultant and Head of the Department.
- To attend to all routine and urgent consultations from other Departments.

Call Schedules

- Call Schedules are the responsibility of the Senior Resident. The call schedule, however needs to be approved by the Head of the Department and a copy of the same needs to be distributed to the all the concerned departments

Duty Hours

Duty hours are defined as all clinical and academic activities related to the residency program, i.e., patient care (both inpatient and outpatient), administrative duties related to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled academic activities such as conferences. Duty hours do not include reading and preparation time spent away from the duty site

COMPETENCE EXPECTED AT END OF TRAINING

First 18 months

- Develop a knowledge base in basic and clinical neurosurgery,
- Develop a thorough understanding of basic neurological examinations
- Become knowledgeable in the physiology of pre and post operative care of neurosurgical patients.
- On-call as required by the rotations in compliance with regulations.
- Become comfortable with minor neurosurgical procedures, specifically lumbar puncture, external ventricular drain placement, and burr hole placement, placement of head-frames for stereotactic radiosurgery procedures.
- Formulate a research project.
- Knowledge of the biomechanics of the spine, cranial base anatomy, management of all tumors encountered in neurosurgical practice.
- Successfully complete rotations in neurology, neuropathology, neuroradiology.
- Show evidence of learning and undertake progressively responsible patient Management.

Second 18 months

- Become comfortable with basic cranial and spine surgery in both adult and pediatric patients, assuming a more active role in the OR
- Further develop knowledge base in clinical neurosurgery.
- Augment skills and become proficient in the management of complex neurosurgical conditions
- Become comfortable with most neurosurgical cases and perform surgery with moderate supervision
- Be involved in basic science neurolab and complete an anatomical project in skull

base lab and a spine project in the biomechanics lab (preferable)

Develop knowledge base concerning more complex neurosurgical procedures, focusing attention on subspecialties.

Learn fundamentals of head trauma, spinal cord injury and critical care management.

Become proficient in basic post-operative neurosurgical management.

Formulate evidence-based treatment plans

Successfully complete publication of research project and all publication

Requirements

ASSESSMENT

Assessment should be comprehensive & objective. It should address the stated competencies of the course. The assessment needs to be spread over the duration of the course.

FORMATIVE ASSESSMENT, i.e., assessment during the training.

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

Credit-based evaluation

The internal evaluation of the senior residents will be based on grading. The grading will be based on the performance in each module with specified maximum credits against them

Module I: Patient evaluation and management (40 Credits)

1. Ward posting (20 credits)

The evaluation tools will be as follows,

1. Completion of admission and discharge summaries & at discharge patient education and prescription.

2. Evaluation of his understanding of the clinical problem of all inpatients under his charge and recognition using clinical laboratory parameters of patient's progress, deterioration or complications.
3. Identification of all clinical issues setting targets to be achieved at discharge.
4. Patient education and counselling especially with respect to post discharge life style, diet, exercise, behavior modification & drugs and drug interactions.
5. Clinical appreciation of bedside signs and symptoms
6. Interpretation of all laboratory and invasive and noninvasive tests results
7. Discharge Summary quality and completeness
8. Bedside procedures including pleural and ascitic tap, and central venous cannula placement.

II. Assessment of Outpatient training (10 credits).

1. Number of clinical cases seen and discussed with Consultant.
2. Completeness of case history writing and the plan of management along with patient education and quality of prescription given to patient.
3. Interpretation of all routine investigation including CT, MRI, DSA and Laboratory reports.
4. Total evaluation / plan management strategy of patient on completed routine investigations.
5. Understanding of the clinical problem, judgment in patient management and knowledge of the clinical / management issues involved.
6. Number of the patients identified with new problem / worsening of existing clinical issues requiring change of management plan and management discussed with consultant and also presented to the Medical/Surgery Department meetings charting out plan of management, with all relevant investigations.
7. Identification of critically ill patients and channeling their acute management.
8. Inter-departmental consultations

III. ICU and Emergency (10 Credits)

This includes evaluation of patient management in the ICCU (newly admitted. transferred from OT, wards, transferred after intervention procedure, etc) and charting out plan of management and carrying out the same.

ICU training will include all emergency procedures like External Ventricular Drainage, Tracheostomy, Traction, Central Venous Cannulation, Endo Tracheal Intubation, Ventilator management and blood gases interpretation, CPR, CPR protocol.

Module II: Procedural skills (50 credits)

1. Completion of the mandatory numbers of each procedures
2. Documentation : both preoperative work up and post operative follow up
3. Maintaining an operative logbook

Module III: Academic Presentation (40 credits)

1. Journal Review [10 credits] (Minimum 10 in 3 yrs; 1 hr each)

Purpose of journal presentation is to instill qualities of enquiry and analysis of scientific medical articles and to evaluate its relevance and impact in understanding pathobiology of disease or in clinical management. The resident can select recent articles of clinical relevance, or consult the faculty to help select scientific articles with original research content for presentation. The presentation should reflect the resident's understanding of the problem under discussion and the outcome and analysis of the articles presented in print with a copy for the dept. and one for the individual, highlighting the aim/results with regard to various aspects of disease state and the clinical relevance. 3-4 articles with brief exposition of the highlights of the study and its clinical relevance and the take home message. The senior resident should submit a short report of the, methodology, patient recruitment criteria, results, discussion and implications for clinical practice. Each resident will have to present a minimum of ten journal clubs during his entire residency program. The oral presentation and the write up will be equally weighted.

2. Seminar (3/year) 45 min [10 credits]

It is intended to encourage extensive literature review on the topic and present the highlights of the topic under review in a succinct manner with clear take home messages, but at the same time the extensive literature search elevates the presenter as an authority on the topic. The topic should be prepared as a review article with complete bibliography in a publishable format, along with the topic presentation. The presentation and the write up are equally weighted.

3. Neuroradiology meetings (2nd year & 3rd year: 20-25 presentations, 15 min each) {10 credits}

1. Brief clinical summary
2. Discussion of imaging findings
3. Interpretation of images with differential diagnosis

4. Short synopsis when needed.

4. Bedside Clinical Presentation (1st year 3/year, 2nd year:5/year, 3rd year: 6-8/year) {10 credits}

The following parameters will be assessed

1. History taking, presentation and analysis of history.
2. Physical findings, presentation and discussion with differential diagnosis.
3. Investigation-CT, MRI ,DSA and laboratory investigations.
4. Final Diagnosis: Physiological abnormalities/anatomical defects / etiology/ functional class / associated conditions/ complications
5. Further evaluation / Laboratory / Invasive investigations and plan of patient management including surgical approach and complication avoidance.

Module IV: Paper publication and presentation (10 credits) in national / international conference , outstanding research (5 credits) & Evaluation of Thesis (15 credits). (Total 30 credits)

Evaluation of thesis:

1. Mid-term evaluation of projects mandatory and will carry credits
2. Prospective / Retrospective Study
3. Ethical Committee clearance / Institute funding obtained
4. Contribution of candidates experience in the study
5. Descriptive data collection / Quantitative data subjected to statistical analysis.
6. Midterm Review: At 18 months of MCh course: Aims and objectives, review of literature, materials and methods (exclusion / inclusion criteria), data collection and presentation (% of target of the project) and preliminary data analysis.
7. Review at 30 months: Presentation of the full project as thesis and also in publishable form, complete with statistical analysis, discussion, study limitations, conclusion, and bibliography.
8. Overall impact of the project in adding to our knowledgebase, and patient management. Between 30-33 months, the project should have been sent for publication to preferably peer reviewed journals (before appearing for Part 2 examination).
9. Presentation of the project work as scientific presentation at national level and at

state level- mandatory.

Paper presentation / publication: Senior residents are encouraged to present / publish scientific research or articles in indexed journals / national & international conferences

Research (5 credits)

Residents who engage in and excel in research activities in addition to the above stipulated ones shall earn credits for outstanding performance

Module V: Internal Examination : Theory (32; 4 X 8 credits)

There will be 4 internal theory examinations, each having one theory paper of 100 marks during the 3-year course. These examination will have theory papers only, and the answer papers will be evaluated by the faculty members of the department. The results will be conveyed to the residents as a part of the regular appraisal.

SUMMATIVE ASSESSMENT,

Ratio of marks for theory and practical examination will be same.

Pass percentage will be 50%.

Theory : 100 marks each

(100x4=400 marks)

Paper 1-Basic science as related to Neurosurgery

Paper 2-Clinical Neurosurgery

Paper 3 – Operative Neurosurgery

Paper 4- Recent advances in Neurosurgery

Practical & Viva-Voce Examination

400 marks

- | | |
|-------------------------------------------------------------------------------------|-----------|
| 1. Long Case – one | 100 marks |
| 2. Short case – two (50x2) | 100 marks |
| 3. OSCE 5 stations (20x5) | 100 marks |
| 4. Grand viva- Operative procedure, Instruments, Radiology, History of Neurosurgery | 100 marks |

Suggested reading

1. Youman`s Neurological Surgery edited by H. Richard Winn
2. Operative Neurosurgical Techniques by Schmidek and Sweet
3. Textbook of Neurosurgery edited by RamamurthiTandon

4. Greenberg`s Handbook of Neurosurgery
5. DeJong`s The Neurological examination
6. Localization in clinical neurology by Brazis
7. Rhoton; Cranial Anatomy and Surgical Approaches.

Journals

1. Journal of Neurosurgery
2. Neurosurgery
3. Neurology India
4. ActaNeurochirurgica
5. World Neurosurgery

Neeraj Patni

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