



UNIVERSITY OF NAIROBI

COLLEGE OF HEALTH SCIENCES

**SCHOOL OF MEDICINE
DEPARTMENT OF SURGERY
DIVISION OF NEUROSURGERY
KENYATTA NATIONAL HOSPITAL
PO Box 19676, 00202, NAIROBI
KENYA.**

NEUROLOGICAL SURGERY

TRAINING PROGRAMME

FACULTY

Prof N J M Mwang'ombe MBChB, MMed PhD (Lond), Dr. P O Akuku MBChB, MMed, Dr. C K Musau MBChB, MMed, Mr. D O Olunya MBChB, FRCS (SN), Dr. J Kiboi MBChB, MMed, Dr. V Wekesa MBChB. MMed (NS,UoN), Dr. P Lubanga MBChB, MMed, Dr P Wanyoike MBChB, MMed, Dr. P Mwangi MBChB, MMed, Dr. J Boore MBChB, MMed, FCS(ECSA) NS, Dr. S Kanja MBChB, MMed (NS, UoN), Prof Leland Albright MD (Paediatric Neurosurgery, Kijabe Medical Centre), Dr. F Koech, MBChB, MMed (Moi Teaching and Referral Hospital, Eldoret, Spine and General Neurosurgery).

TABLE OF CONTENTS

Mission statement	3
Division of Neurosurgery Goals and Objectives	3
Program Outline	3
Core Competencies for Neurosurgery Training	5
Reference List for Teaching Tools and Methods	9
Policy on Supervision and Evaluation	9
Residency Competency Goals and Objectives	13
Basic Sciences and Principles of Surgery	15
Clinical Neurosciences	23
Basic Clinical Neurosurgery	27
Intermediate Clinical Neurosurgery	30
Final Stage Clinical Neurosurgery	35
Evaluation Form	46
Resident Rotation	47

MISSION STATEMENT

The mission of the Division of Neurosurgery is to provide optimal neurosurgical care to Kenyans and to train physicians as neurosurgical specialists who will become leaders in their field in Africa. The division is also committed to the advancement of neurosurgery as part of the neurosciences at the University of Nairobi. These goals are accomplished through the high calibre faculty, house officers, and support staff.

Goals and Objectives

To provide general and subspecialty neurosurgical services to patients.

To provide the training needed for our house officers to excel in surgical care and in research.

To provide instruction in the basic and clinical neurosciences to medical students, allied health students, and to house officers in other disciplines.

To promote and support basic science and clinical research in the neurosciences.

To achieve national and international recognition of our clinical and research endeavours.

PROGRAM OUTLINE

The Master of Medicine in Neurosurgery Program of The University of Nairobi is a six year Training Program with a mandatory two years of pre-registration independent clinical work at the Kenyatta National Hospital after graduation. This two year period may also be spent in an approved busy Neurosurgical Unit within Kenya or outside Kenya.

Post Graduate Year 1 & 2 (PG Yr 1&2)

PG Yr 1 Residents undertake Clinical Duties at The Kenyatta National Hospital in Neurosurgery (3 months). The Clinical duties may be undertaken as weekend and night calls. The Residents undertake courses in Applied Anatomy and Neuroanatomy (Department of Human Anatomy) and Neurophysiology and Surgical Physiology (Department of Medical Physiology) at The Chiromo Campus. Residents will be examined in those two subjects at the end of PG Yr 1.

PG Yr 2 Residents rotate in The General Surgery/Paediatric Surgery Wards (6 months), Orthopaedic Surgery (3 months), and Critical Care (1 month) at The Kenyatta National Hospital. During that period they are expected to complete The Surgery logbook. Seminars on Principles of Surgery are given during that period on Wednesdays 8:00 AM-9:00 AM, Department of Surgery. Residents are expected to attend all the teaching sessions in General Surgery, Critical Care and Orthopaedic Surgery. There is a Departmental Written and a Clinical Examination. The Departmental Examination contributes thirty percent of the marks in the Final Principles of Surgery University Examination. The Surgery logbook must be handed in one month prior to sitting for the Principles of Surgery Examination. Successful completion of the log book is required before sitting for the Principles of Surgery Examination.

Post Graduate Year 3

PG Yr 3 Residents work in the Neurosurgical Unit at the Kenyatta National Hospital while undertaking courses in Neuropathology and General Pathology (Departments of Pathology & Microbiology), Neuroradiology (Department of Radiology), Neuro-otology (Department of Surgery-Division of ENT) and Neuro-ophthalmology (Department of Ophthalmology). Residents undertake a three month Clinical Rotation in Neurology (Department of Internal Medicine). The Residents co-ordinate the weekly Neuropathology and Neuroradiology Conferences. They are expected to sit for University Examinations at the end of the academic year in the areas mentioned.

Post Graduate Year 4, 5 & 6

Neurosurgical outpatient clinics.

Neurosurgical Outpatient Clinics are held every Monday at 2:00 PM every Tuesday at 2:00 PM and every Wednesday 9:00-11:00 AM (Paediatric Neurosurgery) at the Surgical Outpatient Clinic (SOPC), No. 24. All Residents, except the on-call Resident, are expected to attend. The Monday Clinic is a Clerkship Clinic for Final Year Medical Students and the Wednesday Clinic is a Clerkship Clinic for 3rd year Medical Students. The Clinics are co-ordinated by the PGY 5/6 on-duty Resident. The clerkship clinics are conducted by the Consultants.

Clinical rounds

Neurosurgery Resident Teaching and Hospital Rounds are held every day by the On-duty Consultant. Patient management Rounds are conducted twice a day, in the morning and late afternoon, after operative cases are completed, by the on-call Resident under the guidance of the On-duty Consultant.

Neurosurgical Grand Round

Neurosurgical Grand Round is held every Thursday from 9:15 AM to 11:00 AM. The Grand Round consists of presentations by Neurosurgery Residents.

Journal Club, Morbidity & Mortality Conference

Journal Club is held every first Monday of the month at 12:00 NOON. Morbidity and Mortality Conference is held every last Monday of the Month at 12:00 NOON. The Journal Club provides critical review of literature related to the care and evaluation of patients with neurosurgical disorders. Faculty and residents review each death and complication of the preceding month at the Morbidity and Mortality Conference. Interesting cases are discussed in depth. These Conferences are co-ordinated by the Chief Resident.

Neuroradiology Conference.

Neuroradiology Conference is held every Thursday at 8:00 AM. This conference reviews images of pre-operative cases and is co-ordinated by the PGY 3 Residents and the Radiology Residents.

Neuropathology (Clinico-pathological-CPC) Conference.

Neuropathology Conference is held every Friday at 7:30 AM. This is a multidisciplinary conference that incorporates neuroradiology and neuropathology for review of interesting neurosurgical cases and is co-ordinated by the PGY 3 Residents and the Pathology Residents.

Principles and Practice of Neurosurgery Seminars

Seminars on Principles and Practice of Neurosurgery are given during the year on Thursdays 11:00 AM-1:00 PM, Department of Surgery.

Case Discussion Seminars

Case discussion seminars are held on Mondays 10:30 AM-1:00 PM.

Assessment

There is a University Written Assessment and a Clinical and Oral Examination on completion of the Lecture schedule during PG Yr 4, 5 and 6 levels of Training.

Successful completion of the University Examination is required before proceeding to the next level of training or completing the training program.

The Neurosurgery logbook must be handed in one month prior to sitting for each stage of the MMed Neurosurgery Examination. Successful completion of the log book is required before sitting for each stage of the MMed Neurosurgery Examination.

Dissertation

Residents are required to undertake research and write a dissertation. The research theme shall be within the area of Neurosurgery and Neurosciences and will be agreed

upon between the candidate and the faculty academic supervisors. Residents are expected to attend a Clinical Epidemiology Course conducted by the Clinical Epidemiology Unit during their period of training and familiarise themselves with Research Methodologies. The Dissertation must be submitted three months to the date of the Final MMed Neurosurgery Examination. Successful completion of the dissertation is required before sitting for the final MMed Neurosurgery Examination.

Pre-Registration

The newly qualified MMed neurosurgery graduate must work at the Kenyatta National Hospital (or at a similar Local or International Neurosurgical Unit) for a minimum period of two years before seeking Specialist Board Registration.

CORE COMPETENCIES FOR NEUROSURGERY TRAINING

This residency program requires its residents to obtain competence in the six areas listed below to the level expected of a new practitioner. Toward this end, the program has defined the specific knowledge, skills, behaviours, and attitudes required, and will provide the educational experiences as needed in order for the residents to demonstrate the following:

Patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health with specific reference to neurosurgical conditions. At a minimum residents are expected to:

- 1) gather and understand essential patient information in a timely manner
- 2) generate an appropriate differential diagnosis
- 3) implement an effective plan of management
- 4) prioritize and stabilize multiple patients simultaneously
- 5) competently perform neurosurgical operative procedures
- 6) manage complications
- 7) analyze outcomes
- 8) counsel and educate patients and families.
- 9) provide health care services aimed at preventing health problems and maintaining health.
- 10) work with health care professionals to provide patient-focused care.

Teaching tools and methods the program uses to deliver the opportunity for resident(s) to develop this competency;

- 1, 2, 3, 4, 6, Daily rounds,
- 1, 2, 6, Teaching rounds
- 3, 7, 10, Specialty practice guidelines
- 1, 2, 3, 8, 9, Clinic
- 5, 6, Intra-operative teaching
- 1-9 M&M, Neuroradiology, Neuropathology Conferences
- 1-9 Case Management Conferences

Feedback and measurement used to gauge the resident(s) development of this Competency;

- 1-10, Faculty evaluation
- 2, M&M, Neuroradiology, Neuropathology Conferences
- 1-9 Daily observation and evaluation by Consultants
- 1-9 MMed NS Part 1. II and III University Examinations
- 2, 5,6 MMed NS log books

Documentation used to verify attainment of this competency by residents

- 1-10 Faculty Evaluations are completed every 12 months
- 1-10 Residents are given daily feedback from the Consultants
- 1-10 Continuous Assessment Examination

1-10 MMed NS Part I, II, III University Examinations

Medical Knowledge: Residents must demonstrate knowledge about established and evolving biomedical, clinical, and cognate sciences, with specific reference to basic and clinical neurosciences, as well as the application of this knowledge to patient care. Among other things, residents are expected to:

- 1) Generate a differential diagnosis and properly sequence critical actions for patient care, including management of complications, morbidity and mortality.
- 2) Synthesize and properly utilize acquired patient data.
- 3) Identify neurosurgical emergencies.
- 4) Know how to access current medical information.
- 5) Understand how to treat neurosurgical conditions.
- 6) Incorporate evidence-based principles

Teaching tools and methods the program uses to deliver the opportunity for resident(s) to develop this competency;

1-6, Surgery Texts

1-6 Surgery Journals

1-6 Teaching Rounds & Case Management Conferences

1-6, Lectures

4, 5, 6, Pubmed/online journals

1-6 Self-directed study

1, 2, 3, 5 M&M Conferences

1, 2, 4, 5, 6 Case Management Conferences

2, 4, Journal Club

Feedback and measurement used to gauge the resident(s) development of this Competency;

1-6 Faculty evaluations

1-6 MMed NS Part I, II, III Continuous Assessment and University Examinations

1, 2, 3, 5 M&M Conference

4, 5, Publications

1, 2, Presentations

1, 2, 3, 5 MMed NS logbooks

1-6 Daily observation and evaluation by Consultants

Documentation used to verify attainment of this competency by residents;

1-6 Residents are given daily feedback from the Consultants

1-6 Faculty Evaluations are completed every 12 months

Practice-based learning and improvement that involves the investigation and evaluation of care for their patients, the appraisal and assimilation of scientific evidence, and improvements in patient care. At a minimum, residents are expected to:

- 1) Analyze and assess their practice experience and perform practice-based improvement.
- 2) Locate, appraise and utilize scientific evidence related to their patients' health problems.
- 3) Apply knowledge of study design and statistical methods to critically appraise the medical literature.
- 4) Utilize information technology to enhance their education and improve patient care.
- 5) Facilitate the learning of students and other health care professionals

Teaching tools and methods the program uses to deliver the opportunity for resident(s) to develop this competency;

1 MMed NS log books
 1, 2, 3, 4, Journal Club
 2, 4, 5 Case Management Conferences
 1-5 M&M conference
 1-5 Core competency lectures
 Feedback and measurement used to gauge the resident(s) development of this Competency;
 1-5 M&M Conferences
 1-5 Evaluations by Faculty
 1-5 Daily observation and evaluation by consultants
 2, 3, 4 MMed NS Part I, II, III Continuous assessment and University examination
 Documentation used to verify attainment of this competency by residents;
 1-5 Residents are given daily feedback from the Consultants
 1-5 Faculty Evaluations are completed every 12 months
 Residents must be able to demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and other health professionals. At a minimum, residents are expected to:

- 1) Develop an effective therapeutic relationship with patients and their families, with respect for diversity and cultural, ethnic, spiritual, emotional, and age-specific differences.
- 2) Demonstrate effective participation in and leadership of the health care team.
- 3) Develop effective written communication skills.
- 4) Maintain relevant and legible medical records
- 5) Effectively communicate with out-of hospital personnel as well as non-medical personnel.
- 6) Involve patients in medical decisions
- 7) Strengthen listening and non-verbal communication skills

Teaching tools and methods the program uses to deliver the opportunity for resident(s) to develop this competency;
 1-7 Mentoring from Consultants
 1-7 Daily interactions with patients, families and health care staff
 5, 7 Case Management Conferences
 Feedback and measurement used to gauge the resident(s) development of this competency;
 1-7 Evaluation by Faculty
 1-7 Daily observation and evaluation by Consultants
 Documentation used to verify attainment of this competency by residents;
 1-7 Residents are given daily feedback from the Consultant
 1-7 Program Evaluations are completed every 12 months
 Professionalism, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to patients of diverse backgrounds. At a minimum, residents are expected to:

- 1) Treat patients/family/staff/ paraprofessional personnel with respect.
- 2) Demonstrate sensitivity to patient's pain, emotional state, and gender/ethnicity issues.
- 3) Discuss death honestly, sensitively, patiently, and compassionately.
- 4) Exemplify integrity
- 5) Accept responsibility/accountability
- 6) Demonstrate reliability

- 7) Maintain calm, even temperament
- 8) Exhibit self-awareness and knowledge of limits.
- 9) Respond to the comments of other team members, patients, families, and peers openly and responsibly.

Teaching tools and methods the program uses to deliver the opportunity for resident(s) to develop this competency;

1-9 Daily examples of standards set by Consultants

1, 4, 6, Establishment of dress code

1-9 Daily interactions with patients and health care professionals in the operating room, the clinic and on the floor

4, 5, 6, 7, 8, 9 Case Management Conferences

Feedback and measurement used to gauge the resident(s) development of this Competency;

1-9 Daily observation and evaluation by Consultants

1-9 Program Evaluation

Documentation used to verify attainment of this competency by residents;

1-9 Residents are given daily feedback from the Consultants

1-9 Performance Evaluations are completed every 12 months

Systems-based practice, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. At a minimum, residents are expected to:

- 1) Understand, access, appropriately utilize, and evaluate the effectiveness of the resources, providers, and systems necessary to provide optimal neurosurgical care.
- 2) Understand different medical practice models and delivery systems and how to best utilize them to care for the individual patient.
- 3) Practice cost-effective health care and resource allocation that does not compromise quality of care.
- 4) Advocate, coordinate, and facilitate patient care.
- 5) Understand principles of and advance practices for patient safety at the institutional and individual level

Teaching tools and methods the program uses to deliver the opportunity for resident(s) to develop this competency

1-5 Clinicopathological Conferences

1-5 Core competency lectures

1-5 Observation of faculty utilizing cost-effective healthcare

1, 2, 5 Case Management Conferences

Feedback and measurement used to gauge the resident(s) development of this competency

1-5 Evaluations by Faculty

1-5 Program Evaluation

1, 2, 5 MMed NS Part III Continuous assessment and University examinations

Documentation used to verify attainment of this competency by residents;

1-5 Performance Evaluations are completed every 12 months

Didactic Modules

Learning Objectives:

1. For the resident to model their independent lifelong learning process in neurosurgery, based upon didactic topic specific series provided by the faculty.
2. For the resident to study specific topics in advance of the lectures.

3. To improve the resident's teaching and communication skills through participation in didactic lectures.

Journal Club

Goals and Objectives

To acquire critical analysis of journals

Learning Objectives:

- 1) To develop a clinical question on which to base the selection of a journal club article.
- 2) To succinctly describe the study design, methodology and results in five minutes.
- 3) To be able to discuss the strengths and weaknesses of the study design and methodology.
- 4) To draw their own conclusions based upon the study design and results; and then compare this to the author's conclusions.

REFERENCE LIST FOR TEACHING TOOLS AND METHODS

Neurosurgery Texts

1. Essential Practice of Neurosurgery (WFNS). Eds. Kazadi Kalangu, Yoko Kato, Gilbert Dechambenoit
2. Youmans Neurological Surgery 5th Edition. Winn RH. Philadelphia, PA: W.B. Saunders, Inc., 2004
3. Handbook of Neurosurgery, 5th Edition. Greenberg MS
4. Neurosurgical Operative Atlas. AANS
5. Case Discussion Seminar Notes, University of Nairobi

Surgical Loupes;

Residents are expected to attain competence as outlined in the curriculum for each level of training.

EVALUATION OF RESIDENTS, FACULTY AND PROGRAM

Basis of Evaluations of Residents

Every twelve months evaluations of the residents of this program are performed.

These evaluations are based upon six general competencies; patient care, medical knowledge, practice-based learning and improvement, communication and interpersonal skills, professionalism, and systems-based practice.

The residency program requires residents to develop proficiency in the competencies and all evaluations of residents follow the six areas, listed below. Toward this end, the program defines the specific knowledge, skills, and attitudes required and provides educational experiences for our residents to demonstrate knowledge of the competencies.

1. PATIENT CARE

Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

Residents are expected to:

- communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
- gather essential and accurate information about their patients
- make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
- develop and carry out patient management plans
- counsel and educate patients and their families
- use information technology to support patient care decisions and patient education

- perform competently all medical and invasive procedures considered essential for the area of practice
- provide health care services aimed at preventing health problems or maintaining health
- work with health care professionals, including those from other disciplines, to provide patient-focused care

2. MEDICAL KNOWLEDGE

Residents must demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care. Residents are expected to:

- demonstrate an investigatory and analytic thinking approach to clinical situations
- know and apply the basic and clinically supportive sciences

3. PRACTICE-BASED LEARNING AND IMPROVEMENT

Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:

- analyze practice experience and perform practice-based improvement activities using a systematic methodology
- locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems
- obtain and use information about their own population of patients and the larger population from which their patients are drawn
- apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness
- use information technology to manage information, access on-line medical information and support their own education
- facilitate the learning of students and other health care professionals

4. INTERPERSONAL AND COMMUNICATION SKILLS

Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients families, and professional associates. Residents are expected to:

- create and sustain a therapeutic and ethically sound relationship with patients
- use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
- work effectively with others as a member or leader of a health care team or other professional group

5. PROFESSIONALISM

Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.

Residents are expected to:

- demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supersedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
- demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices
- demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

6. SYSTEMS-BASED PRACTICE

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

Residents are expected to:

- understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice
- know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
- practice cost-effective health care and resource allocation that does not compromise quality of care
- advocate for quality patient care and assist patients in dealing with system complexities
- know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

FORMAL YEARLY EVALUATIONS

At the end of each academic year, an appointment is scheduled with the resident to discuss their evaluations, progress and any concerns. The resident has the opportunity to review their evaluations and sign them. This is also an opportunity to discuss any concerns the resident may have about the rotation, faculty and the program in general.

Resident Portfolio

A resident's portfolio meets the twin needs of training verification for certifying organizations and to assist the resident in determining their strengths and weaknesses. In essence the portfolio will become a quality control tool for resident training and proficiencies.

For the duration of a neurosurgeon's active career, their training is verified whenever they apply for a license to practice medicine in a new jurisdiction, they apply for hospital privileges, or to be vetted for payment purposes by third party insurers. Periodically, these institutions repeat the credentialing process. The training institution is requested not only to verify the training, but to detail how the resident performed in training, were there any deficiencies, probation, and are they capable of performing certain procedures or not.

The resident portfolio is developed over the 6 years of the resident's training.

Important portions of the portfolio are the yearly evaluations, MMed NS Part I, II and III scores, MMed NS log books, any presentations at meetings, awards and honors, and any disciplinary actions. At the end of training the portfolio is used to generate a very detailed letter of the resident's training. This letter is then placed in their permanent file and is used for the verification of training for credentialing purposes. Thus, any entity that requests verification of training, with the appropriate release signed by the former resident, is given a detailed assessment performed by those who trained the former resident. This is more accurate and fair than having a consultant in charge or faculty member try to determine the course and results of training of a former resident who graduated years before.

The resident is able to view their portfolio at any time and they will take it with them upon completion of their residency.

PROMOTION

Resident evaluations occur annually. The faculty evaluates each

resident's performance on his/her clinical rotation and performance in the annual University Examination. In addition the following are also evaluated;

1. Acquisition of a solid foundation of fundamental surgical knowledge prior to progression in the program to the level of independent but supervised patient management and operative care.
2. Mastery of specific objectives in each year of training.
3. A high level of professionalism, interpersonal communication skills and ethical behavior as related to interpersonal relationships with faculty, peers, staff, medical students, and nurses.
4. Teaching skills
5. Presentations at conferences
6. Academic achievements, presentations at meetings, papers, and research
7. Maintain operative logs, duty hours and conference attendance

PROBATION AND DISMISSAL

It is assumed that residents entering Neurological Surgery will successfully complete the program. The selection process is rigorous and in general applicants are highly motivated and qualified. Once in the program, the faculty is committed to the education and success of the resident.

If a problem arises related to the six core competencies or due to a failure to comply with University or Hospital policies, there is a process for resolving the difficulty. The initial step in the process is a warning to the resident. A warning may be initiated by any faculty member by contacting the Chairman or Consultant-in-charge and generating a letter documenting the area of concern. The warning will be addressed at a special meeting of the faculty and the resident. The corrective action required by the resident will be given to the resident in writing.

If the deficiency is not corrected after the warning, the resident will be placed on focused review. This only requires a discussion with the resident about the issue and if corrected no other formal action is necessary. If the faculty is not satisfied that the issue is resolved the resident is placed on probation. Probation requires documentation and a formal hearing by a committee of the School/College/Hospital chaired by the Dean/Principal/Director. The final steps are suspension and/or dismissal.

Each step requires faculty review and approval and complete and frank discussion with the resident. If it is the recommendation of the faculty that the resident be placed on probation, the resident will be informed in writing and have the opportunity to meet with the faculty. The faculty will then determine the length of time the probation will last and the specific action required by the resident to correct the deficiency. A specific faculty member will be appointed to work with and mentor the resident during this period, and meetings will take place at predetermined times. The faculty will also meet with the resident at prescribed intervals to assess the progress of the resident. Failure to rectify the issue causing probation will result in dismissal of the resident. The time frame to rectify the issue will be determined by the seriousness of the issue requiring remedy.

Other issues may lead to warnings which if not corrected may lead to probation.

These include failure to maintain duty and operative logs in a timely manner, failure to attend conferences and violation of the moonlighting rules. Any of these may result in a resident receiving a warning, which if not corrected, could lead to probation.

Failure to adhere to any of the other policies outlined in this document could result in a warning which if not properly corrected and dealt with may result in probation and potentially dismissal.

FINAL EVALUATION

At the end of the training program, the Consultant-in-charge completes a final written evaluation of each graduating resident which include a review of the Residents performance during the final period of training and verifies that the resident has demonstrated sufficient professional ability to practice competently and independently.

Leave and Vacation

Each resident is allowed 4 weeks of leave. Study leave may be granted with approval by the Consultant-in-charge. Requests should be submitted at least 30 days prior to the dates requested for arrangements to be made by the Chief Resident. Copies of conference registration are to be submitted for study leave.

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 University official duty site(s).

Log book

Each resident should record all procedures performed on a daily basis. All procedures should be entered within 24 hours.

BASIC SCIENCES AND PRINCIPLES OF SURGERY PGY 1, 2

1 Basic sciences

Objective:

To acquire and demonstrate basic science knowledge appropriate for the practice of surgery, including:-

Applied anatomy: Knowledge of anatomy appropriate for surgery

Physiology: Knowledge of physiology relevant to surgical practice

Pharmacology: Knowledge of pharmacology relevant to surgical practice centred around safe prescribing of common drugs

Imaging: Knowledge of the principles, strengths and weaknesses of various diagnostic and interventional imaging methods

Knowledge:

Applied anatomy: Development and embryology. Gross and microscopic anatomy of the organs and other structures. Surface anatomy. Imaging anatomy.

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.

Applied neuroanatomy

Neuroembryology

Objective: To understand basic neuroembryology and its relevance to clinical practice

Knowledge: Embryogenesis of the brain and spinal cord

Embryogenesis of supporting structures - skull and vertebral column

Common anatomical variations and developmental abnormalities

Anatomy of the skull

Objective: To understand the anatomy of the skull

Knowledge: Structure, blood supply, innervation, surface and three-dimensional relationships of the: scalp, skull, meninges, orbit, cranial fossae, cranial foraminae, cranial nerves

Anatomy of the brain

Objective: To understand the structural anatomy of the brain

Knowledge: Cortical topography, Projection and association tracts, Organisation of the basal ganglia, Structure, organisation and connections of the cerebellum, pons and brainstem, Cranial nerves and their relationships, Visual and auditory pathways, Ventricular system and choroid plexus, Subarachnoid space and cisterns, Circle of Willis and principle regional and segmental blood supply, Venous drainage and dural sinuses

Anatomy of the spine

Objective: To understand the anatomy of the spine

Knowledge: Structure, blood supply, innervation, surface and three-dimensional relationships of the: vertebral column, spinal cord, ascending and descending tracts, spinal nerve roots, cauda equine.

Anatomy of the autonomic and peripheral nervous system

Objective: To understand the anatomy of the autonomic and peripheral nervous system

Knowledge: Sympathetic and parasympathetic pathways, Visceral and pelvic innervation, control of sphincter function, Brachial plexus, Lumbosacral plexus, Course, distribution and innervation of the major peripheral nerves

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.

Neurophysiology

Functional neurophysiology

Objective: To understand the functional organisation and integration of the central nervous system

Knowledge: Structure and function of neurones and glial cells, Synaptic function, action potentials and axonal conduction, Higher cerebral functions, Sleep and coma, Memory and disorders of the limbic system, Control of motor function: ascending and descending pathways, basal ganglia and cerebellar function, The special senses, Functions of the autonomic nervous system, Hypothalamic-pituitary function

Clinical neurophysiology

Objective: To understand the basic principles of clinical neurophysiology

Knowledge: Principles of electroencephalography, Principles of somatosensory, motor and brainstem evoked potential monitoring.

Peripheral neuropathies and entrapment neuropathies including: structure and function of peripheral nerves, use of nerve conduction studies

Disorders of the neuromuscular junction including: structure and function of smooth and striated muscle, use of electromyographic studies.

Interpretation of the results of EEG, EMG and NC studies

Objective: To understand the pathophysiology of intracranial disorders

Knowledge: Cerebral blood flow and metabolism, Cerebral autoregulation and vasospasm, Blood brain barrier and cerebral odema, Intracranial pressure dynamics, Cerebral ischaemia and neuroprotection, CSF hydrodynamics - production and absorption

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

Imaging:

Principles of diagnostic and interventional imaging including x-rays, ultrasound, CT, MRI. PET, radiounucleotide scanning

2. Common Surgical Conditions

Objective:

To demonstrate understanding of the relevant basic scientific principles for each of these surgical conditions and to be able to provide the relevant clinical care:

Abdominal pain, Appendicitis, Abdominal swelling, Change in bowel habit, Gastrointestinal haemorrhage, Rectal bleeding, Dysphagia, Dyspepsia, Jaundice, Gastrointestinal malignancy, Inflammatory bowel disease, Diverticular disease, Intestinal obstruction, Adhesions, Abdominal hernias, Peritonitis, Intestinal perforation, Benign oesophageal disease, Peptic ulcer disease, Benign and malignant hepatic, gall bladder and pancreatic disease, Haemorrhoids and perianal disease, Abdominal wall stomata

Breast disease; Breast lumps and nipple discharge, Acute Breast pain, Benign and malignant breast lumps, Mastitis and breast abscess.

Peripheral vascular disease; Presenting symptoms or syndrome, Chronic and acute limb ischaemia, Aneurysmal disease, Transient ischaemic attacks, Varicose veins, Leg ulceration, Atherosclerotic arterial disease, Embolic and thrombotic arterial Disease, Venous insufficiency, Diabetic ulceration.

Cardiovascular and pulmonary Disease; Coronary heart disease. Bronchial carcinoma. Obstructive airways disease. Space occupying lesions of the chest. Pulmonary embolus.

Genitourinary disease; Presenting symptoms or syndrome, Loin pain, Haematuria, Lower urinary tract symptoms, Urinary retention, Renal failure, Scrotal swellings, Testicular pain, Genitourinary malignancy, Urinary calculus disease, Urinary tract infection, Benign prostatic hyperplasia, Obstructive uropathy.

Trauma and orthopaedics; Presenting symptoms or syndrome, Traumatic limb and joint pain and deformity, Chronic limb and joint pain and deformity, Back pain, Simple fractures and joint dislocations, Fractures around the hip and ankle. Basic principles of Degenerative joint disease. Basic principles of inflammatory joint disease including bone and joint infection. Compartment syndrome. Spinal nerve root entrapment and spinal cord compression. Metastatic bone cancer. Common peripheral neuropathies and nerve injuries.

Disease of the Skin, Head and Neck; Presenting symptoms or syndrome. Lumps in the neck. Epistaxis. Upper airway obstructions. Benign and malignant skin lesions.

Benign and malignant lesions of the mouth and tongue.

Neurology and Neurosurgery; Presenting symptoms or syndrome. Headache. Facial pain. Coma. Space occupying lesions from bleeding and tumour

Endocrine; Presenting symptoms or syndrome. Lumps in the neck. Acute endocrine crises. Thyroid and parathyroid disease. Adrenal gland disease. Diabetes

3. Basic surgical skills

Objective:

Preparation of the surgeon for surgery
 Safe administration of appropriate local anaesthetic agents
 Acquisition of basic surgical skills in instrument and tissue handling.
 Understanding of the formation and healing of surgical wounds
 Incise superficial tissues accurately with suitable instruments.
 Close superficial tissues accurately. Tie secure knots.
 Safely use surgical diathermy. Achieve haemostasis of superficial vessels.
 Use suitable methods of retraction.
 Knowledge of when to use a drain and which to choose.
 Handle tissues gently with appropriate instruments.
 Assist helpfully, even when the operation is not familiar.
 Understand the principles of anastomosis
 Understand the principles of endoscopy including laparoscopy
 Knowledge:
 Principles of safe surgery
 Principles of hand washing, scrubbing and gowning
 Immunisation protocols for surgeons and patients
 Administration of local anaesthesia
 Choice of anaesthetic agent
 Surgical wounds; Classification of surgical wounds, Principles of wound management
 Pathophysiology of wound healing, Scars and contractures. Incision of skin and
 subcutaneous tissue. Langer's lines. Choice of instrument. Closure of skin and
 subcutaneous tissue. Options for closure.
 Suture and needle choice. Knot tying. Range and choice of material for suture and
 ligation
 Safe application of knots for surgical sutures and ligatures.
 Haemostasis: Surgical techniques. Principles of diathermy
 Tissue handling and retraction: Choice of instruments
 Biopsy techniques including fine needle aspiration cytology
 Use of drains: Indications. Types. Management/removal
 Principles of anastomosis
 Principles of surgical endoscopy including laparoscopy
 Clinical Skills:
 Preparation of the surgeon for surgery
 Effective and safe hand washing, gloving and gowning
 Preparation of a patient for surgery; Creation of a sterile field. Antisepsis. Draping
 Administration of local anaesthesia; Accurate and safe administration of local
 anaesthetic agent
 Technical Skills and Procedures:
 Preparation of the surgeon for surgery
 Effective and safe hand washing, gloving and gowning
 Administration of local anaesthesia
 Accurate and safe administration of local anaesthetic agent
 Incision of skin and subcutaneous tissue: Ability to use scalpel, diathermy and
 scissors
 Closure of skin and subcutaneous tissue: Accurate and tension free apposition of
 wound edges
 Knot tying: Single handed. Double handed
 Instrument. Superficial. Deep

Haemostasis: Control of bleeding vessel (superficial). Diathermy. Suture ligation. Tie ligation

Clip application. Transfixion suture

Tissue retraction: Tissue forceps. Placement of wound retractors

Use of drains: Insertion. Fixation. Removal

Tissue handling: Appropriate application of instruments and respect for tissues.

Biopsy techniques

Skill as assistant: Anticipation of needs of surgeon when assisting

Surgery Log book

4. The assessment and management of the surgical patient

Objective

To demonstrate the relevant knowledge, skills and attitudes in assessing the patient and manage the patient, and propose surgical or non-surgical management.

Knowledge

The knowledge relevant to this section will be variable from patient to patient and is covered within the rest of the syllabus – see common surgical conditions.

Clinical Skills

Surgical history and examination (elective and emergency)

Construct a differential diagnosis

Plan investigations. Clinical decision making. Team working and planning

Case work up and evaluation; risk management

Active participation in clinical audit events

Appropriate prescribing

Taking consent for intermediate level intervention; emergency and elective

Written clinical communication skills

Interactive clinical communication skills: patients

Interactive clinical communication skills: colleagues

5. Peri-operative care

Objective:

To assess and manage preoperative risk

To manage patient care in the peri-operative period

To conduct safe surgery in the operating theatre environment

To assess and manage bleeding including the use of blood products

To care for the patient in the post-operative period including the assessment of common complications

To assess and plan perioperative nutritional management

Knowledge:

Pre-operative assessment and management:

Cardiorespiratory physiology.

Diabetes mellitus and other relevant endocrine disorders

Fluid balance and homeostasis

Renal failure

Pathophysiology of sepsis – prevention and prophylaxis

Thromboprophylaxis

Laboratory testing and imaging

Risk factors for surgery and scoring systems

Pre-medication and other preoperative prescribing

Principles of day surgery

Intraoperative care:

Safety in theatre including patient positioning and avoidance of nerve injuries. Sharps safety. Diathermy, laser use. Infection risks. Radiation use and risks

Tourniquet use including indications, effects and complications

Principles of local, regional and general anaesthesia

Principles of invasive and non-invasive monitoring

Prevention of venous thrombosis

Surgery in hepatitis and HIV carriers

Fluid balance and homeostasis

Post-operative care:

Post-operative monitoring. Cardiorespiratory physiology. Fluid balance and homeostasis

Diabetes mellitus and other relevant endocrine disorders. Renal failure.

Pathophysiology of blood loss

Pathophysiology of sepsis including SIRS and shock

Multi-organ dysfunction syndrome

Post-operative complications in general

Methods of postoperative analgesia

To assess and plan nutritional management

Post-operative nutrition

Effects of malnutrition, both excess and depletion

Metabolic response to injury

Methods of screening and assessment of nutritional status

Methods of enteral and parenteral nutrition

Haemostasis and Blood Products:

Mechanism of haemostasis including the clotting cascade

Pathology of impaired haemostasis e.g. haemophilia, liver disease, massive haemorrhage. Components of blood. Alternatives to use of blood products

Principles of administration of blood products

Patient safety with respect to blood products

Coagulation, deep vein thrombosis and embolism:

Clotting mechanism (Virchow Triad)

Effect of surgery and trauma on coagulation

Tests for thrombophilia and other disorders of coagulation

Methods of investigation for suspected thromboembolic disease

Principles of treatment of venous thrombosis and pulmonary embolism including anticoagulation

Role of V/Q scanning, CT, pulmonary angiography, D-dimer and thrombolysis

Place of pulmonary embolectomy

Prophylaxis of thromboembolism:

Risk classification and management of DVT

Knowledge of methods of prevention of DVT, mechanical and pharmacological

Antibiotics:

Common pathogens in surgical patients

Antibiotic sensitivities. Antibiotic side-effects

Principles of prophylaxis and treatment

Metabolic and endocrine disorders in relation to perioperative management

Pathophysiology of thyroid hormone excess and deficiency and associated risks from surgery
 Causes and effects of hypercalcaemia and hypocalcaemia
 Complications of corticosteroid therapy
 Causes and consequences of Steroid insufficiency
 Complications of diabetes mellitus
 Causes and effects of hyponatraemia
 Causes and effects of hyperkalaemia and hypokalaemia
 Clinical Skills
 Pre-operative assessment and management:
 History and examination of a patient from a medical and surgical standpoint
 Interpretation of pre-operative investigations
 Management of co morbidity. Resuscitation
 Appropriate preoperative prescribing including premedication
 Intra-operative care:
 Safe conduct of intraoperative care
 Correct patient positioning
 Avoidance of nerve injuries
 Management of sharps injuries
 Prevention of diathermy injury
 Prevention of venous thrombosis
 Post-operative care:
 Writing of operation records
 Assessment and monitoring of patient's condition
 Post-operative analgesia
 Fluid and electrolyte management
 Detection of impending organ failure
 Initial management of organ failure
 Principles and indications for Dialysis
 Recognition, prevention and treatment of post-operative complications
 Haemostasis and Blood Products:
 Recognition of conditions likely to lead to the diathesis
 Recognition of abnormal bleeding during surgery
 Appropriate use of blood products
 Management of the complications of blood product transfusion
 Coagulation, deep vein thrombosis and embolism; Recognition of patients at risk.
 Awareness and diagnosis of pulmonary embolism and DVT. Role of duplex scanning, venography and d-dimer measurement. Initiate and monitor treatment of venous thrombosis and pulmonary
 Embolism. Initiation of prophylaxis
 Antibiotics: Appropriate prescription of antibiotics.
 Assess and plan preoperative nutritional management. Arrange access to suitable artificial nutritional support, preferably via a nutrition team including Dietary supplements, Enteral nutrition and Parenteral nutrition.
 Metabolic and endocrine disorders; History and examination in patients with endocrine and electrolyte disorders. Investigation and management of thyrotoxicosis and hypothyroidism
 Investigation and management of hypercalcaemia and hypocalcaemia.

Peri-operative management of patients on steroid therapy

Peri-operative management of diabetic patients

Investigation and management of hyponatraemia

Investigation and management of hyperkalaemia and hypokalaemia

Technical Skills and Procedures:

Surgery log book

6. Assessment and management of patients with trauma (including the multiply injured patient)

Objective:

Assess and initiate management of patients with chest trauma, head injury, spinal cord injury, abdominal and urogenital trauma, vascular trauma, a single or multiple fractures or dislocations, traumatic skin and soft tissue injury, burns, multiply injured patient.

Be able to prioritise management in such situation as defined by ATLS, etc

Knowledge:

General; Scoring systems for assessment of the injured patient, Major incident triage, Differences In children

Shock; Pathogenesis of shock, Shock and cardiovascular physiology, Metabolic response to injury, Adult respiratory distress syndrome, Indications for using uncross matched blood

Wounds and soft tissue injuries; Gunshot and blast injuries, Stab wounds, Human and animal bites, Nature and mechanism of soft tissue injury, Principles of management of soft tissue injuries

Principles of management of traumatic wounds, Compartment syndrome

Burns; Classification of burns, Principle of management of burns

Fractures; Classification of fractures, Pathophysiology of fractures, Principles of management of fractures, Complications of fractures, Joint injuries

Organ specific trauma; Pathophysiology of thoracic trauma, Pneumothorax, Head injuries including traumatic intracranial haemorrhage and brain injury, Spinal cord injury, Peripheral nerve injuries, Blunt and penetrating abdominal trauma including spleen, Vascular injury including iatrogenic injuries and intravascular drug abuse
Crush injury, Principles of management of skin loss including use of skin grafts and skin flaps

Clinical Skills:

General

History and examination, Investigation, Referral to appropriate surgical subspecialties

Resuscitation and early management of patient who has sustained

thoracic, head, spinal, abdominal or limb injury according to ATLS and APLS guidelines

Resuscitation and early management of the multiply injured patient

Specific problems; Management of the unconscious patient, Initial management of skin loss

Initial management of burns, Prevention and early management of the compartment syndrome

Technical Skills and Procedures:

See log book

7 Surgical care of the Paediatric patient

Objective:

To assess and manage children with surgical problems, understanding the similarities and differences from adult surgical patients

To understand the issues of child protection and to take action as appropriate

Knowledge:

Physiological and metabolic response to injury and surgery

Fluid and electrolyte balance

Thermoregulation safe prescribing in children

Principles of vascular access in children

Clinical Skills:

History and examination of paediatric surgical patient

Assessment of respiratory and cardiovascular status

Undertake consent for surgical procedures in Paediatric patients

8 Organ and Tissue transplantation

Objective:

To understand the principles of organ and tissue transplantation

Knowledge:

Principles of transplant immunology including tissue typing and rejection

Principles of immunosuppression

Tissue donation and procurement

Indications for whole organ transplantation

9 Management of the dying patient

Objective

Ability to manage the dying patient appropriately.

Palliative Care: Good management of the dying patient in consultation with the palliative care team.

Knowledge

Palliative Care: Care of the terminally ill

Appropriate use of analgesia, anti-emetics and laxatives

Principles of organ donation:

Circumstances in which consideration of organ donation is appropriate

Principles of brain death

Understanding the role of the pathologist and the certification of death

Clinical Skills

Palliative Care:

Symptom control in the terminally ill patient

Principles of organ donation:

Assessment of brain stem death

Certification of death

CLINICAL NEUROSCIENCES (PGY 3)

Principles of neuropathology

Objective: To understand the neuropathology of infection, inflammation, ischaemia, neoplasia and trauma affecting the nervous system

Knowledge: Acute and chronic inflammatory processes in the CNS including

Demyelination, Bacterial, fungal and parasitic meningitis, encephalitis and abscess

Formation, Viral encephalitis, Slow viruses, CJD and vCJD, HIV associated

infections, tumours and leucoencehalopathies, Cytopathology of neurones and glial in response to ischaemia, hypoxia and trauma. Diffuse axonal injury. Macroscopic brain and spinal cord injury including effects of brain shift, herniation and raised ICP.

Classification, epidemiology and pathology of CNS tumours.

Tumour biology, cell kinetics, tumour markers, immunocytochemistry

General Pathology:

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
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 sterilisation
Antibiotics including prophylaxis and resistance
Principles of high risk patient management
Hospital acquired infections

Principles of neuroradiology

Objective: To understand the principles of neuroradiological imaging of the structure and function of the nervous system

Knowledge: Interpretation of plain radiographs of the skull and spine,

Principles of computerised tomography of the brain, skull and spine

Interpretation of CT scans with particular reference to acute spinal disorders, cranial trauma, hydrocephalus, intracranial tumours and spontaneous intracranial haemorrhage

Principles of basic magnetic resonance imaging

Interpretation of MRI scans with particular reference to acute spinal disorders, cranial trauma, hydrocephalus and intracranial tumours

Principles of advanced magnetic resonance imaging including fMRI, DWI and spectroscopy

Interpretation of angiographic images: CTA, MRA and DSA

Principles of neuropsychology

Objective: To understand the principles of neuropsychological assessment.

Knowledge: The principles of neuropsychological assessment

Common neuropsychological problems associated with head injury, subarachnoid haemorrhage, hydrocephalus, structural lesions of the frontal and temporal lobes and disorders of the limbic system

Clinical Skills: Ability to undertake bed-side assessment of cognition and memory

Principles of neurological rehabilitation

Objective: To understand the principles of neurological rehabilitation

Knowledge: The principles of neurological rehabilitation including strategies to optimise the recovery of cognition, communication, continence, selective movement, gait, self-care, psychological stability, social adjustment and employment

Medical ethics

Objective: To understand the ethical issues that commonly arise in the management of patients with neurological disorders

Knowledge: Criteria for the diagnosis of brainstem death. Diagnosis and management of persistent vegetative states. Prognosis in chronic progressive neurological disorders

Professional and statutory framework governing living directives and end-of-life decisions

Clinical Skills: Ability to empathise with and support patients and carers

Principles of neurogenetics

Objective: To understand the principles of neurogenetic studies and their relevance to clinical practice

Knowledge: Inherited neurological disorders. Genetic control of neural connectivity
Inborn errors of metabolism. Molecular genetics of CNS tumours

Management of Common Neurological Conditions

1. Topic: Impaired consciousness and non-traumatic coma

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with impaired consciousness and nontraumatic coma

Knowledge: The aetiology, pathophysiology and differential diagnosis of altered consciousness and coma due to meningitis, encephalitis, intracranial haemorrhage, acutely raised ICP, hydrocephalus, hypoxaemia and ischaemia, cardiogenic shock, hypoglycaemia, epilepsy, metabolic encephalopathies, drugs and toxins

Clinical Skills: Neurological assessment and initial resuscitation of patients in coma or with impaired consciousness, Indications for intubation and ventilation, Treatment of seizures, Establishing a neurological differential diagnosis, Planning and interpreting scans and other investigations, Presentation and summary of cases

Technical Skills and Procedures: Maintenance of airway, Endotracheal intubation, Central venous cannulation, Lumbar puncture

2. Topic: Headache - acute and chronic

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with acute and chronic headache

Knowledge: The aetiology and differential diagnosis of acute and chronic headache including headache associated with benign headache syndromes, migraine, cluster headache and related syndromes, space occupying lesions, meningitic disorders, intracranial haemorrhage, trigeminal neuralgia, atypical craniofacial pain syndrome

Indications for investigation including scanning, lumbar puncture and angiography

Clinical Skills: Neurological history taking, Neurological examination, Establishing a neurological differential diagnosis, Planning investigation, Interpretation of scans and other investigations, Presentation and summary of cases

Technical Skills and Procedures: Lumbar puncture

3. Topic Weakness and paralysis

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with weakness and paralysis

Knowledge: Common causes of ocular, cranial nerve, limb, trunk and respiratory muscle weakness

Clinical Skills: Neurological history taking, Neurological examination, Establishing a neurological differential diagnosis, Planning investigation, Interpretation of scans and other investigations, Presentation and summary of cases

4. Topic: Dizziness, unsteadiness and falls (Neuro-otology)

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with dizziness, unsteadiness and falls

Knowledge: Common causes of cerebellar, vestibular, extrapyramidal and autonomic dysfunction

Clinical Skills: Neurological history taking, Neurological examination, Establishing a neurological differential diagnosis, Planning investigation, Interpretation of scans and other investigations, Presentation and summary of cases

5. Topic: Pain and sensory loss

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with pain and sensory loss

Knowledge: Common causes of musculoskeletal, neurogenic and neuropathic pain and sensory loss

Clinical Skills: Neurological history taking, Neurological examination, Establishing a neurological differential diagnosis, Planning investigation, Interpretation of scans and other investigations, Presentation and summary of cases, management of patients presenting with hearing loss

6. Topic: Hearing disorders (Neuro-otology)

Knowledge: Common causes of conductive and sensorineural hearing loss, Principles of audiological assessment

Clinical Skills: Neurological history taking, Neurological examination, Establishing a neurological differential diagnosis, Planning investigation, Interpretation of scans, Interpretation of pure tone audiograms and auditory evoked potentials, Presentation and summary of cases

7. Topic: Visual disorders (Neuro-ophthalmology)

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with visual disorders

Knowledge: Patterns of visual loss in relation to common bulbar, retrobulbar, sellar, parasellar and optic pathway disorders, Analysis of diplopia and nystagmus in relation to common cranial nerve and brainstem disorders

Clinical Skills: Neurological history taking, Neurological examination, Use of computerised visual field assessment, Detailed fundoscopy, Establishing a neurological differential diagnosis, Planning investigation, Interpretation of scans and other investigations, Presentation and summary of cases

8. Topic: Language and speech disturbance

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with disturbances of language and speech

Knowledge: Classification, causes and presentations of dysphasias, speech dyspraxia and dyslexia. Classification, causes and presentations of dysarthria. Role of speech and language therapists in assessment and treatment

Clinical Skills: Neurological history taking. Neurological examination with assessment of dysphasia and dysarthria. Establishing a neurological differential diagnosis. Planning investigation. Interpretation of scans and other investigations. Presentation and summary of cases

9. Topic: Swallowing disorders

Objective: To understand the aetiology, differential diagnosis, investigation and initial

management of patients presenting with swallowing disorders

Knowledge: Neurological causes of dysphagia. Indications for laryngoscopy, videofluoroscopy, nasogastric and percutaneous gastric feeding

Clinical Skills: Neurological history taking. Neurological examination. Establishing a neurological differential diagnosis. Planning investigation. Interpretation of scans and other investigations. Presentation and summary of cases

10. Topic: Disorders of the Sphincteric and sexual function

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with sphincteric disorders

Knowledge: Common causes of sphincteric and sexual dysfunction, Interpretation of urodynamic studies,

Clinical Skills: Neurological history taking. Neurological examination. Establishing a neurological differential diagnosis. Planning investigation. Interpretation of scans and other investigations. Presentation and summary of cases

11. Topic: Movement disorder

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with movement disorders

Knowledge: Parkinson's disease. Iatrogenic movement disorders. Dystonic syndromes. Choreiform syndromes

Clinical Skills: Neurological history taking. Neurological examination. Establishing a neurological differential diagnosis. Planning investigation. Interpretation of scans and other investigations. Presentation and summary of cases

12. Topic: Memory and cognitive disorders

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with disorders of memory and cognition

Knowledge: Disorders of memory and cognition associated with head injury, subarachnoid haemorrhage, hydrocephalus, structural lesions of the frontal and temporal lobes and disorders of the limbic system

Clinical Skills: Neurological history taking. Neurological examination. Establishing a neurological differential diagnosis. Planning investigation. Interpretation of scans and other investigations. Presentation and summary of cases

13. Topic: Behavioural disorders

Objective: To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with behavioural disorders

Knowledge: The common acute and chronic presentations of organic and psychiatric behavioural disorders relating to alcohol and drug abuse, encephalitis, organic dementia, and psychosis

Clinical Skills: Neurological history taking. Neurological examination. Establishing a neurological differential diagnosis. Planning investigation. Interpretation of scans and other investigations. Presentation and summary of cases

Neuropharmacology

Objective: To understand the principles of neuropharmacology

Knowledge: Receptor and ion channel function, Neuropeptides and neurotransmitters, Principles of pharmacological neuroprotection.

The pharmacology of anaesthetic agents, muscle relaxants, barbiturates, anticonvulsants and corticosteroids including: mechanisms of action, pharmacodynamics, interactions

CLINICAL NEUROSURGERY

BASIC CLINICAL NEUROSURGERY (PGY 1, 2, 3)

1. Topic: General management of the head injured patient

Objective: To achieve competence in the general management of head-injured patients

Knowledge: Pathophysiology of head injury and of multiple trauma including an understanding of Cerebral perfusion and oxygenation, Raised intracranial pressure, Impaired intracranial compliance, Intracranial herniation, Medical management of acutely raised intracranial pressure, Indications for operation intervention including the use of pressure monitoring, Principles, diagnosis and confirmation of brain death, Principles of intensive care of head injured patients, Principles of spinal stabilisation and radiological assessment in head injured patients, Natural history of recovery from head injury including neurological, cognitive and behavioural disability and post-traumatic epilepsy, Role of neurological rehabilitation

Clinical Skills: Clinical assessment of the multiply-injured patient. Neurological assessment of the head-injured patient including Assessment and categorisation of impaired consciousness, Recognition and interpretation of focal neurological deficits, Prioritisation of clinical risk, Interpretation of CT scans and plain radiology

2. Topic: Insertion of ICP monitor

Objective: To achieve competence in the insertion of subdural and intraparenchymal ICP monitors

Knowledge: Indications for ICP monitoring, Applied anatomy of the skull vault, Calibration, zeroing and interpretation of ICP traces, Potential complications of the procedure

Technical Skills and Procedures: Insertion of frontal subdural and intraparenchymal ICP monitors using a standard frontal burr hole and/or twist drill craniostomy.

3. Topic: Burr hole evacuation of chronic subdural haematoma

Objective: To achieve competence in burr hole evacuation of chronic subdural haematomas

Knowledge: Pathophysiology of chronic subdural haematomas. Applied anatomy of the skull vault and subdural space. Indications for surgery. Surgical options.

Complications of surgery. Management of anti-platelet and anti-coagulant medication

Clinical Skills: Neurological assessment of patients with a CSDH. Interpretation of CT scans Obtaining informed consent. Post-operative assessment and management

Technical Skills and Procedures: Performance of single and multiple frontal and parietal burr hole evacuation of CSDHs

4. Topic: Management of soft tissue trauma

Objective: To achieve competence in the management of cranial soft tissue trauma

Knowledge: Anatomy and blood supply of the scalp. Indications for primary and secondary closure of wounds. Indications for antibiotic prophylaxis

Clinical Skills: Assessment of tissue perfusion and viability

Technical Skills and Procedures: Wound exploration under local and general anaesthesia Wound debridement Arrest of scalp haemorrhage Layered closure of the scalp without tension Suturing technique Wound drainage and head bandaging

5. Topic: General management of subarachnoid haemorrhage

Objective: To achieve competence in the general management of subarachnoid haemorrhage (SAH)

Knowledge: Aetiology of SAH. Pathophysiology of SAH. WFNS grading of SAH.

Principles of resuscitation and timing of interventions. Indications for CT scanning, diagnostic lumbar puncture, CT angiography and digital subtraction angiography.

Principles of management of post-haemorrhagic hydrocephalus. Indications for endovascular and surgical intervention

Clinical Skills: Interpretation of CT scans including assessment of intracranial blood load, haematomas and hydrocephalus. Basic interpretation of cerebral angiography
Technical Skills and Procedures: Lumbar puncture

6. Topic: Diagnostic lumbar puncture

Objective: To understand the indications for diagnostic lumbar puncture. To undertake an atraumatic lumbar puncture

Knowledge: Indications for diagnostic lumbar puncture. Interpretation of basic microscopy and biochemistry. Principles of spectrophotometry

Technical Skills and Procedures: Lumbar puncture

7. Topic Management of delayed secondary ischaemia

Objective: To recognise and manage delayed cerebral ischaemia following subarachnoid haemorrhage

Knowledge: Pathophysiology of delayed cerebral ischaemia including the impact of secondary insults. Principles governing the augmentation of cerebral blood flow

Clinical Skills: Assessment of a deteriorating patient. Recognition and management of secondary insults. Interpretation of CT scans. Management of hypervolaemic hypertension

Technical Skills and Procedures: Insertion of central venous catheter. Insertion of lumbar drain. Insertion of external ventricular drain

8. Topic Management of post-haemorrhagic hydrocephalus

Objective: To achieve competence in the management of post-haemorrhagic hydrocephalus

Knowledge: Pathophysiology of hydrocephalus. Indications for external ventricular drainage and lumbar subarachnoid drainage. Applied anatomy of the skull vault, subdural space and ventricular system. Complications of surgery

Clinical Skills: Assessment of the unconscious and deteriorating SAH patient. Interpretation of CT scans

Technical Skills and Procedures: Insertion of lumbar drain. Insertion of external ventricular drain

9. Topic: Hydrocephalus

Objective: The management of hydrocephalus complicating intracranial haemorrhage, head injury and intracranial space occupying lesions; insertion and taping of CSF reservoirs; insertion and maintenance of lumbar and ventricular drains

Knowledge: The pathophysiology of CSF circulation. Applied surgical anatomy of the ventricular system. Indications for external ventricular drainage, ventriculoperitoneal shunting, lumbar CSF drainage and shunting, ventriculo-cisternostomy. Complications of surgery

Technical Skills and Procedures: Insertion of ventricular drain/access device
Insertion of VP shunt. Revision of VP shunt

10. Topic: Assessment and peri-operative management of patients with spaceoccupying intracranial tumours

Objective: To achieve competence in the assessment and peri-operative management of patients with intracranial tumours

Knowledge: The neuropathology of primary and secondary intracranial tumours including: classification, epidemiology, natural history, Clinical presentations of intracranial tumours, Indications for neuroimaging. Management of raised intracranial pressure. Principles of operative management. Detection and management of post-operative complications.

Clinical Skills: Neurological history taking and examination. Basic interpretation of CT and MRI scans

11. Topic: Biopsy of intracranial tumour

Objective: To undertake biopsy of an intracranial tumour under supervision

Knowledge: Indications for biopsy of intracranial tumours. Risks of biopsy. Principles of image-guided surgery

Clinical Skills: Interpretation of CT and MRI scans and selection of biopsy targets

Technical Skills and Procedures: Image-guided frameless and/or frame-based stereotactic biopsy including: Setting up a computer workstation and importing and interrogating image data. Positioning the patient and applying a cranial fixator
Obtaining and confirming accurate patient registration. Positioning and performing a suitable burr hole. Passage of biopsy probe and biopsy. Preparation of smear histology (when available)

12. Topic Acute Spinal Disorders

Objective: To achieve competence in the peri-operative management of patients presenting with acute spinal disorders

Knowledge: The assessment and peri-operative management of patients presenting with spinal cord, cauda equina and spinal root compression. The management of spinal shock. The ward management of patients with spinal instability. The detection and initial management of post-operative complications including compressing haematomas, CSF fistula and spinal sepsis.

INTERMEDIATE STAGE CLINICAL NEUROSURGERY (PGY 3, 4)

1. Topic: General management of the head injured patient

Objective: To achieve competence in all aspects of the general management of head-injured patients

Knowledge: Pathophysiology of head injury and of multiple trauma. Prevention of secondary insults. Indications for operative intervention. Medical management of acutely raised intracranial pressure

Clinical Skills: Clinical assessment of the head-injured and multiply-injured patient

Prioritisation of clinical risk. Interpretation of CT scans and plain radiology

Interpretation of multi-modality cerebral monitoring. Ability to assess and advise on the transfer of head-injured patient using imagetransfer and telemedicine

2. Topic: Surgical management of cranial trauma

Objective: To achieve competence in the operative management of head-injured patients

Knowledge: Pathophysiology of raised intracranial pressure and space occupying haematomas. Applied surgical anatomy. Principles of peri-operative care. Indications for surgery and appropriate surgical approaches

Clinical Skills: Assessment of the head-injured patient. Interpretation of trauma CT scans

Technical Skills and Procedures: Craniotomy for supratentorial traumatic haematoma, in particular: Planning and siting of craniotomies for evacuation of extradural and subdural haematomas. Handling the "tight" brain. Achieving haemostasis in the coagulopathic patient. Achieving haemostasis from the skull base and venous sinuses. Elevation of compound depressed skull fracture with dural repair. Delayed cranioplasty of skull vault

3. Topic Neuro-intensive care of the head-injured patient

Objective: To achieve competence in the neurointensive care of head-injured patients

Knowledge: Pathophysiology of head injury. The management of raised intracranial pressure, impaired intracranial compliance, and cerebral ischaemia, Prevention and management of secondary insults

Clinical Skills: Assessment of the unconscious patient. Use and interpretation of multimodality monitoring. Interpretation of CT scans. Ability to advise on management of secondary complications and further surgical intervention

4. Topic: Neurological rehabilitation

Objective: To understand the role of post-traumatic neurological rehabilitation

Knowledge: The natural history of recovery from head injury. Understanding of neurological, cognitive and behavioural disabilities following mild

and severe head injury. Risks of post-traumatic epilepsy and its management

Clinical Skills: Ability to contribute to the multi-disciplinary assessment of head injured patients. Ability to advise family and carers regarding prognosis, professional and lay support

5. Topic: Primary intracerebral haematomas

Objective: To achieve competence in the operative management of space-occupying spontaneous intracerebral haematomas

Knowledge: Aetiology of supra and infratentorial intracerebral haemorrhage.

Pathophysiology of spontaneous intracerebral haemorrhage. Indications for surgical evacuation. Management strategies to reduce the risk of intra-operative re-bleeding in presence of suspected aneurysm or AVM including partial haematoma evacuation, pre or postoperative embolisation and definitive surgical treatment

Clinical Skills: Assessment of patients with intracerebral haematomas and raised intracranial pressure. Interpretation of CT and MRI scans and identification of probable aetiology. Indications for pre-operative CT angiography, MRA and digital subtraction angiography

Technical Skills and Procedures: Craniotomy for supratentorial haematoma including: Planning and siting of craniotomies, Use of ventricular drainage, Intracerebral haemostasis in the coagulopathic patient.

6. Topic Aneurysmal subarachnoid haemorrhage

Objective: To achieve competence in the surgical aspects of the multi-disciplinary management of aneurysmal subarachnoid haemorrhage SAH

Knowledge: Pathophysiology of SAH. Prevention and management of delayed cerebral ischaemia, cerebral vasospasm and hydrocephalus. Relative indications for endovascular and surgical interventions

Clinical Skills: Clinical assessment of patients with aneurysmal SAH

Non operative management of patients undergoing endovascular coiling

Management of delayed cerebral ischaemia

Technical Skills and Procedures: External ventricular drainage. Lumbar subarachnoid drainage. Ventriculoperitoneal shunting

7. Topic: Adult hydrocephalus

Objective: To achieve competence in the assessment and operative management of adult patients with communicating and non communicating hydrocephalus.

Knowledge: The pathophysiology of CSF circulation. Applied surgical anatomy of the ventricular system. Indications for external ventricular drainage, ventriculoperitoneal shunting, lumbar CSF drainage and shunting, ventriculo-cisternostomy. Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with hydrocephalus, including interpretation of CT and MRI scans and identification of shunt malfunction

Technical Skills and Procedures: Lumbar subarachnoid drainage. External ventricular drainage. Primary ventriculoperitoneal shunt. Revision of ventriculoperitoneal shunt. Lumbo-peritoneal shunt

8. Topic Paediatric hydrocephalus

Objective: To achieve competence in the assessment of children with hydrocephalus. To undertake emergency external ventricular drainage in children with acute hydrocephalus

Knowledge: The pathophysiology of CSF circulation. Applied surgical anatomy of the ventricular system. Indications for external ventricular drainage

Clinical Skills: Assessment of the ill child with hydrocephalus, impaired consciousness and sepsis. Differential diagnosis of shunt malfunction.

Interpretation of CT scans in shunted children

Technical Skills and Procedures: Taping and draining from an Ommaya reservoir

Taping a shunt. External ventricular drainage

9. Topic: General principles of neuro-oncology

Objective: To achieve competence in the multi-disciplinary management of patients with intracranial neoplasia

Knowledge: Classification, natural history and pathology of benign and malignant intracranial neoplasia. Pathophysiology of raised intracranial pressure associated with space occupying tumours. Diagnostic imaging of intracranial tumours including the interpretation of CT and MRI scans and the role of MRS. Principles of fractionated radiotherapy, stereotactic radiotherapy and radiosurgery. Role of adjuvant chemotherapy. Principles of clinical trials and their application to neuro-oncology

Principles of palliative care

Clinical Skills: Clinical assessment of patients with raised intracranial pressure and space occupying lesions. Ability to contribute to the multi-disciplinary management of patients with intracranial neoplasia. Empathetic communication with patients and families

*10. Topic Principles of image-guided surgery (optional)

Objective: To achieve competence in image-guided surgery applied to the management of patients with intracranial tumours

Knowledge: An understanding of the principles and practice of frameless image-guided surgery and the principles of frame-based stereotactic surgery

Clinical Skills: Interpretation of CT and MRI scans

Technical Skills and Procedures: Image-guided biopsy of supratentorial intrinsic tumour. Ability to import, check and interrogate image data sets on a standard work station. Setting up an image-guidance system and obtaining satisfactory intra-operative registration. Planning and siting burr holes and craniotomy flaps using image-guidance. Identification of an intra-cranial tumour and its margins using image-guidance.

11. Topic: Supra-tentorial intrinsic tumours

Objective: To achieve competence in the operative management of supra-tentorial intrinsic tumours

Knowledge: Indications for surgery. Applied surgical anatomy. Principles of peri-operative care. Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with supratentorial intrinsic tumours

Technical Skills and Procedures: Craniotomy for superficial, lobar supratentorial intrinsic tumour. In particular: safe patient positioning, planning and siting of craniotomy with and without image-guidance, intra-operative management of raised ICP, appropriate exposure of the tumour, using operating microscope as necessary. safe use of fixed retractors, precise use of suction, electro-coagulation and ultrasonic aspiration, intracranial haemostasis

12. Topic: Convexity meningioma

Objective: To achieve competence in the operative management of a convexity meningiomas

Knowledge: Indications for surgery. Applied surgical anatomy. Principles of peri-operative care. Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with convexity meningiomas

Technical Skills and Procedures: Resection of a convexity meningioma, in particular: safe patient positioning, planning and siting of craniotomy with and without image-guidance, intra-operative management of raised ICP, appropriate exposure of the tumour, precise use of suction, electro-coagulation and ultrasonic aspiration, use of internal tumour decompression, dissection in the subarachnoid plane using the operating microscope as necessary, intracranial haemostasis, use of duraplasty and cranioplasty

13. Topic: General microbiological principles

Objective: To achieve competence in the general management of CNS infections including ventriculitis, cerebral abscess, subdural empyema and spinal epidural abscess

Knowledge: The pathophysiology of intracranial and spinal sepsis. Principles of anti-microbial chemotherapy. Indications for operative intervention

Clinical Skills: Clinical assessment of patients with CNS infections. Interpretation of CT and MRI scans

14. Topic Management of intracerebral abscess

Objective: To achieve competence in the operative management of cerebral abscess using burr hole aspiration

Knowledge: Indications for surgery. Applied surgical anatomy. Principles of peri-operative care. Complications of surgery

Clinical Skills: The assessment and pre-operative preparation of patients with a cerebral abscess

Technical Skills and Procedures: Burr hole aspiration of a cerebral abscess with and without image-guidance

15. Topic: Management of the spinal injury patient

Objective: To achieve competence in all aspects of the non-operative management of spinal injury patients.

Knowledge: Pathophysiology of spinal cord injury. Classification of spinal fracture dislocations. Biomechanics of spinal instability. Indications for halo traction and external stabilisation. Indications for and principles of open reduction and stabilisation

Clinical Skills: Clinical assessment of the spinal injury patient. Management of spinal shock. Interpretation of plain radiology, CT and MRI scans. Liaison with spinal injury units

Technical Skills and Procedures: Use of external mobilisation including cervical collars and spinal boards. Application of halo traction. Application of a halo-body jacket

16. Topic: Malignant spinal cord compression

Objective: To achieve competence in the general management of patients with malignant spinal cord compression.

Knowledge: The pathophysiology of spinal cord compression. The classification, aetiology and natural history of vertebral metastases. Spinal instability associated with

vertebral malignancy. Indications for surgical intervention. Role of primary radiotherapy and adjuvant radiotherapy or chemotherapy

Clinical Skills: Clinical assessment of patients with malignant spinal cord compression. Interpretation of plain radiology, CT and MRI scans. Liaison with medical oncologists and radiotherapist

17. Topic: Surgical management of thoraco-lumbar metastases

Objective: To achieve competence in the basic surgical management of patients with malignant spinal cord compression

Knowledge: Indications for surgery. The principles of operative spinal decompression and stabilisation of patients with spinal cord metastases. Applied surgical anatomy

Principles of peri-operative care. Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with malignant spinal cord compression

Technical Skills and Procedures: Extradural spinal biopsy and decompression by laminectomy in selected patients without segmental instability. Instrumented posterior spinal stabilisation

18. Topic Lumbar radiculopathies

Objective: To achieve competence in the surgical management of lumbar compressive radiculopathies by lumbar microdiscectomies and associated microsurgical decompressions.

Knowledge: Indications for operative management of lumbar radiculopathies

Applied surgical anatomy of the lumbar spine with particular reference to degenerative neural compression and morphological variations in vertebral anatomy

Selection of minimally-invasive approaches. Principles of peri-operative care

Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with lumbar radiculopathies. Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms

Technical Skills and Procedures: Primary lumbar microdiscectomy. Primary posterior decompression (laminotomy, hemilaminectomy etc): including

Identification of spinal level by pre and intra-operative fluoroscopy

Achieving safe access to the spinal canal by micro-surgical fenestration

Achieving full decompression of the spinal canal, lateral recess and foramen by appropriate bone and soft tissue resection

Protection and safe retraction of neural tissues

19. Topic: Compressive cervical myeloradiculopathies

Objective: To achieve competence in the surgical management of compressive cervical myeloradiculopathies

Knowledge: Indications for operative management of cervical myeloradiculopathies

Applied surgical anatomy of the cervical spinal column with particular reference to the relationships between the bony elements, spinal cord, nerve roots and vertebral arteries. Selection of surgical approaches. Principles of peri-operative care

Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with cervical myeloradiculopathies. Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms

Technical Skills and Procedures: Single level anterior cervical discectomy with and without fusion. In particular: Standard anterolateral approach to the cervical spine

Use of fluoroscopy or plain radiographs to confirm spinal level

Radical and subtotal excision of the cervical disc, PLL, central and unco-vertebral

Osteophytes. Protection and full decompression of the spinal cord and spinal nerve roots. Interbody fusion using autologous bone with or without interbody cages

FINAL STAGE CLINICAL NEUROSURGERY PGY 4, 5, 6

1. Topic: Management of head injured patients

Objective: To achieve competence in all aspects of the advanced operative management of head-injured patients

Knowledge: Pathophysiology of raised intracranial pressure and space occupying haematomas. Applied surgical anatomy. Principles of peri-operative care. Indications for surgery and appropriate surgical approaches. Indications for open and endoscopic closure of traumatic CSF fistulae. Complications of surgery and their management

Clinical Skills: Competence in all aspects of peri-operative management of head-injured patients. Ability to diagnose and confirm brain death

Technical Skills and Procedures: Craniotomy for supra and infratentorial extradural, subdural and intracerebral haematomas

Lobectomy for haemorrhagic contusion

Vault cranioplasty using in-situ or preformed prostheses

Decompressive bifrontal craniotomy with extensive durotomy

Subfrontal extradural or subdural repair of anterior fossa fractures

Combined craniofacial repair of fronto-orbito-maxillary injuries

2. Topic: Aneurysmal Subarachnoid haemorrhage

Objective: To achieve competence in the surgical aspects of the multi-disciplinary management of aneurysmal subarachnoid haemorrhage SAH

Knowledge: Pathophysiology of SAH. Prevention and management of delayed cerebral ischaemia, cerebral vasospasm and hydrocephalus

Relative indications for endovascular and surgical interventions

Clinical Skills: Clinical assessment of patients with aneurysmal SAH

Non operative management of patients undergoing endovascular coiling

Management of delayed cerebral ischaemia

Technical Skills and Procedures: External ventricular drainage. Lumbar subarachnoid drainage. Ventriculoperitoneal shunting. Revision of ventriculoperitoneal shunt.

Craniotomy for intracerebral haematoma

3. Topic: Adult hydrocephalus

Objective: To achieve competence in all aspects of the management of adult patients with hydrocephalus

Knowledge: The pathophysiology of CSF circulation. Applied surgical anatomy of the ventricular system. Indications for external ventricular drainage, shunting, lumbar CSF drainage and shunting, ventriculo-cisternostomy. Surgical complications and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with hydrocephalus. Interpretation of pressure studies and CSF infusion studies

Interpretation of CT and MRI scans and identification of shunt malfunction

Technical Skills and Procedures: Competence in all aspects of primary and revisional shunt surgery including: Use of 3-D image-guidance or ultrasound for difficult ventricular cannulation. Intra-operative testing of shunt function. Selection of appropriate shunts. Management of peri-operative ventricular haemorrhage. Lumbo-peritoneal shunt. Third ventriculo-cisternostomy

4. Topic: Anterior and middle fossa skull base tumours

Objective: To achieve competence in the surgical management of patients with anterior and middle fossa tumours

Knowledge: Indications for selected approaches in relation to pathology and surgical goals. Applied microsurgical anatomy of the anterior and middle cranial fossae
Principles of intra-operative management of patients undergoing resection of anterior and middle fossa tumours including olfactory groove, planum sphenoidale, parasellar and sphenoid wing and falx meningiomas. Complications of surgery and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with anterior and middle fossa tumours. Interpretation of CT and MRI scans

Technical Skills and Procedures: Standard pterional and subfrontal approaches including: Pterional resection and basal drilling, Subfrontal approach to the optic nerve, chiasm and internal carotid arteries, Sylvian fissure splitting and exposure of the MCA bifurcation, CSF drainage by chiasmatic cisternal suction, intra-operative ventricular puncture and lamina terminalis fenestration, Bi-Frontal/Frontal and parietal parafalcine approaches, Microsurgical resection of superficial skull base meningioma, Anterior interhemispheric, fronto-orbital, zygomatic and temporo-zygomatic approaches

5. Topic: Transphenoidal surgery

Objective: To achieve competence in transphenoidal approaches to the pituitary fossa and resection of pituitary adenomas

Knowledge: Pathophysiology of the hypothalamic-pituitary axis. Indications for surgery. Selection of surgical approaches: sublabial, transnasal and endoscopic
Applied surgical anatomy of the skull base. Principles of peri-operative care

Complications of surgery and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with pituitary, sellar and parasellar tumours. Interpretation of CT and MRI scans

Technical Skills and Procedures: Microsurgical transphenoidal approach.

Transphenoidal resection of non-functioning macroadenoma

6. Topic: Movement disorders

Objective: To understand the management of patients with movement disorders

Knowledge: The aetiology and pathophysiology of movement disorders. Indications for medical, minimally-invasive and surgical management. Complications of surgery and their management

Clinical Skills: Surgical aspects of the multi-disciplinary assessment of patients with movement disorders

Technical Skills and Procedures: None

7. Topic: Midline tumours

Objective: To achieve competence in the management of patients with midline sellar, parasellar, pineal and third ventricular tumours

Knowledge: Indications for surgery. Applied surgical anatomy of midline structures
Selection of surgical approaches including principles of endoscopic biopsy and/or Resection. Principles of intra-operative management of patients undergoing resection of midline sellar, para-sellar, pineal and third ventricular tumours including colloid cysts. Complications of surgery and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with midline tumours. Interpretation of CT and MRI scans

Technical Skills and Procedures: Transfrontal, transcortical approach to the lateral and third ventricle. Microsurgical resection of lateral intraventricular tumour.

Transfrontal endoscopic biopsy

8. Topic: Malignant posterior fossa tumours

Objective: To achieve competence in the surgical management of superficial, hemispheric and midline intrinsic posterior fossa tumours and metastases

Knowledge: Indications for surgery. Selection of surgical approaches. Applied surgical anatomy. Principles of peri-operative care. Complications of surgery and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with posterior fossa malignant tumours. Interpretation of CT and MRI scans

Technical Skills and Procedures: Competence in midline, paramedian and retrosigmoid posterior fossa craniotomies including: safe patient positioning in the prone and semi-prone positions exposure of the lateral and sigmoid sinuses exposure and decompression of the foramen magnum use of cisternal CSF drainage safe use of fixed retractors exposure and resection of superficial, lateral and mid-line intrinsic cerebellar tumours and metastases

9. Topic: Cerebellopontine angle tumours

Objective: To achieve competence in the management of patients with cerebellopontine angle tumours

Knowledge: Relative indications for surgery, radiosurgery and conservative management. Principles of intra-operative management of patients undergoing resection of CP angle tumours including vestibular schwannomas and meningiomas

Principles and application of cranial nerve and brainstem monitoring

Applied microsurgical anatomy of the CP angle, brainstem and lower cranial nerves

Relative indications for retrosigmoid, middle fossa, and translabyrinthine approaches with respect to hearing preservation, tumour size and position

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with CP angle tumours. Interpretation of CT and MR scans

Technical Skills and Procedures: Retrosigmoid approach. Subarachnoid dissection and exposure of the tumour and lower cranial nerves. Subtotal microsurgical resection of acoustic neuroma

10. Topic Intracerebral abscess and subdural empyema

Objective: To achieve competence in the management of patients with CNS infections including ventriculitis, cerebral abscess and subdural empyema

Knowledge: The aetiology and pathophysiology of intracranial sepsis. Indications for burr hole drainage, ventricular drainage and craniotomy in the management of intracranial sepsis. Indications for combined otorhinological procedures. Applied surgical anatomy. Principles of peri-operative care. Surgical complications

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with intracranial sepsis. Interpretation of CT and MRI scans. Management of anti-microbial therapy

Technical Skills and Procedures: Burr hole drainage of intracerebral abscess

Ventricular drainage. Craniotomy for subdural empyema, including frontal and parietal parafalcine approaches. Craniotomy and resection of frontal, temporal and cerebellar abscess. Anterior and middle fossa extradural and subdural duroplasty

11. Topic: Intracranial aneurysms

Objective: To achieve competence in the surgical aspects of the multi-disciplinary management of ruptured and unruptured intracranial aneurysms

Knowledge: Aetiology, epidemiology and natural history of unruptured and ruptured intracranial aneurysms

Pathophysiology and general management of subarachnoid haemorrhage

Angiographic and microsurgical anatomy of the cerebral circulation

Indications for surgical management of intracranial aneurysms by clipping, trapping, microsurgical reconstruction and microvascular bypass

Complications of surgery and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with ruptured and unruptured aneurysms. Interpretation of CT, MR and catheter angiography

Technical Skills and Procedures: Standard pterional and subfrontal approaches.

Clipping of anterior circulation aneurysm

12. Topic: Intracranial vascular malformations

Objective: To achieve competence in the surgical aspects of the multi-disciplinary management of intracranial vascular malformations

Knowledge: Pathogenesis, aetiology, epidemiology and natural history of intracranial vascular malformations including AVMs, A-V fistula, cavernomas and venous malformations. Pathophysiology and general management of intracranial haemorrhage. Angiographic and microsurgical anatomy of the cerebral circulation.

Indications for embolisation and radiosurgery. Indications for surgical management of malformations. Complications of surgery and their management, including hyperperfusion syndromes

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with vascular malformations. Interpretation of CT, MR and catheter angiography

Technical Skills and Procedures:

Image-guided craniotomy and exposure of supratentorial AVM

Microsurgical resection of superficial gyral or sulcal AVM

13. Topic: Occlusive cerebrovascular disease

Objective: To achieve competence in the clinical management of occlusive cerebrovascular disease

Knowledge: The epidemiology, natural history and pathophysiology of extra- and intracranial atherosclerotic occlusive disease. The epidemiology, natural history and pathophysiology of non-atherosclerotic occlusive diseases. Optimal medical management of occlusive and thrombo-embolic cerebrovascular disease

Imaging of the acutely ischaemic brain using CT and MRI

Principles of non-invasive and invasive imaging of the extra and intracranial vasculature using CT, MRI and catheter angiography

Principles of regional cerebral blood flow and metabolism measurement and imaging using CT and MRI perfusion techniques; SPECT and PET scanning

Indications for carotid endarterectomy

Indications for endovascular intervention including intra-arterial thrombolysis; carotid angioplasty and stenting; intracranial angioplasty

Principles of cerebral revascularisation by indirect synangiosis, low-flow EC-IC anastomosis and high flow EC-IC bypass grafting

Clinical Skills: The assessment, counselling and pre-operative preparation of patients undergoing surgery for occlusive cerebrovascular disease with ruptured and unruptured aneurysms. Interpretation of CT, MR and catheter angiography

Technical Skills and Procedures: None

14. Topic: Chronic pain

Objective: To understand the management of patients with chronic pain syndromes

Knowledge: The aetiology and pathophysiology of chronic pain syndromes.

Indications for medical, minimally-invasive and surgical management. Complications of surgery and their management

Clinical Skills: Surgical aspects of the multi-disciplinary assessment of chronic pain patients. Pre-operative counselling and preparation

Technical Skills and Procedures: None

15. Topic: Trigeminal neuralgia

Objective: To achieve competence in the surgical aspects of the multi-disciplinary management of patients with trigeminal neuralgia

Knowledge: Aetiology, epidemiology and natural history of trigeminal neuralgia

Differential diagnosis and management of related cranio-facial pain syndromes

Medical management of cranio-facial pain. Surface anatomy of the trigeminal nerve and microsurgical anatomy of the CP angle

Indications for surgical management of trigeminal neuralgia by peripheral neurectomy, percutaneous rhizotomy, radiofrequency rhizotomy, microvascular decompression. Complications of surgery and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with trigeminal neuralgia. Interpretation of posterior fossa CT and MRI scans

Technical Skills and Procedures: Retrosigmoid microsurgical approach to the CP angle and trigeminal nerve. Trigeminal microvascular decompression. Percutaneous trigeminal rhizotomy

16. Topic: Epilepsy

Objective: To understand the management of patients with idiopathic and lesional epilepsy

Knowledge: The aetiology and pathophysiology of idiopathic and lesional epilepsy

Indications for medical and surgical management

Clinical Skills: Surgical aspects of the multi-disciplinary assessment of epilepsy patients. Interpretation of CT, MRI and SPECT scans. Pre-operative counselling and preparation.

Technical Skills and Procedures: Image-guided resection of cortical lesions (optional)
Vagal nerve stimulation (optional)

17. Topic: Cervical spine fracture-subluxation

Objective: To achieve competence in the general management of fracture-subluxations of the cervical spine

Knowledge: Pathophysiology of spinal cord injury. Classification of cervical spinal fracture dislocations. Biomechanics of spinal instability. Indications for halo traction and external stabilisation. Indications for and principles of open reduction and stabilisation

Clinical Skills: Clinical assessment of the spinal injury patient. Management of spinal shock. Interpretation of plain radiology, CT and MRI scans. Liaison with spinal injury units. Counselling and pre-operative preparation of spinal injury patients

Technical Skills and Procedures: Application of cranial-cervical traction

18. Topic: Thoraco-lumbar fractures

Objective: To achieve competence in the general management of thoracolumbar fractures

Knowledge: Pathophysiology of spinal cord injury. Classification of thoracolumbar fracture dislocations. Biomechanics of spinal instability. Indications for open reduction and stabilisation

Clinical Skills: Clinical assessment of the spinal injury patient. Management of spinal shock. Interpretation of plain radiology, CT and MRI scans. Liaison with spinal injury units. Counselling and pre-operative preparation of spinal injury patients

Technical Skills and Procedures: Posterior reduction of thoracolumbar fractures by pedicle screw instrumentation and ligamentotaxis

19. Topic: Intradural extramedullary tumours

Objective: To achieve competence in the management of patients with intradural extramedullary tumours including schwannomas, neurofibromas and meningiomas

Knowledge: Classification, natural history and basic molecular biology of intradural spinal tumours. Pathophysiology of spinal cord compression. Indications for surgery Selection of surgical approaches. Applied surgical anatomy. Principles of peri-operative care. Complications of surgery and their management

Clinical Skills: Assessment, counselling and pre-operative preparation of patients with intradural spinal tumours. Interpretation of spinal MRI scans

Technical Skills and Procedures: Microsurgical excision of posterior and posterolateral intradural extramedullary tumours. Microsurgical excision of anterior intradural extramedullary tumours

20. Topic: Intramedullary spinal cord tumours

Objective: To achieve competence in the management of patients with intramedullary spinal cord tumours

Knowledge: Classification, natural history and pathology of intramedullary spinal cord tumours. Indications for biopsy, subtotal and radical excision. Role of adjuvant treatment. Applied surgical anatomy of spine and spinal cord. Selection of surgical approaches. Principles of intra-operative management of patients undergoing resection of intramedullary tumours. Complications of surgery and their management

Clinical Skills: Assessment, counselling and pre-operative preparation of patients with intramedullary spinal cord tumours. Interpretation of spinal MRI scans

Technical Skills and Procedures: Microsurgical biopsy of intramedullary spinal cord tumour. Subtotal microsurgical resection of intramedullary tumour. Duroplasty

21. Topic: Malignant spinal cord compression

Objective: To achieve competence in the management of patients with malignant secondary spinal cord compression

Knowledge: The pathophysiology of spinal cord compression. The classification, aetiology and natural history of vertebral metastases. Spinal instability associated with vertebral malignancy. Indications for percutaneous and open spinal biopsy

Role of primary radiotherapy and adjuvant radiotherapy or chemotherapy

Indications for spinal decompression with and without instrumented spinal stabilisation

Clinical Skills: Clinical assessment of patients with malignant spinal cord compression. Interpretation of plain radiology, CT and MRI scans. Liaison with medical oncologists and radiotherapist. Counselling and pre-operative preparation of patients with malignant spinal cord compression

Technical Skills and procedures: Decompressive thoracic and lumbar laminectomy with extradural tumour resection. Posterior pedicle screw stabilisation

Anterior cervical corpectomy with anterior column re-construction and anterior cervical plating

22. Topic: Lumbar radiculopathies

Objective: To achieve competence in the surgical management of lumbar compressive radiculopathies by lumbar microdiscectomies and associated microsurgical decompressions

Knowledge: Indications for operative management of lumbar radiculopathies

Applied surgical anatomy of the lumbar spine with particular reference to degenerative neural compression and morphological variations in vertebral anatomy

Selection of minimally-invasive approaches. Principles of peri-operative care

Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with lumbar radiculopathies. Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms

Technical Skills and Procedures: Lumbar microdiscectomy. Microsurgical lateral recess decompression. Posterior decompression (laminotomy, hemilaminectomy etc)

Revisional lumbar microsurgical discectomy with and without decompression

Microsurgical lumbar discectomy for central disc protrusion with cauda equina compression

23. Topic: Cervical myeloradiculopathy

Objective: To achieve competence in the management of cervical radiculopathy

Knowledge: Indications for operative management of cervical radiculopathies

Applied surgical anatomy of the cervical spinal column, spinal cord, nerve roots and vertebral arteries. Selection of surgical approaches. Principles of peri-operative care
Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with cervical myeloradiculopathies

Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms

Technical Skills and Procedures:

Single and multi-level anterior cervical discectomy with and without fusion

Anterior cervical plating. Posterior cervical microforaminotomy and microdiscectomy

Posterior cervical decompression (laminotomy, hemilaminectomy etc)

24. Topic: Craniovertebral Anomaly (CVA). Rheumatoid disease

Objective: To understand the management of CVA and rheumatoid patients with atlanto-axial subluxation, cranial settling and related disorders

Knowledge: The pathology and natural history of CVA and rheumatoid spondylopathy

Indications for operative management of atlanto-axial subluxation, cranial settling and related disorders. Applied surgical anatomy of the craniocervical junction

Selection of surgical approaches. Principles of peri-operative care. Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with CVA and cervical myeloradiculopathies. Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms and 3D spinal reconstructions

Technical Skills and Procedures: Atlanto-axial wiring for reducible atlanto-axial subluxation. Posterior fossa decompression.

25. Topic: Hindbrain herniation

Objective: To achieve competence in the management of craniocervical stenosis and hindbrain herniation

Knowledge: The pathogenesis and natural history of hindbrain herniation, craniocervical stenosis, syringomyelia and syringobulbia. Indications for foramen magnum decompression. Applied surgical anatomy of the craniocervical junction
Selection of surgical approaches. Principles of peri-operative care. Complications of surgery

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with hind brain anomalies. Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms and 3D spinal reconstructions

Technical Skills and Procedures: Foramen magnum decompression

26. Topic: Spinal epidural abscess

Objective: To achieve competence in the operative management of spinal epidural abscess

Knowledge: The aetiology and pathophysiology of spinal sepsis. Indications for drainage of spinal epidural abscess by laminectomy and multiple laminotomies. Applied surgical anatomy. Principles of peri-operative care. Surgical complications and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with spinal sepsis. Interpretation of spinal CT and MRI scans. Management of anti-microbial therapy.

Technical Skills and Procedures: Drainage of spinal epidural abscess by laminectomy and/or multiple laminotomies

27. Topic: Vertebral osteomyelitis and discitis

Objective: To achieve competence in the operative management of vertebral osteomyelitis and discitis

Knowledge: The aetiology and pathophysiology of vertebral osteomyelitis and discitis, including pyogenic, tuberculous and atypical infections

Indications for percutaneous and open biopsy. Indications for spinal stabilisation

Principles of peri-operative care. Surgical complications and their management

Clinical Skills: The assessment, counselling and pre-operative preparation of patients with spinal sepsis. Interpretation of spinal CT and MRI scans. Management of anti-microbial therapy

Technical Skills and Procedures: Transpedicular and open vertebral and disc biopsy

28. Topic: Carpal tunnel compression

Objective: To achieve competence in carpal tunnel decompression

Knowledge: Presentation, differential diagnosis and management of carpal tunnel syndrome. Interpretation of nerve conduction studies. Indications for surgery

Applied surgical anatomy

Clinical Skills: Assessment and counselling of patients with carpal tunnel syndrome

Technical Skills and Procedures: Carpal tunnel decompression

29. Topic: Ulnar neuropathy

Objective: To achieve competence in the management of ulnar neuropathy

Knowledge: Presentation, differential diagnosis and management of ulnar neuropathies. Interpretation of nerve conduction studies. Indications for surgery

Applied surgical anatomy.

Clinical Skills: Assessment and counselling of patients with an ulnar neuropathy

Technical Skills and Procedures: Cubital ulnar nerve decompression with and without transposition

30. Topic: Peripheral nerve sheath tumours

Objective: To achieve competence in the resection of major and minor peripheral nerve tumours

Knowledge: Pathology of peripheral nerve sheath tumours. Indications for complete and subtotal resection of tumours. Applied surgical anatomy of the major peripheral nerves

Clinical Skills: Assessment and counselling of patients with peripheral nerve sheath tumours

Technical Skills and Procedures: Microsurgical excision of peripheral nerve sheath tumour

31. Topic: Paediatric head and spinal injury

Objective: To achieve competence the management of accidental and non-accidental paediatric head and spinal injuries.

Knowledge: Pathophysiology of raised intracranial pressure in children following head injury. Prevention and treatment of secondary insults relating to transfer and

emergency surgery in head-injured children. Medical management and intensive care in paediatric head injury. Pathophysiology, legal and social aspects of non-accidental injury in children. Management of perinatal trauma, growing fractures and penetrating injuries in children. Indications for decompressive craniectomy in management of intractable increases in ICP. Rehabilitation after mild, moderate and severe head injuries. Diagnosis and certification of brain death in children. Classification, assessment, investigation and management of paediatric spinal injuries (including SCIWORA)

Clinical Skills: Assessment and clinical management of children with head and spinal injuries.

Technical Skills and Procedures: Insertion of ICP monitor. Insertion of ventriculostomy. Craniotomy for traumatic intracranial haematoma. Repair of depressed skull fracture.

32. Topic Paediatric hydrocephalus

Objective: To achieve competence in the management of paediatric hydrocephalus

Knowledge: The pathophysiology of CSF circulation. Applied surgical anatomy of the ventricular system. Indications for external ventricular drainage, lumbar CSF drainage and shunting, ventriculo-cisternostomy. Indications for VP and VA shunting and Principles of shunt function and selection. Surgical complications and their management

Clinical Skills: Assessment of the ill child with hydrocephalus, impaired consciousness and sepsis. Differential diagnosis of shunt malfunction. Interpretation of CT scans in shunted children

Technical Skills and Procedures: Insertion, tapping and draining from a CSF reservoir External ventricular drainage including externalisation of VP shunts

Ventriculo-peritoneal shunting

33. Topic: Paediatric Intracranial vascular disorders

Objective: To achieve competence in the emergency neurosurgical management of children presenting with intracranial vascular disorders

Knowledge: Epidemiology, natural history, pathophysiology and clinical features of subarachnoid haemorrhage, haemorrhagic stroke and ischaemia stroke in children secondary to intracranial aneurysms, arteriovenous malformations and fistulae, cavernomas, arterial dissection, moya-moya disease and venous sinus thrombosis Surgical and endovascular strategies for the management of acute intracranial vascular disorders in children

Clinical Skills: The assessment and clinical management of children presenting with spontaneous intracranial haemorrhage and acute cerebral ischaemia

Technical Skills and Procedures: Emergency operative management of spontaneous intracerebral hemorrhage

34. Topic: Paediatric neurooncology

Objective: To achieve competence in the surgical aspects of the multi-disciplinary management of children with tumours of the brain and spinal cord

Knowledge: Epidemiology, natural history and pathology of tumours of the central nervous system in children including medulloblastoma, pilocytic astrocytoma, high grade gliomas, supratentorial PNET, pineal region tumours, brain stem tumours and intramedullary spinal cord tumours

Imaging of paediatric CNS tumours

Radiological and biochemical staging of tumours

Indications for surgery, radiotherapy, primary and adjuvant chemotherapy

Goals of surgery

Long-term effects of treatment on cognition, hypothalamic-pituitary function and quality of life

Availability of clinical (CCLG) trials

Management of delayed spinal deformity associated with treatment of spinal cord tumours

Clinical Skills: Assessment and clinical management of children with tumours of the central nervous system

Multidisciplinary approach to treating patients with paediatric brain tumours

Technical Skills and Procedures: Emergency operative management of a deteriorating child with an intracranial haemorrhage and/or hydrocephalus secondary to tumour

Use of CT, MRI, electromagnetic and ultrasound guided localisation of tumours of the brain and spine

Stereotactic, image-guided and endoscopic biopsy of intracranial tumours

Supratentorial craniotomy for hemispheric tumour

Approaches to the suprasellar region: pterional, orbitozygomatic and subfrontal

Approaches to the third ventricle: transcortical-transventricular, transcallosal

Approaches to the pineal region: endoscopic, supracerebellar, suboccipital

Transtentorial Midline posterior fossa craniotomy for tumour

Retrosigmoid approach to tumour presenting in the CP angle

Laminoplasty approach to spine cord tumours.

35. Topic: Congenital spinal disorders

Objective: To achieve competence in all aspects of the management (operative and nonoperative) of children with congenital spinal disorders

Knowledge: Embryogenesis of craniospinal dysraphism. Pathophysiology of CSF circulation associated with hindbrain hernia, syringobulbia and syringomyelia

Epidemiology, natural history and clinical features of congenital spinal disorders including dysraphism, tethered cord syndrome, diastematomyelia, Chiari malformations, Klippel-Feil syndrome, achondroplasia, Downs syndrome etc

Imaging of the neonatal and growing paediatric spine of children with congenital Disorders. Antenatal diagnosis of dysraphism and its implications.

Clinical Skills: Assessment and clinical management of children presenting with open or closed dysraphic spines and other congenital spinal abnormalities.

Technical Skills and Procedures: Closure of myelomeningocele. Foramen magnum decompression for hind brain herniation. Syringostomy and shunting of syringomyelia

Untethering of thickened filum. Excision of simple dermal sinus tract

Untethering and resection of bony spur in diastematomyelia

Untethering of lipomyelomeningocele. Instrumented stabilization and fusion in the treatment of congenital spinal disorders

36. Topic: Craniofacial disorders

Objective: To achieve competence in all aspects of the management (operative and nonoperative) of children with simple craniosynostosis and cranial deformity after trauma or tumour. To understand the management of children with syndromic craniosynostosis and encephalocoels

Knowledge: Advances in the genetic understanding of craniofacial conditions

Epidemiology, natural history and clinical features of simple and syndromic craniosynostosis including cosmetic, cognitive and ophthalmological complications

Imaging of simple and syndromic craniosynostosis

Indication for and timing of surgical interventions

Understanding of causes and management of positional plagiocephaly

Epidemiology, natural history, and clinical features of common skull vault conditions

including eosinophilic granuloma, fibrous dysplasia etc

Clinical Skills: Management of ophthalmic and airway emergencies in syndromic craniosynostosis, Neurosurgical contribution to the multi-disciplinary management of children with craniofacial abnormalities

Technical Skills and Procedures: Cranioplasty using autologous, titanium or acrylic implants. Surgical management of non-syndromic single suture synostosis (in the context of a multidisciplinary team)

REGISTRAR EVALUATION FORM

Registrar

Year of Training

Period of Evaluation

ASSESSMENT	1 (Poor)	2 (Below Average)	3 (Average)	4 (Above Average)	5 (Excellent)	Score
A. ABILITY/PATIENT CARE						15
i. Surgical Knowledge					5	
ii. Problem Evaluation and Judgement					5	
iii. Technical Skills					5	
B. PERFORMANCE						20
i. Punctuality					5	
ii. Initiative					5	
iii. Responsibility					5	
iv. Verbal presentation					5	
C. ACADEMIC PERFORMANCE						15
i. Enthusiasm					5	
ii. Attendance at Meetings					5	
iii. Interest in Meetings					5	
D. PERSONAL						20
i. Appearance					5	
ii. Emotional maturity					5	
iii. Patient Rapport and Empathy					5	
iv. Relationship with colleagues and nursing staff					5	
TOTAL						70

Remarks by Supervising Consultant

Signature

REGISTRAR'S TRAINING ROTATIONS

LEVEL/SITE	ROTATION				RESIDENT
	OCTOBER-DECEMBER	JANUARY-MARCH	APRIL-JUNE	JULY-SEPTEMBER	
KNH					
ELDORET					
KIJABE					
6	Neurosurgery Theatre/calls/clinics/ wards	Neurosurgery Theatre/calls/clinics/ wards	Neurosurgery Theatre/calls/clinics/war ds	Neurosurgery Theatre/calls/clinics/ wards (Assessment/ Final Examination)	
5	Neurosurgery Theatre/calls/clinics/ wards	Neurosurgery Theatre/calls/clinics/ wards	Neurosurgery Theatre/calls/clinics/war ds	Neurosurgery Theatre/calls/clinics/ wards (Assessment/ Final Examination)	
4	Neurosurgery Theatre/calls/clinics/ wards	Neurosurgery Theatre/calls/clinics/ wards	Neurosurgery Theatre/calls/clinics/war ds	Neurosurgery Theatre/calls/clinics/ wards (Assessment)	
3	Neurosurgery Theatre/calls/clinics/ wards Neurology/Neurorad /Neuropath/Neuro- oto/oph	Neurosurgery Theatre/calls/clinics/ wards Neurology/Neurorad /Neuropath/Neuro- oto/oph	Neurosurgery Theatre/calls/clinics/war ds Neurology/Neurorad/Ne uropath/Neuro-oto/oph	Neurosurgery Theatre/calls/clinics/ wards Neurology/Neuro rad/Neuropath/N euro-oto/oph (Assmnt/Exam)	
2	General Surgery/Orthopaedi cs	General Surgery/Orthopaedi cs	General Surgery/Orthopaedics	Critical Care/General Surgery/Orthopa edics (Assessment/Uni versityExaminati on)	
1	<u>Chiromo</u> Anatomy/Physiolog y/Neurosurgery KNH/A&E THEATRE	<u>Chiromo</u> Anatomy/Physiolog y/Neurosurgery KNH/A&E THEATRE	<u>Chiromo</u> Anatomy/Physiology/Ne urosurgery KNH/A&E THEATRE	<u>Chiromo</u> Anatomy/Physiol ogy/Neurosurger y KNH/A&E THEATRE	

NEUROSURGERY COURSE POTFOLIO

PGYr 1-2	PGYr 3	PG Yr 4-6	Pre-registration Yr 7-8 Snr Registrar
Surgical Neuroanatomy and Approaches Surgical Physiology and Neurophysiology Operative Skills in Neurosurgery Principles of Surgery (General) Neurotrauma	Neuroradiology Neuropathology Neurology Neuro-otology/ophthalmology		Skull Base Surgical Approaches Minimally invasive Intracranial Neurosurgery Surgical Approaches in Spinal Surgery Paediatric Neurosurgery Neurooncology
	Neurooncology, Paediatric Neurosurgery, Spinal Surgery, Neurotrauma,		