Neurosurgery at Queen's Medical Center, PGY-1

**Description of Rotation**

Despite the trend towards greater specialization in surgery, patients with underlying neurosurgical injury or illnesses are often seen and evaluated first by the general surgeon. In remote areas, general surgeons provide initial neurosurgical care because consultants are available only by phone, with medical center and direct neurosurgical support hours away. Failure to recognize central nervous system pathology in a patient with multi-system disease/trauma will often result in substantial mortality and irreversible morbidity. It is essential that the orthopaedic surgeon be familiar with basic neurologic assessment and has an understanding of common disease entities and diagnostic imaging modalities to provide optimal and timely care of the patient with illness involving the nervous system. A 4-week Neurosurgery rotation is required for Categorical Orthopaedic residents during the first year of training.

**Goals of the Rotation**

Upon completion of the Neurosurgery rotation, the Resident will have the training and experience to enable them to recognize, stabilize, and initiate proper treatment of head and spine injuries as a result of trauma.

Additionally, the Resident will have an understanding of the relevant anatomy and physiology of the central, peripheral, and autonomic nervous system and their supporting elements. Residents will obtain the training necessary to recognize conditions which require referral to a Neurosurgeon on an emergent, urgent, and routine basis.

**Patient Care Competency**

Residents must be able to provide patient care that is compassionate, appropriate, patient-centered and effective for the diagnosis treatment of orthopaedic problems and the promotion of health. Significant leadership in running a patient centered service is expected. Residents are expected to:

**Objectives**

1. Demonstrate the ability to diagnose and manage disorders of the central nervous system that fall within the purview of general surgery.
2. Demonstrate the ability to evaluate and manage head and spine injuries.
3. Describe the components of a focused history and physical examination on patients with neurological or neurosurgical disease.
4. Discuss a differential diagnosis relating to the location and nature of the neuropathology.
5. Describe the characteristics of the various neuroradiologic procedures and the rationale for selecting them.
6. Outline the management of head injuries, to include:
   a. selection, priority, and performance of resuscitation efforts
   b. components and results of a baseline neurological examination to determine and evaluate change in the patient’s neurological status (including the Glasgow Coma Scale)
   c. clinical and radiographic diagnosis
   d. treatment of scalp wounds, skull fractures, intracranial hemorrhage, and brain swelling
   e. identification and selection of pharmacologic agents used to treat acute decompensation of the nervous system
   f. significance of a dilated pupil
7. Outline the management of injuries of the cervical spine, including:
   a. rationale for stabilizing the spine
   b. description and interpretation of the neurological signs of a fracture/dislocation at various levels in the cervical spine
   c. pathophysiological changes in a spinal cord injured patient.
8. Describe the pre- and postoperative management of the neurosurgical patient.

**Medical Knowledge**

**Competency**

Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care. Residents are expected to be able to:

**Objectives**

1. Demonstrate general knowledge of the anatomy, physiology, and pathophysiology of the central, peripheral, and autonomic nervous system.
2. Understand factors influencing cerebral blood flow.
3. Understand intracranial compliance and intracranial pressure.
4. Understand the concepts of primary and secondary brain injury.
5. Understand indications for and appropriate technique for placement of intracranial pressure monitor and/or ventriculostomy.

**Practice-Based Learning and Improvement**

**Competency**

Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life long learning. Residents are expected to develop skills and habits to be able to:

**Objectives**:

1. Evaluate one’s own knowledge, incorporating feedback from others.
2. Appraise and assimilate evidence from scientific studies to provide high quality neurological care.
3. Appropriately use hospital information technology systems to manage patient care and to access online medical information to effect high quality care.
4. Effectively use information technology and other resources to support one’s own ongoing self-education (DVDs, CDs, Vumedi etc)
5. Facilitate the learning of medical and nursing students, and surgical technician students rotating in the Operating Rooms.
6. Attend and participate and take a leadership role in teaching conferences and rounds

**Systems Based Practice**

**Competency**
Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as be able to effectively call on other resources in the system to provide optimal health care. Residents are expected to:

**Objectives**
1. Understand the multidisciplinary role of the Neurosurgeon, Neurointensivists, Surgical Intensivists, Trauma Surgeons, Nurses, Physical Therapists, Occupational Therapists, Rehabilitation Specialists, Social Services, Case Managers, and the Operating Room Team in the provision of safe and high quality neurosurgical care.
2. Serve as patient advocates for quality patient care
3. Work effectively with other services, health care agencies, and case managers
4. Work to improve the system of medical care at Queens Medical Center

**Professionalism**

**Competency**
Residents must demonstrate commitment to carrying out professional responsibilities and an adherence to ethical principles. Residents are expected to:

**Objectives**
Interact with patients and their families in a respectful, sensitive, and ethical manner.
1. Interact with other members of the Neurosurgical Team and ambulatory clinic personnel in a respectful, responsible, and professional manner.
2. Demonstrate sensitivity, respect, and adherence to ethical principles when interacting with patients and their families.
3. Demonstrate non-judgmental sensitivity and responsiveness to the age, culture, disability status, and gender of patients and colleagues.
4. Show ethical/professional leadership by example.

**Interpersonal and Communication Skills**

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

**Objectives**
1. Demonstrate skill in effective information exchange with patients, their families, and other members of the Neurosurgical Team, in the trauma setting and for elective procedures.
2. Demonstrate ability for accurate and timely information exchange between other members of the healthcare team, both verbally and in writing, with appropriate use of the medical record.

Clinical Content
The clinical activities will include:
1. Performing detailed neurological examinations of patients in all states of consciousness.
2. Writing admission, diagnostic, and preoperative orders as directed by the Attending Faculty Neurosurgeon.
3. Reviewing all preoperative diagnostic studies with the Attending Faculty Neurosurgeon.
4. Becoming familiar with the modalities available for the diagnosis of neurosurgical disease, including plain x-rays, MRI, CT, and angiography.
5. Interpreting the results of neuroradiological procedures under supervision.
6. Participating in neurosurgical procedures and learning the skills used, including:
   a. bone work (craniotomy)
   b. hemostasis
   c. protection of neural tissue
   d. removal of specific lesions
   e. management of problems related to CSF circulation
   f. repair of dura and bone
7. Performing limited neurosurgical procedures under direction, such as:
   a. diagnostic lumbar puncture
   b. burr hole
   c. closure of scalp
   d. elevation of simple depressed skull fracture
   e. application and management of skeletal traction by tongs or halo
8. Managing postoperative neurosurgical patients.

Implementation
The 4 week Neurosurgery elective will take place at The Queen’s Medical Center under the preceptorship of Dr. William Obana, and will also include the following faculty: Drs. Calvin Kam, Michon Morita, Jon Graham, Leon Liem, Todd Thompson, and Daniel Donovan. The Resident is to report to Dr. Obana on the first day of the rotation. The following will be covered during the rotation:

2. Diagnostic studies:
   a. plain films of the spine
   b. computed tomography
   c. cerebral angiography
   d. magnetic resonance imaging (MRI).
3. Intracranial tumors.
4. Spontaneous intracranial hemorrhage.
5. Head and spine injuries.
6. Intracranial infection.
7. Spinal tumors.
8. Lumbar and cervical disc disease.

Required Readings
In order to maximize the resident's learning experience during the Neurosurgery rotation, Dr. Obana and his colleagues will assign pertinent chapters from: Handbook of Neurosurgery, Sixth Edition Mark Greenberg (2006)
Reading materials and other rotation information will be provided by the surgery administrative staff prior to the rotation.

**Assessment Method (Residents)**
Resident performance will be subject to daily formative evaluation in the operating room, and the clinic; the 360 degree evaluation process (using faculty and nurse managers) will take place at the end of each rotation. Semiannual Program Director/Faculty/Resident evaluation meetings will provide summative evaluation.

**Assessment Method (Program Evaluation)**
Annual evaluations and assessment by the Program Director and faculty. Annual resident confidential evaluation of program, and its rotations.