

## **NEUROSURGICAL CRITICAL CARE SERVICE ROTATION**

### **Location:**

Neurosurgical Intensive Care Unit  
Harborview Medical Center

### **FACULTY CONTACT:**

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## **OVERALL EDUCATIONAL PURPOSE**

To acquire knowledge and clinical experience in caring for critically ill patients with central neurologic injury, including advanced understanding of neuroanatomy and neuroimaging.

To learn basic and advanced neurophysiologic principles, including control of cerebral blood flow, determinants of intracranial pressure and brain resuscitation techniques.

To acquire knowledge and clinical competence in performing multiple tasks of critical care medicine, including the establishment and maintenance of an open airway, the use of both invasive and non-invasive mechanical ventilation, weaning and respiratory care techniques, and the indications and placement of arterial and central venous catheters.

To gain experience in the analysis of data and management of hemodynamic and electrolyte instability, particularly shock, hypertensive, hypervolemic hemodilution for cerebral vasospasm, hyponatremic states related to SIADH and salt wasting, and diabetes insipidus.

To gain experience in the ethical principles and practical management of end-of-life care.

## **TEAM STRUCTURE**

Critical Care Attending (Anesthesiology, Pulmonary or Neurology)  
Pulmonary and Critical Care Fellow  
Anesthesiology Critical Care Fellow  
Two to three Anesthesiology R-2 or R-3s.  
One Neurosurgery R2  
One to two Emergency Medicine R-1s

## **PRINCIPAL TEACHING METHODS**

### *Case discussion and review*

The fellow will supervise the residents in the accumulation of data and the provision of care for each patient in the Neurosurgical ICU. The Critical Care Attending will see and evaluate each patient on the service and review the care with the fellow and resident on at least a daily basis.

### *Rounds*

The resident's will pre-round on each patient. The fellows and attending will participate in combined work/teaching rounds.

### *Didactics*

A joint Medical-Surgical ICU conference is also held every Wednesday, and the Neurosurgical Critical Care Service team will present at this conference once per month. Assigned didactics occur twice weekly. The fellow will provide one didactic session directed towards the entire team once per month. The fellow will also attend Chest Conference and Respiratory/CCM Conference at HMC on Thursdays.

## **EDUCATIONAL CONTENT**

### **Mix of Diseases**

Traumatic neurologic injury  
Subarachnoid hemorrhage  
Intracerebral bleeds  
Complications of neurologic injury, including:  
Hemodynamic instability  
Acute lung injury  
Ventilator associated pneumonia  
Sepsis and septic shock  
Endocrine dysfunction

### **Patient Characteristics**

Patients are representative of the population in the Seattle metropolitan area.

### **Types of Clinical Encounters**

Fellows will be responsible for the oversight of all patients admitted to the Neurosurgical Intensive Care Unit. Patients are generally admitted from the ER or are transferred in emergently from outside facilities. The fellow will be expected to evaluate each patient in the ICU at least daily, to supervise and assist the residents with all aspects of the patient management and to consult with the attending, the neurosurgical service, and other services as required for optimal patient management. There are no outpatient responsibilities during this rotation.

### **Procedures**

Endotracheal intubation.  
Mechanical ventilation, both invasive and non-invasive.  
Maintenance of circulation, employing arterial, central venous and right heart catheterization.  
Neurophysiologic monitoring, including intracranial pressure monitor placement, retrograde jugular venous catheter placement and transcranial dopplers.

## **Services**

The Neurosurgical Intensive Care Unit employs state of the art technology and full critical care and neurosurgical services in order to improve the outcome in patients with neurological injury. The NSICU is equipped to perform all types of neurophysiologic monitoring and to provide all needed services for the peri-operative management of patients with traumatic and non-traumatic brain injury.

## **Rotation Specific Schedule**

### **Monday**

7:30 am: Didactics

### **Tuesday**

7:30 am: Didactics

### **Wednesday**

7:00 am: Neurosurgery Grand Rounds

11:00 am: Med-Surg ICU conference

### **Thursday**

7:30 am: Didactics

7:45 am: Neuroradiology rounds with neurosurgeons

### **Friday**

7:30 am: Didactics

## **Call and Weekend Responsibilities**

No in-house call. The Pulmonary/CCM fellow will be on call from home and available to assist the in-house resident, but it is uncommon that the fellow needs to return to the hospital after leaving. The fellow will be relieved of all clinic duties, including home call, at least one 24-hour period per week.

## **Principle Educational Materials Used**

### **Recommended Readings**

Course syllabus, including recommended readings.

## **METHODS USED IN EVALUATING RESIDENT AND PROGRAM PERFORMANCE**

At the end of the rotation, the fellow is evaluated in writing and their performance reviewed with them verbally by every attending he or she has interacted with for more than five days. The evaluator rates the fellow on a nine-point scale in each component of clinical competence (i.e. patient care, medical knowledge, practice based learning improvement, interpersonal and communication skills, professionalism, system based learning, educational attitudes, leadership, overall clinical competence).

The fellow is given the opportunity to evaluate in writing the quality of the curriculum and the extent to which the educational goals and objectives of the rotation have been met. The resident also evaluates the teaching competence of each attending with whom s/he has interacted for a significant amount of time.

## **EXPLICIT LINES OF RESPONSIBILITY FOR CARE OF PATIENTS ON THIS SERVICE**

If new admissions are sufficiently stable, the residents are responsible for the initial history, physical examination, and diagnostic approach. These are reviewed with the Pulmonary and Critical Care fellow. The Neurosurgical service will be aware of every admission and will be involved in planning immediate disposition. If patient acuity warrants more rapid attention, the initial evaluation and approach is done by the resident and fellow jointly. Each new admission is also evaluated by the Critical Care Medicine Attending within 12-14 hours of admission. Attendings examine and review the care of each patient at least once daily and write daily progress notes.

Most procedures (i.e., central or arterial catheter placement, lumbar punctures, thoracenteses) will be performed by either the resident with fellow and/or attending supervision or directly by the fellow with attending supervision, depending upon level of previous training. Endotracheal intubation may be performed by the fellow with the supervision of an Anesthesiology Critical Care attending. Ventilator management will be guided by the fellow. Procedures related to neurophysiologic monitoring will be performed by the Neurosurgical service or by the fellow with appropriate supervision by Neurosurgery.

The fellow, with attending supervision and in conjunction with the Neurosurgical service, remains primarily responsible for the continued care of all patients on the NCCS and will coordinate all diagnostic evaluations, therapeutic procedures, consultations and disposition planning. Residents are responsible for writing daily orders and progress notes.