

Neurocritical Care ROTATION at Upstate Medical University

Goals and Objective:

Rotation in the Neuro-ICU offers unique learning experience for the Resident Rotator in the evaluation and management of patients with central nervous system dysfunction requiring critical care and intensive monitoring. Resident Rotator will learn the application of critical care principles in the care of patients with acute neurological conditions and trauma victims with complex multiorgan dysfunction. Resident Rotator will acquire knowledge and clinical skills in emergency management of critically ill patients with stroke, hemorrhage, brain trauma, status epilepticus, CNS infection and coma.

Rotation Detail:

NICU rotation will take place at Upstate Neuroscience ICU. Resident Rotator is expected to arrive by 7:30 AM daily and will pre-round with the NICU team until the NICU Attending arrives and formal walk rounds start. Resident Rotator will have a chance to take at least one patient and have direct clinical responsibility along with NICU residents and midlevel practitioners. Resident Rotator will work under close supervision by the NICU Attending and NICU Fellows. Resident Rotator will not have any in-house night call responsibilities.

The educational experience will primarily take place during bedside rounds with Attending and house staff as well as direct patient care. Resident Rotator is encouraged to attend regular didactic conferences given by NICU Attendings covering the Neurocritical Care core Curriculum. Resident Rotator is also encouraged to present in regular case conferences may be asked to present topics in Neurocritical Care of interest to the Resident Rotator.

Core Topics:

1. Cerebrovascular diseases
 - a. Emergency management of stroke and hemorrhage
 - b. Intensive care management of patients with acute cerebrovascular disorders
2. Neurotrauma
 - a. Traumatic brain injury
 - b. Spinal cord injury
3. Disorders, Diseases, Seizures and Epilepsy
 - a. Status Epilepticus and refractory seizure
 - b. Neuromuscular diseases
 - i. Myasthenia gravis
 - ii. Guillain-Barre Syndrome
 - iii. ALS
 - iv. Rhabdomyolysis and toxic myopathies
 - v. Critical illness myopathy/neuropathy
 - c. Infection
 - i. Encephalitis
 - ii. Meningitis

- iii. Brain and spinal epidural abscess
 - d. Toxic metabolic disorders
 - i. Neuroleptic malignant syndrome/malignant hyperthermia
 - ii. • Serotonin syndrome
 - iii. • Drug overdose and withdrawal (e.g., barbiturates, narcotics, alcohol, cocaine, acetaminophen).
 - iv. • Temperature related injuries (hyperthermia, hypothermia)
 - e. Inflammatory and demyelinating diseases
 - i. • Multiple sclerosis (Marburg variant, transverse myelitis)
 - ii. • Neurosarcoidosis
 - iii. • Acute disseminated encephalomyelitis (ADEM)
 - iv. • CNS vasculitis
 - v. • Chemical or sterile meningitis (i.e. posterior fossa syndrome, NSAID induced)
 - vi. • Central pontine myelinolysis
 - vii. • Others
 - f. Neuroendocrine disorders
 - i. • Pituitary apoplexy
 - ii. • Diabetes insipidus (including triple phase response)
 - iii. • Panhypopituitarism
 - iv. • Thyroid storm and coma
 - v. • Myxedema coma
 - vi. Addisonian crisis
 - g. Neuro-oncology
 - i. Brain tumors and metastases
 - ii. Spinal cord tumors and metastases
 - iii. Carcinomatous meningitis
 - iv. Paraneoplastic syndromes
 - h. Encephalopathies
 - i. Eclampsia, including HELLP Syndrome
 - ii. Hypertensive encephalopathy
 - iii. Hepatic encephalopathy
 - iv. Uremic encephalopathy
 - v. Hypoxic-ischemic and anoxic encephalopathy
 - vi. MELAS
 - i. Clinical syndromes
 - i. Coma
 - ii. Herniation syndromes with monitoring & ICP
 - iii. Elevated intracranial pressure and Intracranial hypotension/hypovolemia
 - iv. Hydrocephalus detection & treatment
 - v. Cord compression
 - vi. Death by neurologic criteria, end of life issues, and organ donation
 - vii. Vegetative state
 - viii. Dysautonomia (cardiovascular instability, central fever, hyperventilation)
 - ix. Reversible posterior leukoencephalopathy
 - x. Psychiatric emergencies (psychosis)
 - j. Perioperative Neurosurgical Care
- 4. General Critical Care
 - a. Cardiovascular physiology and hemodynamic monitoring
 - b. Respiratory physiology, airway management and mechanical ventilation
 - c. Renal physiology, Fluid and Electrolyte, renal failure and renal replacement therapy
 - d. Metabolic and endocrine effects of critical illness
 - e. Infectious disease pathophysiology and therapy
 - f. Acute Hematologic disorder pathophysiology, hemostasis and coagulopathy
 - g. GI/GU pathophysiology

- h. Immunology and Transplantation
- i. General trauma and burns
- 5. General and Advanced multimodality monitoring/evaluation
 - a. Hemodynamic monitoring
 - b. Continuous/Quantitative EEG monitoring
 - c. Intracranial pressure monitoring
 - d. Brain tissue Oxygen monitoring
 - e. Jugular bulb oxygenation monitoring
 - f. Microdialysis
 - g. Perfusion imaging/evaluation
 - h. Ultrasound Flow studies (TCD, Carotid)
 - i. Other non-invasive hemodynamic/physiologic monitoring
- 6. Procedural Skills
 - a. Central venous catheterization
 - b. Arterial catheterization
 - c. Jugular venous bulb catheterization
 - d. Pulmonary artery catheterization and other cardiac output monitoring techniques
 - e. Management of mechanical ventilation and non-invasive ventilation techniques
 - f. Maintenance of airway and ventilation in non-intubated, unconscious patients
 - g. Direct laryngoscopy and endotracheal intubation
 - h. External ventricular drain/parenchymal brain monitor insertion
 - i. Conscious and deep sedation
 - j. Interpretation of continuous EEG monitoring
 - k. Interpretation and management of ICP/ CPP data
 - l. Interpretation and management of SjvO₂/PbtO₂ data
 - m. Administration of intravenous and intraventricular thrombolysis
 - n. Interpretation of CT/MR standard imaging and perfusion studies
 - o. Interpretation of cerebral angiography
 - p. Perioperative and postoperative clinical evaluation of neurosurgical and interventional patients
 - q. Induction and maintenance of therapeutic coma
 - r. Induction and management of therapeutic temperature modulation including hypothermia and controlled normothermia including management of shivering

Competencies:

At the end of the rotation, Resident Rotator will have the following competencies:

1. Patient care – appropriately provide initial management applying the principles of critical care to patients with acute central nervous system dysfunction requiring critical care and/or intensive monitoring; appropriately recognize and evaluate neurologic emergencies and alert senior house staff/fellows/attendings for further management;
2. Medical Knowledge – appropriately use and interpret cerebrovascular and hemodynamic monitoring devices; appropriately institute initial work-up and management of core competencies listed above; determine the indication and rationale for different invasive and non-invasive multimodality neurologic monitoring.
3. Professionalism – demonstrate commitment to ethical principles pertaining to provision or withholding of care, confidentiality, decisional capacity and informed consent; demonstrate sensitivity and responsiveness to staff, patient and family.
4. Interpersonal and Communication Skills – demonstrate ability to interact and communicate with health care personnel, patients and family in a respectful manner.
5. System based practice – demonstrate awareness and advocacy for cost effective patient care practices; appropriately work with multidisciplinary team in developing patient care plan.

Evaluation:

Weekly evaluation will be given in person to the Resident Rotator by the NICU Attending and/or Fellow, covering the competencies outlined above.

Formal written evaluation will be given to the Resident Rotator and provided to the Resident Rotator Program Director at the end of the rotation.

Faculty Evaluators:

Julius Gene Latorre, MD MPH - Director Neurocritical Care Service

Ziad El-Zammar, MD

Ashok Devanasepathy, MD

Tarakad Ramachandran, MD