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| **Medical Knowledge 1: Knowledge of biomedical, clinical, epidemiological, and social-behavioral sciences as outlined in the American Board of Anesthesiology Content Outline** |
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Demonstrates knowledge of the etiology, pathophysiology, diagnosis, and treatment of common neurologic and neurosurgical problems. | Demonstrates knowledge of CNS and ANS anatomy and CSF physiology.Demonstrates understanding of the key concepts in Neuroanesthesia including:- Effects of carbon dioxide on the cerebral circulation- Cerebral autoregulation- Pathophysiology and assessment of elevated ICP. | Demonstrates knowledge of the following key concepts and their implications:- Effects of anesthetic agents on neurophysiology- Intracranial hypertension and intraoperative brain relaxation- Pharmacology of osmotherapy, common anticonvulsants, steroids- Hemodynamic management in Neuroanesthesia (including rationale selection of pressors / inotropes / antihypertensives) - Fluid, electrolyte, and glycemic management in neurologically ill patients- Positioning for neurosurgery- Venous air embolism- Multimodal analgesia- Enhanced recovery after surgery- Radiculopathy, myelopathy and spine trauma- Endocrine manifestations of pituitary tumors- Pathophysiology and evidence based management of traumatic brain injury. | Demonstrates knowledge of the following key concepts and implications of:- Posterior fossa surgery including sitting craniotomy- Pathophysiology and sequela of subarachnoid hemorrhage - Cerebral vasospasm- Open and endovascular treatment of cerebrovascular diseases - Endovascular treatment of acute ischemic stroke- Epilepsy and awake craniotomy- Complex spinal fusion surgery- Neurologic outcomes of surgery and anesthesia- Controversies in clinical neuroprotection. | Possesses consultant level knowledge to support Neuroanesthesia practice. This includes advanced knowledge of neurological diseases and anesthetic implications thereof. |
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| Comments:  | Unable to determine milestone performance level **☐** |
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| **Medical Knowledge 2: Knowledge of Neuroimaging and Multimodality Neurologic Monitoring in Operating Room and Critical Care** |
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Interprets normal radiological anatomy relevant to Neuroanesthesiology.Demonstrates knowledge of the determinants of ICP and CPP. | Demonstrates the knowledge of general principles of intraoperative neuromonitoring involving:- EEG and evoked potentials - Cerebral oximetryEnumerates common applications of intraoperative neuromonitoring. Interprets basic radiological anatomy relevant to Neuroanesthesiology including identifying abnormal radiological images. Describes conditions that increase ICP and the consequences of elevated ICP. | Demonstrates knowledge of the key concepts of neuromonitoring including the effects of anesthetic management and intraoperative pathophysiologic changes on:- EEG and evoked potentials - Cerebral oximetry. Recognizes intracranial hematoma, cerebral edema, midline shift, and spinal stenosis on imaging.Utilizes data from neuroimaging and multimodality monitoring to make clinical decisions under indirect supervision.Compares methods of ICP assessment.Describes options for monitoring venous air embolism. | Demonstrates knowledge of the evidence based applications of intraoperative neuromonitoring involving - EEG and evoked potentials - Cerebral oximetry.Identifies basic vascular intracranial abnormalities, myelopathy on neuroimaging. Utilizes data from neuroimaging and multimodality neuromonitoring to make clinical decisions with conditional independence. Understands multimodality monitoring (i.e. TCD, CBF/brain tissue oxygen tension monitors, microdialysis) and can utilize data obtained to make clinical decisions under conditional independence.  | Possesses in-depth, consultant level knowledge of intraoperative multimodality monitoring (EEG, SSEP, MEP, EMG, ICP, NIRS, SjvO2, PbtO2, TCD, TEE, ONSD, precordial doppler) and neuroimaging, serves as an expert resource.Able to independently recommend and utilize intraoperative and intensive care monitors to optimize cerebral physiology and improve outcomes. |
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| Are you concerned that this resident lags behind peers and needs extra help?Comments:  | Unable to determine milestone performance level **☐** |