

Neuroanesthesia Advanced Rotation

The goal of your neuroanesthesia advanced rotation is to provide you with detailed knowledge and clinical skills necessary for the management of more complex neuroanesthesia cases.

During your rotation with us, you will be expected to do a thorough preoperative evaluation, formulate an anesthetic plan, and act as a primary anesthetic caregiver under the appropriate faculty supervision. We realize that the schedule can sometimes run into the late afternoon. You are encouraged to finish those cases, which are more interesting and challenging, such as awake craniotomy and emergency intracranial vascular or head injury cases. At the conclusion of the advanced neuroanesthesia rotation you should have enough knowledge, skills and confidence to manage “routine” neurosurgical cases with substantial independence and more complex cases with the appropriate guidance from the faculty. This is accomplished by your OR experience, completing your reading assignments and by your participation in informal discussions with faculty in the operating room. Your discussions with the faculty are strongly encouraged.

Please contact Dr. Rusa or Dr. Shangraw during the first day of your neuroanesthesia rotation for an orientation. You should obtain educational material from the Education Coordinator.

Goals

Medical Knowledge

Residents are expected to:

- Understand the indications, complications and rationale of the following: deliberate hypothermia, induced hypertension, and controlled hypotension.
- Understand preoperative and intraoperative considerations of awake craniotomy in patients undergoing resection of tissue near eloquent areas.
- Understand the pathophysiology of cerebral ischemia.
- Understand the uses of EEG monitoring.
- Understand motor evoked potentials and the expected anesthetic effects on them.
- Understand basic anatomy in a cerebral angiogram and obvious lesions, such as aneurysms and AVMs.
- Understand vasospasm in subarachnoid hemorrhage and available diagnostic and therapeutic modalities.
- Understand the significance of arteriovenous malformations.
- Understand the pathophysiology of blood flow characteristics in arteriovenous malformations in the preoperative, operative and postoperative period.
- Have a basic knowledge of different ICP monitors, jugular bulb oxygen saturation, and cerebral oximetry monitoring and the theory of their uses as well as their use in guiding hemodynamic therapy.
- Understand the concept, uses and limitations of paratrend and microdialysis catheters.

Patient Care

Residents are expected to:

- Manage an awake craniotomy.
- Comprehensively manage intracranial vascular surgery.
- Manage a multi-trauma patient with concurrent traumatic brain injury and problems inherent to that type of case.
- Demonstrate skills in using different intracranial pressure monitoring devices.
- Demonstrate skills using adjunctive airway management tools and techniques, such as GlideScope and asleep fiberoptic intubation.

Interpersonal and Communication Skills

Residents are expected to:

- Demonstrate therapeutic and ethically sound relationships with patients and their families.
- Demonstrate the understanding of their advanced role as members of the anesthesia team.
- Demonstrate the initiative and consult with other health care professionals.

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.

Practice Based Learning and Improvement

Residents are expected to:

- Understand the role of information technology in anesthesiology practice.
- Demonstrate the understanding of Evidence Based Medicine practice.
- Demonstrate continued improvement in clinical performance and practice.
- Demonstrate reflective clinical performance based upon individual practice and the institutional guidelines and policies.
- Exhibit metacognitive and life long learning skills.
- Understand the anesthesiologist's role in education of other health care professionals and support staff.

System Based Practice

Residents are expected to:

- Demonstrate awareness of and responsiveness to the larger context and system of health care including the institutional and societal levels.
- Understand the interactions and roles of different medical teams and other health care professionals in patient care.
- Demonstrate awareness of health care costs and resource allocation.
- Understand the anesthesiologist's role as an advocate for patient safety and quality of care.
- Understand the anesthesiologist's role as an educator and consultant to other health professionals.

Objectives

Medical Knowledge

Residents are expected to:

- Explain the indications, uses and complications, and defend reasoning of the following procedures: deliberate hypothermia, induced hypertension, and controlled hypotension.
- Create an anesthetic plan describing the preoperative and intraoperative considerations in patients for awake craniotomy in patients undergoing resection of tissue near eloquent areas.

- Explain in detail the pathophysiology of cerebral ischemia, and the rationale for use of agents in brain protection.
- Explain the uses of EEG monitoring and its limitations.
- Describe the use of motor evoked potentials and the anesthetic effects on them; describe the use of motor strip detection during awake craniotomy.
- Explain the different diagnostic modalities for detection of vasospasm in subarachnoid hemorrhage and therapeutic options currently available.
- Explain the significance of arteriovenous malformations and the pathophysiology of
- AVM blood flow characteristics in the preoperative, operative and postoperative period.
- Explain the uses and limitations of paratrend and microdialysis catheters.
- Identify basic anatomy in a cerebral angiogram and identify obvious lesions, such as aneurysms and AVMs.

Patient Care

Residents are expected to:

- Create and execute an anesthetic plan for an awake craniotomy.
- Create and execute an anesthetic plan for intracranial vascular surgery, including cases with complex intracranial pathology and/or significant co-existing medical conditions.
- Create and execute a comprehensive anesthetic plan for a multi-trauma patient with concurrent traumatic brain injury. Explain problems inherent to that kind of case.
- Correctly identify different ICP monitoring devices and show appropriate use and interpretation of data.
- Perform adjunctive airway management using a GlideScope or asleep fiberoptic intubation.

Interpersonal and Communication Skills

Residents are expected to:

- Elicit patient medical history and obtain other pertinent information efficiently in a clear, accurate, and concise manner while being sensitive to the needs of the patients and their families.
- Take the initiative and clarify, direct inquiries to, and discuss concerns with the surgical and nursing staff when necessary.
- Discuss anesthetic plan, risks and alternatives in an appropriate detail while showing sensitivity to patient's needs and concerns. Provide accurate information to the inquiries patients may have.
- Utilize the necessary verbal, non-verbal and written communication skills with the attending, residents, OR staff and other health professionals, e.g. intensivists, hospitalists, and surgeons.
- Deliver concise, organized case presentations to the staff that include pre-anesthetic concerns and management of complex cases.
- Apply the necessary knowledge, analytical and communication skills and defend the anesthetic plan and perioperative management of cases of various complexities.

Professionalism

Residents are expected to:

- Demonstrate responsibility and physical and mental attentiveness in a positive and constructive manner.
- Cope with diversions, and minimize distractions while maintaining vigilance
- Initiate interactions with patients, colleagues and peers using respectful communication and conscientious behaviors.
- Arrive for clinical and learning responsibilities in a timely and punctual fashion; prepare to perform tasks, explain reasoning and reasoning process.
- Employ electronic/technology and communication devices in a timely fashion to support patient care and teamwork.
- Answer pages in a timely manner.
- Demonstrate willingness to show consideration and appreciation for patients and co-workers.
- Interact with colleagues and peers in a respectful and conscientious manner.
- Identify respectful interactions.

- Value patients' leadership role in their own care.
- Respond to questions, requests for information, follow-up, and other communication in a timely manner.
- Exhibit compassion, empathy and support in patient care and professional interactions.
- Appreciate patient vulnerability.
- Communicate in an open, inclusive manner ensuring appropriate patient care and teamwork.
- Acknowledge diversity while providing equanimity in patient care and therapeutic and work relationships.
- Initiate interactions and manages exchanges with patients, colleagues and peers using respectful communication and conscientious behaviors.
- Demonstrate truthful and ethical standards in professional interactions and conduct.
- Adhere to departmental and university policies and procedures.
- Exhibit honesty in recordkeeping and medical records.
- Present information, concerns, and suggestions without bias or for personal gain.
- Report concerns, errors, or potential problems to attending.
- Inform patients and appropriate caregivers about care and care options using HIPAA and PARQ.
- Demonstrate an understanding of the value of continuing education and life-long learning through membership to professional organizations including OMA & ASA.

Practice Based Learning and Improvement

Residents are expected to:

- Effectively utilize information technology in anesthesiology practice.
- Use information technology to manage information, support self-education and facilitate learning of students and other health care professionals.
- Apply knowledge of study designs and statistical methods to the critical review of basic science literature and clinical trials.
- Critically evaluate and assimilate evidence from scientific studies as related to patient's care management.
- Analyze own practice and the practice of other colleagues; assimilate departmental and institutional guidelines; utilize the CQI process; perform continued practice-based improvement.

System Based Practice

Residents are expected to:

- Recognize how their patient care affects other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice.
- Design a care plan utilizing the skills and needs of different medical teams and other health care professionals involved in patient care.
- Practice cost-effective health care that does not compromise patient safety or quality of care.
- Work effectively with others as a member or leader of a health care team.

Instructional Methods

Residents will be assigned to the Neuro OR by the daily scheduler, giving preference to the resident(s) assigned to the neuroanesthesia rotation.

Residents will discuss their preoperative assessments, monitoring plan, anesthetic and postoperative plan with their attending anesthesiologist the day prior to the scheduled case.

Case based or clinical case discussions and formal reading/didactic material will be used during the rotation.

Suggested discussion points:

- SAH, management of intraoperative aneurismal rupture
- Cerebral ischemia and neuroprotection
- AVM, hemodynamic manipulation, management of massive blood loss
- TBI, systemic consequences
- Sitting craniotomy, venous air embolism
- Awake craniotomy, alternative approaches

Evaluation

Your performance will be evaluated in concert with the current resident clinical evaluation process of daily evaluations and verbal feedback as well as the global narrative rotation evaluation.

We would also welcome your feedback and suggestions so that we can make the necessary modifications and/or improvements for future residents.

We are looking forward to working with you.

References and Resources

1. Chapters on Cerebral Physiology and Neurosurgical Anesthesia by John C. Drummond and Piyush M. Patel (from Anesthesia edited by Ronald D. Miller).
2. Anesthesia and Neurosurgery by J. Cottrell and D. Smith, Fourth Edition
The following chapters are highly recommended:

CH 7: Effects of Anesthetic Agents on CBF, Metabolism, and ICP, pp. 129 – 143
CH 9: Evoked Potentials, pp. 183 – 200
CH 10: EEG, pp. 201 – 217
CH 14: Supratentorial Mass, pp. 297 – 317
CH 18: Cerebral aneurysms, pp. 367 – 396
CH 20: Interventional Neuroradiology; Pts with Arteriovenous malformations, pp. 399-423
CHs 31 and 32: Severe Head Injury, pp. 663 – 713
3. A folder containing several articles on a variety of neuroanesthesia related topics
4. Guidelines for neurosurgical anesthesia at OHSU and neuroanesthesia related journal articles available on J:drive

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