

# Overview of Goals and Objectives of Rotation: Anesthesia Rotation

**Director:** OHSU-Chris Swide,.PVMAC- Michael Jamond

**Principle Preceptors:** Michael Hutchens, Hussain Lakdawalla, Matthas Merkel, Lars Hegnell

The Anesthesia rotation is one month in duration and is intended to provide the fellow with necessary cognitive and technical skills to manage patients in need of assisted ventilation and undergoing general anesthesia. In addition, fellows are expected to gain familiarity with issues of perioperative risk reduction and complications arising from use of anesthetic agents, paralytics, and airway devices.

**Medical Knowledge:** *Residents are expected to demonstrate knowledge of established and evolving biomedical, clinical and social sciences, and the application of their knowledge to patient care and the education of others.*

## Perioperative Medicine:

During the course of the rotation, fellows have the opportunity to acquaint themselves with the ASA operative risk grading system and also learn methods to reduce perioperative cardiopulmonary complications. At the end of the rotation, fellows will :

- Assess pre-operative risk factors for cardio-pulmonary complications
- Know the indications for peri-operative  $\beta$ -blockade
- Describe the perioperative management of patients with OSA, AICDs/Pacemakers, and congestive heart failure
- Know the peri-operative indications for invasive hemodynamic monitoring
- Understand the role that 1) peri-operative fluid 2) pain control 3) heat loss and 4) residual anesthetic/paralytic agents play in post-operative complications
- Know the common causes & management of anaphylaxis in the peri-operative period
- Understand the common complications of endotracheal tubes and airway appliances

## Pharmacology of Induction Agents/Paralytics:

Over the course of the rotation the fellow will demonstrate knowledge of (induction) dose, rapidity of onset, predicted duration of effect, complications, and contraindications of the following agents:

- Sedatives/Analgesics- Propofol, midazolam, fentanyl(+/- other synthetic narcotics), etomidate, pentothal(sodium thiopental)
- Volatile Anesthetics
- Paralytics- Succinylcholine, rocuronium, cis-atracurium, vecuronium
- Vasoactive Agents-Phenylephrine, ephedrine, epinephrine, norepinephrine
- Glycopyrrolate/atropine

The fellow will demonstrate:

I. Knowledge of the issues and approaches to intubation of high-risk patients with the following conditions:

- Ischemic Heart Disease
- Elevated Intracranial Pressure
- Pregnancy
- Unstable Cervical Spines
- Morbid Obesity

II. Pre-operative airway assessment, understanding of ***Practice Guidelines for Management of the Difficult Airway*** and ability to formulate a plan for the known difficult airway

III. Methods to improve laryngoscopic view, including;

- Improved Jackson/sniffing position
- BURP technique

- Left molar approach
- Head-elevated laryngoscopy
- Proper positioning of the morbidly obese

#### IV. Familiarity with alternative airway devices (LMA, different blades, including glidescope)

During the course of the rotation, fellows may have significant blocks of time outside of the surgical suites in which self-directed learning can occur. The following areas often impact the practice of Critical Care and therefore require familiarity with the subject.

#### **Pain Management:**

- Understand the basic tenets of acute post-operative pain management as expressed in the ASA Practice Guidelines document
- Review approaches to post-operative pain management in the chronic opioid dependent patient
- Describe the role and complications of neuraxial anesthesia

#### **Conscious Sedation:**

- Describe the difference between levels of sedation (minimal, moderate, deep)
- List the requirements for credentialing in and performance of conscious sedation

#### **Patient Care:** *Residents are expected to provide patient care that is compassionate, appropriate and effective for the promotion of health, prevention of illness, treatment of disease and at the end of life.*

During the rotation, the fellow will demonstrate the following airway assessment and management skills:

- Apply various scoring systems (Mallapati scoring system, lip bit test, thyromental distance, mouth opening, etc) in airway assessment
- Maintain an open airway and provide adequate bag-mask ventilation to sedated patients
- Demonstrate proper manipulation and intubation of the airway
- Provide standard grading of laryngeal view during laryngoscopy
- Demonstrate familiarity with Difficult Airway algorithm
- Perform alternative to conventional endotracheal intubation ( LMA placement, Bougie-assisted placement)
- Provide levels of induction & paralytic agents appropriate to the clinical situation
- Maintain hemodynamic stability and adequate gas exchange around the time of induction/intubation
- Demonstrate ability to reverse NM blockade, establish criteria for extubation, and manage acute problems related to anesthesia emergence and extubation

#### **Practice based Learning:** *Residents are expected to be able to use scientific evidence and methods to investigate, evaluate, and improve patient care practices.*

Fellows at all levels of training are expected to 1) identify areas for improvement and implement strategies to enhance knowledge, skills, attitudes and processes of care 2) analyze and evaluate practice experiences and implement strategies to continually improve the quality of patient practice 3) develop and maintain a willingness to learn from errors and use errors to improve the system or processes of care and 4) use information technology or other available methodologies to access and manage information, support patient care decisions and enhance both patient and physician education. Requirements for this competency include;

- Maintain a list of patients attended to experiencing an untoward event (morbidity and mortality) during the peri-operative period
- Review relevant literature surrounding occurrences and presenting findings to fellows and faculty at monthly M&M conference

- Review key articles in the literature related to patient safety (see section on conferences) and present synopsis at M&M conference
- Demonstrate ability to access critical event and adverse drug reporting forms and participating in surveillance
- Translate techniques & management skills learned in this rotation into other settings (familiarity with, use & maintenance of difficult airway, regular availability of routine vasoactive agents)

**Professionalism:** Residents are expected to demonstrate behaviors that reflect a commitment to continuous professional development, ethical practice, an understanding and sensitivity to diversity and a responsible attitude toward their patients, their profession, and society.

- Demonstrate respect, compassion, integrity, and altruism in relationships with patients, families, and colleagues
- Demonstrate sensitivity and responsiveness to the gender, age, culture, religion, sexual preference, socioeconomic status, beliefs, behaviors and disabilities of patients and professional colleagues
- Adhere to principles of confidentiality, scientific/academic integrity, and informed consent
- Recognize and identify deficiencies in peer performance
- Admit to and seek help in remedying errors
- Interact with nursing staff and other professionals as two-way educational opportunities when current approach does not appear to be effective

**Interpersonal and Communication Skills:** Residents are expected to demonstrate interpersonal and communication skills that enable them to establish and maintain professional relationships with patients, families, and other members of health care teams.

- Provide effective and professional consultation to other physicians and health care professionals and sustain therapeutic and ethically sound professional relationships with patients, their families, and colleagues.
- Communicate effectively in times of dynamically changing conditions
- Interact with consultants in a respectful, appropriate manner
- Transfer care of the patient in a manner that ensures patients safety, comfort and continuity of care
- Demonstrate respect for and recognition of particular skill sets possessed by other CC practitioners, such as CC nurses, RT, PT, OT, dieticians, pharmacists.
- Considers ethical issues and patient wishes in treatment decisions

**Systems-Based Practice:** Residents are expected to demonstrate both an understanding of the contexts and systems in which health care is provided, and the ability to apply this knowledge to improve *and optimize health care*.

- Understand, access and utilize the resources, providers and systems necessary to provide optimal care
- Apply evidence-based, cost-conscious strategies to delivery of peri-operative care
- Demonstrate the Critical Care Practitioner's role as patient/quality care advocate
- Establish multidisciplinary relationships needed to effect quality care
- Participate actively in PCCM or multidisciplinary M&M or case conferences
- Recognize how Anesthesia/Critical Care services are documented, coded, billed, and reimbursed in different medical practices
- Interpret drug costs in context of outcomes (e.g., advanced generation NMBAs, reversal agents)
- Describe the proper procedure to correctly identify a patient to minimize patient errors.

## **Instructional Methods:**

Introductory Lecture Series, Web-Based Curriculum (RICU), Weekly Critical Care Fellows Conference, Multidisciplinary ICU lecture Series, weekly Anesthesiology Grand Rounds.

## **Methods of Assessment:**

- Competency-based staff evaluations
- Ancillary care provider evaluations
- Conference attendance and participation
- Structured evaluations of airway management, central line placement,

## **References:**

### **Airway Adjuncts**

The laryngeal mask airway: A comprehensive review for the Emergency Physician, Pollack C, J Emer Med 2001;20:53-66

Crackdown on crics: Needle cricthyotomy & percutaneous transtracheal jet ventilation explained. Vitberg DA, et al, J Emerg Med Serv JEMS. 2001 Mar;26(3):58-62, 64-5, 78-9

Approaches to managing the upper airway, Behringer EC, Anesthesiology Clin N Am 2002; 20:813– 832

Facemask, nasal, and oral airway devices, Greenberg RS, Anesthesiology Clin N Am 2002;20:833– 861

Using the laryngeal mask airway to manage the difficult airway, Bogetz MS, Anesthesiology Clin N Am 2002;20:863– 870

### **Anaphylaxis in the Peri-Operative Period:**

Anaphylaxis During the Perioperative Period, Hepner DL, Castells MC, Anesth Analg 2003;97:1381–95

Latex Allergy: An Update, Hepner DL, Castells MC, Anesth Analg 2003;96:1219–29

Anaphylactic Reactions to Neuromuscular Blocking Drugs: Are We Making the Correct Diagnosis? Levy JH, Anesth Analg 2004;98:881–2

### **Complications of Intubation:**

**Acute complications of artificial airways, Feller-Kopman D, Clinics in Chest Med 2003;24:445-455**

**Clinical practice and risk factors for immediate complications of endotracheal intubation in the intensive care unit: A prospective, multiple-center study, Jaber S, Amraoui J, Lefrant J-V, et al, Crit Care Med 2006;34:2355–2361**

Predictors of Hypotension After Induction of General Anesthesia, Reich DL, Hossain S, Krol M, et al, Anesth Analg 2005;101:622–8

Clinical Relevance of the Bezold–Jarisch Reflex, Campagna JA, Carter C, Anesthesiology 2003; 98:1250–60

Perioperative bradycardia and asystole: Relationship to vasovagal syncope and the Bezold-Jarisch reflex, Kinsella SM, Tuckey JP, Brit J Anest 2001;86(6):859-68

Predicting proper endotracheal tube placement in underexposed radiographs: Tangent line of the aortic arch, Pappas J, Goodman P, AJR 1999;173:1357-1359

The cuff leak test to predict failure of tracheal extubation for laryngeal edema, De Bast Y, et al, Inten Care Med 2002;28:1267-72

Post-extubation stridor in Intensive Care Unit patients: Risk factors, evaluation, and importance of the cuff-leak test, Jamir S, Inten Care Med 2003;29:69-74

Traumatic complications of intubation and other airway management procedures. Loh KS, Irish JC, Anesthesiol Clin North America. 2002 Dec;20(4):953-69.

Traumatic complications of airway management, Weber S, Anesthesiology Clin N Am 2002; 20: 503– 512

Respiratory Complications Associated with Anesthesia, Watson CB, Anesthesiology Clin N Am 2002;20:513– 537

### **Conscious Sedation:**

**Practice Guidelines for Sedation and Analgesia by Non-Anesthesiologists: An Updated Report by the American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists, Anesthesiology 2002; 96:1004–17**

Procedural Sedation and Analgesia: A Review and New Concepts, Bahn EL, Holt KR, Emerg Med Clin N Am 2005;23:503–517

Procedure-Specific Postoperative Pain Management, Kehlet H, Anesthesiology Clin N Am 2005; 23:203– 210

Distinguishing Monitored Anesthesia Care(MAC) From Moderate Anesthesia /Analgesia (Conscious Sedation): (Approved by the ASA House of Delegates on October 27, 2004)

Guidelines for Nonoperative Room Anesthetizing Locations:(Approved by House of Delegates on October 19, 1994, and last amended on October 15, 2003)

Continuum of Depth of Seation Defintion of General Anesthesia and Levels of Sedation / Analgesia:(Approved by ASA House of Delegates on October 13, 1999, and amended on October 27, 2004)

### **High Risk Patients:**

**Emergent management of the airway: New pharmacology and the control of comorbidities in cardiac disease, ischemia, and valvular heart disease, Horak J, et al, Crit Care Clinics 2000;16(3):411-427**

Airway Management in Adults after Cervical Spine Trauma, Crosby, ET, Anesthesiology 2006; 104:1293–318

Airway management of the Obstetric Patient, Lewin S, et al, Crit Care Clinics 2000;16(3):505-513

Difficult airway in obstetric anesthesia: A review, Ezri T, et al, Obstet Gyn Survey 2001;58(10):631-641

A practical clinical approach to management of the difficult airway, Eindhoven GB, et al, European J Anaesth 2001;18(Suppl 23):60-65

Awake intubation, Woodall N, Current Anaesthesia Crit Care 2001;12:218-24

### **Management of the Difficult Airway**

**Practice guidelines for management of the difficult airway: An updated report by the American Society of Anesthesiologists Task Force on management of the difficult airway, Anesthesiology 2003; 98:1269–77**

Prediction of Difficult Mask Ventilation, Langeron O, Masso E, Huraux C, et al, Anesthesiology 2000; 92:1229–36

Management of the difficult airway: alternative airway techniques and adjuncts, Butler KH, Clyne B, Emerg Med Clin N Am 2003;21:259–289

Head-elevated laryngoscopy position: Improving laryngeal exposure during laryngoscopy by increasing head elevation, Levitan R, et al, Ann Emerg Med. 2003;41:322-330.

Safe use of cricoid pressure, Vanner R, et al, Anaesthesia, 1999; 54:1–3

Left-molar approach improves the laryngeal view in patients with difficult laryngoscopy, Yamamoto L, et al, Anesthesiology 2000; 92(1):70-4

The efficacy of the “BURP” maneuver during a difficult laryngoscopy, Takahata O, et al, Anesth Analg. 1997;84(2):419-21

Anatomy and physiology of the upper airway, Isaacs RS, Sykes JM, Anesthesiology Clin N Am 2002;20:33– 745

The upper airway during anaesthesia, Hillman DR, Eastwood PR, British Journal of Anaesthesia 2003;91(1): 31-9

Manoeuvres used to clear the airway during fiberoptic intubation, Durga VK, Smith JE, Brit J Anaesthesia 2001;87(2):207-11

### **Perioperative Risk Assessment/Modification**

**Practice Advisory for the Perioperative Management of Patients with Cardiac Rhythm Management Devices: Pacemakers and Implantable Cardioverter–Defibrillators A Report by the American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Cardiac Rhythm Management Devices Anesthesiology 2005; 103:186–98**

**Practice guidelines for pulmonary artery catheterization: An updated report by the American Society of Anesthesiologists Task Force on pulmonary artery catheterization, Anesthesiology 2003; 99:988–1014**

Assessing and Reducing the Cardiac Risk of Noncardiac Surgery, Auerbach A, Goldman L, Circulation. 2006;113:1361-1376.)

Perioperative Management of Chronic Heart Failure, Groban L, Butterworth J, (Anesth Analg 2006;103:557–75

Anaesthesia and sleep apnoea, Loadsman JA, et al, Brit J Anaesth 2001;86(2):254-66

Minimizing perioperative adverse events in the elderly, F. Jin, et al, Brit J Anaesth 2001;87(4):608-24

Evidence- based practice in peri-operative medicine, Walder B, Best Pract Research Clin Anaesth 2001;15:519-29

ACC/AHA guideline update for perioperative cardiovascular evaluation for noncardiac surgery, Eagle KA, et al, Circulation. 2002;105:1257–1267

### **Pharmacology of Induction Agents/Paralytics**

**Neuromuscular Blockade in Critically Ill Patients. Nguyen TT, Stevens RD, Mirski MA, Contemporary Critical Care 2006;3(9):1-10**

**Succinylcholine-induced Hyperkalemia in Acquired Pathologic States: Etiologic Factors and Molecular Mechanisms, Jeevendra Martyn JA, Richtsfeld M, Anesthesiology 2006; 104:158–69**

Choice of the hypnotic and the opioid for rapid-sequence induction, Lavazais S, European J Anaesth 2001;18(Suppl 23):66-70

Predictors of onset and offset of drug effect, Schnider W, et al, European J Anaesth 2001;18(Suppl 23):26-31

Succinylcholine-induced hyperkalemia in patients with renal failure: An old question revisited, Thapa S, et al, Anesth Analg 2000;91:237-241

Advances in Neurobiology of the Neuromuscular Junction Implications for the Anesthesiologist, Naguib M, Flood P, McArdle JJ, et al, Anesthesiology 2002; 96:202–31

### **Pain Management:**

**Practice Guidelines for Acute Pain Management in the Perioperative Setting: An Updated Report by the American Society of Anesthesiologists Task Force on Acute Pain Management, Anesthesiology 2004; 100:1573–81**

Pain Management, De Pinto M, Dunbar PJ, Edwards T, Anesthesiology Clin N Am 2006;24 :19–37

Current Issues in Spinal Anesthesia, Liu SS, McDonald SB, Anesthesiology 2001;94:888–906

Epidural Analgesia for Postoperative Pain, Richman JM, Wu CL, Anesthesiology Clin N Am 2005; 23:125– 140

Misconceptions about neuraxial analgesia, Halpern SH, Leighton BL, Anesthesiology Clin N Am 2003;21:59– 70

Intravenous Patient-Controlled Analgesia:One Size Does Not Fit All, Macintyre PE, Anesthesiology Clin N Am 2005;23:109– 123

Postoperative Care of the Chronic Opioid-Consuming Patient, Swenson JD, Davis JJ, Johnson KB, *Anesthesiology Clin N Am* 2005;23:37– 48

Role of Analgesic Adjuncts in Postoperative Pain Management, Habib AS, Gan TJ, *Anesthesiology Clin N Am* 2005;23:85– 107

The effect of pain on survival, Staats PS, *Anesthesiology Clin N Am* 2003;21:825– 833

Effect of Post-Operative Analgesia on Morbidity, Wu C, Caldwell M, *Best Prac & Research Clin Anes* 2002;16(4):549-563

### **Post-Operative Complications:**

***Practice Guidelines for Postanesthetic Care A Report by the American Society of Anesthesiologists Task Force on Postanesthetic Care*** *Anesthesiology* 2002; 96:742–52

***Practice Guidelines for the Perioperative Management of Patients with Obstructive Sleep Apnea: A Report by the American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Obstructive Sleep Apnea***, *Anesthesiology* 2006; 104:1081–93

The effects of residual neuromuscular blockade and volatile anesthetics on the control of ventilation, Eriksson L, *Anesth Analg* 1999;89:243-51

Residual paralysis in the PACU after a single intubating dose of nondepolarizing muscle relaxation with an intermediate duration of action, Debaene B, et al, *Anesthesiology* 2003;98:1042-8

Management of Perioperative Myocardial Infarction in Noncardiac Surgical Patients, Adesanya AO, de Lemos JA, *Chest* 2006;130:584–596

Strategies To Reduce Postoperative Pulmonary Complications after Noncardiothoracic Surgery: Systematic Review for the American College of Physicians, Lawrence VA, Cornell JE, Smetana GW, *Ann Intern Med.* 2006;144:596-608.

Pathophysiology and clinical implications of perioperative fluid excess, Holte K Sharrock NE, Kehlet H, *Br J Anaesth* 2002;89: 622-32

Complications and treatment of mild hypothermia, Sessler D, *Anesthesiology* 2001;95:531-43  
Perioperative heat balance, Sessler D, *Anesthesiology* 2000;92:578-96

Perioperative Heat Balance, Sessler DI, *Anesthesiology* 2000; 92:578–96