

Educational Objectives for the PACU Rotation

Overview

As we move into the next decade, a safe efficient flow of patients through our recovery units is an essential element of perioperative management. The PACU is an area where anesthesiologists have primary responsibility for managing patients in the immediate post operative phase. Anesthesiologists are the physicians responsible for the patient in this critical time of emergence and recovery and will be called upon not just for “airway” emergencies, but also for decisions on pain management, managing patients’ hemodynamics, managing neurological status issues, nausea/vomiting, reviewing central line placements, and evaluating possible serious postoperative complications and. Anesthesiologists arrange appropriate consultations are needed and must be able to communicate with those consultants in an informed manner. Anesthesiologists also set the standards and make the assessments on when and where patients are discharged from the PACU.

Goals:

Medical Knowledge:

1. Understand the physiology of common post operative problems seen in the PACU including hypertension, hypotension, cardiac dysrhythmias, hypothermia, hypoventilation, agitation, nausea, vomiting and pain control.
2. Understand the pharmacology of anesthetic drugs and how it affects emergence in the PACU.
3. Understand the pharmacology of local anesthetics and the anatomy of regional anesthetic techniques used for post op pain control.
4. Understand normal chest xrays and the important findings to diagnose pneumothorax
5. Understand the ACLS algorithms.
6. Understand the PACU scoring system (Aldrete score.)

Patient Care:

1. Develop and apply patient management plans for common postoperative problems.
2. Demonstrate the technical skills needed to manage acute PACU patients including airway, invasive monitors and ACLS procedures/algorithms.

Professionalism:

1. Demonstrate care and compassion with patients and professional staff in the PACU.
2. Demonstrate professional commitment to responsibilities in the PACU.

Interpersonal and Communication Skills:

1. Develop the ability to manage acute care patients in a team environment.

Practice Based Learning

1. Examine outcomes in the immediate postoperative period and apply to future operative care management plans.

Systems Based Practice

1. Understand the role of the PACU in the flow of patients through the perioperative period.
2. Understand how operative case management plans can affect disposition of patients from the immediate postoperative period.

Objectives:

Medical Knowledge

1. Discuss differential diagnoses for the following post-operative problems:
 - a) Upper Airway Obstruction
 - b) Hypoxemia
 - c) Hypoventilation
 - d) Hypotension
 - e) Hypertension
 - f) Cardiac dysrhythmias
 - g) Agitation/confusion
 - h) Delayed emergence
 - i) Oliguria
 - j) Bleeding
 - k) Nausea
 - l) Pain
2. Discuss the consequences and treatment of hypothermia and shivering.
3. Discuss the indications for chest xrays in the PACU and describe a rational plan for interpretation.
4. Describe the ACLS algorithms and how they are applied in the immediate post anesthesia recovery period.
5. Describe predicted wake up patterns for the commonly used anesthetic agents and predict potential side effects.
6. Describe the regression of regional anesthesia for common peripheral nerve blocks and central neuraxial blocks and for commonly used local anesthetics.
7. Describe the components of the Aldrete scoring system.

Patient Care

1. Formulate management plans for common post-anesthesia problems, i.e., hypertension, hypotension, cardiac dysrhythmias, hypothermia, hypoventilation, agitation, confusion, nausea, vomiting, and pain control.
2. Demonstrate the ability to perform acute pain management via epidural catheters in the immediate postoperative period, including:

PACU Rotation Curriculum

- A. Determination of catheter function
 - B. Management of postoperative pain using the epidural catheter
 - C. Programming and ongoing management of epidural infusion pumps
3. Demonstrate the ability to interpret postoperative chest x-ray, including diagnoses of pneumothorax, aspiration, congestive heart failure, and atelectasis, and correct placement of CVP and pulmonary artery catheters.

Professionalism

1. Arrive in a timely manner and sign in to the PACU charge nurse and the D1 of the day.
2. Be available for patient care throughout the duty shift.

Interpersonal and Communication Skills:

1. Employ effective communication skills with PACU nursing staff and surgical teams.

Practice Based Learning

1. Compare and contrast anesthetic management plans and how they impact PACU courses.
2. Describe a case involving postoperative management challenges and describe how it will apply to care of similar patients.

Systems Based Practice

1. Describe the costs involved in an extended PACU stay.

Duties:

1. Make admission rounds on all patients admitted to PACU, preferably during report from the performing anesthesiologist.
2. Function as first call for all patient needs and nursing requests for assistance in the PACU, consulting the performing anesthesiology faculty/resident or the PACU Medical Director as necessary.
3. When appropriate, assume care of those PACU patients requiring the ongoing presence of an anesthesiologist to allow the performing anesthesiologist to continue with his/her schedule.
4. Coordinate with Nursing Service and the receiving intensivist for the transport of unstable or high acuity patients to ICU when requested, assuring that faculty-to-faculty contact has been carried out.
5. During the first week, prepare two “Hip Pocket” lectures (approximately 15 minutes each) on topics approved by PACU Medical Director for presentation to PACU Nursing staff at opportune times when workload allows.
6. Answer the provided study questions and return to the rotation director.

Instructional Methods:

Residents will be provided instruction by the faculty covering the PACU (D1/E1) regarding clinical experiences encountered in the PACU. Nurses will provide formative feedback on the presentations. Residents will also self-study and answer the provided study questions.

Assessment and Evaluation

Summative evaluation of the resident on PACU rotation will be conducted by the PACU Medical Director, using information obtained from faculty, and PACU nursing evaluations. Evaluations will be based in demonstration of interest, knowledge, and appropriate use of interpersonal skills in solving patient management problems. The resident's answers to the study questions will also be used as an assessment of completion of learning objectives.

PACU Residents will be asked to submit an end of rotation evaluation of the rotation via the electronic evaluation system (E-Value).

STUDY QUESTIONS:

1. List and discuss the differential diagnosis of postoperative coma including the following"
 - a.) prolonged anesthetic effect
 - b.) drug interactions
 - c.) respiratory insufficiency
 - d.) intraoperative neurologic catastrophe
 - e.) fluid/electrolyte imbalance
1. List and describe devices available to deliver oxygen including oxygen concentrations delivered. Examples: nasal prongs, simple masks, partial rebreathing masks, non-rebreathing masks, and Venturi masks, Ambu bags, Jackson Rees systems.
2. Describe the Aldrete recovery score. What scale do we use and why?
3. Discuss the cause and treatment of hypothermia in the postoperative patient. When is active rewarming indicated?
4. Discuss the pharmacokinetic profile and use of each of the following: naloxone, physostigmine, doxapram, flumazenil and caffeine.
5. Discuss emergence delirium including its causes and treatments.
6. What is the physiologic control of emesis and what are the pharmacologic agents available for its therapy?
7. What medications are used and how are they delivered for a "breathing treatment"?

Resources

1. Vender and Spiess, "Post Anesthesia Care", Sanders, 1992. A copy is available for your use.

The following resources are available at J:\ANES\Adult Anesthesia articles\PACU

2. OHSU Departmental Policies regarding the PACU.
3. ASA Standards for PACU Care – 1988 amended 2004. These standards spell out what our specialty requires for post anesthesia recovery.
4. Murphy GS: "Residual neuromuscular blockade: incidence, assessment, and relevance in the postoperative period." *Minerva Anesthesiol.* 2006 Mar;72(3):97-109.
5. Pandharipande P, Ely EW, Maze M. Alpha-2 agonists: can they modify the outcomes in the Postanesthesia Care Unit? *Curr Drug Targets.* 2005 Nov;6(7):749-54. Review
6. Edler AA, Mariano ER, Golianu B, Kuan C, Pentcheva K. An analysis of factors influencing postanesthesia recovery after pediatric ambulatory tonsillectomy and adenoidectomy. *Anesth Analg.* 2007 Apr;104(4):784-9.
7. Rose DK, et al. Critical Respiratory Events in the Post Anesthesia Care Unit. *Anesthesiology* 1994 (81):410-8.
8. Vlajkovic GP, et al. Emergence Delirium in Children: Many Questions, Few Answers. *Anesth Analg* 2007;104:84 –91).
9. Lepouse C, et al. Emergence Delirium in Adults in the Post Anesthesia Care Unit. *British Journal of Anaesthesia* 96 (6): 747–53 (2006).
10. Awad IT and Chung F. Factors affecting recovery and discharge after ambulatory surgery. *Can J Anesth* 2006 53: (9):858–872.
11. Lentschener C, et al. Opioid Induced Sedation in the Postanesthesia Care Unit Does Not Insure Adequate Pain Relief: A Case-Control Study. *Anesth Analg* 2007;105:1143–7.
12. Waddle JP, et al. Postanesthesia Care Unit Length of Stay: Quantifying and Assessing Dependent Factors. (*Anesth Analg* 1998;87:628-33)
13. Habib A and Gan TJ: "Evidence-based management of postoperative nausea and vomiting: a review". *Canadian Journal of Anesthesia.* 2004 51:4, pp. 326-41.
14. Abdy S. An Audit of Airway Problems in the Recovery Room. *Anaesthesia* 1999 Apr;54(4):372-5
15. Kluger MT and Bullock MF. Recovery Room Incidents: a review of 419 reports from the AIMS. *Anaesthesia.* 2002 Nov;57(11):1060-6.