

CA-1 Curriculum for Obstetric Anesthesia Department of Anesthesiology

Description of Rotation or Educational Experience

During clinical experience in obstetric anesthesia, residents will be assigned to the Maternal-Infant Care Center. The goals during this rotation are for residents to develop the skills to make appropriate clinical decisions regarding the conduct of anesthesia for cesarean section and peripartum surgeries, the management of analgesia during labor, and the intraoperative and perioperative management of patients with pregnancy specific pathology.

Patient Care

Goals

Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Residents are expected to:

- Become facile in the delivery of regional analgesia during labor & delivery
- Be conversant in alternative analgesic techniques for labor
- Recognize obstetric pathology and its potential threat to mother or baby
- Manage the patient during cesarean delivery with regional or general anesthesia

Competencies

- Appropriately directed History and Physical Examinations
- Develop appropriate patient-specific analgesia plans for labor
- Develop appropriate patient-specific anesthetic plans for Obstetric Surgical Procedures
- Placement and Management of Lumbar Epidural Analgesia - Continuous Infusion
- Placement and Management of Lumbar Epidural Analgesia – Patient Controlled
- Placement and Management of Lumbar Epidural Anesthesia for Obstetric Surgical Procedures
- Placement and Management of Spinal Anesthesia for Labor
- Placement and Management of Spinal Anesthesia for Obstetric Surgical Procedures
- Placement and Management of Combined Spinal Epidural Analgesia for Labor
- Placement and Management of Combined Spinal Epidural Anesthesia for Obstetric Surgical Procedures
- Management of General Anesthesia for Obstetric Surgical Procedures

Objectives

By the end of the rotation the resident will accomplish the following

- Evaluate a minimum 15 patients for labor analgesia and develop an anesthetic plans which are validated by the attending physician
- Evaluate a minimum 12 patients for obstetric surgical procedures and develop anesthetic plans which are validated by the attending physician

- Successfully Perform a minimum of 15 epidural anesthetics for labor analgesia
- Successfully Perform at least 5 of the 15 labor epidurals as Combined Spinal Epidurals
- Successfully Perform at least 5 of the 15 labor epidurals as Patient Controlled Epidural Analgesia
- Successfully Perform a minimum of 12 spinal anesthetics for Cesarean Delivery
- Successfully Perform at least 4 of the 12 spinal anesthetics as Combined Spinal Epidurals
- Successfully Perform at least 5 epidural anesthetics for Cesarean Delivery
- Successfully Perform at least 4 spinal anesthetics for Post-Partum Tubal Occlusion
- During the last week of the rotation Pass an Oral Examination based upon the American Board of Anesthesiology format and scored using ABA criteria Demonstrating appropriate Patient Management
- Successful demonstration of adequate patient care as assessed by faculty on Written Formative Evaluations

Medical Knowledge

Goals

Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care. Residents are expected to:

- Detail the physiologic changes associated with pregnancy and describe the impact of these changes on the conduct of anesthesia during pregnancy
- List the anatomic changes associated with pregnancy and describe the impact of these changes on the conduct of anesthesia during pregnancy
- Demonstrate proficiency in obstetric anesthetic management related to the anatomic and physiologic changes
- Recognize pregnancy specific pathophysiology
- Recognize the impact of pregnancy on associated non-obstetric disease states
- Become conversant with the obstetric anesthesia related topics listed in the obstetric anesthesia content outline (see attached).
- Contrast between different pharmacological agents effecting uterine tonicity

Competencies

- Be able to list and describe the major anatomic and physiologic changes associated with the Cardiovascular system during pregnancy and correlate with the conduct of anesthesia during pregnancy.
- Be able to list and describe the major anatomic and physiologic changes associated with the Respiratory system during pregnancy and correlate with the conduct of anesthesia during pregnancy.
- Be able to list and describe the major anatomic and physiologic changes associated with the Endocrine function during pregnancy and correlate with the conduct of anesthesia during pregnancy.
- Be able to list and describe the major anatomic and physiologic changes

associated with the Gastrointestinal system during pregnancy and correlate with the conduct of anesthesia during pregnancy.

- Be able to list and describe the major anatomic and physiologic changes associated with the Hematologic system during pregnancy and correlate with the conduct of anesthesia during pregnancy.
- Be able to list and describe the major anatomic and physiologic changes associated with Metabolism during pregnancy and correlate with the conduct of anesthesia during pregnancy.
- Be able to list and describe the major anatomic and physiologic changes associated with the Renal function during pregnancy and correlate with the conduct of anesthesia during pregnancy.
- Be able to list and describe the major anatomic and physiologic changes associated with the Neurologic function during pregnancy and correlate with the conduct of anesthesia during pregnancy.
- Be able to list and describe pregnancy specific disease states and the impact of these diseases on the conduct of anesthesia during pregnancy.
- Be able to list and describe obstetric complications and the impact of these diseases on fluid management and the conduct of anesthesia during pregnancy.
- Be able to list and describe the impact of malpresentations and multiple gestations on the conduct of anesthesia during pregnancy.
- List known pharmacological agents effecting uterine tonicity and describe their indications, contraindications, and side effects
- Detail the effects of common anesthetic drugs that differ between pregnant and non-pregnant patients

Objectives

- During the last week of the rotation Pass an Oral Examination based upon the American Board of Anesthesiology format and scored using ABA criteria Demonstrating appropriate knowledge in the area of Obstetric Anesthesia.
- Pass a Written Examination during the last week of the rotation
- Successful knowledge acquisition as assessed by faculty on Written Formative Evaluations
- Complete Portfolio Assignment: Faculty assessment of knowledge exhibited in resident case work up of 1 patient with a pregnancy related co-morbidity. Assessment should include a summary of the pertinent evaluation of the patient and anesthesia plan demonstrating evidenced based medical practice as documented with pertinent literature references.

Practice- Based Learning and Improvement

Goals

Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life long learning. Residents are expected to develop skills and habits to be able to:

- Be able to identify and access appropriate reference resources to solve obstetric anesthesia management problems in a timely manner

- Independently seek answers to previously unencountered clinical questions and incorporate this knowledge acquisition into appropriate management and care plans
- Review the post-anesthetic hospital course of their patients receiving anesthesia for complications or suboptimal outcomes and devise alternative management plans that could have improved outcomes.
- Be able to access 'on-line' reference sources pertinent to the anesthetic management of obstetric patients

Competencies

- Identify personal strengths, deficiencies and limits in knowledge and expertise related to the field of obstetric anesthesia.
- Set learning and improvement goals based on patient and colleague feedback
- Actively participate and seek educational opportunities
- Systematically analyze anesthesia practice, peri-operatively and through post-anesthetic assessment of patients and restructure anesthetic practice based on improved patient outcomes
- Incorporate formative evaluation feedback into daily practice
- Incorporate pertinent findings and conclusions of scientific studies to improve obstetric anesthesia outcomes
- Use information technology to optimize learning
- Disseminate knowledge acquired for the further education of patients, families, students, residents and other health professionals

Objectives

- Portfolio: Resident Experience Narrative - Case Management: Residents will identify 1 patient with a pregnancy related co-morbidity, perform a literature search, identify at least 2 references pertinent to the patient and produce a 1 page synopsis of the evaluation, alternatives, their proposed management of the patient, and anticipated possible complications. The resident will review the case with the attending physician and submit copies for inclusion in their portfolio.
- Portfolio: Review of Patient Record - Post-Anesthetic Rounds: Residents will identify 2 patients on post-anesthetic rounds that they feel had suboptimal outcomes. Residents will summarize the anesthetic management of each patient in writing and submit a brief synopsis of alternative management techniques that might have produced more optimal outcome. Residents will review the plans with the attending physician and submit copies for their portfolio.
- During the last week of the rotation Pass an Oral Examination based upon the American Board of Anesthesiology format and scored using ABA criteria Demonstrating appropriate strategies for acquisition of additional skills and knowledge for care and management of the anesthetic of an obstetric patient.
- Successful demonstration of adequate practice- based learning and improvement as assessed by faculty on Written Formative Evaluations

Systems Based Practice

Goals

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Residents are expected to:

- Be able to prioritize the delivery of anesthesia and analgesia based on the acuity of the parturient and fetus in consultation with obstetric providers.
- Function as a member of a care team with nurses, obstetricians, pediatricians and neonatologists

Competencies

The list below reflects competencies that fall under Systems Based Practice.

- Work effectively with nurses, obstetricians, pediatricians and neonatologists to deliver timely and effective anesthetic care
- Coordinate patient care within the health care system relevant to obstetric anesthesia
- Incorporate considerations of risk-benefit analysis in patient care
- Advocate for quality patient care and educate nurses, obstetricians, pediatricians of the anesthetic implications to maternal – fetal well being
- Participate as part of inter-professional team to enhance patient safety and improve patient care quality
- Participate in identifying systems errors and in implementing potential systems solutions

Objectives

- Overall satisfactory performance on a 360 evaluation demonstrating satisfactory performance as part of an obstetric patient care team.
- Successful acquisition of patient information from hospital based systems as documented in the resident's Portfolio of patient case presentation.
- During the last week of the rotation Pass an Oral Examination based upon the American Board of Anesthesiology format and scored using ABA criteria Demonstrating appropriate utilization of hospital based resources in preparation and management of an obstetric anesthetic.
- Successful demonstration of adequate systems based practice as assessed by faculty on Written Formative Evaluations

Professionalism

Goals

Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Residents are expected to:

- Provide the highest possible quality obstetric anesthesia care
- Provide a role model to students and related practitioners as to commitment and professional conduct in the care of patients
- Discuss ethical challenges in the care of the parturient and the fetus
- Express sensitivity to the particular needs of the parturient that has suffered fetal

loss

Competencies

- Demonstrates Courtesy and Respect for patients, nurses, physicians, and ancillary staff
- Demonstrates Compassion and Integrity for others
- Responds to patient requests for labor analgesia in a timely manner that supersedes self-interest
- Completes patient care tasks and provides appropriate follow-up and feedback to patient and staff
- Acts in the best interest of the patient
- Advocates quality and timely patient care
- Respects patient privacy and autonomy
- Accountable to patients, society, and the profession
- Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in age, culture, race, religion, disabilities, and sexual orientation

Objectives

- Demonstration of professionalism on 360 degree evaluation
- During the last week of the rotation Pass an Oral Examination based upon the American Board of Anesthesiology format and scored using ABA criteria Demonstrating appropriate interpersonal interaction strategies for dealing with anesthesia and obstetric faculty and residents, MICC nursing staff, surgical technologists, secretarial staff or other support staff.
- Successful demonstration of adequate professionalism as assessed by faculty on Written Formative Evaluations

Interpersonal and Communication Skills

Goals

Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with patients, their families, and professional associates. Residents are expected to:

- Effectively obtain pertinent medical history from the parturient
- Effectively describe available anesthetic options at appropriate age and education specific levels
- Obtain informed consent for anesthesia and labor analgesia and explain related risks including the potential anesthetic impact on the parturient and the baby
- Provide sensitive reassurance while performing regional anesthesia

Competencies

- Communicate effectively with patients and families across a broad range of socioeconomic and cultural backgrounds
- Communicate effectively with physicians, nurses, and ancillary staff
- Work effectively as a member of the health care team
- Act as a junior consultant to other physicians and health professionals
- Maintain comprehensive, timely, and legible anesthetic records

Objectives

- Positive assessment of interpersonal and communication skills on 360 degree evaluation
- During the last week of the rotation Pass an Oral Examination based upon the American Board of Anesthesiology format and scored using ABA criteria Demonstrating appropriate communication skills.
- Successful demonstration of adequate interpersonal and communication skills as assessed by faculty on Written Formative Evaluations
- Demonstrate effective written communication skills on Portfolio entries

Teaching Methods

What teaching methods are you using on this rotation or educational experience?

- Didactic Lectures (70% Completion Goal)
- Review and discussion of Preoperative evaluations and anesthetic plans
- Intraoperative discussion of pertinent physiologic changes and case management
- Review and discussion of post-anesthetic evaluation
- Case Scenario discussions
- Portfolio assignments
- Suggested Readings
- Socratic Method

Assessment Method (residents)

- Oral Examination
- Written Examination
- Clinical Performance Ratings (Global)
- 360 Degree Evaluation
- Review of Patient Record: Post-anesthetic Rounds
- Resident Experience Narrative: Complicated Obstetric Patient
- Focused Observation and Evaluation

	Patient Care	Medical Knowledge	Practice Based Learning	System Based Practice	Professionalism	Communication
Clinical Performance Ratings	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
Resident Experience Narrative	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Oral Examination	Monthly	Monthly				
Written Examination		Monthly				
360 Degree Evaluation				Monthly	Monthly	Monthly
Review of Patient Record	Monthly	Monthly	Monthly			Monthly
Focused Observation and Assessment	Weekly					Weekly

Assessment Method (Program Evaluation)

- Assessment of successful Patient Care Competency in oral examinations and faculty evaluations of observations of clinical practice.
- Performance of residents on written and oral examinations
- Performance on the Obstetric Anesthesia subset of In-Service Examinations administered by the American Board of Anesthesiology
- Performance on the Obstetric Anesthesia subset of Anesthesia Knowledge Test
- Performance of program graduates on the Obstetric Anesthesia subset of the written examination of the American Board of Anesthesiology
- Review of Resident Evaluations of Faculty Performance
- Review of Resident Program Evaluations
- Post-graduate assessments of adequacy of training

Level of Supervision

- Residents are supervised 1:1 by an attending anesthesiologist with sub-specialty training or documented subspecialty interest in Obstetric Anesthesia.

Educational Resources

Recommended readings and references:

PRIMARY TEXT: Palmer CM, D'Angelo R, Paech MJ. Handbook of Obstetric Anesthesia. Bios Scientific Publ Lmt, Oxford, UK 2002.

REFERENCE TEXT: Chestnut, David. Obstetric Anesthesia: Principles and Practice. Mosby, Inc. Philadelphia, PA 2004.

WEB REFERENCES:

ASA Practice guidelines on obstetrical anesthesia:

<http://www.asahq.org/publicationsAndServices/obguide.html>

ASA Guidelines for regional anesthesia in obstetrics

<http://www.asahq.org/publicationsAndServices/standards/11.html>

ASA Guidelines optimal goals for anesthesia care in obstetrics

<http://www.asahq.org/publicationsAndServices/standards/24.html>

Society of Obstetric Anesthesia and Perinatology

<http://www.soap.org>

American Society of Anesthesiologists

<http://www.asahq.org>. Keyword: obstetric

American College of Obstetricians and Gynecologists
<http://www.acog.org> Keyword: anesthesia

ASA refresher courses: Advances in labor analgesia.
http://www.asahq.org/rcls/RCLS_SRC/212_Birnbach.pdf

ASA refresher courses: Does regional anesthesia influence the progress and outcome of labor? http://www.asahq.org/rcls/RCLS_SRC/216_Camann.pdf

ASA refresher courses: Problems in obstetric anesthesia: blood pressure, blood loss and blood patch http://www.asahq.org/rcls/RCLS_SRC/211_Chestnut.pdf

ASA refresher courses: Anesthesia for emergency caesarean section
http://www.asahq.org/rcls/RCLS_SRC/214_Malinow.pdf

ASA refresher courses: Obstetric emergencies and anesthetic management
http://www.asahq.org/rcls/RCLS_SRC/522_Palmer.pdf

Social Justice

West Virginia University is committed to social justice. We concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color, or national group. Any suggestions as to how to further such a positive and open environment in this rotation will be appreciated and given serious consideration.

Attached Addenda

Addendum 1:	Obstetric Anesthesia Content Outline
Addendum 2:	Obstetric Anesthesia Rotation Orientation Manual
Addendum 3:	Educational Experience Checklist

Curriculum Timeline

Written by Richard Driver Jr. MD, Christine Bezouska MD, 1995

Revised by Richard Driver Jr. MD, 1997

Revised by Richard Driver Jr. MD, 2004

Revised by Richard Driver Jr. MD, Roger Cook MD, November 2006

Approved by the Anesthesiology Education Committee on 2-26-2007

Addendum 1

CA-1/CA-2 Content Outline Obstetric Anesthesia Department of Anesthesiology

CA-1/CA-2 Content Outline Obstetric Anesthesia Department of Anesthesiology

A. Maternal Physiology and Anatomy

Study of maternal physiology and anatomy will include i) the physiologic and anatomic adaptations unique to pregnancy that prepare the maternal system for fetal development, labor, delivery, and lactation, and ii) the effects these adaptive changes have on drug pharmacodynamics and pharmacokinetics including anesthetic agents, neuromuscular blockers, resuscitative drugs.

1. Cardiovascular System

- a. increased CO - physiology, implications
- b. changes in SVR, MAP, SBP, DBP, HR
- c. management of CVP, PAOP, PAP's, EjF%
- d. expansion of plasma volume
- e. changes in EKG and rhythm
- f. chest roetgenographic changes
- g. aortocaval syndrome
- h. femoral venous pressures and sequestration of blood in the lower extremities
- i. cardiac murmurs - pathologic vs. nonpathologic

2. Pulmonary Function and Respiration

- a. changes in the upper, mid, and lower airway
- b. changes in chest wall structures effecting intubation
- c. reduction in FRC
- d. significance of increased oxygen consumption
- e. Pregnancy and ERV, RR, TV, RV, FEV₁, MEF
- f. Significance of increase minute ventilation
- f. decreased pCO₂ - maternal and fetal implications
- g. maternal/fetal acid base physiology

3 Hematologic/Homeostatic/Metabolic

- a. increased RBC and Hemoglobin Mass
- b. expansion of Plasma Volume and relative anemia
- c. platelet count in pregnancy
- d. WBC count in pregnancy
- e. coagulation and fibrinolytic systems
- f. hypercoaguability of pregnancy
- g. serum electrolytes during pregnancy

- h. central regulation of plasma volume and osmolality
- i. increased metabolic needs
- j. increased cutaneous blood flow

4. Gastrointestinal System

- a. decreased gastrointestinal motility
 - i) decreased gastric emptying - increased volume
 - ii) increased absorption of nutrients
 - iii) increased colonic water resorption - constipation
- b. controversies of gastric acidity
- c. intragastric pressures
- d. function and anatomy of the LES
- e. increased risks of aspiration

5. Renal System

- a. increased RPF and GFR
- b. increased excretion of serum bicarbonate
- c. significance in compensatory metabolic acidosis
- c. normal values of BUN and creatinine

6. Central and Peripheral Nervous System

- a. decreased MAC during pregnancy
 - i) progesterone theory
 - ii) endorphin theory
- b. increased F_A/F_I rate of rise
- c. increased sensitivity to local anesthetics
 - i) progesterone theory

7. Endocrine Function

- a) placental hormones and maternal/fetal effects
- b) thyroid function
- c) 'insulin' resistance and glucose metabolism
- d) placental glucose transport
- e) gestational diabetes mellitus
- f) perioperative insulin requirements

B. Conduct of General Anesthesia for Cesarean Section

In addition to the general considerations involved in administration of general anesthesia during non-pregnancy, residents should become familiar with the maternal and fetal effects of general anesthesia and the unique difficulties associated with the administration of general anesthesia during pregnancy . These are outlined below.

1. Fetal depression with prolonged exposure to volatile anesthetics and N_2O
2. Increased difficulty of endotracheal intubation

- a. airway edema
 - b. venous engorgement
 - c. soft tissue obstruction (breasts, chest shape)
3. More rapid arterial desaturation with apnea
 - a. increased metabolic needs and oxygen consumption of maternal and fetal systems
 - b. decreased FRC.
4. Increased risk of aspiration of pulmonary contents and aspiration pneumonitis
 - a. increased intragastric pressure
 - b. decreased intragastric pH
 - c. possible decreased LES tone
5. Altered response to Volatile Anesthetics
 - a. decreased MAC
 - b. more rapid uptake due to decreased FRC
 - c. more rapid FA/FI rate of rise
6. Muscular effects of progesterone
 - a. decreased post-operative myalgia

C. Conduct of Regional Anesthesia for Cesarean Section and Labor Analgesia

In addition to the general considerations involved in administration of epidural anesthesia during non-pregnancy, residents should become familiar with the effects of pregnancy on the administration of epidural analgesia. These are outlined below.

1. Increased technical difficulty due to anatomic changes
 - a. increased lumbar lordosis in pregnancy resulting in narrowing of the inter-spinous space
 - b. difficulty in positioning
 - c. dependent edema may extend to lower back making identification of landmarks difficult
 - d. enlarged abdomen tilting patient from perpendicular axis
2. Aortocaval compression resulting in reduced preload and exaggerated hypotensive response to sympathectomy
3. Aortocaval compression resulting in epidural venous engorgement
4. Increased neuronal sensitivity to LA's and/or decrease volume of epidural space
5. Controversies associated with the administration of epidural labor analgesia and the normal progress of labor and rate of instrumental and cesarean deliveries.
6. Alternatives to regional anesthesia for labor analgesia.
 - a. psychoprophylaxis/lamaze
 - b. intravenous opioids
 - c. internal pudendal nerve block
 - d. cervical block
 - e. bilateral sympathetic chain blocks

D. Pregnancy Disease States

Pregnancy Disease States will include information regarding the impact of pregnancy on perioperative and intraoperative patient management and anesthetic management in patients with disorders specific to or worsened by pregnancy, labor, delivery, or the immediate postpartum period. Residents should become familiar with the frequent causes of maternal morbidity and mortality and the impact of anesthetic management on outcome.

D1. Hypertensive Disorders of Pregnancy

Hypertensive Disorders of Pregnancy emphasizes the family of disorders specific to pregnancy associated with hypertension, hepatic and renal impairment, and thrombocytopenia/platelet dysfunction. Content will include delineation of these various entities, suspected etiology, pathophysiologic changes associated with the disease, and guidelines regarding intra- and perioperative monitoring and the administration of anesthesia.

1. Definitions/Criteria
 - a. Pre-eclampsia- criteria
 - i) hypertension
 - ii) proteinuria
 - iii) nondependent edema.
 - b. Severe Pre-eclampsia - criteria
 - c. HELLP Syndrome - criteria
 - d. Other Hypertensive Disorders of pregnancy
 - i) Chronic hypertension
 - ii) Chronic hypertension with superimposed pre-eclampsia/eclampsia
 - iii) Gestational hypertension
 - iv) PIH
2. Epidemiology
 - a. Primiparity
 - b. Young age (<20yo 5x increase)
 - c. Lower socioeconomic status
 - d. Unwed
 - e. Rapid uterine enlargement
 - f. incidence pre-eclampsia and eclampsia
3. Morbidity/Mortality
 - a. maternal
 - i) ranges approx from 0.4-12%.
 - ii) Intracranial hemorrhage (#1)
 - iii) CHF
 - iv) Respiratory Failure 2° to pulmonary edema
 - v) Postpartum hemorrhage

- vi) Aspiration/Failed Intubation
 - vii) Hepatic Rupture
 - viii) ARF
 - ix) DIC
 - b. fetal
 - i) ranges between 20-30%
 - ii) Placental Infarction (#1)
 - iii) IUFG
 - iv) Abruptio Placentae
- 4. Pathophysiology-Mechanisms
 - a. Reduction of Placental Perfusion
 - b. "Substances" Released from Hypoperfused Trophoblasts
 - c. Fibronectin Released from Damaged Endothelial Cells -
 - d. Increased Thromboxane and Decreased Prostacyclin Levels
- 5. Cardiovascular Pathophysiology
 - a. LV function
 - b. SVR
 - c. BP
 - d. PCWP
 - e. CVP
 - f. Plasma Volume
 - g. Oncotic Pressure
 - h. CVP vs. PCWP - correlation
 - I. Response to sympathomimetic agents
- 6. Airway Pathophysiology
 - a. exacerbation of airway
 - b. intubation difficulty
- 7) Pulmonary
 - a. Pulmonary Edema
- 8) Placenta Pathophysiology
 - a. Decreased uterine and placental blood flow
- 9) Hepatic Pathophysiology
 - a. liver function
 - b. etiology of RUQ pain
 - c. hepatic rupture
- 10) Renal Pathophysiology
 - a. glomerular capillary endotheliosis
 - b. GFR and CrCl
 - c. oliguria and ARF
- 11) CNS
 - a. cerebral edema
 - b. elevated ICP
 - c. CNS "irritability"
 - d. hyper-reflexia.
- 12) Hematologic

- a. thrombocytopenia and abnormal platelet function
- b. hemoglobin dissociation curve is shifted to the left
- 13) Uterine activity
- 14) Anesthetic Management
 - a. Labor Analgesia
 - i) Epidural analgesia
 - reduction of circulating catecholamines
 - increased uterine and placental blood flow.
- 15) Cesarean Section
 - i) Regional anesthesia
 - ii) SAB vs. Epidural
- 16) Management of regional anesthesia and thrombocytopenia
 - i) risk of epidural hematoma
 - ii) rational for platelet counts

D2. Cardiac Disease in Pregnancy

Cardiac Disease States in pregnancy emphasizes the cardiovascular changes occurring during normal parturition and the acceleration of progressive cardiovascular changes that occurs with the onset of 1st stage labor, 2nd stage labor and the immediate post-delivery period. Within this context residents should develop an understanding of acquired, congenital, and pregnancy specific cardiac pathology and the appropriate peripartum management of patients with cardiac disease.

- 1) Epidemiology
 - a. incidence 0.4-4.1%
 - b. rheumatic heart disease vs. congenital Heart disease
 - c. maternal mortality - range
 - d. cardiovascular stress induced in pregnancy
- 2) Normal Maternal Cardiovascular Adaptation
 - a. parturition
 - b. 1st stage labor
 - c. 2nd stage labor
 - d. immediate postpartum
- 3) Valvular lesions associated with Rheumatic Heart Disease
 - a. etiology - group A b-hemolytic streptococcus
 - b. progression with age
 - c. Mitral Regurgitation
 - d. Mitral Stenosis -
 - e. Mitral Valve Prolapse -
 - f. Aortic Stenosis
 - g. Aortic Insufficiency
- 4) Other acquired Cardiac Diseases
 - a. Idiopathic Hypertrophic Subaortic Stenosis (IHHS)
 - b. Primary Pulmonary Hypertension

- c. Dissecting Aortic Aneurysm
- 5) Congenital Heart Lesions
 - a. Isolated VSD
 - b. Tetralogy of Fallot
 - c. ASD
 - d. PDA
 - e. Eisenmenger's Syndrome
- 6) Cardiac Disease Associated with Pregnancy
 - a. Cardiomyopathy of Pregnancy

D3. Abruptio Placentae

Residents should become familiar with the management of patients with abruptio placentae including 1) assessment of intravascular volume, and 2) appropriate selection of anesthetic technique and choice of anesthetic agents.

- 1) Epidemiology:
 - a. Incidence 0.2-0.4%
 - b. Maternal Mortality 0-3.1% to 1.8-2.8%
 - c. Perinatal Mortality 50%
 - d. Associated diseases
 - e. marginal or mild vs. moderate or severe.
- 2) Presentation and Diagnosis:
 - a. 'painful vaginal bleeding' - uterine hypertonicity
 - b. fetal distress, maternal hypotension, or coagulopathy.
- c. Diagnosis confirmed by USG
- 3) Pathophysiology:
 - a. placental separation likely multifactorial.
 - b. Hemorrhage concealed.
 - c. coagulopathy - factors
- 4) Differential Diagnosis:
 - a. pulmonary emboli - thrombotic, amniotic
 - b. local anesthetic toxicity
 - c. intracranial hemorrhage
 - d. aspiration pneumonitis
 - e. shock
 - f. acute heart failure
- 5) Management:
 - a. 'Evacuation of the uterus'
 - i) vaginal delivery vs. C/S
 - ii) GA vs RA
 - iii) uterine hypotonicity

D4. Amniotic Fluid Embolus

Residents should become familiar with 1) the signs and symptoms associated AFE, 2) appropriate intraoperative and postoperative management of patients with AFE, 3) and the differential diagnosis of critical intraoperative and perioperative complications.

- 1) Epidemiology:
 - a. incidence 1:20,000 approx.
 - b. mortality 86%
 - c. high incidence of fetal and neonatal deaths
 - d. most frequently occurs in labor
 - e. typical patient: mean age 32, 90% multiparous, term, 90% in labor.
- 2) Presentation and Diagnosis:
 - a. four cardinal signs
 - i) dyspnea
 - ii) cyanosis
 - iii) coma
 - iv) cardiovascular collapse
 - b. diagnosis by clinical presentation
 - c. fetal components in blood
- 3) Pathophysiology:
 - a. amniotic fluid - quantity vs. quality
 - b. mechanisms of entry
 - c. pulmonary vasospasm
 - d. mechanical obstruction
 - e. acute cor pulmonale and RVF
 - f. markedly reduced LV preload
 - g. severe V/Q abnormalities resulting in hypoxemia
 - h. end organ damage
- 4) Differential Diagnosis:
 - a. other pulmonary emboli - thrombotic
 - b. local anesthetic toxicity
 - c. intracranial hemorrhage
 - d. aspiration pneumonitis
 - e. shock
 - f. acute heart failure
- 5) Management
 - a. intubate/ventilate with 100% O₂ and PEEP
 - b. large bore peripheral IV access
 - c. BCLS and ACLS - EMD.
 - d. monitors
 - e. hydrocortisone 1g IV bolus and then Q6° for 48hrs.
 - f. sympathomimetics

D5. Placenta Previa

Residents should become familiar with the management of patients with placenta previa including 1) assessment of intravascular volume, and 2) appropriate selection of anesthetic technique and choice of anesthetic agents.

- 1) Epidemiology:
 - a. incidence - 0.1-1.0%
 - b. maternal Mortality - 0-0.9%
 - c. risk increased with multiparity and prior C/S
 - d. recurrent PP in 5%
 - e. associated with abnormal placental implantation:
 - i) placenta accreta
 - ii) placenta increta
 - iii) placenta percreta
- 2) Presentation and Diagnosis:
 - a. "Painless vaginal bleeding"
 - b. sporadic bleeding.
 - c. diagnosis:
 - i) ultrasonography (95%)
 - ii) cervical examination ("Double Set-up")
- 3) Differential Diagnosis:
 - a. Abruptio placentae.
 - b. Uterine rupture.
 - c. Vasa previa (with velamentous cord insertion)
 - d. Circumvallate placenta
- 4) Management:
 - a. volume status
 - b. hematocrit
 - c. GA vs. regional
 - d. induction agents in hypovolemia

D6. Multiple Gestations

Residents will become familiar with the management of multiple gestation pregnancies including 1) factors determining the obstetric management plan, 2) common obstetrical outcomes and the impact of anesthetic choice on fetal and maternal morbidity and mortality, 3) the additional changes in maternal physiology associated with multiple gestations and 4) maternal pathology resulting from multiple gestations.

- 1) Epidemiology:
 - a. twins: 1 in 90 pregnancies.
 - b. triplets: 1 in 8000
- 2) Diagnosis:
 - a. ultrasonography.
 - b. large fundal height
- 3) Pathophysiology:

- a.) Maternal physiology is altered more than in singleton pregnancies.
 - b. aortocaval compression.
 - c. FRC
 - d. EBV 40% greater than in singleton pregnancy
 - e. increased risk of postpartum atony and hemorrhage
 - f. increased incidence of PIH
 - g. More profound anemia
 - h. 6-10x rate of premature labor
 - i. fetal viability requires more advanced gestational age - >27wks
- 4) Obstetric Management
 - a. vaginal delivery
 - b. C/S delivery
- 5) Anesthetic Management
 - a. importance of obstetrician - anesthesiologist communication
 - b. early placement of an epidural catheter
 - c. vaginal delivery
 - d. Cesarean Section - RA or GA
 - prematurity and anesthetic depression
 - apneic oxygenation and multiple gestations

D7. Breech Presentations and Cord Prolapse

Residents will acquire the knowledge necessary to manage patients with breech and other abnormal fetal presentations and to develop an awareness of 1) the increased morbidity and mortality associated with abnormal presentations, 2) anesthetic management plans that can impact on fetal outcome, and 3) the importance of obstetrician-anesthesiologist communication in reaching favorable patient outcome.

- 1. Epidemiology
 - a. 3-4% incidence at term
 - b. incidence related to gestational age
- 2. Types of Breech
 - a. complete
 - b. incomplete
 - c. frank
- 3. Pathophysiology:
 - a. Factors associated with breech presentation
 - Prematurity
 - Intrauterine abnormalities
 - Fetal anomalies
 - Uterine hypotonicity
 - b. Increased incidence of morbidity/mortality
 - Fetal death
 - Intrapartum asphyxia

- Cord Prolapse
- Birth Trauma/Intra-ventricular hemorrhage
- Entrapment of after coming HEAD
- Cervical spine injuries
- Maternal
- 4. Obstetric Management:
 - a. Obstetric Options
 - Vaginal Delivery
 - 1.) Spontaneous Breech Delivery
 - 2.) Partial Breech Extraction
 - 3.) Total Breech Extraction
 - Cesarean Section
 - External Cephalic Version (prior to onset of labor)
 - b. Determinants for Attempting Breech Vaginal Delivery
 - Estimated fetal weight
 - Flexion of fetal neck
 - Frank or Complete
 - Adequate maternal
 - Gestational age
 - c. Determinants for C/S
 - Fetal weight
 - Footling Breech
 - Inadequate pelvis
 - Extension of fetal head
 - Parity
- 5. Anesthetic Management
 - a. importance of obstetrician - anesthesiologist communication
 - b. early placement of an epidural catheter
 - c. vaginal delivery
 - perineal block for forceps
 - d. Cesarean Section
 - e. Uterine relaxants
 - types
 - dosage
 - pharmacokinetics

D8. Maternal Obesity

Residents should recognize the impact of obesity on normal pregnancy and parturition, including increased technical difficulties in performing both regional and general anesthesia and the resultant increase in maternal morbidity and mortality.

- 1. Obesity Defined
 - a. ideal body weight (IDBW)
 - b. Broca Index [IDBW(kg) = cm - 100].

- c. Other definitions - Body Mass Index (BMI), Ponderal Index, body density, total fat content, or skinfold thickness.
- 2. Epidemiology
 - a. incidence
 - b. morbidity/mortality
 - c. increase incidence associated with pregnancy
 - hypertension - chronic and PIH
 - diabetes - chronic and gestational
 - cesarean section - non-emergent and emergent
 - prolonged operative time for C/S
 - post-partum hemorrhage/operative blood loss
 - perinatal mortality
 - shoulder dystocia
 - respiratory dysfunction/obesity hypoventilation syndrome
 - aspiration pneumonitis/hiatal hernia
 - post-operative complications/wound infection/respiratory
 - macrosomia
 - dysfunctional labor
 - malpresentation
 - CHF/cardiac disease
 - birth trauma/asphyxia
- 4. Anesthetic Management:
 - a. increased risk of cesarean section
 - b. higher incidence of emergency C/S
 - c. preferential use of RA
 - d. theory of ultimate success
 - e. maximal lateral uterine displacement
 - f. supplemental O₂ to prevent hypoxemia
 - g. head up position whenever possible
 - h. sitting position for regional anesthetics..
 - i. adequate post-op analgesia to enhance respiration
 - j. early and adequate assessment of the airway - plan
 - k. aspiration pneumonitis prophylaxis.
 - l. preparation for anticipated airway difficulties
 - m. altered drug requirements.

D9. Retained Placenta

Residents should develop the knowledge and skills necessary for the appropriate management of extraction of retained placenta.

- 1. Management of analgesia
 - a. intravenous agents/conscious sedation
 - b. indwelling labor epidural
 - c. saddle block

- d. internal pudendal nerve block
 - e. general anesthesia
- 2. Pharmacologic Adjuncts
 - a. inhalational agents
 - b. β_2 adrenergic agonists
 - c. magnesium sulfate
 - d. intravenous nitroglycerine
 - e.
- 3. Associated pathology
 - a. postpartum hemorrhage
 - b. placental accreta, percreta, increta

D10. Maternal Morbidity and Mortality

Residents should be familiar with both the leading anesthetic and non-anesthetic causes of maternal morbidity and mortality and present practice patterns developed to minimize potential causes of morbidity and mortality.

- 1. Incidence of mortality
- 2. Causes of maternal mortality (ACOG; NYC 1973-1976)
 - #1) Pulmonary Embolism
 - #2) Hemorrhage
 - #3) Pre-eclampsia/Eclampsia
 - #4) Anesthetic
 - #5) Ectopic Pregnancy
 - #6) Infection
- 3. Anesthetic causes of maternal mortality
 - #1) Aspiration on induction
 - #2) Aspiration with difficult intubation
 - #3) Hypoxia with failed intubation
 - #4) Misuse of Drugs
 - #5) Equipment mishap
 - #6) Subarachnoid injection for epidural
 - #7) Misc.

E. Fetal Physiology, Monitoring, Assessment, and Resuscitation

Residents should be familiar with maternal-fetal physiology, peripartum and intrapartum monitoring procedures, be able to evaluate fetal data for the presence of fetal distress, and be able to assess the newborn and perform neonatal resuscitation as indicated.

- 1. Intrapartum monitoring
 - a. Fetal Heart Rate
 - b. Contractions
 - c. Fetal bradycardia

- d. Fetal Heart Rate Decelerations
 - i) early
 - ii) variable
 - iii) late
- e. fetal mixed arteriovenous scalp pH
- f. fetal hemoglobin and oxygen dissociation curve
- g. fetal acid/base physiology - CO² offloading
- 2. Antepartum Monitoring
 - a. NST
 - b. CST
 - c. BPP
 - d. FSI, L/S Ratio, FLM[®], Phosphatidylcholine
- 3. Postpartum Monitoring
 - a. APGAR Scores and fetal evaluation
 - b. Neurobehavioral Scores

F. Anesthetic Interactions of Common Drugs Used in Obstetrics

The study of drugs commonly used by obstetricians in managing peripartum patients will include 1) the potential effects and interactions associated with the administration of general and regional anesthesia, and 2) the proper usage and dosage of the medications in the management of peripartum patients

- 1. Tocolytic Agents
 - a. β -agonists
 - b. MgSO₄
 - c. Ethanol
 - d. Ca⁺⁺ Channel Blockers
 - e. NSAID's
 - f. Nitroglycerin
- 2. Tocoagonists
 - a. Oxytocin
 - b. Ergot alkaloids
 - c. PGE₂, PGF_{2 α} and Me-PGF_{2 α}
- 3. Antihypertensives
 - a. Hydralazine
 - b. α -methyldopa (aldomet[®])
- 4. PIH Prophylaxis
 - a. MgSO₄ (revisited)
 - b. Phenytoin (dilantin[®])
- 5. IV Analgesia
 - a. Nalbuphine (Nubain[®])
 - b. Butorphanol (Stadol[®])
- 6. Misc.
 - a. Glucocorticoids
 - b. Hydroxyzine (Vistaril[®])

G. Anesthesia for Non-Obstetric Surgery During Pregnancy

Residents will be able to recognize the risks and special considerations involve in the administration of both regional and general anesthesia to parturients who are not expecting to deliver immediately.

1. Patient Population
 - a. emergency surgeries only.
 - b. all post-pubescent and pre-menstrual females
 - c. Trauma
 - d. Abdominal Procedures - ovarian rupture/torsion, appendicitis
 - e. Breast biopsies/surgeries
 - f. other - cerclage, aneurysms, valvular disease etc.
2. Controversies of Anesthesia and Pregnancy
 - a. solid conclusions
 - i. highest correlation with fetal death is with type of surgery
 - ii. no correlation with a specific anesthetic technique.
 - iii. no correlation with fetal anomalies.
 - b. conflicting Data
 - i. data suggest there is an increased incidence of fetal deaths, in the first trimester after anesthesia
 - ii. studies have indicated an increased incidence of premature labor.
 - iii. higher incidence of congenital anomalies among female OR staff.
3. Anesthetic Considerations during Pregnancy.
 - a. physiologic changes in pregnancy
 - b. anesthetic induced changes in utero-placental blood flow.
 - c. potential for premature delivery or abortion.
 - d. potential for Teratogenicity
4. Physiologic changes in pregnancy
 - a. Supine Hypotensive Syndrome
 - b. Review of CV, Pulm, Metabolic effects (See Maternal Phys)
5. Maternal-Fetal Physiologic Effects of Anesthetic Compounds
 - a. Utero-placental Blood Flow
 - $UBF = UAP - UVP / UVR$
 - b. anesthesia can effect UBF by altering
 - i. UAP or UVP
 - ii. UVR
 - c. effects of Specific Anesthetic Agents on UBF
 - barbiturates
 - benzodiazepines
 - ketamine
 - inhalational Agents
 - local Anesthetics
6. Effects of Regional Anesthesia on UBF

- a. normal pregnancy
- b. pre-eclampsia
- 7. Effects of Vasoactive Drugs on UBF
 - a. α -adrenergic agonists
 - b. hydralazine
 - c. nitroglycerine
 - d. nitroprusside
- 8. Gestational Effects of Anesthetic Compounds
 - a. general considerations:
 - 1. Response to agent exposure is related to dose
 - 2. Most studies use supra-therapeutic doses
 - 3. Most studies have been done in lower mammals
 - 4. Congenital malformations show a multifactorial mode of inheritance
 - b. specific agents
 - N₂O
 - volatile agents
 - local anesthetics
 - narcotics
 - benzodiazepines
 - ketamine
 - anticholinergics
 - barbiturates
 - neuromuscular blockers
 - phenothiazines
- 9. Management of Anesthesia During Pregnancy
 - Do's and Don'ts
 - a. Don't do elective surgery during pregnancy.
 - b. Do use anesthetic agents with long, safe track records.
 - c. Don't place use supine position after 20wks
 - d. Do give antacids and/or metoclopramide preoperatively
 - e. Do use cricoid pressure.
 - f. Do be vigilant for hypotension
 - g. Do monitor FHR intraoperatively after 16 weeks
 - h. Do monitor postoperatively for premature labor.

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Revised by Richard Driver Jr. MD, 1997

Revised by Richard Driver Jr. MD, Roger Cook MD, November 2006

Approved by the Anesthesiology Education Committee December 2006

Revised by Richard Driver Jr. MD and approved June 6, 2007

Addendum 2

Obstetric Anesthesia

Orientation Manual

**Orientation and Practice Guidelines
Obstetric Anesthesiology Module
Department of Anesthesiology**

I. Patient Care

1. The Obstetric anesthesia service should evaluate all patients that are high risk for surgical intervention or instrumental delivery. Also, patients at increased risk for maternal morbidity or mortality that could be impacted by the intervention of an anesthesiologist should be evaluated. A formal pre-operative evaluation should be placed in the patients “nurse server” outside of the patients room, or if a consult, in the patients chart. There is no charge for this service unless specifically consulted by the primary service. Patients requesting epidural analgesia should be evaluated upon admission and informed consent obtained. This will eliminate delays when the patient is ready for epidural analgesia.

2. Anesthesiology staff should be notified of any cases or procedures in the MICC. This will allow the staff to coordinate L&D activities with activities in the main OR.

3. Each morning the resident and attending covering L&D will make post-operative pain rounds on all patients from the Ob Anesthesia service who are receiving post-operative analgesia.

II. Anesthesia Preparation

A significant part of obstetric anesthesia involves preparation for emergency surgeries and management of emergency clinical situations with little or no warning. Because L&D is essentially an ‘off site’ location, much of this preparation must be done by the Ob Anesthesia team. Additional vigilance to the details of preparing for the administration of anesthesia is necessary. This includes an awareness of the ‘routine’ set up of the OR’s, epidural and spinal carts, and the presence and location of emergency and back-up equipment. Details of the responsibilities of the resident covering L&D (including call teams) and the basic setups and equipment requirements are detailed below.

1. Both L&D OR’s should be set up to allow immediate induction and maintenance of anesthesia for emergency surgery (i.e. C/S). All standards and requirements existing in the main OR’s also apply in L&D. Additional minimum requirements in each L&D OR include the following:

Functioning anesthesia circuit with mask and ET-CO₂ connection

Functioning suction apparatus with Yankauer
Styletted 7.0, 6.5, and 6.0 ETT's (on machine)
Short handled laryngoscope with Mac 3 blade (on machine)
Extra laryngoscope blades - Mac 2-4; Miller 2-4 (top drawer)
Multiple sizes of oral airways (on machine)
Size 3 and 4 LMA's (on top shelf of anesthesia machine)
Combitube® (on top shelf of Blue Bell® cart)
Cricothyrotomy needle and assembly (in machine top drawer)
Adult Ambu® bag (on side of anesthesia machine)
Emergency Induction and Resuscitation drugs aliquoted in
appropriate syringes or delivery systems including:

Sodium Thiopental
Succinylcholine
Ephedrine
Atropine
Lidocaine

Syringes labeled and ready for drawing up-
Oxytocin
Fentanyl
Midazolam

2. The resident covering L&D is responsible to check daily for the presence of the outlined minimum equipment and drugs in the L&D OR's and for performing a complete systems and equipment check to ensure that equipment is functioning normally.

3. Drugs and syringes should be labeled with the drug name, concentration, the date and time the drug was drawn up, and the initials of the individual that made them. Drugs should be checked daily and discarded when greater than 48 hours old. Sodium Thiopental must be exchanged at the Peds pharmacy for a new syringe. If no cases have been done, a routine of changing the drugs and syringes on Monday, Wednesday, and Friday is acceptable. Emergency drugs located on the epidural cart should also be checked and replaced according to these guidelines. The hospital pharmacy monitors the drugs in the OR Pyxis and the epidural carts

4. The Anesthesia Techs are responsible for stocking the epidural **and** spinal carts as well as the OR's and stock room. However, over holidays and weekends, stocks sometimes run low. As a rule of thumb, items that are getting low in stock should be replaced in the same location in the carts. Some specific details are outlined below.

A. The epidural cart must contain the following items in the resuscitation drawer;

Styletted 7.0, 6.5, and 6.0 ETT's
Short handled laryngoscope with Mac 3 blade
Extra laryngoscope blades - Mac 2-4; Miller 2-4
Multiple sizes of oral airways

- Tongue blades
- Cricothyrotomy needle and assembly
- Manual sphygmomanometer
- Disposable stethoscope
- LR 1000ml bag for IV infusion
- Blood pump iv tubing
- IV catheters: 14g, 16g, 18g
- Emergency Induction and Recusitation drugs and syringes
 - Sodium Thiopental or Etomidate
 - Succinylcholine
 - Atropine
 - Lidocaine

The emergency drugs are stocked by the pharmacy in a lock box in the epidural cart resuscitation drawer. An intact plastic pharmacy lock indicates that the box is stocked.

B. Ephedrine should be diluted and aliquoted in the appropriate syringe (and labeled appropriately) on the top shelf of the epidural cart for immediate use during administration of epidural analgesia.

C. In addition, the following items should be routinely stocked in the epidural cart.

- Epidural trays
- Sprotte[®] 25g, 120mm or 123mm spinal needles
- Safety pins
- 100ml NS bags
- Epidural pump tubing
- Large and small Band-aids[®]
- Ioband[®] dressings
- Syringes: 12ml, 6ml, 3ml, 1ml
- Needles: 18g, 19g, 20g
- Tape: 2inch clear and adhesive
- 0.25% Bupivacaine
- 0.5% Bupivacaine
- 0.2% Ropivacaine
- 0.5% Ropivacaine
- 2% 2-chloroprocaine
- 2% lidocaine plain
- 2% lidocaine with 1:200,000 epinephrine
- 1.5% lidocaine with 1:200,000 epinephrine

III. Clinical Teaching

1. It is the staff's responsibility to integrate the didactic teaching with clinical content and this will be done whenever practicable.
2. It is the staff's responsibility to demonstrate a number of alternative techniques for labor analgesia and for anesthesia. however, the resident should suggest alternatives that they would like to try.
3. Alternative and special clinical techniques that should be approached during the module are listed as follows:

Intermittent bolus techniques
ambulatory epidurals
alternative test dosing
perineal dosing
catheter placement and depth of insertion
epidural narcotics
intrathecal narcotics for analgesia and surgery
catheter placement in obese patients

4. Obstetric Morning Report is held Monday, Wednesday and Friday at 0800 in the 6W conference room. These are useful and educational conferences to attend.

Pyxis

Residents should be familiar with the operation of Pyxis in the OR's. Several drugs are kept in the nursing Pyxis and attached Pyxis refrigerator, including epidural infusions, opioids for intrathecal injection and liposomal morphine suspension.

V. Record Keeping and the Computerized Anesthesia Record

Labor Analgesia

During lumbar epidural labor analgesia, a continuous record of the patient's anesthetic should be kept and readily available for review by other anesthesiologists. This procedure is outlined below as follows:

- A. Anesthesia record will be completed during initiation of conduction anesthesia.
- B. After initiation of lumbar analgesia, the intact anesthesia record will be placed in the "nurse server" outside the patient's door.
- C. If there are problems with the epidural, the chart is readily available to the anesthesiologist for review of dosage, time of last dose, infusion composition

and concentration, infusion rate, extent of block at last intervention, and hemodynamic responses.

- D. If further intervention is required, the type of intervention, drugs and dosages, and patient vital signs during the intervention must be charted on the anesthesia record. The discontinuity in time from the last intervention can be indicated by a 'slash mark' on the anesthesia record. If the anesthesia record becomes full a second page will be begun.
- E. If the obstetric plan changes i.e. vaginal delivery turns into cesarean section, the written anesthesia record may be used to dose the epidural until the patient is in the OR and the computerized anesthesia record is activated.
- F. Following delivery the anesthesia record should be stored appropriately. There are bins for the anesthesia records adjacent to the stations clerk's work station. The front, original copies of the anesthesia record and preoperative evaluations should be placed in the anesthesia bin. The pharmacy copy should be placed in the pharmacy bin. One copy of the anesthesia record and perianesthesia assessment should be placed in the patient's chart. If an anesthesiologist is not present at the delivery, the station clerk or nursing staff will file the anesthesia sheets.

During epidural labor analgesia, the following specific information should be documented in the chart as follows:

- A. The exact nature of the patients complaint.
e.g. "perineal pain" or "RLQ pain"
- B. The extent of sensory blockade in both the cranial and caudal directions.
- C. e.g. **R** T10-L4; **L** T11-S2
- C. The type and time of any intervention. The rational for the particular intervention may be included if several different possibilities exist.
e.g. "Bolus 100mcg fentanyl per epidural" or "Cath withdrawn to 3cm in epidural space. Bolus 0.25% bupivacaine 5ml"
- D. The response of the mother and fetus; i.e. Blood pressure, change in sensory level, patients perception of quality of analgesia, fetal heart rate (or that there is no change)
- D. Infusion. Document infusion continued, changed in content or rate of infusion altered.

Computerized Anesthesia Record

Currently, CompuRecord is located only in the 2 MICC OR's and there is no centralized workstation. Completed anesthesia records must be printed from within the OR. This requires returning to the OR following transport of the patient. The CompuRecord printer is located behind the nursing station in the MICC. This printer is shared so there may be other documents in the printer out tray.

Once completed, one copy of the record goes in the patients chart, one in the anesthesia bin, and one in the pharmacy bin (bins located near the secretary's desk). One copy is for your records.

VI. Didactic Teaching

Didactic lectures are the joint responsibility of the staff and the resident. Lectures can not always occur at the specified time however every attempt should be made to have lecture at the scheduled time. It is the resident's responsibility to notify staff and arrange the lecture. Conversely, it is the staff's responsibility to notify the resident in kind and make alternate arrangements if the lecture can not be given. The goal should be to complete all lectures during the one month module.

A list of anticipated lectures is as follows:

1. Maternal Physiology I
2. Maternal Physiology II
3. Anesthesia for Labor and Delivery
4. Anesthesia for Cesarean Section
5. Epidural/Spinal Anesthesia and Blood Patch
6. Epidural/Spinal Narcotics
7. Pregnancy Induced Hypertension
8. Cardiac Disease in Pregnancy
9. Fetal Physiology, Monitoring, and Assessment
10. Ob Drugs Impacting Anesthesia
11. Anesthesia for Non-obstetric Surgery in Pregnancy
12. Obese Parturient
13. Fetal Monitoring/High Risk
14. Anesthesia Drugs in L&D
15. AFE/Placenta Previa/Abruptio Placentae
16. Aspiration
17. Breech/Twin Deliveries

VII. Departmental Research

Residents rotating in obstetric anesthesia should be familiar with the research protocols ongoing in labor and delivery and the post-partum areas. Residents will be expected to recruit patients into any studies for which the patient is a candidate, to actively participate in ongoing studies, and to assist in data collection. Residents interested in particular research areas or in co-authorship of publications resulting from the research program should express this interest to one of the co-directors.

VIII. Evaluation

Residents are evaluated based on the ACGME defined 6 clinical competencies defined as:

Patient Care
Knowledge
Practice-Based Learning and Improvement
Interpersonal and Communication Skills
Professionalism
Systems-Based Practice

Residents are also evaluated based upon their professional growth during the module. Information used in this evaluation includes Written Formative Evaluations from attending anesthesiologists, 360 evaluations, performance on oral and written examinations, and entries in the resident's portfolio. Specific requirements are detailed in the rotation curriculum. The oral examination is based upon the ABA oral examination for board certification. This exam is intended primarily as an educational tool to familiarize the resident with the format of the ABA oral examination.

Addendum 3

CA-1 Obstetric Anesthesia

Educational Experience Check List

CA-1 Obstetric Anesthesia
Educational Experience Check List

Resident _____

Rotation Date _____

	Staff	Resident	Date
Materials:			
Orientation Manual	_____	_____	_____
Curriculum	_____	_____	_____
Didactic Lectures:			
Maternal Phys I	_____	_____	_____
Maternal Phys II	_____	_____	_____
Regional “101”	_____	_____	_____
Labor Analgesia	_____	_____	_____
Hemorrhage	_____	_____	_____
Ob Drugs	_____	_____	_____
C/S Anesthesia	_____	_____	_____
Fetal Monitors	_____	_____	_____
PIH	_____	_____	_____
Multiple Gestation	_____	_____	_____
Assessment:			
Portfolio (Mngmt)	_____	_____	_____
Case Logs	_____	_____	_____

Oral Exam _____

Portfolio (PostOp1) _____

Portfolio (PostOp2) _____

Section Chief _____ Date _____