Lesson S48: Understanding Standards, Guidelines and Practice Parameters

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REVIEW DATE: March, 2016

Read this article, reflect on the information presented, then go online and complete the lesson post-test and course evaluation before the termination date below. (CME credit is not valid past this date.) You must achieve a score of 80% or better to earn CME credit.

TIME TO COMPLETE ACTIVITY: 2 hours
RELEASE DATE: May 1, 2016
TERMINATION DATE: April 30, 2017

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Professional Gaps

Most anesthesiologists are aware that the parent organization, the American Society of Anesthesiologists (ASA), periodically issues recommendations for the safe practice of anesthesia. The impact on standards of care from a medicolegal point of view is less well understood. In addition, the number of statements that are issued or updated annually is growing exponentially. The anesthesiologist in clinical practice should have a working knowledge of the statements and guidelines that affect their practice.

Learning Objectives

At the completion of the activity, the reader will be able to:

1. Define Standards in anesthesia
2. Distinguish between guidelines and standards
3. Apply recommendations to fire prevention
4. Identify some recent practice parameters
5. Explain the need for frequent practice updates
6. Plan the anesthetic management for a patient undergoing major back surgery
7. List the recent recommendations for safe obstetrical anesthesia
8. Recognize when blood transfusion is appropriate
9. State means to reduce infection during central line placement
10. Choose the best position for rotator cuff surgery repair
Case

A 65 year-old man is scheduled for multi-level laminectomies with instrumentation. He has a history of hypertension, hypercholesterolemia, and he has smoked 1 pack-per-day for 50 years. Past surgical history includes two laminectomies over the past 12 years. His medications are amlodipine 5 mg, hydrochlorothiazide 25 mg, metoprolol 100 mg, simvastatin 20 mg, aspirin 81 mg as well as multiple pain clinic visits. Vital signs are height 68 in; weight 295 lbs; BP 160/95; heart rate 53 bpm; Hb 11.9; and blood serum glucose 188mg/dl.

The patient notes that his surgeon informed him that this will be a long and difficult operation. The patient asks the attending anesthesiologist about potential risks. The attending anesthesiologist reviews the recent guidelines or suggestions for the ASA that pertain to this case.

Introduction

The Committee on Standards and Practice Parameters (CSPP) of the ASA is charged with providing educational and scientific information to promote the safe and effective practice of anesthesiology. The committee compiles evidence-based guidelines, practice standards, alerts and other consensus-based documents. Documents from other health care organizations are periodically considered.

Definitions

**Standards** define a level of quality or excellence. They provide rules that outline the minimum requirements for clinical practice and patient management. Standards may only be modified under extenuating circumstances such as an extreme emergency or unavailability of equipment. It is important to note that the term “Standard of Care” is a legal, rather than a medical term. Examples of standards include the basic monitoring of vital signs such as blood pressure, heart rate and rhythm, temperature, respiration and oxygenation, preanesthetic assessment and the need for a dedicated postanesthetic care unit with dedicated staff and equipment (*vide infra*).

**Guidelines and Practice Parameters** are systematically developed recommendations to assist in decision making. They may be adopted, modified or rejected according to clinical needs and constraints and are not intended to replace institutional policies. Guidelines are not absolute requirements and their implementation cannot guarantee specific outcomes. They are subject to revision according to evolution of medical knowledge. In other words, they are basic recommendations, supported by synthesis and analysis of current literature, forums and feasibility studies.

**Statements** are opinions, beliefs, and best medical judgments of the House of Delegates of the ASA. They are not subject to the same level of formal scientific review as ASA Standards and Guidelines. Anesthetic providers and institutions determine whether to implement all of the statements, some of them or none at all, based on the medical judgment of practitioners in the practice or institution (in other words, the standard of care applicable to that environment).

Annually, the ASA releases 60 - 70 new and updated recommendations. It is a challenge for practitioners to keep abreast of the information. For the year 2016, as of March, there were 19 updated Statements and 12 new ones.
Standards define minimal level of practice for anesthesiologists in the United States. There are three basic standards that pertain to all anesthetics and in all anesthetizing locations:

Monitoring

1. Qualified anesthesia personnel must be present in the room for all anesthetics. (Nursing students or medical students cannot be left in the room alone.)

2. Oxygenation, ventilation, circulation and temperature must be continually evaluated according to the following:
   - Oxygenation: FiO₂ measured by a gas analyzer with a low O₂ concentration limit alarm in use as well as SPO₂ with pitch pulse tone and audible low threshold alarm
   - Ventilation is monitored by clinical signs, ETCO₂ with alarms, and expired volumes.
   - Circulation is monitored by continuous electrocardiography, blood pressure and heart rate at a minimum of every 5 minutes.
   - Additional clinical signs include pulse oximetry, arterial cannulation and peripheral pulse monitoring.

Preanesthesia care

1. These standards apply to all patients who receive anesthesia care and may be modified under extenuating circumstances. The latter must be documented in the patient’s record.

2. An anesthesiologist shall be responsible for determining the medical status of the patient and developing a plan of anesthesia care.

3. The anesthesiologist, before the delivery of anesthesia care, is responsible for:
   a. Reviewing the available medical record.
   b. Interviewing and performing a focused examination of the patient.
   c. Discussing the medical history, including previous anesthetic experiences and medical therapy.
   d. Assessing those aspects of the patient’s physical condition that might affect decisions regarding perioperative risk and management.
   e. Ordering and reviewing pertinent available tests and consultations as necessary for the delivery of anesthesia care.
   f. Ordering appropriate preoperative medications.
   g. Ensuring that consent has been obtained for the anesthesia care.
   h. Documenting in the chart that the above has been performed.

Postanesthesia care

1. All patients shall receive appropriate postanesthesia care and be transported to the postanesthesia care unit (PACU) by a knowledgeable member of the anesthetic care team (ACT).

2. The status on arrival must be documented and all information given to the PACU nurse.
3. A member of the ACT must remain in the PACU until nurse accepts responsibility.
4. The patient’s condition must be evaluated continually and a written report maintained with use of a scoring system.
5. An anesthesiologist is responsible for general medical supervision.
6. There must be a physician within the facility certified in CPR.
7. A physician is responsible for discharge from the PACU. The name should be noted.

Guidelines and Practice Parameters (2012-2016)

2012

Four guidelines were presented in 2012, an update on postoperative visual loss and back surgery, an advisory on preanesthetic assessment, acute pain management in the perioperative setting, and central venous access.

1. Major back surgery and postoperative visual loss. Following reports of visual loss after major black surgery in the prone position, the ASA established a registry in 1999 in an attempt to define causes, associated factors and means to prevent the complication. Several hundred cases were analyzed and Practice Parameters were published in 2006. Risks factors were identified as duration of surgery exceeding 6 hours, male sex, obesity, Wilson frame use, and fluid overload (crystalloid). Associated factors included diabetes, rapid blood loss and hypotension. In further analysis of these cases, the ASA advised use of invasive pressure monitoring, addition of colloids to crystalloids with restricted use of the latter, avoidance of the Wilson frame and advising patients of the risk.

2. Preanesthetic Assessment. Recognizing the enormous cost of unnecessary tests and the very low return, the ASA determined that history and physical examination must precede the ordering of any tests. The airway, lungs and heart should be examined and vital signs documented. Information can be obtained from multiple sources but tests should be ordered selectively - not routinely. Tests ordered on the chance of discovering a disease in an asymptomatic patient do not make an important contribution. No specific time for testing was identified and results within 6 months are acceptable if there are no clinical changes. The risk/benefit ratio must be considered. For cardiac evaluation, stress tests are expensive and rarely indicated. A cardiogram is of very limited value; older patients have more anomalies that may not interfere with the quality of life. Indications for further cardiac workup were compiled by the American College of Cardiology and the American Heart Association (ACC/AHA) and include:
   a. unstable coronary syndrome (MI, unstable angina)
   b. decompensated heart failure (NYHA IV, or new onset)
   c. significant dysrhythmias (high grade or Mobitz II AV block, 3rd degree AV block, symptomatic ventricular dysrhythmias)
   d. severe valvular disease
The ASA also considered the recommendation offered by the American Board of Internal Medicine under the *Choosing Wisely* consensus as follows:

a. Baseline labs are not needed in patients without significant systemic disease.
b. Baseline diagnostic cardiac testing is not needed in asymptomatic stable patients with known cardiac disease undergoing low to moderate risk non-cardiac surgery.
c. Pulmonary artery catheterization is not necessary routinely in cardiac patients.
d. Packed red blood cell transfusion is unnecessary in young healthy patients without ongoing blood loss and Hb >6gm unless they are unstable.
e. Colloids for fluid resuscitation should not be used without appropriate indication.

3. **Acute Pain Management.** Institutional policies should be in place to include education and training, monitoring of patient outcomes, documentation of monitoring activities, monitoring of outcomes by institution. There should be 24 hour availability of an anesthesiologist to provide perioperative pain management as well as a dedicated acute pain service.

4. **Central Line Access.** Concerned with the high incidence of infection and other complications of central line placement, the ASA offered new guidelines for care of patients who require central line access for monitoring and fluid replacement. Regarding resource preparation: aseptic technique is preferred with availability of standardized equipment sets, assistance, and a checklist. Intravenous antibiotic use should be restricted to immunocompromised patients. Chlorhexidine preparation is preferred. All attempts must be made to prevent mechanical trauma or injury by attention to site selection, patient position, needle insertion, and monitoring placement.

2013

Three advisories and guidelines were offered in 2013: Practice Advisory for the Prevention and Management of Operating Room Fires (updated from 2007), Postanesthetic care, and Practice Guidelines for Management of the Difficult Airway (updated from 2002).

1. **Operating room fires.** OR fires continue to occur in the United States, amounting to several hundred annually. The ASA has determined they should be “never events.” For a fire to occur, three components – or a “fire triad” – must be present in the OR: an oxidizer, an ignition source and a fuel. Oxidizers include oxygen and nitrous oxide, ignition sources include lasers, drills and electro-surgery units, and fuels include endotracheal tubes, sponges and drapes. By identifying high risk situations one arm of the triad can be eliminated. Discussion of the risk of fire should be part of “time out” at the start of the case. The questions to be posed at that time include:

a. Is supplemental O₂ needed?
b. Did the patient use after-shave?
c. Is the prep solution dry?
d. Are drapes indicated?
e. How much cautery is indicated?
Fire drills, outside of operating room time should be conducted. The risk of fire can be minimized by avoiding O\textsubscript{2} -enriched atmosphere near the surgical site, managing ignition sources and fuels, and most of all - by ensuring good communication. Treatment of an airway fire requires immediate removal of the endotracheal tube, irrigation of the airway with normal saline, cessation of the flow of all airway gases, removal of sponges and flammable material from the vicinity of the airway. As soon as the fire is out, ventilation must be reestablished, the endotracheal tube should be checked for missing pieces and if soot is seen around the nose or mouth or desaturation is occurring, bronchoscopy is indicated. Management of a fire outside of the airway requires stopping the flow of airway gases, removal of drapes and burning material while extinguishing the fire with saline. Ventilation should be maintained and assessment made for airway damage. If the fire continues, a CO\textsubscript{2} extinguisher must be used, the general fire alarm activated, while the patient evacuated from the room and the door closed. The gas supply to the room should be shut off. Operating room fires must be treated as critical incidents, generating a root cause analysis.

2. *Guidelines for post anesthetic care*\textsuperscript{5} emphasized the need for assessment and monitoring of respiration, cardiovascular function, neuromuscular efforts, mental status, temperature, pain, nausea and vomiting, fluids, urinary output, drainage and bleeding. Supplemental O\textsubscript{2} should be used during transport to PACU. Prophylaxis and treatment of nausea and vomiting is required. A check should be made that all anesthetic agents and neuromuscular blockers are reversed. A protocol for discharge must be developed without defining a routine to void or drink fluids and no mandatory minimum stay. There should be no remaining risk of cardio-respiratory depression and a responsible adult should be identified to take the patient home.

3. *Practice parameters for care of the difficult airway*\textsuperscript{7} were updated from 2002. (Fig 1) Preanesthetic evaluation of the airway was emphasized as well as basic preparation to include availability of the difficult airway cart, informing the patient of anticipated problems and the management plan. Appropriate face masks should be available as well and prolonged preoxygenation undertaken. A strategy for intubation essentially offers four choices: awake intubation vs asleep, noninvasive vs invasive, video assisted, preservation vs ablation of spontaneous ventilation. There should also be a plan in place for extubation; awake vs asleep and available devices for expedited reintubation. Follow up care must also be considered. Documentation of the plans and all events is necessary and patients should be made aware of the management outcome.
Fig 1. Algorithm from the ASA for management of the difficult airway
Alternative techniques for management on cases of both difficult intubation and difficult ventilation are also tabulated. (Table 1) Implementation depends on the practitioner’s experience and skill and clinical availability. A combination of techniques may be used.

Table 1. Alternative techniques for difficult intubation and ventilation

<table>
<thead>
<tr>
<th>DIFFICULT INTUBATION</th>
<th>DIFFICULT VENTILATION</th>
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<tbody>
<tr>
<td>Awake intubation</td>
<td>Intratracheal jet stylet and ventilation</td>
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<tr>
<td>Blind intubation (oral or nasal)</td>
<td>Invasive airway access, tracheotomy</td>
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<tr>
<td>Fiberoptic intubation</td>
<td>Supraglottic airway</td>
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<td>Intubating stylet (tube changer)</td>
<td>Oral and nasopharyngeal airways</td>
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<td>Supraglottic airway (as conduit)</td>
<td>Rigid ventilating bronchoscope</td>
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<td>Different laryngoscope blades</td>
<td>Two person mask ventilation</td>
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<td>Light wand</td>
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<td>Videolaryngoscopy</td>
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2014

The major guideline offered in 2014 referred to obstructive sleep apnea (OSA), reflecting increasing concern about postoperative respiratory depression and complications, especially in patients with histories of disturbed sleep patterns, many of whom, but not all, were obese.8 The practice parameters addressed the syndrome at 3 stages. Preoperatively, intraoperatively and postoperatively:

1. **Preoperative evaluation**: The medical record should be reviewed and the patient and family interviewed and made aware of potential risks. A screening protocol should be in effect. As the diagnosis of OSA is more likely to be made by the anesthesiologist rather than the surgeon, the latter must also be involved. Physical examination, especially of the airway, is essential. A multimodal analgesic plan should be devised. Documentation should be made.

2. **Intraoperative management**: Local or regional anesthetic techniques are preferred - if the operative site permits - because of the potential for postoperative respiratory compromise. Capnography should be used during moderate sedation. General anesthesia is preferred to deep sedation.

3. **Postoperative management**: Continuous positive airway pressure devices and oxygen supplementation should be available immediately. Lateral, prone or sitting positions are preferred. Opiates should be avoided if at all possible or used in smaller amounts. Regional analgesia or peripheral blocks together with intravenous acetaminophen or nonsteroidal agents should be used for pain control. Observation with respiratory monitoring should be prolonged. Patients receiving patient controlled analgesia should not be discharged from a monitored setting until room air oxygen saturation exceeds 91%.

While the ASA did not directly address monitoring in the beach chair position, the Anesthetic Patient
Safety Foundation together with orthopedic and regional anesthetic societies offered several statements. It was noted that hypotension and decreased cerebral oxygenation were common and observed less with regional anesthesia and sedation. Blood pressure measured in the arm and leg does not reflect pressure in the brain. Cerebral oximetry may be a useful indicator of desaturation but some controversy remains as to reliability and thus this monitor has not yet been adopted as a standard of care.

2015

Two guidelines and advisories were issued in 2015 relating to blood management and anesthetic care during magnetic resonance imaging (MRI).

1. **Blood management** was addressed because of the increased awareness of complications that occur following transfusion and evidence that suggests that many patients who receive blood either did not need it or did not improve. The following recommendations were made:
   a. Emphasis on preoperative assessment and the risk for transfusion is made. The use of adjuncts to prevent and treat bleeding should be listed including history, physical and the need for repeated laboratory analysis, which in itself contributes to anemia. Anemia (Hb < 11.5 - 15gm), should be treated preoperatively, if possible, and anticoagulants discontinued.
   b. Patients should be informed of risks/benefits and their preference obtained. Predonation should be offered if transfusion is likely.
   c. A greater tolerance for a low Hb level should be realized.
   d. Restrictive transfusion at Hb < 8g/dL, Hct < 25% although blood should not be transfused based on a preconceived minimum Hb level.
   e. Greater use of pharmacologic therapies to minimize transfusions should be made such as erythropoietin for anemia, prothrombin complex concentrates for urgent reversal of Warfarin, Vitamin K if the procedure is non-urgent, and the availability and use of intraoperative antithrombolytics such as epsilon aminocaproic acid, tranexamic acid for procedures with a high risk for bleeding. Excessive bleeding should be treated with desmopressin, antifibrinolytics, topical hemostatics, plasma and factor concentrates, (r Factor VIIa)
   f. Cell saver techniques should be readily available.
   g. Monitoring should be made in conjunction with the surgical team and include organ perfusion as assessed by urinary output, echocardiography, cerebral oximetry and mixed venous O2 sat. Hb/Hct should also be measured although it may not provide a reliable guide to transfusion.
   h. Coagulation profiles should be assessed prior to fresh frozen plasma transfusion.
   i. Fibrinogen levels should be noted prior to administering cryoprecipitate.
   k. Acute normovolemic hemodilution may be considered in certain cases.
   l. Patients should be monitored for adverse effects of transfusion. Leukocyte reduced red cells reduce complication rates and should be used in immunocompromised patients. No consensus was reached regarding the influence of age on stored blood.
   m. In general, transfusion algorithms should be employed, based on thromboelastography testing (TEG), blood ordering schedules, with restrictive transfusion strategies.
2. **Anesthetic care during magnetic resonance imaging**\(^{10}\) is one of the ASA guidelines addressing anesthetic care outside of the operating room. The ASA has offered guidelines and advisories for care in off-site venues such as interventional radiology. Anesthetic care may require sedation, general anesthesia, ventilatory support as well as critical care management. Education and care assessment is required to ensure identification of ferromagnetic objects. Proper precautions must be taken. The ability to respond to cardiac arrest is outlined, as well as screening of all individuals entering zones III and IV (the area housing the magnetic scanner). Patient related risks revolve mainly around extremes of age, co-morbidities, presence of tattoos, and implanted items. Equipment related items involve monitors, oxygen tanks, endotracheal tubes, deep brain stimulators, pacemakers, phrenic nerve stimulators and cochlear implants. Once more, the ASA emphasizes the importance of communication.

Advisories include:

a. An anesthetic plan is essential, including access to recovery facilities and help.

b. ST segment interpretation may be unreliable.

c. Patients in renal failure should not be given gadolinium.

d. Use of safe monitors is the responsibility of the department of anesthesia. Equipment should be identified and labeled as **safe, unsafe, conditional** for each scanner. Capnography is advised. Equipment should not interfere with imaging.

e. While pacemakers and defibrillators are contraindicated, some implanted electronic devices are compatible and check should be made with the manufacturer especially with newer cardiac devices.

f. Monitors should allow viewing of vital signs from zone IV if anesthetic personnel are not in that zone.

g. Burns can occur from EKG leads and from metal particles in tattoos.

h. A plan should be in place for emergence and removal of patients to a safe zone in cases of complications.

i. During a controlled quench (shut down of the scanner), energy is released as heat. There is dissipation of oxygen, and high pressure in rooms prevents doors from opening. A hospital policy and procedure should be available and followed.

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**2016**

As of this writing, the ASA has offered 2 Practice Parameters - the first regarding obstetrical anesthesia (updated from 2006), and the second addressing prevention of respiratory depression after neuraxial anesthesia.

1. **Update on Obstetrical Anesthesia**\(^{11}\) is the result of a coordinated effort with the American College of Obstetricians and Perinatologists. Apart from noting that a communication system between the obstetrical and anesthesia departments must be in place, several points are made:

a. The perianesthetic evaluation is a focused history and physical examination. Any anesthetic or obstetrical risks should encourage consultation between the 2 specialties.

b. During the intrapartum period, a routine platelet count and blood type and cross match are not necessary for healthy patients scheduled for vaginal or surgical delivery.
c. Fetal heart monitoring should be done by qualified individuals before and after neuraxial anesthesia. Continuous electronic recording of fetal heart rate is not essential.

d. Clear liquids are allowed orally during healthy labor; prior to cesarean section, clear fluids may be given up to 2 hours before and solid foods should be held for 6 - 8h; antacid prophylaxis is indicated.

e. Early in labor (<5cm), the option of neuraxial analgesia should be offered, regardless of dilatation with the advice to patients that neuraxial analgesia does not increase the risk of cesarean section It may also be offered during trial of vaginal delivery after cesarean section.

f. Pencil point needles should be used; neuraxial opioids are indicated for control of postoperative pain.

g. Depending on anticipated duration, single or combined spinal-epidural analgesia is indicated; and in some instances, patient controlled epidural anesthesia may be indicated.

h. During removal of a retained placenta, nitroglycerine allows uterine relaxation and is a reasonable alternative to general endotracheal anesthesia and terbutaline.

i. All equipment and personnel should be comparable to that maintained in the general OR.

j. Ephedrine or phenylephrine are preferred drugs to treat hypotension.

k. Individualized management is indicated for postpartum bilateral tubal ligation; neuraxial anesthesia is appropriate and antacids should be given.

l. For the management of obstetrical emergencies, O-negative blood and cell saver should be available as well as the difficult airway cart, and all equipment required for cardio-pulmonary resuscitation.

2. Confronted with a continuing concern over postoperative complications, the ASA presented practice guidelines to decrease the incidence of respiratory depression after neuraxial opioids. Developed in conjunction with the American Society for Regional Anesthesia and Pain Medicine, four areas were explored: identification of persons at increased risk; strategies to prevent respiratory depression; means to detect respiratory depression; and management and treatment of respiratory depression.

a. Identifying at risk patients requires a focused history, elucidating co-morbidities, especially obstructive sleep apnea (OSA), diabetes mellitus, obesity, current medications, and any known adverse reactions to opioids. Physical examination includes documentation of baseline vital signs, and assessment of the airway, heart, lungs and cognitive function.

b. Means to prevent respiratory depression include advice to patients with OSA to bring their CPAP machines to the hospital, use of single injection neuraxial opioids, preferring fentanyl or sufentanil, or extended release epidural morphine, choice of continuous epidural opioids rather than parenteral opioids. Also, ambulatory patients should not receive neuraxial morphine or hydromorphone. In all cases, lower doses should be used and parenteral opioids should not be combined with neuraxial opioids.

c. Suggested strategies to detect respiratory depression include monitoring of respiratory rate and depth, oxygenation and level of consciousness. In the presence of increased risks, monitoring should be more frequent. Following a single injection of a lipophilic drug (fentanyl), monitoring should be done for a minimum of 2 hours, repeated at least every 20 minutes, then once per hour for 2 hours, and then as indicated. In the case of a continuous infusion, monitoring should take place as follows: continuously for 20 minutes;
once per hour for the first 12 hours; once per 2 hours for the next 12 hours; and then once per 4 hours for therapy lasting > 24 hours. After a single injection of a hydrophilic drug (morphine), monitoring should be for a minimum of 24 hours – once per hour for the first 24 hours and once per 2 hours for the next 12 hours. In the case of a continuous infusion, monitoring should be once per hour for the first 12 hours, once per 2 hours for the next 12 hours. After extended release epidural morphine, monitoring once per hour for 12 hours, then once per 2 hours.

d. Suggestions for management and treatment include availability of supplemental O₂ to be given if consciousness is decreased consciousness, respiratory depression, or hypoxemia is are detected. Oxygen administration should continue until the patient is alert. Reversal agents such as naloxone and sugammadex should be available as well as appropriate resuscitation and non-invasive positive pressure ventilation equipment.

Apart from the publications discussed here, several other agencies and organizations including the Centers for Medicare and Medicaid Services (CMS) have published guidelines and recommendations. The ASA has also established several registries that seek to obtain information about complications through anonymous reporting. To date some of these registries include, anesthesia awareness, postoperative visual loss, the beach chair position, postoperative cardiac arrest (children) and fire in the OR. The closed claims project collects data from malpractice cases now settled. The Anesthesia Quality Institute is home to the National Anesthesia Clinical Outcomes Registry (NACOR), and is designated as a Qualified Clinical Data Registry (QCDR) by CMS. To date, it has collected 33 million cases and provides continuous performance monitors, performance gap analysis, patient outlier identification, access to improvement intervention to close gaps, targets education, links to anesthesiology information technology and research studies.

Management of the case

In consultation with the surgeon, it was felt that the case would require blood transfusion and probably last 6-7 hours. The patient predonated 1 unit of blood and a cell saver was also set up. The surgeon felt that staging would not be advantageous. A Jackson table was selected. The anesthetic technique took into account the need for neuromonitoring and combination of inhalation and intravenous anesthesia with minimal neuro-blockade was selected. Monitoring included arterial cannulation and cerebral oximetry. Fluid replacement was a combination of colloids and crystalloids with a fluid excess not exceeding 2 liters. The patient was advised of the slight risk of postoperative blindness, of blood transfusion and the possible need for postoperative ventilation.

Conclusion

There are many resources available which provide valuable information that promotes and ensures safe patient care in anesthesia, not only from the ASA but also from other specialties. These guidelines and practice parameters are updated frequently. Many statements are also added. Readers can remain up-to-date by visiting the ASA web site at www.asahq.org.
Dr. Elizabeth A.M. Frost, who is the editor of this continuing medical education series, is clinical professor of anesthesiology at The Mount Sinai School of Medicine in New York City. She is the author of Clinical Anesthesia in Neurosurgery (Butterworth-Heinemann, Boston) and numerous articles. Dr. Frost is past president of the Anesthesia History Association and former editor of the journal of the New York State Society of Anesthesiologists, Sphere. She is also editor of the book series based on this CME program, Preanaesthetic Assessment, Volumes 1 through 3 (Birkhäuser, Boston) and 4 through 6 (McMahon Publishing, New York City).

REFERENCES


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### Post-test

1. The ASA has determined that a fire in the operating room must be:
   a. An unavoidable complication of facial surgery
   b. A never event
   c. A rare malpractice issue
   d. Kept at an acceptable rate of occurrence

2. A true statement regarding standards:
   a. They provide minimal levels of practice for anesthesiologist
   b. They may be modified according to location of practice
   c. “Standard of Care” is now considered a medical term used in hospital policies
   d. Medical students may administer anesthesia as long as an anesthesiologist is in the hospital

3. A true statement regarding practice parameters:
   a. They must be strictly followed at all times.
   b. They may be rejected according to clinical needs.
   c. Revisions are not needed or required.
   d. Feasibility studies show that outcomes are guaranteed when they are followed.

4. During administration of neuraxial block for labor:
   a. Fetal heart rate should be measured and documented before and after block insertion
   b. Platelet count must be available
   c. Consultation with the obstetrician is not necessary
   d. The patient should be given access to water at any time

5. Major risks for postoperative visual loss after back surgery include:
   a. Fluid overload
   b. Long duration of surgery
   c. Wilson frame use
   d. All of the above
6. Regarding recommendations for anesthetic monitoring in the beach chair position:
   a. Cerebral oximetry is the standard of care
   b. Practice parameters exist from the ASA for direct monitoring
   c. Blood pressure taken from the leg may not reflect pressure at the base of the brain
   d. Decreased cerebral oxygenation is not common

7. During magnetic resonance imaging:
   a. EKG leads have been shown to be completely safe
   b. Implanted electronic devices are always incompatible
   c. Capnography is advised
   d. Monitors should be placed in Zone I

8. Risk factors for respiratory depression after neuraxial opioids are least likely to include:
   a. Obesity
   b. A history of obstructive sleep apnea
   c. History of adverse reaction to opioids
   d. Age > 70 years

9. A true statement about fentanyl is:
   a. Fentanyl is a hydrophilic drug.
   b. A single injection of fentanyl requires monitoring for at least 24 hours.
   c. It is a lipophilic drug requiring monitoring for at least 2 hours after a single injection.
   d. All of the above are true statements.

10. The least effective approach to blood management is:
    a. Transfusing at a preconceived minimum Hb level
    b. Predonation
    c. Cell saver
    d. Treat anemia preoperatively