Malpractice Cases: Lessons from an Expert Witness in Pediatric Anesthesia

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Improved electronic documentation: now able to “interrogate” machines because they all have memory (even true when not part of electronic medical record [EMR])

Case record: 11-yr-old boy presented to free-standing ambulatory surgery center (ASC) for tonsillectomy; body mass index in 99th percentile; apnea-hypopnea index (AHI) 80 (considered severe); options for management — usual general anesthesia with endotracheal intubation and administration of intraoperative and postoperative opioids; usual general anesthesia with lower doses of opioids; replace opioids with dexmedetomidine; any of above, but with prolonged stay in postanesthesia care unit (PACU); cancel case because patient not suitable for care at ASC; speaker’s view — case should be canceled because not suitable for ASC; in this situation, would also reserve bed in pediatric intensive care unit for recovery; outcome of case — patient underwent general anesthesia with endotracheal intubation and received opioids intraoperatively and postoperatively; observed for 1 hr in PACU and then discharged home with prescription for hydrocodone with acetaminophen; found dead in bed later that night; evaluation — speaker categorizes care in case as reckless negligence (some would argue for negligent homicide)

Case record: 2-yr-old boy scheduled for elective magnetic resonance imaging (MRI) for follow-up after resection of retinoblastoma; history of obstructive sleep apnea; 2 wk before presentation, had been scheduled for tonsillectomy, but cancelled because of patient illness; patient treated with intravenous propofol and ketamine; infusion of propofol started; nasal cannula applied with natural airway; in induction room, patient developed upper airway obstruction; ventilated by bag-mask, and oxygen saturation improved; choices for management — intubate patient and proceed with MRI; insert laryngeal mask airway (LMA) and proceed with MRI; cancel case; proceed with natural airway; speaker considers any of first 3 options acceptable if oxygen saturation remains satisfactory; if in free-standing MRI center, also quite acceptable to cancel case; if performed in hospital, speaker would probably secure airway with LMA; course of case — patient placed in scanner with natural airway; propofol infusion continued at 50 μg/kg/min (usual starting dose of propofol for MRI 200 to 250 μg/kg/min, and often needs to be titrated upward); 20 min into MRI child started to cough and desaturate; child removed from MRI, but could not be ventilated or intubated; treatment of choice in this scenario administration of succinylcholine; providers did not give anything, and patient sustained profound hypoxemia; speaker’s view — negligent to proceed without artificial airway and without giving muscular relaxant; constitutes failure to resuscitate

Case record: patient underwent uneventful coronary artery bypass grafting; extubated in intensive care unit later on day of surgery; overnight experienced respiratory distress and developed fever; on following morning temperature 105°F and patient developed generalized rigidity; required endotracheal intubation; anesthesiologist intubated patient along with administering succinylcholine; temperature rose to 108°F and rigidity persisted; patient died later that day from disseminated intravascular coagulation (DIC); diagnostic considerations — main causes of death from malignant hyperthermia (MH) acute hyperkalemia (from breakdown of muscle) and DIC, which can occur when temperature > 106°F for more than a few minutes; litigation — family sued treating anesthesiologist during CABG for failure to detect intraoperative MH and anesthesiologist who intubated patient next morning for using succinylcholine in patient with fever and rigidity; postoperative MH — textbooks typically state that MH can develop 24 to 48 hr postoperatively; in practice, however, very unusual (“almost unheard of”) for it to develop postoperatively with absence of signs or symptoms (eg, hypercarbia, fever, or rigidity) during operation; postoperative MH has not been documented to start more than few minutes after discontinuation of anesthetic; in this case no evidence of hypercarbia, acidosis, tachycardia, or fever in OR; in investigating case, found that patient taking citalopram; during operation patient received methylene blue; patient also received methylene blue for respiratory distress on night after surgery, on recommendation of pulmonologist; diagnosis of serotonin syndrome established; serotonin syndrome — can resemble MH (hyperthermia, rigidity, agitation, ocular clonus); treated with cyproheptadine; propranolol, bromocriptine, and dantrolene ineffective; in 2011 Food and Drug Administration issued warning not to administer methylene blue to patients taking selective serotonin reuptake inhibitors (SSRIs); speaker’s view — uncertain whether care of this

Educational Objectives

The goal of this program is to improve anesthetic management by reducing errors that may lead to poor outcomes and litigation, and by applying initiatives to improve quality and value in health care. After hearing and assimilating this program, the clinician will be better able to:

1. Recognize the risks of anesthetizing children with a high apnea-hypopnea index and obesity.
2. Consider a diagnosis of serotonin syndrome in appropriate situations.
3. Identify pitfalls of, and alternatives to, preparation of drugs at the point of service.
4. Compare various definitions of value in health care.
5. Evaluate the benefits of Enhanced Recovery After Surgery programs.

Faculty Disclosure

In adherence to ACCME Standards for Commercial Support, Audio Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and not a proprietary business or commercial interest. For this program, members of the faculty and planning committee reported nothing to disclose.
The Economics of Quality Improvement

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Definitions of value: equation — value equals quality divided by cost (ie, good quality at low expense equals high value); Institute of Medicine — defines value as provision of care that is safe, effective, patient-centered, timely, efficient, and equitable; if system does not serve all individuals, then some value lacking; economist may consider only final mathematical result; but for humans other factors important, so value equation may be different (eg, satisfaction of needs or benefits (whether monetary or nonmonetary) divided by use of resources or expenditures involved (eg, money, personnel, energy, or resources)).

Quality: example of good quality of care — patient experienced sudden onset of chest pain; emergency medical services responded quickly and connected patient to electrocardiography; image transmitted to smart phone of emergency physician; diagnosis of subendocardial myocardial infarction established; patient greeted at door of emergency department door (ED) and transported to catheterization laboratory within 10 min; found to have 100% occlusion of left anterior descending artery and underwent insertion of stent; example of poor quality of care — 90-yr-old man with modest dementia fell and injured knee; presented to ED with knee effusion; patient hospitalized because of leukocytosis and advanced age; admitted to general medical service with consultations to geriatric medicine, pulmonary medicine (history of chronic obstructive pulmonary disease), nephrology (elevated creatinine), and orthopedics (who drained knee); case illustrates abuse and waste in medical system.

Global view of quality: United States clear outlier in spending, with very high annual per capita spending on health care as percentage of gross domestic product; for individuals <60 yr of age, annual spending on health care in United States comparable to Germany, United Kingdom, Sweden, and Spain; for individuals ≥60 yr of age, spending rises in United States much more than other countries; uncertain whether United States achieving value from health care system.

Berwick’s 6 wedges of waste: overtreatment; failures of coordination (eg, neccessitating cancellation of procedures); failures of reliability; administrative complexity; pricing failures; fraud and abuse; failures of reliability — poor execution of good medical care; failure to deliver low tidal volumes during anesthesia for thoracic surgery: dispensing of antibiotics for viral illness because of parental pressure; result in reduced safety and poorer outcomes; adherence to guidelines for cardiothoracic anesthesia probably results in better outcomes; these include glucose management, management of atrial fibrillation, and early extubation.

Enhanced Recovery After Surgery (ERAS): translates established knowledge into systemized product to deliver better quality of care; initiative at University of North Carolina — first established for Whipple resection and distal pancreatectomy; standards of care established (eg, preoperative path including hydration, preoperative evaluation, consultations, psychological preparation, and intake of carbohydrate drink; adherence to these measures decreased length of stay (LOS), lowered cost, and resulted in larger volume of patients treated per year; all told, results in increased value; some measures had already been established (eg, prophylaxis for venous thromboembolism, administration of antibiotics before incision, avoidance of bowel preparation); ERAS protocol added carbohydrate drink 2 hr before surgery, targeting patient-specific hemodynamic goals intraoperatively, and identifying patient throughout hospitalization as being in ERAS program; results of ERAS program — for both Whipple procedure and distal pancreatectomy before ERAS program, LOS showed wide variation; after ERAS variability decreased and LOS decreased; multiple
surgeons had been performing pancreatectomy, and all had personal protocols with different care paths and variable results; care paths consolidated, and results became less variable; value of ERAS program illustrated by capture of ≈2.5 days; performance of ≈75 cases/yr; LOS averaged ≈8.5 days; contribution margin to hospital ≈$10,000/case; in 40 cases hospital made extra $125,000; created 200 operative days by reducing LOS; this fulfills definition of value with successfully providing need and benefit with less cost to system; since then ERAS developed for gynecology, urology, and thoracic surgery; increased burden for anesthesia personnel because many more tasks required and more protocols to fulfill

Bundled payments: anticipated that salaries will be dependent on value to patients; current estimates at University of North Carolina—studied contribution to salary from improved value compared with fee for service; compliance with EMR made some money; mission support involves return of hospital profits to providers (based on quality metrics); in analysis of 2 major payers, 98% of revenues of Department of Anesthesiology generated by volume, while only 2% attached to quality initiatives; this raises question of whether quality initiative economically worthwhile

Participation in decision making: those who contribute to value (ie, profits) invited to participate in long-term planning of health care system; ERAS program example of initiative to capture value; minimal definition of value whether same results can be achieved at lower cost; however, those who succeed provide extraordinary service and engage in process of change; challenge in anesthesiology—not many quality metrics (eg, mortality rates very low and cannot be used as metric); administration of recommended perioperative antibiotics also poor discriminator (UNC had 99% compliance); in contrast, study at UNC showed average time spent in ED before admission to hospital 493 min, compared with average in North Carolina of 292 min and national average of 272 min; this type of information to become commonly available (at cms.gov); remains to be determined whether such metrics will be linked to reimbursement; in 2015 National Quality Forum submitted 630 performance measures to Centers for Medicare and Medicaid Services; in 2017 ≈9% of Medicare payments to be performance based; anesthesia insulated because Medicare not anesthesiа’s best payer regarding American Society of Anesthesiologists units (but does provide high volume)

Suggested Reading

Acknowledgments
Dr. Litman and Dr. Zvara spoke at the 21st Annual Advances in Physiology and Pharmacology in Anesthesia and Critical Care, presented by Wake Forest School of Medicine. For information on other CME opportunities presented by Wake Forest School of Medicine please visit wakehealth.edu and click on the Education tab, or visit our website, audiodigest.org, and click on “Upcoming Meetings.” The Audio Digest Foundation thanks the speakers and the sponsors for their cooperation in the production of this program.

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Estimated time to complete the educational process:
Review Educational Objectives on page 1 5 minutes
Take pretest 10 minutes
Listen to audio program 60 minutes
Review written summary and suggested readings 35 minutes
Take posttest 10 minutes
1. An 11-yr-old boy is scheduled for a tonsillectomy at a free-standing ambulatory surgery center. He has a body mass index in the 99th percentile and an apnea-hypopnea index score of 80. Which of the following is the preferred management?
   (A) General anesthesia with standard doses of intraoperative and postoperative opioids
   (B) General anesthesia with reduced doses of opioids
   (C) General anesthesia with opioids and prolonged observation in postanesthesia care unit
   (D) Cancel case

2. A 2-yr-old boy with a history of obstructive sleep apnea is scheduled for an elective magnetic resonance imaging (MRI). He is initially given propofol and ketamine intravenously, followed by an infusion of propofol. In the induction room he develops upper airway obstruction and is ventilated by bag-mask. Oxygen saturation improves. Which of the following would NOT be recommended for subsequent management?
   (A) Apply nasal cannula and proceed with MRI
   (B) Insert endotracheal tube and proceed with MRI
   (C) Insert laryngeal mask airway and proceed with MRI
   (D) Cancel MRI

3. A child becomes hypoxic after the administration of propofol and ketamine for a diagnostic procedure. He is unable to be ventilated or intubated. Which of the following is the most appropriate next step?
   (A) Propofol and endotracheal intubation
   (B) Ketamine and endotracheal intubation
   (C) Fentanyl and endotracheal intubation
   (D) Succinylcholine and endotracheal intubation

4. A patient on a selective serotonin reuptake inhibitor is given methylene blue during surgery. Postoperatively he develops fever, rigidity, and ocular clonus. The patient should be treated with which of the following?
   (A) Propranolol
   (B) Cyproheptadine
   (C) Bromocriptine
   (D) Dantrolene

5. The Anesthesia Patient Safety Foundation’s 4-pronged paradigm for improving safety in the operating room advocates that each drug available to the anesthesiologist be present in only one concentration.
   (A) True
   (B) False

6. Which of the following is NOT included in the Institute of Medicine’s definition of what constitutes value in health care?
   (A) Effective care
   (B) Equitable care
   (C) Timely care
   (D) Preventive care

7. Annual spending on health care for patients >60 yr of age is highest in which of the following countries?
   (A) United States
   (B) Spain
   (C) Sweden
   (D) Germany

8. Which of the following is NOT included in Berwick’s 6 wedges of waste?
   (A) Failures of coordination
   (B) Inappropriate consultations
   (C) Administrative complexity
   (D) Fraud and abuse

9. The Enhanced Recovery After Surgery program for patients undergoing Whipple procedure or distal pancreatectomy at the University of North Carolina resulted in which of the following?
   1. Decreased length of stay
   2. Decreased rate of complications
   3. Decreased mortality rate
   4. Increased hospital profit
   (A) 1
   (B) 1,4
   (C) 1,2,4
   (D) 1,2,3,4

10. Which of the following represents the contribution of quality initiatives to the overall revenues of the Department of Anesthesiology at the University of North Carolina?
   (A) 2%
   (B) 7%
   (C) 15%
   (D) 30%

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