

NON-ANESTHESIOLOGIST PERFORMED CAPNOGRAPHY IN PROCEDURAL SEDATION

In October 2010 (effective date July 1, 2011), the American Society of Anesthesiologists (ASA) House of Delegates amended their Standards for Basic Anesthetic Monitoring to include monitoring exhaled carbon dioxide (etCO₂) during moderate or deep sedation. Section 3.2.4 of the standards advises:

The adequacy of ventilation should be evaluated by continual observation of qualitative clinical signs and monitoring for the presence of exhaled carbon dioxide unless precluded or invalidated by the nature of the patient, procedure, or equipment.¹

The ASA standards are regarded as generally accepted principles of patient management, and should only be modified under unusual circumstances, e.g., extreme emergencies or unavailability of equipment.²

Evidence Leading to Standard

Analyses of the ASA Closed Claims Database show that anesthesia care outside of the operating room resulted in substantially higher risks. In a review of injury and liability claims associated with monitored anesthesia care (MAC), respiratory depression was the most common specific damaging mechanism. Nearly half of these claims were judged as preventable with better patient monitoring, including capnography.³

A 2009 ASA closed claims analysis of risk and safety of anesthesia at remote locations shows the proportion of claims for death was almost double in remote location claims versus OR claims (54 vs. 29%). Respiratory damaging events were more than twice as frequent in remote location claims (44 vs. 20%), with inadequate oxygenation/ventilation the most common specific event, occurring seven times the rate as in the OR (21 vs. 3%). Of claims associated with over-sedation, 62% were judged to be preventable by better monitoring.⁴

In a study of Propofol sedation in over 49,000 pediatric patients, the most prominent type of complication involved the airway, and affected one in 65 sedations. One in 70 cases required interventions to rescue the airway. Contributory mechanisms involved mostly respiratory depression, airway obstruction, and apnea.⁵

In a review of the literature examining the role of the anesthesia care provider in mitigating risk of anesthesia or sedation outside the operating room, the authors note, "the majority of complications were the result of anesthetic, drug-induced respiratory depression or airway obstruction which led to hypoxemia or hypoventilation."⁶

Impact on Non-Anesthesiologist Delivered Sedation

The ASA has developed statements on granting privileges for administration of moderate and deep sedation to practitioners who are not anesthesia professionals.^{7,8} As the recognized experts in providing anesthesia and sedation, the ASA actively supports and promotes safe administration of anesthesia and has concern for any system or set of practices that can negatively impact the safety of anesthesia administration. The ASA is concerned that clinicians, who are not anesthesia professionals may not recognize that sedation and general anesthesia are on a continuum and inadvertently administer sedation on the level of general anesthesia without training and experience to recognize this state and respond appropriately.⁹

The intent of these statements is to offer guidelines for granting privileges to help ensure those who administer or supervise the administration of moderate sedation are adequately trained.¹⁰

The ASA Practice Parameters for Sedation and Analgesia by Non-Anesthesiologists (2012) also echoes the ASA's Basic Anesthetic Monitoring standard advising that pulse oximetry is recommended for early detection of hypoxemia, but should be complimented by monitoring ventilatory function. Monitoring of pulmonary ventilation is essential since drug-induced respiratory depression is a primary cause of morbidity associated with sedation/analgesia. Monitoring the adequacy of ventilation during moderate sedation should be performed unless precluded or invalidated by the nature of the patient, procedure, or equipment.¹¹

Centers for Medicare and Medicaid Services (CMS) Position

CMS conditions to bill for Medicare and Medicaid services governing Anesthesia Services requires that hospitals conform to generally accepted standards of anesthesia care when establishing policies governing anesthesia administration by these types of practitioners as well as MDs or DOs who are not anesthesiologists.¹²

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CMS expects that anesthesia services throughout the hospital (including all departments in all campuses and off-site locations where anesthesia services are provided) must be directed by one qualified doctor of medicine (MD) or doctor of osteopathy (DO). Areas where anesthesia services are furnished may include (but are not limited to):

- Operating room suite(s), both inpatient and outpatient
- Obstetrical suite(s)
- Radiology department
- Clinics
- Emergency department
- Psychiatry department
- Outpatient surgery areas
- Special procedures area (e.g., endoscopy suite, pain management clinic, etc.)

ASA Standard 3.2.4, requiring monitoring of exhaled CO₂, applies to all anesthesia services listed in the CMS document, both on and off-site, and to the non-anesthesiologist clinicians responsible for sedating patients.¹²

Use of Capnography Goes Worldwide

Subsequent to adoption of capnography as a standard of care by the ASA, anesthesia societies around the world have begun following suit in passing recommendations for monitoring CO₂ during procedural sedation.

In May 2011, the Association of Anaesthetists of Great Britain and Ireland (AAGBI) released a statement that included, "Continuous capnography should be used for all patients undergoing moderate or deep sedation, and should be available wherever any patients undergoing anaesthesia or moderate or deep sedation are recovered."¹³ In January 2012, the Canadian Anesthesia Society (CAS) updated Guidelines to the Practice of Anesthesia requiring the use of capnography during general anesthesia and deeper levels of sedation (Ramsey Sedation Scale 4-6).¹⁴

Summary

Clinical papers and anesthesia societies clearly recognize the importance of using capnography for patient safety during anesthesia and sedation, both inside and outside the OR. Both anesthesiologists and non-anesthesiologists who are responsible for providing moderate and deep sedation should closely follow the recommendations of the experts to maximize patient safety.

References

1. American Society of Anesthesiologists. Standards and Practice Parameters. Standards for basic anesthetic monitoring. Section 3.2.4. (Amended October 20, 2010 with an effective date of July 1, 2011).
2. American Society of Anesthesiologists. Standards, Guidelines, Statements and Other Documents. <http://www.asahq.org/For-Members/Standards-Guidelines-and-Statements.aspx>.
3. Bhananker SM, Posner KL, Cheney FW, Caplan RA, Lee LA, Domino KB. Injury and Liability Associated with Monitored Anesthesia Care: A Closed Claims Analysis. *Anesthesiology* 2006; 104:228-34.
4. Metzner J, Domino KB. The risk and safety of anesthesia at remote locations: the US closed claims analysis. *Current Opinion in Anaesthesiology* 2009; 22:502-508.
5. Cravero JP, Beach ML, Blike GT, et al. The incidence and nature of adverse events during pediatric sedation/ anesthesia with propofol for procedures outside the operating room: a report from the Pediatric Sedation Research Consortium. *Anesth Analg* 2009; 108:795-804.
6. Metzner J, Domino KB. Risks of anesthesia or sedation outside the operating room: the role of the anesthesia care provider. *Current Opinions in Anaesthesiology* 2010; 23:523-531.
7. ASA Standards, Guidelines, Statements. Statement on Granting Privileges for Administration of Moderate Sedation to Practitioners Who Are Not Anesthesia Professionals, 2011.
8. ASA Standards, Guidelines, Statements. UPDATED - Statement on Granting Privileges to Nonanesthesiologist Physicians for Personally Administering or Supervising Deep Sedation, 2012.
9. American Society of Anesthesiologists. Standards and Practice Parameters. Standards for basic anesthetic monitoring. Section 3.2.4. (Amended October 20, 2010 with an effective date of July 1, 2011).
10. American Society of Anesthesiologists. Standards, Guidelines, Statements and Other Documents. <http://www.asahq.org/For-Members/Standards-Guidelines-and-Statements.aspx>.
11. American Society of Anesthesiologists. Sedation and Analgesia by Non-Anesthesiologists 2012.
12. CMS Center for Clinical Standards and Quality/Survey & Certification Group. Requirements for Hospital Medication Administration, Particularly Intravenous (IV) Medications and Post-Operative Care of Patients Receiving IV Opioids. S&C: 14-15-Hospital. March 14, 2014.
13. Association of Anaesthetists of Great Britain & Ireland Safety Statement. The use of capnography outside the operating theatre, updated statement from the (AAGBI) May 2011.
14. Merchant R, Chartrand D, Dain S, Dobson J, Kurrek M, LeDez K, Morgan P, Shukia R. Guidelines to the Practice of Anesthesia: Revised Edition 2012. *Can J Anesth* 2012;59:63-102.