

ASA Upgrades Procedural Sedation Standards: Requirement for Capnography

Capnography, the continuous monitoring of exhaled CO₂, has long been the standard of care for monitoring a patient's ventilation in the operating room (OR). Anesthesiologists have now taken a significant step in improving patient safety outside the OR by recognizing capnography as the appropriate measure of adequacy of ventilation during non-intubated procedures requiring moderate or deep sedation.

In October of 2010, the American Society of Anesthesiologists (ASA) committee on Standards and Practice Parameters re-defined the standards for basic anesthetic monitoring and is now requiring that the adequacy of ventilation shall be evaluated by exhaled carbon dioxide (Effective July 1, 2011). The ASA defines a standard as those documents which “provide rules or minimum requirements for clinical practice. They are regarded as generally accepted principles of patient management. Standards may be modified only under unusual circumstances, e.g., extreme emergencies or unavailability of equipment.”¹ Specifically, in section 3.2.4 of the Standards for Basic Anesthetic Monitoring, the ASA states, “... During moderate or deep sedation the adequacy of ventilation shall 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.”²

This mandate has been created in part because of the inherent risk associated with sedation cases. In most care areas, pulse oximetry is the current practice for respiratory monitoring in non-intubated patients undergoing sedation. While an excellent measure of oxygenation, oximetry does not provide a timely notification of changes in ventilation. Relying on this mode of monitoring as a ventilation marker has been shown time and again to be a late

determinant of respiratory compromise.³ In a comparative study of capnography and oximetry during sedation, Lightdale explicitly states, “...Capnography allowed early detection of arterial oxygen desaturation because of alveolar hypoventilation in the presence of supplemental oxygen. The current standard of care for monitoring all patients receiving sedation relies overtly on pulse oximetry, which does not measure ventilation.”⁴ Additionally in a two-year series of elective endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasonography (EUS) patients, which can involve a number of hours of non-intubated deep sedation, researchers at the Cleveland Clinic “noted that changes in oxygenation that led to hypoxic events were consistently preceded by changes in ventilation, and capnography detected those changes in ventilation prior to pulse oximetry’s detection of oxygenation.”⁵

This risk has also been highlighted through the analysis of

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previous sedation incidents. In a review of an ASA database consisting “of an in-depth investigation of 8,954 closed insurance claims resulting from anesthetic mishaps. Data is gathered in the form of detailed case summaries collected by ASA member anesthesiologists from insurance company claim files.” (Closed Claims Project) When analyzed, the last twenty years of closed claims data demonstrate that legal claims associated with cases outside of the

1. Standards Guidelines and Statements – Viewed 3-21-11 at <http://www.asahq.org/For-Members/Clinical-Information/Standards-Guidelines-and-Statements.aspx>

2. ASA Standards for Basic Anesthetic Monitoring, Committee of Origin: Standards and Practice Parameters (Approved by the ASA House of Delegates on October 21, 1986, and last amended on October 20, 2010 with an effective date of July 1, 2011) - Viewed 3-21-11 at www.asahq.org/Standards%20Guidelines%20Stmts/Basic%20Anesthetic%20Monitoring%202011.ashx

3. Burton JH, Harrah JD, Germann CA, Dillon DC. Does End-tidal Carbon Dioxide Monitoring Detect Respiratory Events Prior to Current Sedation Monitoring Practices? Academic Emergency Medicine. May 2006. 13:5.

4. Lightdale JR. Microstream Capnography Improves Patient Monitoring During Moderate Sedation: A Randomized, Controlled Trial. Pediatrics. June 2006. 117:6:e1170-e1178

5. Qadeer M, Vargo J, et al. Capnographic monitoring of respiratory activity improves safety of sedation for endoscopic cholangiopancreatography and ultrasonography. Gastroenterology. May 2009. 136:1568-76.

operating room lead more frequently to severe injury and have a higher proportion of death. In addition, the ASA concluded that 62% of events could have been prevented with better monitoring.⁶ Another analysis of the claims data demonstrated that respiratory events and *respiratory events leading to death* occurred twice as often when patients were sedated outside the operating room.⁷ It is this risk of compromise and death that the new standards attempt to mitigate with a mode of monitoring that has been clinically validated to be more effective than current use of pulse oximetry.

Note that in this statement the ASA defines the two key elements required to evaluate the “*adequacy of ventilation*”: clinical acumen and end tidal carbon dioxide monitoring. While other respiratory parameters are available

(e.g., respiratory rate, oximetry), none meet the minimum requirements or standards of care as set by the American Society of Anesthesiologists nor do they measure the adequacy of ventilation. Clinical studies and recommendations from a multitude of clinical organizations including the ASA, Joint Commission for the Accreditation of Health Care Organizations (JCAHO), Anesthesia Patient Safety Foundation (APSF), and Institute for Safe Medication Practices (ISMP) clearly recognize the importance of monitoring adequacy of ventilation as is provided with Microstream® Capnography with Integrated Pulmonary Index™ (IPI). Through the use of Microstream Capnography, practitioners will reduce the risk associated with their work, improve patient safety, and comply with basic standards as mandated by the ASA.

6. Metzner J, Posner KL, Domino KB. The risk and safety of anesthesia at remote locations: the US closed claims analysis. *Current Opinion in Anesthesiology*. 2009. 22:502–508

7. Cravero JP et al. Incidence and nature of adverse events during pediatric sedation/anesthesia for procedures outside the operating room: report from the Pediatric Sedation Research Consortium. *Pediatrics* 2006. 118:1087–1096



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