

AAGBI SAFETY STATEMENT

The use of capnography outside the operating theatre

Updated statement from the Association of Anaesthetists of Great Britain & Ireland (AAGBI) May 2011

The AAGBI publications 'Recommendations for standards of monitoring during anaesthesia and recovery' (4th edition) 2007 (1) and 'Capnography outside the operating room' 2009 (2) recommend continuous capnography in all patients who are anaesthetised or intubated, regardless of their location in the hospital, or the type of airway device used. In addition, continuous capnography is recommended for all patients undergoing deep sedation or any sedation where the airway cannot be directly observed, and should be immediately available during the treatment of cardiac arrest.

Whilst the use of capnography is routine in the operating theatre, this is not so in other areas of hospital practice, and the AAGBI recognises that the practice of moderate sedation using agents such as propofol is increasing. The AAGBI would also like to alert the membership to two important recent publications and to strengthen our recommendations on the routine use of capnography. This has the potential to have a major impact on deaths due to airway complications outside the operating theatre (5).

1. The 2010 International Consensus Guidelines on Cardiopulmonary Resuscitation (3) and the Resuscitation Council UK Resuscitation Guidelines 2010 (4) emphasise the importance of capnography during cardiopulmonary resuscitation to continually monitor tracheal tube placement and quality of CPR and to provide an early indication of return of spontaneous circulation.
2. The fourth National Audit Project 'Major complications of airway management' (NAP4) was published in March 2011 (5) and raised particular concerns about complications of airway management in ICU and the emergency department. At least one in four major airway complications reported to NAP4 was from the ICU or the emergency department and more than 60% of events in the ICU led

to death or brain damage. Common factors in both the ICU and emergency department included unrecognised oesophageal intubation or unrecognised displacement of tracheal tubes or tracheostomy tubes after patient movement, intervention, or during transport. Capnography was frequently absent or a flat capnography trace due to airway displacement was misinterpreted during cardiopulmonary resuscitation. The absence of capnography, or the failure to use it properly, contributed to 80% of deaths from airway complications in the ICU and 50% of deaths from airway complications in the emergency department.

The AAGBI recommends that:

- Continuous capnography should be used in all anaesthetised patients, regardless of the airway device used or the location of the patient.
- Continuous capnography should be used for all patients whose trachea is intubated, regardless of the location of the patient (see note 1).
- 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 (see note 2).
- Continuous capnography should be used for all patients undergoing advanced life support (see note 3).

Notes

1. Patients with tracheostomy tubes and who are also breathing spontaneously without ventilator support or continuous positive airway pressure (CPAP) do not normally require continuous capnography.
2. Sedation is a continuum and it is not always possible to predict how an individual patient will respond. **Moderate Sedation/Analgesia (“Conscious Sedation”)** is a drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate...**Deep Sedation/Analgesia** is a drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully following repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. Patients may require assistance in maintaining a patent airway, and spontaneous ventilation may be inadequate (6).

3. The AAGBI recognises that capnography is not yet standard on resuscitation trolleys, but notes that a number of companies produce defibrillators with integrated capnography. The AAGBI recommends that capnography should be available and delivered promptly to any patient undergoing advanced life support.

References

1. AAGBI Recommendations for standards of monitoring during anaesthesia and recovery' 2007 (4th edition)
<http://www.aagbi.org/sites/default/files/standardsofmonitoring07.pdf> (accessed 24th May 2011)
2. AAGBI Capnography outside the operating room' 2009
http://www.aagbi.org/sites/default/files/AAGBI%20SAFETY%20STATEMENT_0.pdf (accessed 24th May 2011)
3. Deakin CD, Morrison LJ, Morley PT. 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations Part 8: Advanced life support. Resuscitation 2010; **81s**: 93–174.
4. Resuscitation Council (UK) Resuscitation Guidelines 2010
<http://www.resus.org.uk/pages/guide.htm> (accessed 24th May 2011)
5. 4th National Audit of the Royal College of Anaesthetists and the Difficult Airway Society: Major complications of airway management 2011 Ed Cook T, Woodall N, Frerk C <http://rcoa.ac.uk/index.asp?PageID=1089> (accessed 24th May 2011)
6. ASA Committee on Quality Management and Departmental Administration: Continuum of depth of sedation, definition of general anesthesia and levels of sedation/analgesia (approved by ASA House of Delegates on October 27th 2004 and amended on October 21st 2009)
<http://www.asahq.org/publicationsAndServices/sgstoc.htm> (accessed 17th June 2011)