

Australian and New Zealand College of Anaesthetists (ANZCA)

Recommendations on Monitoring During Anaesthesia

The terms “anaesthetist”, “medical practitioner” and “practitioner” are used interchangeably in this document. Although this document is primarily aimed at anaesthetists, any practitioner responsible for patient monitoring during “anaesthesia” should follow these recommendations. The following recommendations refer to patients undergoing general anaesthesia, major regional anaesthesia/analgesia or sedation (to be collectively described by the term “anaesthesia”) for diagnostic or therapeutic procedures and should be interpreted in conjunction with other professional documents published by the Australian and New Zealand College of Anaesthetists.

1. INTRODUCTION

- 1.1 Monitoring of fundamental physiological variables during anaesthesia is essential. Clinical judgment will determine how long this monitoring should be continued following completion of anaesthesia.
- 1.2 The healthcare facility in which the procedure is being performed is responsible for provision of equipment for anaesthesia and monitoring on the advice of one or more designated specialist anaesthetists, and for effective maintenance of this equipment (see College professional document *PS55 Recommendations on Minimum Facilities for Safe Administration of Anaesthesia in Operating Suites and Other Anaesthetising Locations*).
- 1.3 Some or all of the recommendations in this document may need to be exceeded depending on the results of the patient assessment at the pre-anaesthesia consultation (see *PS07 Recommendations for the Pre-Anaesthesia Consultation*).
- 1.4 Monitoring must always be used in conjunction with careful clinical observation by the anaesthetist as there are circumstances in which equipment may not detect unfavourable clinical developments.
- 1.5 Visual and audible alarms must be appropriate and enabled at the commencement of anaesthesia by the anaesthetist. There may be exceptional circumstances where this may not be achievable (for example, cardiopulmonary bypass surgery where the patient is rendered apnoeic and pulseless) but those alarms should be made operational as soon as practicable.



2. CLINICAL MONITORING BY AN ANAESTHETIST

- 2.1 Clinical monitoring by a vigilant anaesthetist is essential for safe patient care during anaesthesia. This person cannot be the practitioner performing the procedure. This clinical monitoring should be supplemented when necessary by appropriate devices to assist the practitioner responsible for the anaesthesia.
- 2.2 A medical practitioner whose sole responsibility is the provision of anaesthetic care for that patient must be constantly present from induction of anaesthesia until safe transfer to recovery room staff or intensive care unit has been accomplished (see *PS02 Statement on Credentialling and Defining the Scope of Clinical Practice in Anaesthesia* and the relevant ANZCA training and accreditation handbook).
- 2.3 In exceptional circumstances brief absences of the anaesthetist primarily responsible for the anaesthetic may be unavoidable. In such circumstances that anaesthetist may temporarily delegate observation of the patient to an appropriately qualified person who is judged to be competent for the task.
- 2.4 Permanent handover of responsibility must be to an anaesthetist who is able to accept continued responsibility for the care of the patient (see College professional document *PS53 Statement on the Handover Responsibilities of the Anaesthetist*).
- 2.5 The individual anaesthetist responsible for monitoring the patient should ensure that appropriate monitoring equipment is available. Some procedures necessitate special monitoring (for example, magnetic resonance imaging) or remote monitoring to reduce the hazard to staff (for example, radiological procedures) (see College professional document *PS55 Recommendations on Minimum Facilities for Safe Administration of Anaesthesia in Operating Suites and Other Anaesthetising Locations*).

2.6 Clinical monitoring of the patient

The clinical monitoring of a patient undergoing any type of anaesthesia should include regular assessment and recording of the following:

2.6.1 Circulation

The circulation must be monitored at frequent and clinically appropriate intervals by detection of the arterial pulse and supplemented, where appropriate, by measurement of arterial blood pressure

2.6.2 Ventilation

Ventilation must be monitored continuously by both direct and indirect means.

2.6.3 Oxygenation

Oximetric values must be interpreted in conjunction with clinical observation of the patient. Adequate lighting must be available to aid with assessment of patient colour.

3. MONITORING EQUIPMENT

In general, monitoring equipment aids the clinical assessment of a patient and the following equipment should be available for use on every patient undergoing anaesthesia. However, depending on the type of anaesthesia, some of these monitors are mandatory (please refer to those specific monitors). When the monitors are in use on a patient, the alarms (visual and audible) must be enabled and appropriate (see item 1.5). The audible component of the alarm system must be able to be heard by the practitioner responsible for the anaesthesia. When any of the monitors of physiological function are in use during anaesthesia, regular recordings should be documented in the anaesthesia record.

3.1 Oxygen analyser

A device incorporating an audible signal to warn of low oxygen concentrations, correctly fitted in the breathing system, must be in continuous operation for every patient when an anaesthesia breathing system is in use.

3.2 Breathing system disconnection or ventilator failure alarm

When an automatic ventilator is in use, a monitor capable of warning promptly of a breathing system disconnection or ventilator failure must be in continuous operation. This must be automatically activated.

3.3 Pulse oximeter

Pulse oximetry provides evidence of the level of oxygen saturation of the haemoglobin of arterial blood at the site of application and may identify arterial pulsation. A pulse oximeter must be in use for every patient undergoing general anaesthesia or sedation. When this particular monitor is in use, the variable pulse tone as well as the low threshold alarm shall be appropriately set and audible to the practitioner responsible for the anaesthesia.

3.4 Electrocardiograph

Equipment to monitor and continually display the electrocardiograph must be available for every anaesthetised patient. There should be a five-lead option available for every patient.

3.5 Intermittent non-invasive blood pressure monitor

Equipment to provide intermittent non-invasive blood pressure monitoring must be available for every patient undergoing anaesthesia. A variety of cuff sizes must be available.

3.6 Continuous invasive blood pressure monitor

Equipment to provide continuous invasive blood pressure monitoring should be available. In most cases, this refers to a monitor connected via a transducer to an intra-arterial line.

3.7 Carbon dioxide monitor

A monitor of the carbon dioxide level in inhaled and exhaled gases must be in use for every patient undergoing general anaesthesia.

3.8 Volatile anaesthetic agent concentration monitor

Equipment to monitor the concentration of inhalational anaesthetics must be in use for every patient undergoing general anaesthesia from an anaesthesia delivery system where volatile anaesthetic agents are available. Automatic agent identification should be available on new monitors.

3.9 Temperature monitor

Equipment to monitor “core” temperature continuously must be available for every patient undergoing general anaesthesia.

3.10 Neuromuscular function monitor

Equipment to monitor neuromuscular function must be available for every patient in whom neuromuscular blockade has been induced.

3.11 Monitoring of anaesthetic effect on the brain

When clinically indicated, equipment to monitor the anaesthetic effect on the brain should be available for use on patients at high risk of awareness during general anaesthesia.

3.12 Other equipment

When clinically indicated, equipment to monitor other physiological variables (for example, the electroencephalogram, central venous pressure, transoesophageal echocardiogram, cardiac output monitor or respiratory mechanics) should be available.

RELATED ANZCA DOCUMENTS

PS02 Statement on Credentialling and Defining the Scope of Clinical Practice in Anaesthesia

PS03 Guidelines for the Management of Major Regional Analgesia

PS06 Recommendations on the Recording of an Episode of Anaesthesia Care

PS07 Recommendations for the Pre-Anaesthesia Consultation

PS09 Guidelines on Sedation and/or Analgesia for Diagnostic and Interventional Medical, Dental or Surgical Procedures

PS53 Statement on the Handover Responsibilities of the Anaesthetist

PS55 Recommendations on Minimum Facilities for Safe Administration of Anaesthesia in Operating Suites and other Anaesthetising Locations

ANZCA Handbook for Training and Accreditation

ANZCA Handbook for Training and Accreditation in the Affiliated Training Regions

FURTHER READING

Canadian Anesthesiologists' Society. Patient monitoring. In: Guidelines to the practice of anaesthesia. Toronto: Canadian Anesthesiologists' Society, latest edition. From: www.cas.ca. Accessed 1 August 2008.

Committee on Standards and Practice Parameters, American Society of Anesthesiologists. Standards for basic anaesthetic monitoring. Park Ridge: American Society of Anesthesiologists, latest edition. From: <http://www.asahq.org>. Accessed 1 August 2008.

Short TG, O'Regan A, Lew J, Oh TE. Critical incident reporting in an anaesthetic department quality assurance programme. *Anaesthesia* 1992(47)3-7.

The Association of Anaesthetists of Great Britain and Ireland. Recommendations for standards of monitoring during anaesthesia and recovery. London: The Association of Anaesthetists of Great Britain and Ireland, 2007. From: <http://www.aagbi.org/sites/default/files/standardsofmonitoring07.pdf>. Accessed 1 August 2008.

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ANZCA professional documents are reviewed from time to time, and it is the responsibility of each practitioner to ensure that he or she has obtained the current version which is available from the College website (www.anzca.edu.au). The professional documents have been prepared having regard to the information available at the time of their preparation, and practitioners should therefore take into account any information that may have been published or has become available subsequently.

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