

Recommendations For Safety Standards And Monitoring During Anaesthesia And Recovery Revised 2008



**COLLEGE OF ANAESTHESIOLOGISTS
ACADEMY OF MEDICINE OF MALAYSIA**

In collaboration with



MALAYSIAN SOCIETY OF ANAESTHESIOLOGISTS

Recommendations for Safety Standards and Monitoring during Anaesthesia and Recovery

Revised 2008

**College of Anaesthesiologists
Academy of Medicine of Malaysia**

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Preface to Third Edition

It is more than ten years since the second edition of the 'Recommendations for safety standards and monitoring in anaesthesia' was published by the Malaysian Society of Anaesthesiologists (MSA). By mutual agreement between the MSA and the College of Anaesthesiologists the task of revising and publishing the third edition has been given to the College.

During the course of the last decade there have been substantial changes in the way anaesthesia is being practiced in our country. The safety standards published by the Malaysian Society of Anaesthesiologists have been widely adopted by the anaesthetists in both the public and private health care facilities. This is due to the assertiveness of the younger anaesthetists, having been trained using these safety standards, have managed to persuade the hospital management especially in the private sector to provide these for the benefit and safety of patients. Besides, it is to our credit that the Malaysian Society for Quality in Health which surveys health care facilities for accreditation has adopted our standards in their standards for anaesthesia services. The recently gazetted Regulation of the Private Healthcare Facilities and Services Act (2006) places great emphasis on safety and higher standard of care. The medical defense organizations and medical indemnity insurance companies have also noted our initiative in providing and adopting safety standards which has resulted in anaesthesia being downgraded from a high risk specialty to a medium risk specialty with a concomitant decrease in premium for the anaesthetists.

The Committee on Safety Standards of the College of Anaesthesiologists has reviewed the published safety standards by various professional anaesthesia organizations around the globe with particular attention to our region. We have noted that the traditional monitoring standards for oxygenation, circulation and ventilation have not changed substantially. The notable recommended addition is monitoring the depth of anaesthesia in selected cases. In the 2008 edition of our safety standards the use of capnography/capnometer has been made mandatory in all patients who are being ventilated. Provision of anti-hypoxic device in all anaesthetic machines has also become mandatory. Temperature monitoring is now mandatory in neonatal and paediatric patients. In line with the evolving

practice of using some form of brain function monitoring for depth of anaesthesia we are recommending this in selected cases. In this revision 'Monitored Sedation' has been renamed 'Monitored Anaesthesia Care'.

There have been great improvements in the electronic technology, information and communication technology in the last decade. The quality of monitoring equipments and instrumentation has also seen quantum improvement. The cost of these has become affordable to even the smaller health care facilities. There cannot be any excuse for any health care facilities, which provide anaesthesia services not to provide for the recommended standards and monitoring equipments.

Though monitoring technology has improved remarkably over the years since the first safety standards were published, the anaesthetists' clinical judgment and observation still remain the cornerstone of safe anaesthesia practice and the vigilance of the anaesthetists while administering anaesthetics cannot be overemphasized.

The publication of the revised standards indicates our continuing commitment to high quality of anaesthesia practice and care and to reassure the community of our prime desire to provide for the safety of patients under our care.

Dr Mohamed Namazie Ibrahim

1 February 2008

Preface to First Edition

In recent years there has been a worldwide trend towards the adoption of standards of monitoring during anaesthesia and recovery by national anaesthetic societies. There is general agreement among anaesthetists in many countries that the adoption of good monitoring standards in clinical practice leads to improved patient safety. In one instance the effectiveness of this support by the specialty resulted in the reduction of medical malpractice insurance premiums for practising anaesthetists in the United States. As Malaysia progresses towards being a fully developed country it is vital for medical practitioners to adopt high standards of practice including those related to monitoring to maintain optimal patient safety.

The recommended standards apply to anaesthetics administered in operating rooms and other locations. They have been written for the average practising anaesthetist in mind. There are marked variations in anaesthetic practice in different parts of the country. For example it is recognised that, while adoption of the recommended standards may be easier to achieve in many government hospitals, university hospitals and large private health care institutions, there may be hospitals in which adoption of the recommended standards may take a while due to various constraints.

The costs of technology have fallen sharply in recent years and with time better monitoring equipment will be widely available. However the availability of better monitoring equipment does not replace the anaesthetists clinical judgment and observations of the patient because it is recognised that patient safety depends largely on the vigilance of the anaesthetist.

The recommended standards will evolve with progress in technology; hence they are not intended to be an exhaustive code for guidance of anaesthetists. The Society may revise the recommended standards where appropriate, to take into account changing circumstances.

DR K INBASEGARAN

April 1993

Preface to Second Edition

Over the last few years since the first edition of safety standards and monitoring was published there have been very encouraging developments in relation to the practice of anaesthesia in Malaysia. There have been substantial investments in monitoring equipment both in the public and private sector and the compliance of these standards has been good as shown by a recent survey. Compliance however by small "shop lot" practices have not been encouraging and it is hoped that they will comply with accepted standards of care in the near future.

This revised edition has been done with a help of a larger committee and has incorporated two new sections; one on monitored sedation and the other on pre-anaesthetic consultation. Capnometry has been made a requirement for all intubated patients by 1998 and the design of anaesthetic machines to incorporate an anti hypoxic device has been strongly recommended.

The next few years will see changes in the health scene never experienced before. Changes in the Private hospitals Act, Accreditation of hospitals and the adoption of ISO 9000 standards by health institutions are some of the changes expected. It will certainly mean higher standards of care for patients (compelled by legislation in some cases) and the publications such as these by the Society will show our commitment to high standards of care.

Given the robust economic growth of the country and the sharp drop of costs in medical technology in particular monitoring equipment these standards should be easily attainable by the average practising anaesthetist. The reasons for adoption of better standards of care should be for the benefit of our patients and to reassure the community of the high standards of practice in anaesthesia in Malaysia.

DR K INBASEGARAN

7 March 1997

Section 1 - Principles of Anaesthesia Care

- 1.0 Anaesthetist in this document refers to registered medical practitioner who is either a qualified specialist anaesthetist or a medical officer/trainee who administers an anaesthetic.
- 1.1 All anaesthetics should be administered by a registered medical practitioner with recognized certified training in anaesthesia and resuscitation or by medical officers under adequate supervision of qualified specialist anaesthetist. The specialist anaesthetist shall be responsible for the overall anaesthetic care/monitored anaesthesia care of the patient.
 - 1.1.1 The anaesthetist must be constantly present from induction of anaesthesia/monitored anaesthesia care until safe transfer to the recovery room or to the intensive care unit has been accomplished. In exceptional circumstances, the anaesthetist shall delegate, temporarily, the observation of the patient to an appropriately qualified person who is judged by the anaesthetist to be competent for the task.
- 1.2 Every patient presenting for anaesthesia should have pre-anaesthesia consultation by a registered medical practitioner who has appropriate training in anaesthesia
- 1.3 The anaesthetist must provide an adequate and legible record of the anesthetic and this must be part of the patient's medical records.
- 1.4 Skilled assistance for the anaesthetist must be available at all times during the conduct of the anaesthesia. The skilled anaesthesia assistant's sole responsibility is to assist the anaesthetist and should not have any other duties.
- 1.5 Professional care of the patient during anaesthesia requires the continuous presence of the anaesthetist throughout the anaesthetic. The presence of a skilled assistant is no substitute for the anaesthetist.

- 1.6 It is the responsibility of the anaesthetist to ensure that all equipment used for the administration of anaesthesia is correctly functioning before the start of each anaesthetic.
- 1.7 There must be adequate technical assistance provided to ensure proper functioning and servicing of all equipments used.
- 1.8 There must be adequate assistance available for positioning of patient. A minimum of three persons is required to transfer the patient from the operating table to the patient trolley/bed with the anaesthetist having the prime responsibility for the patient's airway, head and neck. The use of proper devices that allows horizontal transfer of the patient without lifting of the patient is recommended to avoid injury to staff.

Section 2 - The Anaesthetic Machine / Apparatus

- 2.1 The anaesthetic machine or apparatus should be regularly maintained and correctly functioning before the start of each operation. It is the responsibility of the anaesthetist to ensure that the anaesthetic machine is correctly functioning before the start of each operating list. It is also the responsibility of the anaesthetist to ensure that airway equipment, the anaesthetic breathing system* and monitoring equipment are correctly functioning before the start of each anaesthetic. Written protocols should be available wherever possible. (See appendix on protocol for checking an anaesthetic machine before use)

* The anaesthetic breathing system is made up of any combination of tubings, valves, bags and all other accessories which together enable continuity of gas supply from the anesthetic machine to the patient's airway. There must be an

alternative means of ventilating the patient (e.g. a self inflating bag) in the event that the anaesthetic machine fails and has to be eliminated. The oxygen supply for this device must be independent of the anaesthetic machine

- 2.2 The oxygen supply to the anaesthetic machine must be fitted with a device which provides immediate warning (for example an audible alarm) of failure in the oxygen supply.
- 2.3 The anaesthetic machine should be fitted with a system that will prevent the delivery of a hypoxic mixture to the patient (anti hypoxic device).
- 2.4 The anaesthetic breathing system should contain an analyser with an alarm to monitor the oxygen concentration being delivered to the patient.
- 2.5 The anaesthetic breathing system should contain a device such as a pressure gauge to detect and display abnormal changes in pressure such as caused by disconnection, leaks, and overpressure.
- 2.6 The use of device with an alarm to detect disconnection of the anaesthetic breathing system is essential when the patient is connected to a ventilator.
- 2.7 A properly functioning suction apparatus must be available together with the anaesthetic machine.
- 2.8 All anaesthetic machines should be fitted with the waste anaesthetic gas scavenging system.

Section 3 - Intra-Operative Monitoring of the Patient

- 3.1 The anaesthetist should ensure that he/she is able to keep a check on functioning of equipment, depth of anaesthesia, oxygenation, and adequacy of ventilation and circulation from induction of anaesthesia until patient is transferred to the recovery room or post anaesthesia care unit.
- 3.2 Clinical observations of essential vital signs must be supplemented by appropriate monitoring equipment wherever possible.
- 3.3 The following parameters in the patient are essential and must be monitored at all times; oxygenation, circulation and ventilation.
- 3.4 Oxygenation
 - 3.4.1 Oxygenation may be monitored by noting the colour of the patient's mucous membranes and colour of the operative site. The use of pulse oximeter to supplement clinical observations is mandatory. The pulse oximeter shall have a variable pulse tone and a low alarm limit that shall be audible to the anaesthetist or the anaesthesia care personnel.
- 3.5 Circulation
 - 3.5.1 The circulation must be monitored by observation of the pulse, heart rate, and blood pressure
 - 3.5.2 The blood pressure and heart rate must be measured and recorded regularly at a frequency appropriate to the clinical condition of the patient.
 - 3.5.3 The electrocardiogram should be continuously displayed throughout the anaesthetic. It is recognised that a normal electrocardiogram may be present even when the circulation or oxygenation is grossly inadequate. However the electrocardiogram

may provide early warning of impending circulatory failure due to arrhythmias and myocardial ischaemia.

3.6 Ventilation

3.6.1 The adequacy of ventilation must be monitored at all times by noting for e.g.

- Excursion of the chest wall.
- Movement of the reservoir bag.
- Auscultation of breath sounds by a pre-cordial or oesophageal stethoscope
- A tidal volume monitor

3.6.2 The use of capnography/capnometer is mandatory when a general anaesthetic is administered:

- As a quantitative assessment of ventilation
- As a detector of adverse clinical events such as air embolism or pulmonary embolism.
- As an indicator of correct placement of a tracheal tube or laryngeal mask airway.
- As an indicator of the presence or absence of circulation.

3.7 Temperature

3.7.1 The means to measure body temperature should be readily available and must be monitored in situations where change of temperature is intended, anticipated or suspected. Body temperature must be continually monitored in all neonatal, paediatric patients and in all patients where an active warming device (e.g. forced air warming, radiant heater) is used.

3.8 Neuromuscular function

3.8.1 Where muscle relaxants are used a device to monitor neuromuscular function such as a peripheral nerve stimulator should be available.

3.9 Anaesthetic Effect on the Brain

3.9.1 Equipment to monitor the anaesthetic effect on the brain should be available for use on all patients when clinically indicated.

3.9.2 Anaesthetic gas concentration monitoring with a minimum alveolar concentration indicator must be available to detect depletion of inhalational anaesthetic agents.

3.10 Specialised Monitors

3.10.1 Specialised monitoring is required under certain circumstances, for example;

- In complicated operations or specialised procedures.
- During special techniques such as induced hypotension or one lung anaesthesia.
- In patients with coexisting medical disease.

3.10.2 Specialised monitoring includes:

- Invasive arterial and central venous pressure monitoring.
- Neurological function monitoring (e.g. somato-sensory evoked potential monitoring in spine surgery)
- Relevant biochemical and haematological investigations.

3.11 Caveats

3.11.1 It is recognised that brief interruptions of continuous monitoring may be unavoidable. It is recommended when this occurs appropriate documentation must be made in the patient's anaesthetic record

3.11.2 In certain rare or unusual circumstances some of these methods of monitoring may be clinically impractical and appropriate notations must be made in the patient's anaesthetic record to reflect this.

3.11.3 It is recognised that the use of these methods of monitoring is to encourage quality patient care and even when appropriately used may fail to detect untoward clinical developments and observing them cannot guarantee any specific outcome.

Section 4 - Recovery from Anaesthesia

- 4.1 Recovery of the patient from anaesthesia should be carried out in a designated area (Post Anaesthesia Care Unit- PACU/ recovery room) which is appropriately staffed and equipped. The minimum staffing ratio should be appropriate for the planned number of beds that are operational.
- 4.2.1 The minimum requirements for a PACU are:
- Suitable beds/trolleys which are capable of head down tilt.
 - Oxygen supply and appropriate delivery equipment e.g. masks, laryngeal masks, Endotracheal tubes, etc
 - Means for ventilation if necessary.
 - Equipment and drugs for resuscitation including access to a defibrillator.
 - Easy access to a range of monitoring equipment similar to the operating room (see section 3)
 - Suction apparatus
 - Patient warming devices (e.g. forced air warmer, radiant heater), and temperature monitoring devices
 - Permanent and dedicated staff.
 - Facilities for easy and rapid communication to summon medical help.
- 4.2.2 All patients in the PACU/ Recovery Room must be appropriately monitored as their condition may require. (See Section 3)
- 4.3 There should be a formal protocol to cover the transfer of care of the patient;
- From operating room staff to PACU/recovery room staff.
 - From the PACU/recovery room staff to the ward staff or to discharge.
- 4.4 There should be a formal verbal hand-over of the care of each patient with clear instructions on;
- Monitoring for that patient.
 - Line of management for unexpected and expected complications.
 - Criteria for discharge of the patient from PACU/ recovery room area.

- 4.5 Medical staff should be immediately available for an emergency.
- 4.6 The patient should be reviewed by an anaesthetist before discharge from the PACU/recovery room.

Section 5 - Anaesthesia Administered Outside the Operating Rooms

- 5.1 In many instances, areas outside the operating room environment where anaesthetics are administered are areas associated with greater risk to the patient. This may be due to physical separation from the patient e.g. radiological suites, specific hazardous environment e.g. radiotherapy or inability to use certain monitors e.g. MRI. For this reason greater vigilance by the anaesthetist is required to maintain safety for the patient.
- 5.2 Patients are entitled to receive the equivalent standard of care of monitoring during anaesthesia and recovery as they would receive within the operating room. Examples of such areas would include the following;
- Obstetric suites
 - Radiological or imaging
 - Endoscopy rooms
 - Dental surgery
 - Electroconvulsive therapy
 - Casualty
 - Radiotherapy
- 5.3 Where close physical monitoring is not possible due to specific hazard (e.g. radiation, magnetic resonance imaging) suitable adaptations of techniques and equipment to monitor the patient is required to provide an adequate level of anaesthetic care and safety for the patient.

Section 6 - Regional Anaesthesia

- 6.1 Patients who undergo major regional anaesthesia are entitled to receive the equivalent standard of care and monitoring as for general anaesthesia. Examples of such regional techniques would include the following;
- Spinal anaesthesia
 - Epidural anaesthesia
 - Plexus blocks
 - Intravenous regional anaesthesia

Section 7 - Monitored Anaesthesia Care / Monitored Sedation

General - The main objectives of sedating a patient are to bring about anxiolysis, produce a degree of amnesia and maintain cooperation of the patient so that uncomfortable diagnostic and minor surgical procedures may be performed. The drugs given for sedation can produce additional effects that may be life threatening which include depression of protective reflexes and depression of the respiratory and cardiovascular systems. In addition there is wide variation in individual patient's response to the variety of drugs and their combinations particularly in the elderly and sick.

- 7.1 A patient who is to be given any form of sedation for a procedure should be assessed by a qualified medical practitioner and his medical status noted.
- 7.2 The medical practitioner administering these drugs should have certain basic knowledge of the actions of these drugs. He or she should be able to detect and manage appropriately any complications due to the actions of these drugs.
- 7.3 A written record of the time and dosages of the drugs used must be kept as part of the patients records. This record must also

note the monitored values of the patient's vital signs (i.e. blood pressure, pulse rate, respiration, and oxygen saturation).

- 7.4 The medical practitioner administering these drugs should be the one monitoring the patient and must not assume the additional role of the operator.
- 7.5 An intravenous access must be always available from the beginning of the procedure to the time of discharge of the patient.
- 7.6 The procedure should be performed in a location which is suitable in size and environment. It should be staffed and equipped to deal with any cardiopulmonary emergency. The following facilities should be available;
- An operating table or trolley which can be tilted to Trendelenburg position.
 - Adequate lighting and suction equipment.
 - Supply of oxygen and suitable equipment for administration of oxygen.
 - Equipment for laryngoscopy, endotracheal intubation and inflating the lungs with oxygen
 - Appropriate drugs for cardiopulmonary resuscitation and equipment for intravenous administration of drugs
- 7.7 Transfer and Discharge of Patients
- 7.7.1 There should be a formal protocol to cover the transfer of care of the patient;
- From operating room staff to PACU/recovery room staff.
 - From the PACU/recovery room staff to the ward staff or to discharge.
- 7.7.2 There should be a formal verbal hand-over of the care of each patient with clear instructions on;
- Monitoring for that patient.
 - Line of management for unexpected and expected complications.
 - Criteria for discharge of the patient from PACU/ recovery room area.

- 7.7.3 Medical staff should be immediately available for an emergency.
- 7.7.4 The patient should be reviewed by an anaesthetist before discharge from the PACU/recovery room.
- 7.8 In day cases the patient must be discharged into the care of a responsible adult and the patient must be cautioned against driving, drinking alcohol or handling machinery.

Section 8 - Pre-Anaesthetic Consultation

General - Consultation by an anaesthetist is essential for the medical assessment of a patient prior to anaesthesia for surgery or any other procedure. While the main purpose of the consultation is to assess and ensure that the patient is optimised before surgery it also includes other aspects of care listed in this section. The skills and judgment required are different and additional to those involved in the administration of anaesthesia.

- 8.1 The pre-anaesthetic consultation should preferably be performed by the anaesthetist who is to administer the anaesthetic. When it is not possible there must be some means for the findings of the consultation to be conveyed to the anaesthetist administering the anaesthetic.
- 8.2 The consultation should take place at an appropriate time before surgery and anaesthesia to allow for adequate optimisation and consideration of the various factors involved. In the case of emergencies it is recognised that this may not be always possible, but the medical assessment should be done just before the commencement of surgery.
- 8.3 The pre-anaesthetic consultation should include the following;
 - 8.3.1 Relevant present and past medical history.

- 8.3.2 Review of current and past medication and allergies.
- 8.3.3 A clinical examination of the patient.
- 8.3.4 Review of laboratory, radiological and other investigations. If necessary the anaesthetist should request for other investigations.
- 8.3.5 Therapeutic measures if necessary should be also ordered and carried out to optimise the patient.
- 8.4 There should be confirmation with the patient (or guardian where applicable) of consent for anaesthesia and surgery and the nature of the procedure. There should be discussion with the patient or guardian of details of anaesthesia which are relevant and of significance to the patient. This is also helpful in reassuring the patient. The consent form shall be separate from that of the surgeon/operator.
- 8.5 There should be consultation with colleagues in other disciplines where appropriate.
- 8.6 A written summary of the pre anaesthetic consultation should be available and becomes part of the patient's medical record.

Section 9 - Resuscitation Facilities

General - It is recognised that there should be adequate facilities provided for the patient being managed certain critical care areas outside the operating room and intensive care. These include the recovery room, areas where procedures carried out under monitored sedation anywhere in the hospital and clinic procedures done under local anaesthesia. These facilities should include a range of emergency drugs and some resuscitation equipment. The list given is only a guideline and may be modified according to local circumstances

Emergency drugs

1. Adrenaline
2. Atropine
3. Isoprenaline
4. Dopamine
5. Furosemide
6. Lignocaine
7. Sodium bicarbonate - 8.4%
8. Hydralazine / Labetalol
9. Nitroglycerin
10. Diazepam
11. Thiopentone
12. Naloxone
13. Aminophylline/Salbutamol
14. Dextrose 50% and 30%
15. IV fluids - crystalloids and colloids and administration sets.

Equipment

1. Syringes and needles of various sizes
2. Intravenous cannulae of various sizes
3. Chest tubes and drainage sets of various sizes.
4. Oropharyngeal, nasopharyngeal airways and supraglottic airways (e.g. laryngeal mask airway) of various sizes
5. Laryngoscopes and blades of different sizes
6. Endotracheal tubes of various sizes
7. Self inflating bag with masks (i.e. Ambu bag)
8. Oxygen supply and means of delivery via flow meters
9. Nasogastric tubes of various sizes
10. Suction facilities
11. Access to monitoring equipment such as pulse oximeter and ECG
12. Access to a defibrillator

Appendix

Protocol for checking an anesthetic machine before use

(Adopted from Australian and New Zealand College of Anaesthetists Policy Document)

Check List

1. Gases
2. Flow meters
3. Vaporisers
4. Pre-circuit leaks
5. Breathing system selection
6. Circle absorption system
7. Scavenging system
8. Other apparatus

1. Bulk Gas Supply (Medical Gases)

- 1.1 Check wall gas panel lights are all normal and working.
- 1.2 Check the bulk gas gauges on the anaesthetic machine shows appropriate pressure when connected.
- 1.3 Check level of contents of all cylinders on the anaesthetic machine.
- 1.4 Oxygen cylinders less than one-quarter full must be replaced.
- 1.5 Test oxygen failure warning device.
 - 1.5.1 With nitrous oxide flowing at two litres / minute turn off or disconnect machine oxygen supply.
 - 1.5.2 Press emergency oxygen button to bleed the oxygen in the machine. The audible whistle indicating oxygen failure should be heard. Machines fitted with devices to interrupt nitrous oxide flow should do so within 10 seconds.
 - 1.5.3 Restore the oxygen supply to the machine and the audible whistle should cease.
- 1.6 Do the "One gas" test to ensure that there is no crossed pressure hose.

- 1.6.1 Check that wall probe for the high pressure gas hose for oxygen is connected to the correct wall outlet and to the oxygen inlet on the machine.
- 1.6.2 Check that the oxygen analyser is correctly calibrated and that the low oxygen alarm is working.
- 1.6.3 Keeping the oxygen supply "ON" turn off or disconnect all other gas sources.
- 1.6.4 Bleed all other gases from the machine, then open all flow meter controls and check that only oxygen flows as detected by the oxygen analyser.
- 1.7 Connect the wall probe for the high pressure gas hose for nitrous oxide to the correct wall outlet and to the nitrous oxide inlet on the machine.
 - 1.7.1 Restore nitrous oxide flow to the machine and ensure that the bobbin in the nitrous oxide flow meter rises.
- 1.8 In machines with anti-hypoxic devices it should be ensured that a minimum of 25% oxygen will be delivered across the range of gas flows normally used.

2. Flow Meters

- 2.1 Ensure that the bobbin moves freely.
- 2.2 Ensure that the bobbins in all the flow meters are at zero when their controls are turned off.

3. Vaporisers

- 3.1 Check each vaporiser in turn
 - 3.1.1 That it is seated correctly and locked in place when applicable.
 - 3.1.2 That it can be turned 'on' and 'off'.
 - 3.1.3 That it contains sufficient amount of the correct liquid agent.
 - 3.1.4 That the filling and emptying ports are closed.

4. Test for Leaks Upstream of the Common Gas Outlet

- 4.1 Turn on the oxygen rotameter to two litres / minute and occlude the common gas outlet for ten seconds. If the rotameter bobbin does not fall, take steps to detect the sites of leakage.
- 4.2 Repeat this test with each vaporiser turned 'off' and 'on' in turn.
- 4.3 If low flow technique with gas flow of less than one litre / minute are to be used more precise testing should be performed to determine the leakage flow rate.

5. Breathing System Selection

- 5.1 Check that the gas supply at the common gas outlet is connected to the selected breathing system.
- 5.2 Check that the tubes are of the appropriate size to meet the anticipated gas flows.
- 5.3 Check that all the connections are firmly fitted and will not disconnect easily.

6. Circle Absorption System

- 6.1 Soda lime - ensure that this is not exhausted. Renew if necessary, and remove the dust from soda lime when refilling canister.
- 6.2 To check the valve function and leaks in breathing system.
 - 6.2.1 Attach a spare breathing bag to the patient connection end of the 'Y' piece and close the expiratory valve.
 - 6.2.2 Fill both the bags by depressing the emergency oxygen button.
 - 6.2.3 Squeeze the two bags alternately to ensure that oxygen passes from one bag to the other and check visually that each unidirectional valve functions correctly.
 - 6.2.4 Simultaneously squeeze both bags to raise the pressure in the circuit to approximately 30 cm. water. Maintain pressure for five seconds, to test for major leaks.
 - 6.2.5 Open expiratory valve and check that gas spills easily when both bags are squeezed.
- 6.3 Disconnect spare breathing bag and replace with a mask suitable for the patient.

7. Scavenging System

- 7.1 Check that the scavenging system is connected to the selected breathing system.
- 7.2 Check that all components of the scavenging system are unencumbered and allow free gas flow.
- 7.3 If negative pressure is used to aid scavenging check that this does not empty the breathing system.
 - 7.3.1 Fill the breathing system with oxygen by occluding the patient outlet and depressing the emergency oxygen button.

7.3.2 Check that the circuit does not empty when the valve is opened.

7.3.3 Close the spill valve again when this check has been done.

8. Apparatus Mounted on the Anaesthetic Machine

8.1 Other apparatus to be used in the conduct of the anaesthetic should be checked according to the protocol appropriate to the device.

8.2 Special attention should be given to:

8.2.1 Equipment for intubation of the trachea.

8.2.2 Suction apparatus.

8.2.3 Gas analysis devices.

8.2.4 Monitoring apparatus.

8.2.5 Ventilators.

8.2.6 Equipment for alternative means of ventilating patients (e.g. self inflating bag)

8.2.7 Disconnection alarm. This should be checked to ensure that the alarm functions when the breathing system is disconnected from the patient airway.