

## TECHNIQUES FROM AROUND THE WORLD

This is a new section of Update in Anaesthesia in which anaesthetists from different countries and different hospitals explain how they anaesthetise for certain types of surgery. Techniques vary widely from one facility to the next and we hope to illustrate the different methods of anaesthesia which are used. In this edition, anaesthetists from South Africa, India and Indonesia describe how they would anaesthetise a previously fit patient for bowel resection.

### Anaesthesia for a patient scheduled for an elective bowel resection

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The anaesthetic course would vary depending on the type of surgery to be undertaken. This patient is scheduled for a simple laparotomy for a bowel resection, and not a major procedure such as an anterior- posterior resection.

**Preoperative preparation and investigations:** Routine preoperative investigations include a finger prick haemoglobin. Any further investigations would depend on the case scenario and the patient's pre-morbid state.

**Premedication:** Temazepam 10-20 mg depending on the patients weight. DVT prophylaxis (for prolonged procedures) with 5000 units of heparin administered subcutaneously.

**Pre-induction:** Venous access is established by placing a large bore intravenous catheter and the administration of modified Ringers lactate

**Induction:** In the absence of any indication for a rapid sequence induction, anaesthesia would be induced with 3-4mg/kg of thiopentone and 0.1mg/kg of vecuronium. The patient is then manually ventilated via a facemask with 50% oxygen in air and 1.5% halothane for 3 minutes after which an oral endotracheal tube is inserted. A rapid sequence induction would be performed if there was any risk of reflux and aspiration.

**Maintenance:** The patient is ventilated with an oxygen/air/halothane mixture. If the patient had received halothane within the last 6 months, isoflurane would be used instead. A circle system is used with a total flow of about 1 litre / minute.

A nasogastric tube would be inserted. Intermittent boluses of vecuronium to maintain surgical relaxation. Analgesia would be provided by 10-15mg of morphine intravenously.

**Monitoring:** 3 lead ECG, non-invasive blood pressure at 3 minute intervals, pulse oximetry, capnography, urinary catheter and peripheral nerve stimulator. Nasopharyngeal temperature probe is used with prolonged surgery. An internal jugular CVP line would be placed if large volumes of fluid shifts were anticipated.

**Fluids:** Modified Ringers lactate at approximately 6-8 mls/kg/hr. Additional colloids and crystalloids administered as required to replace fluid and blood loss and for third space losses.

**Other measures:** Temperature is maintained with forced air warming blanket for a prolonged procedure. Dynamic calf compressors are used to prevent DVT. Antibiotics would be given i.v. in theatre - benzyl penicillin 2 million units, gentamicin 6mg/kg and metronidazole 500mg.

**End of anaesthesia:** Discontinuation of volatile agent. Reverse muscle relaxation with 0.4mg glycopyrrolate and 2.5mg of neostigmine. Extubate patient and transfer to the recovery room, with 40% oxygen via a Venturi facemask.

**Recovery Room:** Patient nursed in the recovery position and given 40% oxygen by facemask. Monitor non-invasive blood pressure and pulse oximetry.

**Pain Management:** Further intravenous boluses of morphine as required to ensure adequate analgesia before transfer to ward.

#### Recovery discharge criteria for ward:

- Patient awake and able to cough
- Sustained head lift for 5 seconds
- Pain free
- Haemodynamically stable
- No nausea or vomiting
- Haemostasis as assessed via surgical dressing

#### Postoperative Instructions

**Monitoring:** Routine postoperative monitoring to include heart rate, respiratory rate, blood pressure every 15 minutes for 2 hours and then 4 hourly if patient stable.

**Fluids:** 5 % dextrose in 0.45% saline; 1000mls each 8hrs

**Analgesia:** Morphine infusion 20mg of morphine in 200mls of saline @ 10-15mls/hr titrated to effect

**How would you anaesthetise a 50 year old previously healthy patient scheduled for elective laparotomy and bowel resection?**

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Patients scheduled for bowel resection invariably have some degree of bowel obstruction and malnutrition. Causes include malignancy, inflammatory bowel disease or more rarely cases of amoebiasis or extra-lumen abscess constricting the bowel.

**Preoperative evaluation** includes physical examination, vital signs evaluation and laboratory evaluation of Hb, Hct, albumin, creatinine,  $K^+$ ,  $Na^+$  and blood glucose whenever possible. A chest X-ray will provide important data for the lung conditions, possible lung metastases and heart configuration. ECG recording is useful in identifying arrhythmias, coronary ischemia and hypertrophy.

**Premedication** is determined by the patient's psychological state as assessed at the preoperative visit. A dose of midazolam 2.5 - 5mg i.m. will help relax the patient; promethazine 1mg/kg i.m. or diazepam 0.2mg/kg i.m. are alternatives. This sedation applies for both general or regional anaesthesia.

When ether anaesthesia is planned, atropine 0.25mg i.m is given preoperatively followed by 0.25mg i.v. on induction to prevent hypersecretion of the salivary and bronchial glands. Opioid analgesia should be provided when the plan includes halothane which has a low analgesic property (e.g. pethidine 1mg/kg or morphine 0.1 mg/kg).

**Anaesthesia:** Some surgeons are capable of performing bowel resection very quickly. With such a surgeon epidural anaesthesia can sometimes be used for lower abdominal operations. A continuous lumbar epidural with the catheter inserted at the lumbar 2-3 intervertebral space usually works well. Lignocaine 1.5% to 2.0% with 1:100,000 adrenaline is used to produce anaesthesia up to the sensory level of thoracic segment 4-6th. However regional anaesthesia is not safer for this type of surgery and general anaesthesia is usually preferred.

**Induction** is usually with thiopentone or ketamine and suxamethonium followed by tracheal intubation. This is followed by an inhalational agent (halothane or ether)

administered with a non-depolarising muscle relaxant such as pancuronium and controlled ventilation. Although deep ether may be used with spontaneous or assisted ventilation (stage III plane 2 or 3), light ether anaesthesia (stage II or I) with pancuronium is preferred because the patient will recover very quickly.

**Basic vital sign monitoring** includes blood pressure, pulse rate, temperature (usually rectal). A precordial stethoscope and a finger on the pulse is compulsory. Ventilation is usually manual, but when a simple ventilator is used chest movement is observed continuously.

**Intravenous fluids:** Preoperative hydration is 1000 ml of Ringer dextrose or Ringer's lactate starting before bowel preparation and continued up to the time of induction. During surgery Ringer's lactate or NaCl 0.9% is given at 10ml/kg/hour via a 16G or 18G i.v.catheter placed in the arm.

**Blood loss** in excess of 15% - 20% of estimated blood volume is replaced with blood transfusion. In my institution we try to delay transfusion until the postoperative period if the circulation is stable. This allows the patient to complain of any adverse effect from the transfusion. When transfusion is delayed, Ringer's lactate 2-3 times the measured loss is given.

**Postoperatively:** At the end of the procedure the patient is extubated and supplemental oxygen is given for 4-6 hours postoperatively. The patient stays in the recovery room before being transferred to the ward. In many hospitals there is a new trend of keeping these patients in a high dependency care area so that the vital signs, fluid balance and pain management can be optimized.

**Postoperative instructions** include pain management, which is often oversimplified and not effective. Opioids are frequently in short supply and this form of analgesia may be impossible. Alternatively, i.v. NSAIDS are more readily available but more expensive.

Ringer's lactate and dextrose 5% 40-50 ml/kg/day is given postoperatively taking into account the high ambient temperature in the ward. As soon as possible gradual oral alimentation is started and normal diet is resumed around day 5 with most patients.

Malnutrition occurs commonly in developing countries and increases the risk of surgery considerably. Although parenteral nutrition has not been proved to be beneficial in these circumstances, we believe that giving some nutrition is better than none. The cost of dextrose 10% is exactly the same as dextrose 5%, and some brands of amino acid

preparations are reasonable compared to the risk of dehiscence (wound breakdown). Many centres therefore give peripheral parenteral nutrition using dextrose 10% plus amino acids, particularly to those patients who are unlikely to be able to eat for more than 7 days.

### **Management of a case of small bowel obstruction for resection in India**

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The management in India would vary widely, from the limited facilities in remote regions to standard anaesthetic techniques in the cities and towns. However a patient requiring such intervention is likely to be taken 20 - 200kms to the nearest large town or city where the facilities available would be either a Government hospital or a private nursing home.

#### **Preoperative preparation**

**Investigations:** Hb, urea, creatinine and electrolytes whenever available, blood grouping and crossmatching if indicated. An ECG is usually performed over the age of 40 years. A chest X-ray is only performed if there is clinical evidence of cardiac or respiratory disease.

**Preoperative fluid resuscitation** is usually with Ringer's lactate and organised by the surgeons. A nasogastric tube is usually inserted on the ward. It is common for patients coming from remote areas to be taken for surgery with inadequate resuscitation and investigations.

**Anaesthetic technique:** Intravenous access is secured using a cannula or Butterfly needle. Premedication, when given, is usually i.v. pethidine (25-50mg), buprenorphine or pentazocine. Morphine is rarely available. Intravenous atropine 0.6mg and metoclopramide 10mg are given by some anaesthetists.

**Induction** is carried out in the operating theatre using thiopentone and suxamethonium. If an assistant is available cricoid pressure is applied and the patient intubated using a red rubber endotracheal tube.

The patient is maintained on a mixture of oxygen, nitrous oxide and halothane and relaxation continued using pancuronium. Further doses of 10mg pethidine are given as required. In poor risk patients diazepam or midazolam may be used in small doses to supplement induction. Occasionally spinal anaesthesia is used where general anaesthetic techniques are not available.

**Reversal:** The patient is given neostigmine and atropine (2.5mg+1.2mg) and the patient extubated on the table when there is adequate respiratory effort. Once the anaesthetist is satisfied with the ability of the patient to maintain their airway and respiration the patient is moved to the recovery area.

**Recovery:** The pulse, respiration and BP is recorded every 15 minutes (manually) by a trained nurse or operating department assistant. Before moving the patient to the ward the anaesthetist is contacted and approval obtained.

#### **Post Operative Instructions**

**Observations:** Record pulse, respiration, BP every 15 minutes for 2 hours, then every 1/2 hour or as required.

**Analgesia** is i.m. pethidine 50 mg 6 to 8 hourly. This may be combined with i.m. diclofenac 50mg bd. Buprenorphine is also used and occasionally morphine. Tramadol is becoming popular.

**Intravenous fluids** are given as advised by the surgeon and is usually of the order of 2000mL Ringer's lactate solution over the next 12 hours.

Note that postoperative instructions are usually written up by the surgeon as they supervise the postoperative care, and the anaesthetist is usually not involved. The incidence of deep vein thrombosis (DVT) appears to be low therefore prophylaxis is unusual.