33. Understanding the Anaesthetist

The first thing to be said about anaesthetics is that they should be avoided if possible. Modern anaesthetics have never been safer but they are not as safe as no anaesthetic. Using general anaesthesia has never been more expensive. Anaesthetists only wish to give general anaesthetic in the operating theatre, which is the most costly facility in the hospital, another reason to carry out as much surgery as possible using local anaesthetic outside the operating theatre. In our hospital it is now quite rare for a patient to be anaesthetised for a dento-alveolar procedure; we simply do not offer it. Nearly all cases can be done with local, or local and sedation. There are a few exceptions, such as the IV drug abuser who may be difficult to sedate.

The anaesthetic room will have all the anaesthetic equipment of the theatre itself

Anaesthetists provide a number of different services apart from giving general anaesthetics. They provide a pain relief service for obstetrics, run a chronic pain service for outpatients, supervise the nurse-provided acute pain service for inpatients, and they also run the Intensive Care Unit and provide a sedation service.

Anaesthetists carry out some sedation for us for patients who have severely compromised general health, such as ischaemic heart disease or chronic obstructive pulmonary disease. In this circumstance the safest way to deal with them is to use local anaesthetic in the operating theatre with an anaesthetist monitoring them with an ECG, administering a small amount of sedation intravenously and oxygen via a small nasal cannula. Fit patients who are having minor surgery and are ASA grade 1 or 2, we may sedate ourselves with midazolam in the outpatient clinic.

The anaesthetist will be responsible for the patient's systemic well being whilst in the operating theatre. He will normally visit the patient pre-operatively to ensure they are to fit for anaesthetic, to discuss the anaesthetic with the patient and to make themselves cognizant of any special problems the patient may have. They will administer the anaesthetic in the anaesthetic room, then transfer the patient to the theatre where they will monitor the anaesthetic and the patient's general condition.

During surgery the anaesthetist will administer any intravenous medication that may be requested, for example antibiotics or steroids to prevent swelling (usually dexamethasone 8mgs), and will be in charge of the same. You must ask the anaesthetist's permission if you wish to give any medication at the operation site, for example local anaesthetic and vasoconstrictor to increase pain control or decrease bleeding. At the end of the operation the patient will be woken up by the anaesthetist and accompanied to the recovery room where they will be looked after by a recovery nurse. Throughout, the anaesthetist will still be in charge of the patient's general condition, and will give permission when the patient has recovered sufficiently for them to be transferred back to the ward with their named nurse.

A trained anaesthetic nurse or an operating department practitioner (ODP) will assist by fetching and carrying, drawing up drugs with the surgeon, and occasionally monitoring the patient, particularly during a long case. In some hospitals, there are 'physician's assistants' who can give the whole anaesthetic supervised by an anaesthetist who might be elsewhere in the theatre suite.

You will find that some specialize in one area of practice, particularly chronic pain or intensive care. More frequently they will have a special interest and skill in some particular practice, such as children or OMFS. In our speciality we are always operating in the area where the anaesthetist wants to be in control of the patient's airway, which has its own special problems, and small children should be anaesthetised by someone who has had special training and a continued special interest in dealing with children. We frequently operate on children under two years for dog bites and other lacerations to the face.

The endotrachael tube prepared for the anaesthetist by the ODP. It has a cuff which is inflated with air from a syringe to make a seal within the trachea

When the anaesthetist visits the patient before the beginning of the operating list he will expect to know exactly what the surgeon intends to do. Usually this will be obvious from the operating list, particularly if the surgeon and anaesthetist usually work together on similar cases. However they should be informed if anything out of the ordinary is contemplated, such as length of the surgery or special airway requirements. Any pre-operative investigations needed should have been organised at a pre-booking or pre-admission clinic by nurses according to agreed protocols, and all patients receiving a general anaesthetic for all but in 'emergency' operations should have no solid food for six hours pre-operatively and no fluids for four hours to ensure their stomachs are empty, in order to minimise the risk of aspiration of stomach contents into the airway. In some hospitals patients having major or complicated surgery and those with complex medical problems who might be high risk may be required to see the anaesthetist in addition to the nurse led clinic.

One of the anaesthetist's responsibilities is the patient's airway and he will usually place a pack in the pharynx at the beginning of the surgery to catch blood or other debris. The pack remains the responsibility of the anaesthetist and at the end of the operation the surgeon should ask the anaesthetist if he wants his pack removed. When the reply is a certainty it should be removed and the pharynx sucked out. This should include careful suction of the post nasal space under direct vision or blood clots caused by bleeding during nasal intubation. The anaesthetist will normally check the pharynx themselves using a laryngoscope before they wake the patient up. One of the questions that the anaesthetist is likely to ask before the surgery is what sort of tube you want. He is referring to the tube in which he delivers the anaesthetic gases to the lungs and, as you will almost certainly be operating around the mouth and face, a mask over the nose and mouth will be contra-indicated as it will obstruct your access. There are four possibilities – the first is an endotracheal tube passed through the nose and known as a 'nasal tube'. This will be the most convenient for operating in the mouth as it will obviously not interfere with your access to the operative site.

From the anaesthetic point of view it does have the disadvantage in that it is not so easily passed and this may become a problem if you are operating on a child or somebody with a narrow nasal airway, particularly somebody who has a deviated septum, allergic rhinitis or a history of trauma to the nose. In these circumstances it may be easier to compromise and work with the second option - an endotracheal tube passed through the mouth known as an 'oral tube'. It is quite usual to carry out many procedures in the mouth around an oral tube, particularly unilateral ones, although it does require some adaption for the surgeon. Some procedures are not possible with an oral tube, such as reduction and fixation of fractures where you will need to occlude the teeth together during the operation. The third possibility is a laryngeal mask. Here the anaesthetic gas is passed through a rather thicker tube and the seal with the airway is made at the larynx by contact with a fairly bulky mask apparatus. From the anaesthetic point of view it does away with the need to pass a tube through the larynx into the trachea so the patient does not require paralysing and the anaesthetic process is much quicker. From the operative point of view the tube is quite bulky and difficult to work round and if you are not used to working with a laryngeal mask it is quite possible that you may dislodge it during the procedure. However, an experienced surgeon can frequently work adequately around a laryngeal mask which has been expertly placed.

Laryngeal mask airway (LMA)

Lastly the anaesthetic can be delivered through a tracheostomy. This is reserved for our major head and neck cancer patients and those with severe facial trauma. The patient is anaesthetised in the conventional manner and an oral tube placed, then a tracheostomy is made and a tube passed into the trachea as the anaesthetist withdraws the oral tube. Now the surgeon can operate anywhere in the head and neck without compromising the airway and is secure in the knowledge that the airway will not be affected by post-operative swelling or bleeding.

Tracheostomy and below with Portex tube in position

Once in the anaesthetic room the anaesthetist will again check the patient's wrist band and ask the patient to confirm their identity. The anaesthetic can then commence. The first task is to place an IV cannula; the ODP will have drawn up all the drugs needed into syringes and labelled them. The anaesthetic is usually induced with an intravenous infusion of an anaesthetic drug such as Propofol. Sometimes the patient may be induced by breathing an inhalation anaesthetic through a mask. Once consciousness is lost the patient will be ventilated with a face mask using an inhalation anaesthetic carried in a mixture of nitrous oxide and oxygen. Once they are deep enough a muscle relaxant is given and a tube passed. The tube is then connected to the anaesthetic machine and secured. The patient's eyes are covered to prevent accidental injury.

Drugs drawn up and labelled by the ODP. From left: Dexamethasone (steroid to reduce swelling & anti-emetic), Mivacurium (short acting non depolarising muscle relaxant), Atropine (antimuscarinic), Ondansetron (anti-emetic), Morphine (opiate analgesic), Co-amoxiclav (antibiotic)

Once the patient is anaesthetised there are other preparations to make before they are ready for surgery. For major cases this may include an arterial line to directly measure blood pressure and to sample for blood gases and pH levels, a central venous pressure line to help gauge fluid status and a cerebral function monitor to measure the depth of the anaesthetic. Once the anaesthetic has been administered the patient will be transferred to the operating theatre where they will be connected to a blood pressure cuff and a pulse oximeter. There may be a urinary catheter to monitor urine output and a temperature probe (often in the urinary catheter) to measure core body temperature. A naso-gastric tube may be passed to aspirate stomach secretions and prevent regurgitation. The patient may be covered in an inflatable blanket to maintain their temperature and have pneumatic compression stockings to gently squeeze their calves to prevent thrombosis in the large veins in the legs. This can be fatal if a clot should embolize and pass into the lungs.

A more recent development is the Total Intravenous Anaesthetic (TIVA). Here the propofol used for induction is continued, using a syringe driver throughout the operation. This may be accompanied by a continuous infusion of a short acting opiate such as remifentanil. In this technique the only gas delivered to the patient's lungs is a mixture of oxygen and air.

During surgery the anaesthetist and ODP will monitor the patient and record the progress on the anaesthetic chart. They will administer any drugs and at the end will wake the patient up and accompany them to the recovery room, handing their care over to the recovery nurse. The patient remains the anaesthetist's responsibility while they are still in the theatre suite. The recovery nurse will ask the anaesthetist's permission to send the patient back to the ward when they have recovered sufficiently. The anaesthetist will ensure that the patient has post-operative analgesia prescribed for the post-operative period; they regard this as one of their responsibilities and are normally very keen that we inject a long acting local anaesthetic with a vasoconstrictor around the operation site as it contributes to a more comfortable recovery.

We have already mentioned that in much OMFS we are attempting to share the upper airway with the anaesthetist. This can cause potential difficulties. In addition there will be a number of specific problems related to our patients which might cause difficulty with conventional intubation. The anaesthetist will want to be forewarned of these so that he can modify his technique. These include patients with obstruction to the airway as a result of cancer or trauma, abnormality of anatomy such as severe retrognathia, limitation of jaw opening consequent upon jaw ankylosis, and fractures of the mandible, maxilla or malar. A common problem is limited mouth opening caused by an acute dental abscess which has been allowed to prosper by negligent management with antibiotics rather than by early drainage by pulp extirpation or extraction.

The anaesthetist will always assess the difficulty or ease of intubation before starting. This assessment will involve an examination of the patient's neck. Difficulty can be anticipated in patients with short, fat necks and those with reduced neck flexion as might be caused by arthritis. They will assess jaw movement in an anterior posterior direction but most particularly mouth opening. They may do this using the Mallampati test which is a grading of visibility of mouth structures with the patient sitting in a head neutral position; the patient is asked to open their mouth as wide as possible and fully protrude their tongue. If this gives full visibility of the tonsils, uvula and soft palate this is a good sign but if only the hard palate can be seen this is a sign that conventional intubation might be difficult.

Anaesthesia is usually induced IV

Intubation. The patient has been induced IV & the anaesthetic physician's assistant is passing an oral tube though the vocal cords into the trachea with direct vision using the laryngoscope. This is helped by an assistant putting downward pressure on the larynx

Once in place the tube is connected to the anaesthetic circuit and secured. The position is checked by inflating the lungs by squeezing the gas reservoir bag and listening to the chest with a stethoscope. The correct position will also be confirmed by looking at the observation monitor which will show the presence of expired CO_2. The eyes are taped shut and protected

Everyone is monitored with ECG and blood pressure

Pulse oximeter on forefinger. This monitors oxygen saturation and pulse rate. A decorative ring is taped

The video monitor during a major case. It shows ECG, pulse rate, blood pressure, O2 saturation, expired CO2, central venous pressure, direct arterial pressure & temperature

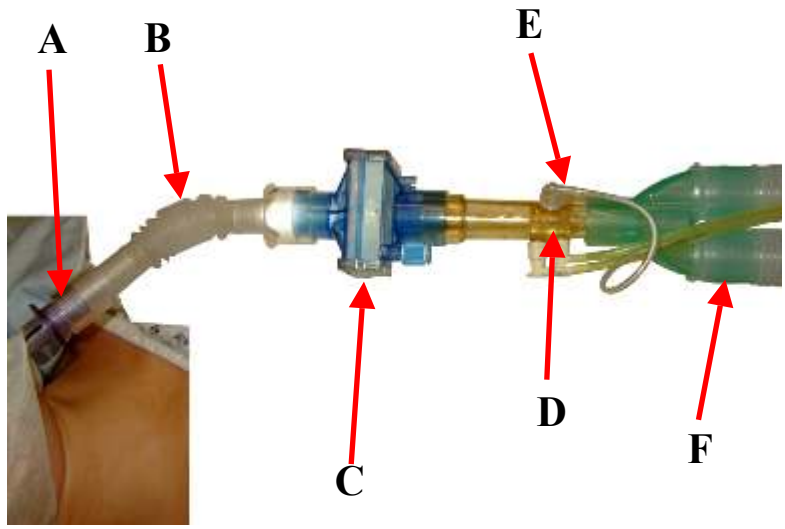
If a patient is given a conventional anaesthetic induction with propofol and a muscle relaxant and then the anaesthetist cannot place a tube in the trachea this is potentially dangerous as the patient will not be able to breathe and the airway might be lost. An alternative technique is to give the patient a gas induction so that he breathes into a deep anaesthetic without a muscle relaxant. However this might be problematical if it is difficult to get a good air seal with a face mask because of abnormal anatomy, facial trauma or a beard, or if the patient is obese and might de-saturate their oxygen concentration quickly. In days of yore some anaesthetists practised the blind nasal intubation in which the patient was induced and then a tube was passed in through the nose and manipulated into the trachea without direct vision. The success of this was based on skill, experience, luck and bravado. This is considered to be too risky nowadays so for potentially difficult intubation cases the fibre-optic intubation technique is used by an anaesthetist who has received special training and has a special interest and skill.

TIVA. Propofol and Remifentanil being administered by continuous infusion from a syringe driver

A nasal airway placed after the tube is removed to prevent airway obstruction during recovery

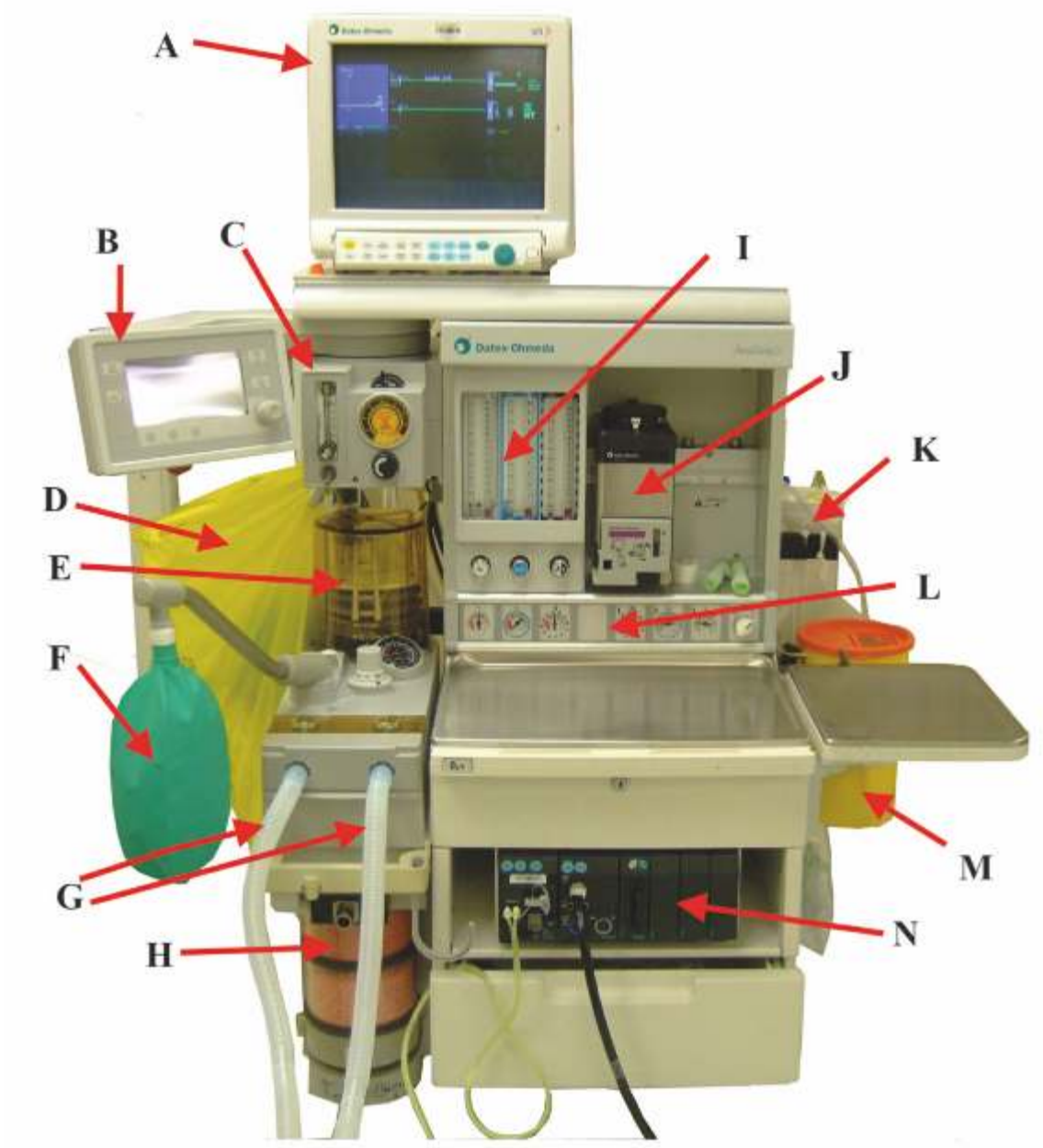
Bispectral index cerebral function monitor. It monitors the depth of anaesthesia by recording electrical activity (Electroencephalography or EEG)

Breathing circuit



A*: Endotrachael tube passing into patient's mouth* ***B****: Connector to tube* **C***: Gas filter/humidifier* **D***: Gas pressure/flow monitor* **E***: Gas (O_2, N_2O and anaesthetic vapour monitor system* **F**: *Anaesthetic gases circuit, in and out*

Anaesthetic machine



A*: Monitor* **B***: Ventilator control system* **C***: Suction control* **D***: Clinical waste bag* **E***: Ventilator bellows* **F***: Reservoir bag* **G***: Anaesthetic gas circuit, in and out* **H***: $C0_2$ scavenger* **I***: Gases flow meters* **J***: Vaporiser for anaesthetic* **K:** *Suction chamber* **L:** *Gas pressure gauges* **M:** *Sharps box* **N***: Monitoring modules for blood pressure, O_2 saturation, arterial pressure, central venous pressure, temperature*

Fibre-optic intubation

1. A conventional endoscope is used. This has a fibre optic light source, a suction portal and fibres which allow vision through the end either directly or via a video display

2. An IV catheter is placed and the patient may be sedated with Remifentanil, a short acting opiate, and given some Glycopyrronium, an antimuscarinic to dry up nasal and salivary secretions. Topical local anaesthetic is placed in the nose

3. Local anaesthetic is injected into the larynx to facilitate the passing of the tube through the vocal cords

4. The endoscope is passed through the endotrachael tube and is then advanced down to the larynx and through the vocal cords into the trachea, facilitated by vision though the scope displayed on the VDU

5. Once the end of the endoscope has passed into the trachea the tube can be safely passed over it into the trachea. The scope is then removed and the tube can be attached to the anaesthetic breathing circuit