# A case study relating to the principles of anaesthetic practice

ASSIGN BUSTER

In this assignment the key features of the pre-operative assessment, anaesthesia and airway management will be explored. I will be identifying a range of drugs that are used and will explain their behaviour and indicate the dosage. I will be reflecting on my own experience of checking an anaesthetic machine following the AAGBI guidelines, and explaining how to check anaesthetic equipment with regards to the AAGBI guidelines. I will also be reflecting on a patient undergoing anaesthetic on my placement. I have changed the name of my patient who I will be following through the anaesthesia for confidentiality reasons. Therefore I will be calling my patient Helen. The HPC code of conduct states that " you must respect people's right to confidentiality" (Urwin 2007).

Helen was referred to the hospital by her GP after suffering bad pains and tightening around her back. After a series of investigations which included an ultrasound scan, gastroscopy, MRI, and blood tests, it was found that Helen had stones in the gallbladder with increased wall thickness. This was detected through the ultrasound scan. She was then diagnosed with symptomatic gallstone disease and given a date to have Laparoscopic Cholecystectomy. For this procedure a general anaesthetic will be given and she will need to been intubated. Laparoscopic Cholecystectomy is the surgical removal of the gallbladder with a scope. These examinations where carried out in the out-patients consultation. Here the surgeon decided the diagnosis from the patient's history, full physical examination and results from the investigations (Simpson, Peter 2002).

A few days before the patient is due to come in for surgery they are asked to attend a pre operative assessment clinic. Here the patients general heath is

checked, current and past medical history is asked and also any family history such as, hereditary conditions like malignant hyperthermia, cholinesterase abnormalities, and porphyries. These can all affect the anaesthetic process in some way (Aikenhead et al 2007). Bloods are then taken for cross matching and the anaesthetist requested an electro cardio gram to be taken due to Helens age. The patient is also asked about any medications she may be taking as these too can interact with some of the agents that may be used during anaesthesia. Alcohol, smoking and the use of recreational drugs can all affect the anaesthesia at some point. For example someone who drinks alcohol regularly may have liver dysfunction which may lead to the patient to be resistant to a range of drugs including induction drugs and sedative drugs (Davies and Cashman 2004). The anaesthetic history of the patient will also be looked at, questions will be asked to the patient and anaesthetic notes will be read by the anaesthetist. This is carried out as the patient may have had problems during anaesthetic in the past and this could then be avoided (Aitkenhead ET all 2007). At the end of the assessment the patient has the chance to ask the anaesthetist any questions they may want to ask. This is great for the patient as it can limit any stress they may have and this in turn reduces blood pressure and relaxes the heart (Davey and Ince 2005). The pre operative assessment is also there to ensure that the patient knows exactly what procedure they are having (Wicker and O’Neil 2006). The assessment identifies any potential problems which can save the operation from been cancelled (Simpson Peter 2002). Helen had no history of any conditions that ran in the family; she is currently taking no medications and has never had an anaesthetic before.

The day before the operation the anaesthetist visits the patient on the ward. Here some final checks are done to see whether the patient is fit for surgery (Davey and Ince 2005). The patient's physical status is assessed. This is done using the ASA classification. Class 1 being a healthy person and class 5 being a patient who is not expected to survive without an operation. Helen was class 2 which meant mild to moderate systemic disease not necessarily related to the condition requiring surgery, (e. g. hypertension). Helen's physiological measurements were taken. Her Blood Pressure was 120/90, Respiratory Rate 18, Temperature 36. 5, Body mass index 26, Oxygen saturation 96%, Pulse rate 70, Blood Glucose level 8. 2, and weight 80. 3kg. The patient's airway is then assessed using the mallampati scoring system. This is done by the patient opening their mouth and sticking out their tongue. It is used to try and forecast how easy or difficult it will be to intubate the patient. The lower the score the easier to intubate (Steven et al 2003). See appendix 1. Helen has a mallampati score of 2 which meant that intubation shouldn't be too hard. However the anaesthetist also looks for other physical problems that may cause intubation to be difficult, for example, sunken cheeks, small mouth, prominent jaw, a short neck, and loose teeth (Woodhead and Wicker 2006). Helen had none of these problems however a difficult intubation trolley is always kept in the anaesthetic room incase intubation become difficult. If the patient is obese then they are usually advised to lose some weight before the operation as obesity increases the risk of wound infections, chest infections, and deep vein thrombosis (Davies and Cashman 2006). The patient should then be prepared for theatre by signing a consent form, fasting and pre medication. Fasting is where the patient cannot eat for 6 six hours, and not to drink any

fluids after 2 hours before surgery (Woodhead and Wicker 2006). This is to reduce the risk of aspiration of stomach contents during induction or recovery of anaesthesia (Wicker and O'Neil 2006). According to Davies and Cashman (2006), pre-medication is in place to relax a patient before they go down to theatre, and also to reduce any pain that the patient may be in. During the pre-operative assessment Helen was given 200mg of ibuprofen to be taken up to the surgery and on the morning of the operation. This was to reduce and pain that Helen may have been in.

It is a mandatory requirement to check all anaesthetic machines and equipment before use each day. In 2004 the association of anaesthetists of Great Britain and Ireland published their third edition checklist of how to check anaesthetic equipment. The check list was approved by professionals and covers various aspects of checking the anaesthetic machine including pipelines, breathing system, ventilation, and monitoring equipment. Staffs have to be trained to check the equipment and a book must be signed by each person who checks the machine and equipment. (The association of anaesthetists of Great Britain and Ireland 2004). With the supervision of my mentor I started to check the anaesthetic machine ready for the day. I firstly made sure that the anaesthetic machine was connected to the mains electricity supply, and switched on. I then began to test all monitoring devices such as the pulse oximeter, capnograph, and oxygen analyser. I then checked that all pipelines were connected and connected to their correct terminal. This is to prevent the wrong gas been given to the patient. The pipe probes have a collar around them and each is different diameters to the other which prevents the probe being inserted into the wrong exit so the

wrong gas in theory would never be given to a patient however it is still very important to check them. The check for this is known as the tug test. To do this I pushed the pipes is into the correct point and then i tried to tug them back out. This will tell you whether it is connected properly. The next piece of equipment on the anaesthetic machine that needs to be checked is the flow meter; i did this by looking to see if the bobbins were spinning and moving freely. I checked the anti-hypoxia device by turning the oxygen and nitrogen oxide on and disconnecting the oxygen pipeline. The nitrogen oxide should drop first and an alarm sounded, this is called the Bowson alarm. This told me that everyone was working how it should be. I then checked to make sure that the emergency bypass was working. I checked to see if the vaporises were securely fastened onto the machine, and did not leak. A then carried out a leak test on the breathing circuit and facemasks, and I checked that airways all the appropriate sizes. Then lastly I checked the ventilator for leaks and made sure that tubing was securely attached and the scavenging tubing was attached to the correct exhaust part of the breathing system, i then switched the gas on. Whist I was checking the anaesthetic machine I felt really nervous, I knew how important it was to check everything and everything correctly and this along with my mentor watching just added to the pressure.

With the supervision of my mentor again I started to check the anaesthetic equipment before Helen was due for her operation. I made sure that I had out on the table 2 Macintosh laryngoscopes, one with a size 3 blades and the other with a size 4 blade. I then checked that the blades were securely fixed to the laryngoscope and also made sure that the light was working and

bright. I then made sure that I had each size endotracheal tube out, a size 7, 8 and 9 and checked them by deflating the cuff and re-inflating it listening out for any leaks. I then got a size 3 and 4 LMA out and did the same test with these deflating and re-inflated but also looking for any holes or rips. I then checked that I had out all the equipment needed in case of difficult intubate, for example a gum elastic bougie, and Magill introducing forceps. The forceps are used to feed the endotracheal tube down into the trachea. I then made sure that I had a 50ml and a 20ml syringe, and also something to tie the endotracheal tube in place and some swabs. We were then ready for Helen.

On the day of the operation Helen was brought down to the theatre reception where the patient liaison asked Helen a few questions, got her to check that she had signed the consent form, and made sure that the correct site had been marked. The patient liaison then passed this information to me and my mentor in the anaesthetic room. I introduced myself to Helen and explained what i was going to do next. Whilst the anaesthetist drew up the drugs I put ECG pads onto Helen, a pulse oximeter onto her finger, and a blood pressure cuff onto her arm. The anaesthetist then inserted 0. 5ml of 1% Lidocain onto the back of Helens hand where he wanted to insert a cannula. Lidocain is a local anaesthetic and was inserted to numb the area he intened to insert the cannula. It is stored in a lockable cupboard in the anaesthetic room (BNF 2009). The anaesthetist then inserted a cannula into a vein on the back of Helens hand. Helen was then pre oxygenated via a facemask which I held over her during induction. 10mg of morphine was firstly given via the cannula. 10mg of morphine is given as it produces better

sedation and reduces the incidence of nausea and vomiting (Clarke et al 2005). 2mg/kg of Propofol (anaesthetic agent) and 100 ug/kg vecurionium bromide (muscle relaxant) was then inserted into the cannula. Propofol is a general anaesthetic and it works by slowing down the brain and nervous system. There are some side effects to Propofol, these are: pain/swelling at the site of insertion, weak shallow breathing, fast or slow heart rate, and some people can have an allergic reaction to the agent. Propofol is stored in a lockable cupboard which can only be accessed by the ODP in charge. Vecuronium Bromide is stored in a locked fridge. It is a muscle relaxant and works by blocking signals between your nerves and your muscles. This agent also has some side effects, these are: an allergic reaction to the drug. Also things such as weak/aching muscles, trouble breathing, and feeling light headed. (BNF 2009). After the anaesthetic agents had been inserted it was time to intubate Helen. I assisted the anaesthetist along with my mentor through this process, passing the anaesthetist any intubating equipment he needed. He gently lifted her head and inserted a Macintosh laryngoscope with a size 3 blade into Helens mouth so that he could get a view of the trachea. He then placed a size 8 tracheal tube into the trachea. I inflated the tube listening for escaping air. Helen was now successfully intubated. To secure the endotracheal tube in place I tied a bandage around the tube. I then placed an upper body warmer onto Helen to maintain her temperature throughout the procedure and also some flowtron boots to prevent pressure sores. Intermitted positive pressure ventilation (IPPV) was used throughout Helens operation and because of this an airway pressure monitor was used. Helen was then maintained on 1litre oxygen with 1litre of nitrous oxide through a closed circuit with a soda lime canister to remove the carbon

dioxide. Throughout the surgery the muscle relaxant was maintained by vecronium bromide, and carbon dioxide levels were kept at 35-45 mmHG. Due to Helen having a general anaesthetic she needed to be reversed with 50ug/kg neostigmine with 10ug/kg glycopyrrolate. Once Helen had been reversed from the vecromium and seen to be breathing on her own she was extubated. Firstly her mouth and the back of her throat were cleared of any secretions using suction. This is to prevent any secretions going down the trachea compromising the lungs which could lead to difficulty with breathing and infection (Gardiner and Grindrod 2005) The endotracheal tube cuff was then deflated and with the aid of a laryngoscope the tube was removed and a gadel airway was inserted to aid breathing and to prevent the tongue from falling back and causing choking. The monitoring was then removed and a mask was applied with 5litre oxygen to keep the patient oxygenised whilst being transferred to the recovery ward.

Monitoring that was used throughout the anaesthesia and the surgery itself was the electrocardiogram, non-invasive arterial pressure monitor airway pressure monitor, pulse oximeter, end-tidal carbon dioxide concentration monitor, peripheral nerve stimulation and body temperature probe.

Helen was very nervous when she got into the anaesthetic room. To try and reduce this I communicated with Helen and held her hand through the insertion of the cannula. I feel that this reduces worries that the patient may have and I would like to think that Helen would have gained some trust of me and my mentor. Communication is a very import quality an ODP should have. It is important when caring for patients as each practitioner needs to pass on information to other practitioners in order to give to right care to

each patient (Wicker, 2006). When Helen was brought into the anaesthetic room i intruded herself to Her. Effective communication at this time is very important as you are trying to build up a relationship with the patient so that they feel more at ease (Wicker, O'Neil , 2006). According to Wicker and Woodhead (2005) patient's fears can be minimised by the use of communication from the ODP to the patient. Each patient should be treated the same and not discriminated against at any times.

Medical gases come in cylinders. These cylinders can be identified by reading the label, the size of the cylinder, and also the colour. Each different gas has a different colour cylinder. For example, oxygen is white, nitrous oxide blue, and carbon dioxide grey. Some gases also have different valve colours, and sometimes multi coloured valves. For example medical air has a black and white top with a grey cylinder. Cylinders must be stored correctly and in the right places. They should be kept dry, clean, and well ventilated (Farley 2007). It should be easy access to them. Depending on the size of the cylinder depends on which way and where they are stored. They are sized using letters. F, G, and J being small cylinders with C, D and E being much bigger cylinders. F, G and J cylinders should be stored vertically and secure whereas C, D, and E sized cylinders should be stored horizontally. Not only are there different sized cylinders but each one has a different valve. Some have bullnoed valves, some pin index valves, others hand wheel and the rest schraeder outlet valves. Oxygen, nitrous oxide, equinox, and carbon dioxide all use pin index valves. Oxygen, air, oxygen/carbon dioxide, he/oxygen all use bullnose valves. There should also be separate areas for empty and full cylinders, and also separate areas for different gas types. Before using a

cylinder you should check that you have the correct one, as mentioned before this is done be checking the label, size and colour. On the label should be the product name, the licence number, the size code, pressure, contents, bar code, storage and handling precautions, and directions for use and the expiry date (Farley 2007).

From following my patient through anaesthesia I have learnt the importance of drugs, and their different behaviours. I have also learnt about the different ways to intubate a patient and all about the sizes of the tubes. I have also reflected upon my own experience of checking the anaesthetic machine and anaesthetic equipment against the AAGBI guidelines. I have explained about the importance of storage of medical gases and all about the sizes and different index openings.

## References

Aitkenhead, A, Alan, R (2006). Textbook of anaesthesia. Churchill Livingstone Elsevier. London.

Allman and Iain Wilson (2006) Oxford Handbook of Anaesthesia. Second Edition. Oxford University. Oxford.

Al-Shaikh, Baha (2007). Essentials of anaesthetic equipment. Churchill Livingstone Elsevier. Oxford.

BNF (2009). British National Formulary. (ONLINE)

Available at: http://www. bnf. org/bnf/

Last accessed: 20/03/2009

Clarke, R, Dundee, J and William, J (2002). Studies of Drugs given before Anaesthesia. British Journal of Anaesthesia. (ONLINE).

Available at: http://bja. oxfordjournals. org/cgi/content/abstract/37/10/772

Last accessed: 04/04/2009

Davey, A (200). Fundamentals of operating department practice. London. Greenwich Medical Media.

Davis, N and Cashman, J (2006). Lee’s synopsis of anaesthesia. Blackwell. London.

Farley, K (2007). Guidelines for the Safe Handling and Storage of Medical Gas Cylinders.

Available at: www. bristolnorthpct. nhs. uk/…/gas…/guidelines%20for%20the%20safe%20handling%20&%20stor…

Last accessed: 28/02/2009

Gardiner and Grindrod (2005). Applying Cricoid Pressure. British Journal of Theatre Nursing.

Simpson, Peter, J (2002). Understanding anaesthesia. Oxford. Butterworth-Heinemann.

Steven M. Yentis, Nicholas P. Hirsch, and Gary B. Smith (2003). Anaesthesia and Intensive Care A to Z: An Encyclopaedia of Principles and Practice. London.

Urwin, C (2007). HPC codes of conduct. (ONLINE)

Available at: www. hpc-uk. org/assets/documents/10001C4620070731aPOLCORConsultationresponsetoNMCC

Last accessed: 12/01/2009

Appendix 1

Actually, the amount of the posterior pharynx you can visualize is important and correlates with the difficulty of intubation.

Visualization of the pharynx is obscured by a large tongue (relative to the size of the mouth), which also interferes with visualization of the larynx on laryngoscopy. The Mallampati Classification is based on the structures visualized with maximal mouth opening and tongue protrusion in the sitting position (originally described without phonation, but others have suggested minimum Mallampati Classification with or without phonation best correlates with intubation difficulty).

Class I: soft palate, fauces, uvula, pillars

Class II: soft palate, fauces, portion of uvula

Class III: soft palate, base of uvula

Class IV: hard palate only