Possible complications

How often

Although anaesthesia is safer than in the past, complications do occur. One large study showed that about 10 per cent of patients experienced some problem during or after the anaesthetic. The complication could be as major as brain damage (but extremely rare) or as minor as muscle soreness (but more common). The most frequent complications are nausea, vomiting and sore throat. Anaesthetists are trained to recognise and manage complications quickly, and many will undergo part of this emergency training in simulators, much like airline pilots do.

The accompanying lists describe some of the complications that may occur during or after an anaesthetic. This lists are selective and do not include all complications.

Complications during anaesthesia

Allergy

Allergy to anaesthetic drugs is rare. The severity of allergic responses can range from mild (wheeze and rash) to severe (life-threatening anaphylactic reactions). As well as anaphylactic or immune-related reactions, some patients develop anaphylactoid reactions. Although this type of reaction does not involve antibodies, these reactions may also be severe, through the release of histamine.

If a patient is undergoing a general anaesthetic and is unconscious, the signs of an anaphylactic reaction may vary. The diagnosis is made by the recognition of such things as low blood pressure, wheezing, hives, rash, swelling (oedema) around the eyes or in the mouth and throat, and breathing difficulties.

Anaesthetists are trained to recognise and treat allergic reactions in the Operating Room. However, an important part of treatment of any allergic reaction is prevention. If you have any history of swelling of the face or generalised itching, you should let your anaesthetist know. Skin testing can be used to identify allergens (substances that cause allergic reactions). This may be helpful in identifying the particular drugs causing a reaction in those patients who apparently are ‘allergic to anaesthesia’.

The prevention of latex allergy includes removing all latex containing materials from the Operating Room, where possible. Most Operating Rooms have a special equipment kit for use in caring for latex-allergic patients.

Adverse drug reactions

Some patients may react abnormally to one or more drugs used during anaesthesia. Usually there will be some warning of this from prior experience, or knowledge of the particular condition or health of the patient. Occasionally, however, there is little warning, and the anaesthetist must be constantly alert to the potential for

abnormal reactions.

Some patients develop complications because of the interaction of specific anaesthetic drugs with a pre-existing condition. There are very few ‘anaesthetic diseases’, that is, specific diseases for which anaesthetic drugs must be carefully selected so as to minimise the risk of problems. However, these diseases do exist. The following brief description of two of these conditions is not meant to replace a more definitive source of information.

Malignant hyperthermia or Malignant hyperpyrexia

First recognised in Australia in 1960, malignant hyperthermia or malignant hyperpyrexia (MH) consists of an unexplained rise in body temperature and muscle rigidity during anaesthesia, due to a massive increase in metabolism. Consumption of oxygen and production of carbon dioxide also rise markedly. Predisposition to malignant hyperthermia is an inherited condition and occurs in about 1 in 40,000 patients. MH is triggered after exposure to specific anaesthetic drugs – the volatile anaesthetic agents (such as isoflurane) and suxamethonium. Triggering may occur on the first exposure to these drugs or even after repeated and uncomplicated anaesthetics.

Treatment of an episode of MH consists of stopping the triggering drug, stopping the operation if possible, and administering a drug called dantrolene. This is the only specific drug treatment for this syndrome; without it, about half of all patients who suffer a malignant hyperthermia reaction will die. Other treatment is also important, in the form of extra oxygen, cooling, and resuscitative drugs and fluids.

The principal test for MH is one performed on a piece of biopsied muscle, although unfortunately some tests appear to show that the patient has the condition when in fact the patient does not. (This is known as a ‘false positive’ test result.) As more genetic patterns are recognised in families with MH, some susceptible patients may be diagnosed using genetic marking. The patient and close relatives should all be tested. A patient who has had an MH reaction or a positive test should obtain some form of Medic Alert notification and carry this at all times.

If a patient with known MH requires an operation, then the Operating Room should be specially prepared. No volatile anaesthetic agents should be used in the room for 12 hours and, if possible, the patient should be scheduled as the first case of the day. A ‘safe’ technique consists of avoiding the known triggering agents and is not difficult to achieve. Drugs that are considered ‘safe’ include nitrous oxide, thiopentone, propofol, midazolam, narcotics, muscle relaxants such as curare or vecuroniun, and any of the local anaesthetic drugs. The patient’s condition, including temperature, should be carefully monitored as with any general anaesthetic. This monitoring should continue into the postoperative period. Some patients have been reported to have a reaction after a ‘safe’ anaesthetic, but these reactions apparently have not been severe.

Plasma cholinesterase deficiency

Plasma cholinesterase deficiency or pseudocholinesterase deficiency (PChD) is an enzyme deficiency that affects the metabolism of some anaesthetic drugs, thus lengthening their action. These drugs include certain types of local anaesthetic agents and suxamethonium. It is important to remember that having PChD does not mean that the patient is ‘allergic’ to these drugs, but simply that the drug takes longer to wear off.

If a patient with PChD is given suxamethonium, then the muscle relaxation from the drug may last for several hours, instead of a few minutes. During this time, the patient is unable to move or breathe spontaneously, and requires artificial ventilation. sedation, which makes the period of the profound weakness less unpleasant, is used while the action of the drug wears off.

PChD may be inherited and is found in less than 0.01 per cent of the population. The condition may also occur in patients with liver failure and certain tumours, as well as in those exposed to specific drugs, such as ecothiopate, and to certain insecticides. Some women at the end of pregnancy may develop a very mild form of PChD which disappears after birth of the baby. The enzyme deficiency can be confirmed by a special blood test.

Heart attack or stroke

It is possible to suffer a heart attack during the course of an anaesthetic. However, if one does occur, it is more likely to be on the second or third day after the operation. The risk of having a heart attack or myocardial infarction (MI) is very low, but patients who have suffered an MI in the past should consider not having elective surgery during the following six months.

Other patients with severe hardening of the arteries of the neck (carotids) are not only at risk of myocardial infarction, but also of a stroke (cerebro-vascular accident or CVA). Again, this is a rare but serious complication of anaesthesia.

Obstructed breathing

Laryngospasm

Sometimes, especially at the beginning or end of an anaesthetic, the vocal chords in the larynx (voice box) may close, making it very difficult for any air or oxygen to pass to and from the lungs. The condition can be likened to “choking”, and if allowed to continue, can result in a lack of oxygen entering the bloodstream. Anaesthetists are trained to deal effectively with this potentially serious complication, sometimes requiring the emergency administration of drugs to relax all muscles.

Difficult airway

Some patients have particular anatomical features of their neck and mouth that make management of their airway, or intubation difficult. The anaesthetist will make a judgement as to the likelihood of such a problem, during the pre-anaesthetic assessment. If he or she suspects that there may be a difficult airway, the anaesthetist will ensure that additional specialised equipment and expert assistance is immediately available.

Bronchospasm

Bronchospasm refers to a narrowing of the major airway branches in the lung. The result is similar to severe asthma with wheezing. When it occurs, the flow of air is reduced, especially when breathing out (exhaling). Commonly, bronchospasm is easily treated by deepening the anaesthetic, removing the stimulus, or giving drugs such as salbutamol, aminophylline, or steroids. For particularly severe reactions, adrenaline may be required.

Patients with asthma or chronic obstructive lung disease (COLD) and smokers may develop wheezing or bronchospasm. Bronchospasm may also occur in previously healthy patients during an allergic reaction due to drugs or blood products or after aspiration of gastric contents. Bronchospasm may also occur after such procedures as insertion of the breathing tube.

Pneumothorax

In this condition, air (or another gas) enters the normally empty space between the lungs and the chest wall. If not detected and treated, this can be life threatening as the gas expands and compresses the heart and the major blood vessels in the chest, preventing blood from entering or leaving. Most often a patient has a small but undiagnosed leak in the lining of the lung. This leak increases with the use of artificial ventilation. The problem may occur spontaneously in those with congenital swellings (bullae) of the lungs, patients with chronic lung disease and emphysema, or in asthmatics. In addition, the lining of the lung may be accidentally punctured by some injections around the neck or in the chest region.

Complications after anaesthesia

Nausea and vomiting

postoperative nausea and vomiting (PONV) is one of the most common postoperative complications, affecting up to as many as 40 per cent of patients. The patient most likely to vomit is a young, non-smoking, overweight woman who has undergone gynaecological surgery. Also at risk are patients with a history of PONV and those with a history of motion sickness (in a car or aeroplane or at sea).

All anaesthetic agents have been blamed, with opiates or narcotics most often implicated. Indeed, the anaesthetic is most often blamed for all PONV, even when nausea and vomiting occurs days after the operation and all traces of the anaesthetic have disappeared from the body.

Other factors may contribute, including:

- preoperative conditions, such as vomiting, increased pressure in the brain, intoxication with alcohol or other drugs
- operations on the eyes, the inner ear, the testicles, or tonsil
- postoperative conditions, such as the presence of blood in the stomach (which no anti-emetic can counter) or blockage of the bowel
- pain and anxiety
- the presence of other vomiting patients or the smell of food
- rapid movement (as on a stretcher) or even slight elevation of the head from the pillow
- painkillers given during the anaesthetic or in the postoperative period.

Many of these factors can be avoided or treated, to reduce the chance of postoperative nausea and vomiting occurring. Your anaesthetist makes all attempts to ensure that you do not suffer from PONV. However, complete prevention of this complication is not possible.

Dental damage

Although anaesthetists are very careful to avoid contact with the teeth, damage may occur when metal or hard plastic instruments are used to maintain an open airway, to help with insertion of the breathing (endotracheal) tube, or to suck out secretions from the mouth and back of the throat. In most cases, damage occurs at the time of tracheal intubation, in about one in every 1000 intubations. Dental damage may also occur when a patient bites down on an oral airway during recovery from anaesthesia. The force generated is enough to break both natural and restored teeth and has been noted in between a quarter and a half of all reported cases of dental damage.

Although human teeth are very strong, they become more brittle with age. Just as you may chip a tooth while eating, the same may occur during intubation. Cosmetic dental work, with veneers, crowns or bridges, is a particular concern, as these structures are not as strong as natural teeth.

If you have had dental work, especially on your front teeth, then you should inform your anaesthetist and discus any concerns you might have. You should also point out any teeth which are loose. You may be able to lessen the risk of damage by having an alternative technique to general anaesthesia, such as regional anaesthesia (if appropriate). However, in some cases, general anaesthesia with an endotracheal tube is necessary. Attempting to avoid tracheal intubation, for example by using a mask, may lead to other complications, such as aspiration of stomach contents into the lungs. Some anaesthetists try to prevent dental damage by removing the oral airway before their patients regain consciousness and replacing it with a soft short tube placed in one nostril. (This is known as a nasal airway.)

Should any of your teeth be damaged or lost during an anaesthetic or operation, or while you are in the recovery room, you will need emergency treatment. This includes re-insertion of the tooth (if appropriate) and emergency dental consultation (if available). Great effort should be made to locate any missing teeth and you may need to have a chest X-ray to ensure that you have not inhaled the tooth. If you have and the tooth is not removed from your lung, then there is a high probability of pneumonia.

Similarly, children may undergo anaesthesia when their first teeth are about to be lost. These first teeth are very easily dislodged, and you should tell the anaesthetist which teeth are loose. Sometimes parents request the anaesthetist remove a tooth that is about to fall out!

Adults with loose teeth should see a dentist, if possible, before their anaesthetic. The same suggestion applies if any of the teeth are badly broken or decayed. In addition, professional dental cleaning is recommended for patients who have gum disease, especially for those patients who are scheduled to have a major operation.

Bruises

Patients often develop a small bruise at the site of insertion of the intravenous cannula, in the back of the hand, in the forearm near the wrist, or in the bend of the elbow. These bruises can become painful and may take a week or so to resolve. Elderly patients, and those with fragile skin and veins, bruise more easily and the bruise often takes longer to disappear.

Eye problems

Various types of eye damage may occur. The cornea or surface of the eye may be scratched when the eyelids are not completely closed, particularly if the face is covered with drapes or towels. Some anaesthetists choose to secure the eyelids closed with tape – although certain patients may develop skin reactions and others may complain of loss of eyelashes after removal of the tape. Other anaesthetists choose to insert a lubricating ointment into the eye – although eye infections have been reported if the ointment is contaminated. Some patients have complained of blurring of vision for a few hours postoperatively, because of the residual ointment. However, corneal damage may occur even if the eye is lubricated and taped shut. The presence of make-up, such as mascara, is potentially hazardous.

Blindness after both general and regional anaesthesia is rare, but it can occur. Loss of vision may result from pressure on the eye. It may be that the arteries at the back of the eye (retina) become compressed, thus depriving the eye of oxygen. Smokers are more at risk than are nonsmokers, because nicotine constricts or narrows arteries, further depriving the eye and the brain of oxygen. Temporary blindness may also occur after spinal anaesthesia for resection of the prostate gland in men. This is due to the effect of a special chemical in the fluid placed in the bladder by the surgeon during the course of the operation.

Nerve damage

Almost any nerve can be damaged. Nerves of the face may be damaged by pressure from the anaesthetic breathing circuit or from the anaesthetist's fingers holding the facemask on and the chin forward. The most common nerve injury is to the ulnar nerve at the elbow, from compression against a hard surface. In general, the prevention of nerve damage is by careful positioning and padding of the patient during anaesthesia. In the past, the cause of postoperative nerve damage was always thought due to improper positioning of the patient; however, some patients who develop nerve damage have been found to have a pre-existing problem.

Nosebleed

Sometimes, instead of passing the breathing (endotracheal) tube through your mouth, your anaesthetist chooses to pass it into one nostril and down the back of the throat and into your voice box (larynx). This change in route may still involve insertion of the laryngoscope into your mouth, so that your anaesthetist can see where he or she is placing the tube. Nasal intubation is normally used for operations around the face and mouth.

Insertion of the tube through the nostril often results in some bleeding from the nose after the tube is removed. This bleeding normally stops after a few minutes, although seeing the nose bleed may be distressing to family members.

Blood clots

Certain patients are at increased risk of having blood clots – for example, those taking oral contraceptives or hormone replacement. Certain surgical procedures also increase the risk of clots, such as operations that last several hours or are on the lower part of the body. In general, anaesthetics do not increase the risk of having a blood clot.

Brain damage

Some operations may lead to a decrease in intellectual ability, for example, after major brain or open heart surgery. Other patients are at risk because of pre-existing medical conditions, such as age-related loss of memory. Elderly patients, particularly those with progressive heart disease, high blood pressure or a history of minor strokes may suffer permanent changes after anaesthesia. This may be a result of a change in critical blood supply to certain parts of the brain, altering specific chemicals in the brain.

Blood supply to the brain may be subtly altered by a decrease in the amount of carbon dioxide in the blood and by slight changes in blood pressure. Many anaesthetic drugs have side effects which can alter blood flow, although modern drugs are less likely to produce these effects.

On rare occasions, patients have suffered brain damage due to lack of oxygen delivery to the brain. Even though all aspects of the anaesthetic are carefully monitored during an anaesthetic, sometimes problems can occur.