Nurse Anaesthesia

Outline
I. Introduction
II. General layout of the Anaesthetic Room
III. Types of Anaesthesia
IV. Preparation for Anaesthesia
V. Intravenous Anaesthesia
VI. Guedal Describes Four Stages of Anaesthesia

General Aims :
The unit is designed to help you learn The main types of Anaesthesia and Preparation for Anaesthesia and Stages of Anaesthesia to increase your reading comprehension and to prepare you for reading similar passages.

Behavioral Objectives :
After studying the following text, it is expected that students will be able to:
- Describe the General layout of the Anaesthetic Room
- Name the main types of Anaesthesia
- Describe how Preparation for Anaesthesia
- Describe the Intravenous Anaesthesia
- Describe Four Stages of Anaesthesia
Anaesthetic Nurse

I. Introduction
Anaesthesia is a complex highly developed science. The anaesthetic nurse or the technician work with the anaesthetist and help him. So the anaesthetic nurse, assistant or technician must familiarise themselves with the basic principles of anaesthetic apparatus and the use of anaesthetic drugs in the particular theatre in which they work.

II. General layout of the anaesthetic room
Anaesthetic room should be of the same hygienic construction as the theatre and sterilising room. If there are more than one anaesthetic room in a multiple theatre suite, equipment should not be interchanged between rooms and to avoid this it is important to ensure that adequate replacements are available.

All anaesthetic rooms should contain dust-proof cupboards, having an adequate number of wide shelves with an impervious surface. Equipment stored in these cupboards is laid neatly on the shelves, labelled and in order. All items must be clearly visible and always kept in the same place. Items such as laryngoscopes should be duplicated as they are known to fail to crucial moments. It is better to have another place to store for general replacements. Various sizes of endotracheal tubes, etc. may be keep separate by storing them complete with their connectors, in individual paper bags.

Separate locked cupboards should be reserved for scheduled "DDA" (dangerous drugs administered) and the keys carried by the anaesthetic nurse or theatre sister on duty. These cupboards may also contain the register used for recording dangerous drugs administered to the patient in theatre. It is the legal obligation of the anaesthetist to enter all use made
of dangerous drugs, the name of the patient and quantity used. Drugs for immediate use may be stored in a locked drawer fitted to the anaesthetic machine. A small wash basin with elbow operated mixing taps and requisites for scrubbing up should be provided in the anaesthetic room. This basin should be positioned away from areas in which sterile trolleys are being used.

An adequate suction machine or pipe line suction device must be available, together with a suction tube and selection of suction nozzles and catheters with connectors of proper size. A dispenser should be provided containing a selection of disposable sterile syringes in sizes ranging form 2 ml to 20 ml, hypodermic and intravenous needles.

In addition to general diffused lighting, a small maneuverable spotlight, wall or ceiling mounted is useful during intravenous procedures. Two trolleys about 45.7 cm (18 inches) square are necessary for the exclusive use of the anaesthetist for transfusions and local anaesthetic techniques. At least two transfusion stands should be available, a Martin transfusion pump to enable rapid transfusion of blood should be fitted to one or ideally to each of the stands, to supplement the pumping device of plastic recipient sets.

Essential equipment always ready for use should include a sphygmomanometer, stethoscopes, tracheotomy set, cardiac arrest set and transfusion sets. Access to a defibrillator and monitoring apparatus is essential. All movable equipment is positioned suitably for anesthetist's convenience.
III. TYPES OF ANAESTHESIA

The main types of anaesthesia are:
1. General anaesthesia
2. Local or regional anaesthesia
3. Spinal and epidural anaesthesia

➢ General Anaesthesia

It induced by inhalation of gases or the vapour of volatile liquids which vaporize readily at normal room temperatures. These include:

➢ Nitrous Oxide

Stored in cylinders in a liquid form, under pressure, often referred to simply as 'gas'. Nitrous oxide is a weak agent of which high concentration (50-60%) are used in conjunction with other anaesthetics and oxygen.

➢ Cyclopropane

A potent gas stored in cylinders in a liquid form and used only in low concentrations (15%). It is flammable and explosive and therefore must not be used in the presence of cautery or diathermy.

➢ D. Ether

A volatile liquid which has a wide margin of safety in use although prolonged inhalation can cause post-operative vomiting and depression, has an unpleasant, irritant smell, is inflammable and explosive when mixed with O2.
E. Halothane (Fluothane)
A volatile liquid which is neither inflammable nor explosive. Its characteristics include lack of irritation of the respiratory tract; effectiveness in low concentration, rapid recovery after administration, absence of side effects such as vomiting.

F. Methoxyfluorane (Penthrane)
Similar to halothane but vaporises less readily; induction and recovery are slower has analgesic properties in low concentration.

G. Trichloroethylene (Trilene)
A blue colored liquid with a relatively slow rate of vaporisation. Trilene has a predominantly analgesic effect and is used to supplement other gaseous anaesthetics. Used alone as a 0.5 per cent mixture in air it can be administered in small amounts in child to relieve pain without loss of consciousness, cannot be used in a closed circuit in the presence of sodalime, which is incompatible with Trilene.

General Anaesthesia induced by the IV Administration of Drugs
Such as the short acting barbiturates. The most commonly used in this class are thiopentone sodium (pentothal), methohexitone sodium (Brietal) and nonbarbiturates such as propanidid (Epontol) a very short acting agent, ketamine hydrochloride (ketalar) and Althesin, a steroid anaesthetic agent. Epontol is very suitable for use in accident and dental departments. Other drugs, although they may not be anesthetics in themselves, are often used in combination with those listed above.
Local Anaesthesia
It induced by surface application, local infiltration regional nerve, block and epidural or subdural spinal injection of drugs such as procaine (Novocaine), lignocaine (Xylocaine), amethocaine (decicaine), prilocaine (citanest), bupivacaine (marcaine) and cinchocaine (decicaine), prilocaine (citanest), bupivacaine (marcaine) and cinchocaine (nupercaine). Cocaine is used for surface application only, e.g. ophthalmic surgery.

Induced Hypothermia
It is a state of lowered body temperature produced by physical cooling of patients who are under the effect of a general anaesthetic, and the so-called lytic cocktail of which the most important element is chlorpromazine (Largactil, Megaphen).

Neuroleptanalgesia
It is a state of indifference and insensitivity to pain induced by the intravenous administration of a potent analgesic drug combined with a tranquilliser, e.g. phenoperidine (operidine) or fentanyl (sublimaze) combined with a butyrophenone tranquilliser such as droperidol (Droleptan) or haloperidol.

The patient is easily rousable with a normal blood pressure and when awakened remains quite. He is in a state of apathy and mental detachment in which he is mildly sedated and uncaring about his surroundings.

Preparation for anaesthesia
1. The gas cylinders and soda lime canister, a box or container for carbondioxide absorbent etc on the anaesthetic machine are checked by
an experienced anaesthetic nurse or technician and reserves of these, together with bottles of halothane (Fluothane), trilene and ether are kept nearby.

2. The anaesthetic nurse also sets out instruments and apparatus required by the anaesthetist. She or he prepares trolleys and trays when necessary for open ether, intravenous anaesthesia, endotracheal intubation, and local regional or spinal analgesia.

**Intravenous anaesthesia**

A selection of intravenous anaesthetic agents, relaxants stimulants, and antidotes should be clearly labeled and available for the anaesthetist. The intravenous barbiturates in common use are thiopentone sodium (Pentothal) 2.5%, methohexitone sodium (Brietal) 1% and the hypnotic propanidid (Epontol) 5% and ketamine hydrochloride. A 2.5% solution is prepared by dissolving 0.5 gin 20 ml of sterile pyrogen-free distilled water respectively. Phenoperidine, pethidine and pentazocine are used extensively. Pethidine is often diluated to 1% solution containing 10 mg/ml.

Relaxants in common use include the "competitive blocker" muscle relaxants such as curare (tubarline), gallamine triethiodide (Flaxedil), pancuronium bromide (pavulon) and depolarising muscle relaxants such as suxamethonium (scoline).

Stimulants in common use include nikethamide (coramine) aminophylline, methedrine, methoxamine, methoxamine, metaraminol, noradrenalin and adrenaline. Antidotes commonly needed include, prostigmine, nalorphine, etc.

It is the anesthetist's responsibility to prepare these solutions, but if the anaesthetic nurse is permitted to do so, she should check the preparation with a second person and show the anaesthetist the ampoules from which the injection has been prepared.
The sizes of needles used vary with individual choice. For continuous or intermittent intravenous injections, either the syringe and needle are left in position so that small quantities may be injected as required; or a special needle such as butterfly is left in the vein. Continuous intravenous anaesthesia can be maintained by using a very weak intravenous solution, which is administrated via a saline transfusion or small quantities of the drug can be injected into the rubber transfusion, as required. When preparing different solutions at once, it is necessary to label syringes to aid identification.

- **Guedal Describes Four Stages of Anaesthesia**

  *The first stage* is one analgesia when peripheral sensation is lost, but the nervous system is under control. In the first stage of induction there are frequently swallowing movements, followed by regular respiration and analgesia.

  *The second stage* is one of excitement, with movements of the limbs followed by tonic spasms of the muscles, dilated pupils and moving eyeballs. Quite often this stage is very short and almost absent, especially when anaesthetising the deeply sedated patient.

  *The third stage* is the stage of surgical anaesthesia which may range from moderate to deep according to the type of operation.

  *The fourth stage* which is respiratory and cardiac arrest. If the patient collapses on the operation table with acute cardiocirculatory arrest his recovery may well depend upon prompt action by all theatre staff. Without treatment, irreversible damage may occur in 3 minutes and a lasting recovery of the brain and thus the whole body is impossible after 8 minutes.