NURSING STUDIES

Year II

ANAESTHESIA

Stages of Anaesthesia

Stage I : Analgesia -
Consciousness and sense of touch retained.

Stage II: Delirium - may be violent.

Stage III: Surgical anaesthesia: four planes of increasing depth; the depth is determined by respiration, pupil reactions, eyeball movements, reflexes and muscle tone.

Stage IV: Medullary Paralysis - an anaesthetic accident - may lead to hind brain death.

General points about anaesthesia:

1) Before surgery, preparation of the client by pre-medication, and assessment of the physical condition;
2) During surgery, production of hypnosis, analgesia, and muscular relaxation.
3) After surgery, relief of pain and rapid recovery of consciousness.

The three components are interdependent; the choice of drugs used at any one point will affect the choice of drugs before and after.

Premedication

i) Sedation, e.g. Hyoscine.
ii) Analgesia if appropriate, e.g. Pethidine.
iii) Inhibition of parasympathetic nerve supply to:
  (a) the lungs, to reduce bronchial secretions;
  (b) the salivary glands, to reduce secretion;
  (c) the heart, to reduce the likelihood of cardiac arrhythmia, e.g. Hyoscine or Atropine.

Routes of administration: S.C.
Oral.

During Surgery:

Aim: sleep, analgesia and muscular relaxation.

Typically, an anaesthetic consists of:

(i) an hypnotic, e.g. thiopentone.
(ii) Analgesia) Hypnosis) e.g. nitrous oxide.
(iii) Extra analgesia, e.g. (a) inhalation agent, e.g. Halothene.
  (b) i.v. analgesia, e.g. Pethidine.
(iv) Muscular relaxation:
  (a) neuromuscular blocking agent i.v., e.g. Suxemethonium.
  (b) deep anaesthesia with an inhalation agent.
  (c) nerve block - local anaesthetic, e.g. Lignocaine.

After Surgery:

i) Reversal of effects of neuromuscular blocking-agents or opiate-induced respiratory depression.
(ii) Analgesia, e.g. pethidine, morphine.

The Pharmacology of Anaesthetic Drugs

The modes of action are largely unknown.

Inhalational Anaesthetics:

The level of anaesthesia is correlated with the amount of anaesthetic drug in the brain, and this in turn is dependent on the amount of the drug entering the blood stream from the alveoli of the lungs.

(a) Nitrous oxide)
(b) Cyclepropane) useful for rapid induction.
(c) Halothane)
(d) Ether) suitable for deep anaesthesia.

Gaseous anaesthetics are relatively quickly eliminated via the lungs when the anaesthetic is withdrawn.

Intravenous Anaesthetics

Rapid induction, but slow recovery because the drug must be metabolised and excreted by the liver and kidneys respectively. e.g.:

1) Combinations of - Diazepam (Valium)
Pentazocine (Forteal)
Useful for light anaesthesia of short duration, e.g. D.C's or setting a # minor.

2) Thiopentone sodium (always intravenous).

Neuromuscular blocking agents

These induce paralysis of voluntary muscle by acting at the myoneural junction; they either compete for, or imitate the action of, acetylcholine at the motor-end plate. e.g.:

Tubocurarine (competitor of acetylcholine)
Suxemethonium (depolarisation by imitation of acetylcholine)

Uses of neuromuscular blocking agents:

(i) in surgery, to induce muscular relaxation.
(ii) in E.C.T. - control of violence of fit.

Centrally acting muscle relaxants:

All sedative-hypnotics, e.g. Diazepam (Valium).

Dangers of Anaesthesia:

1) Respiratory depression.
2) Anoxia.
3) Hypotension.
4) Cardiac arrhythmias.
5) Hypersensitivity reactions.

Local anaesthetics

The way in which local anaesthetics penetrate the nerves is unknown.

Uses:

i) Surface anaesthesia: solutions, ointments or lozenges.
ii) Infiltration anaesthesia: paralysis of sensory nerve endings and small cutaneous nerves - infiltrating a solution into the area concerned.
iii) Nerve block: injection of solution around the appropriate nerve (e.g. facial nerve block in dental anaesthesia)

iv) Others : epidural anaesthesia is a nerve block.

v) Spinal block: the drug is injected into the subarachnoid space.

Local anaesthetics may be used with a small dose of adrenaline (1:250,000) to cause local vasoconstriction; this restricts the amount of local anaesthetic entering the systemic circulation. (Anaphylactic shock may occur).

Local anaesthetics are used for localised operations, where it is neither necessary nor desirable to use deep anaesthesia.
Examples: Lignocaine (Xylocaine).

Anaesthesia in patients already taking drugs:

The following drugs may affect anaesthetics:

i) Adrenal steroids.
ii) Tranquillisers: (a) The Phenothiazines (e.g. Chlorpromazine) potentiate, i.e. enhance, hypnotics and general anaesthetics.
(b) Reserpine may cause hypotension.

iii) Antidepressants: M.A.O.I's potentiate analgesics.
iv) Antihypertensives: cause hypotension.
v) Diuretics: may cause hypokalaemia which enhances general anaesthesia.
vi) Antidiabetic drugs: hypoglycaemia.
vii) Anticoagulants: bleeding tendency.
viii) Alcohol.

Conditions in which special caution must be exercised in the use of anaesthesia.

i) The elderly - respiratory depression - hypoxia, confusion.
ii) Cardiac disease - arrythmia.
iii) Hepatic and renal disease - potentiate injected anaesthetics.
iv) Diabetes - hyper- or hypo-glycaemia may be caused depending on the agent used.
v) Thyroid disease - increased sensitivity to anaesthetic agents.