ANESTHESIA

SUNALI MEHTA

The three agents introduced were nitrous oxide still in use as a gaseous anesthetic. Ether – diethylether is still used occasionally. Chloroform – is not used today due to its toxicity but other halogenated compounds are being used such as haloethane.

There are several steps involved in reaching surgical anesthesia:

1. Analgesia: Pain is abolished but consciousness is retained. This type of anesthesia is used in child birth in the form of Entonox which is 50% nitrous oxide and 50% oxygen and when inhaled it is enough for the pain to recede but there is no loss of consciousness. The sense of hearing is often enhanced in this state.

2. Delirium: this is not a pleasant stage. The client is more or less unconsciousn and can suffer from fitting and violence. This stage should be crossed as quickly as possible. Sometimes death can occur in this stage due to vagal inhibition.

3. Surgical Anesthesia: is characterized by progressive muscular relaxation. It is imp during many surgical procedures that the muscle be in a relaxed state. This muscle relaxation leads to respiratory paralysis else the patient is on a respirator. Various reflexes of the body are indicators of which stage has been reached.

4. Medullary paralysis: this stage begins with respiratory failure and can lead to circulatory collapse. This stage is avoided through careful monitoring.

Mechanism of action of general anesthetic:

Their action is principally confined to the cns. They are all very lipophillic, and this is essential as the drug must cross the bbb. Cell membranes are both lipophillic and hydrophilic depending on the site of the membrane, the lipid layer is interspersed between the islands of proteins and it is thought that there are sodium channels present within these islands. When the lipophilic anesthetic enters the lipid membrane, the whole membrane is squeezed and causes distortation this can cause a marginal blockage of the sodium channels. This then can prevent neural conduction. Different parts of the cns are more sensitive to this action.

Pharmacokinetics of inhalation anaethetics:

Since these drugs are given in a gaseous form their pharmacokinetic differs. The amount of gas absorbed will depend on the pressure at which the gas is being inhaled more the pressure more the gas will be absorbed. The speed of absorption of the gas is determined by the solubility of the gas in the plasma. The more soluble the gas the slower it will be absorbed and the less soluble the more faster it will be absorbed. Ether is highly soluble but nitrous oxide is not. The reverse is true when the person returns to consciousness. The less soluble the drug the faster the person returns to consciousness as compared to a person from more soluble drug.

Local Anesthetics:

Are drugs that block the transmission of nerve impulse between the pns and the cns. The main purpose is to prevent pain impulse from the nociceptors reaching higher centers. Mainly used in minor surgical procedures. When given all structures supplied by nerve roots originating below the site of injection are rendered inactive.

The conduction of impulse between nerve fibers depends on the interchange between ions inside and outside of the cell. Under normal conditions the main intracellular ion is K and extracellular ion is Na. when a nt binds there is a complex series of biochemical rxn and this leads to the opening of the Na channels and the Na enters the cytoplasm and K leaves the cytoplasm. This interchange continues right till the end of the neuron until a point where the nt is released to carry the message onwards. As the message travels down the end that received the message reverts back to its original state with Na outside and K inside. Local anesthetics work by inhibiting the movement of Na thru channels in the plasma membrane. By doing this they inhibit the transmission of the nerve impulse. This action is dose dependent, more drug more inhibition. In unmyelinated nerves the whole of the Na channels are blocked whereas in myelinated fibers only the nodes of ranvier are blocked. All local anesthetics are ionisable molecules and their action depends on the pH of the medium.

Local anesthetics can be divided into two groups:
Amides , have prolonged action and hence metabolism is slow. e.g.prilocaine, cinchocaine,bupivacaine.
Esters, have shorter action and hence metabolism is fast. E.g. cocaine, procaine, amethocaine,