THIOPENTONE

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Preparation. Sodium thiopentone (also known as thiopental or pentothal) is prepared by dissolving a yellowish powder in sterile water to provide a 2.5% solution (ie 25mg/ml). In this concentration 20mls of solution will contain 500mg. The solution should be used within 24 hours of preparation and kept cool. The solution is alkaline with a pH of greater than 10, and can be irritating and painful if accidentally injected into tissues. Because of the alkalinity, thiopentone should not be mixed in the same syringe as other drugs, as it may cause formation of a cloudy precipitate and inactivate the drug.

Uses. Thiopentone is a rapidly acting barbiturate. Its main use is for induction of anaesthesia. Following induction anaesthesia is usually maintained by breathing an anaesthetic vapour such as halothane. Thiopentone can be used as the sole anaesthetic agent for very brief procedures.

Thiopentone can also be used in Intensive Care patients with head injuries to control surges in intracranial pressure. As it posesses potent anticonvulsant activity it may be given to treat epileptic seizures that do not respond to other therapy.

Main Effects. An intravenous injection of thiopentone causes loss of consciousness within 15 to 30 seconds, and lasts for 5 to 10 minutes. The onset time of thlopentone is approximately the time it takes for the drug to travel from the vein in the arm to the brain.

Induction of anaesthesia with thiopentone usually results in two or three deep breaths followed by a short period of breath-holding.

Dose. Healthy adults and children require around 3 to 7 mg/kg of thiopentone. Dose requirements are reduced following premedication, in the elderly and in those with compromised circulations (see adverse efrects).

Administration. After 1-2 mls of thiopentone have been administered ask the patient whether the injection is painful. Pain would suggest extravascular or intra-arterial injection. Titrate the dose against effect; the loss of the eyelash reflex is a good guide to loss of consciousness. After an injection of thiopentone always flush the cannula with a little saline to reduce the chance of forming precipitations with the next drug.

Advantages. Thiopentone causes a rapid, smooth induction of anaesthesia, with little excitation or apnoea. Return of consciousness after thiopentone is rapid, with prompt return of airway protective reflexes.

Thiopentone decreases cerebral metabolism and cerebral blood flow. It does not have any direct toxic effects on the liver or kidney, but patients with liver or kidney disease may require a lower dose range than 3 to 7 mg/kg. Although it crosses the placenta it is a safe agent for induction in obstetric anaesthesia.

Adverse effects. Thiopentone directly depresses the contractile force of the heart, it increases heart rate, coronary blood flow, and the oxygen demand of the heart. Thiopentone also causes a decrease in venous tone, causing pooling of blood in the peripheral veins; this can cause hypotension in patients who are hypovolaemic (eg following haemorrhage).

Thiopentone has no analgesic properties, in fact in low doses it tends to heighten sensitivity to pain. It has poor muscle relaxant properties.

Although thlopentone has a relatively brief duration of action after a single dose, if repeated doses or an infusion of thiopentone are given the drug accumulates, and the more a patient is given, the longer it will take for him to wake up.

Contraindications:

1. Acute intermittent porphyria

2. Barbiturate allergy

3. Patients with a low circulating blood volume, such as after haemorrhage, are prone to severe hypotension with thiopentone.

4. Patients with cardiac disease (particularly those with stenotic heart valve lesions) are at risk from the cardiovascular depressant effects of thiopentone. The drug must be carefully titrated against effect.

5. Patients with partial airway obstruction should not be given an intravenous anaesthetic agent in case total airway obstruction develops.

6. In severe asthma it is thought that thiopentone may occasionally cause bronchospasm.

Metabolism. For many years it was thought that the short duration of action of thiopentone was due to its rapid metabolism. It is now known that thiopentone is metabolised quite slowly, and the rapid recovery is due to redistribution of the drug firstly into muscle and skin, and later into body fat stores.

Thiopentone is metabolised in the liver; less than 1% of the drug appears in the urine unchanged.