SUXAMETHONIUM

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Preparation. Suxamethonlum is available as the chloride, bromide, or in some countries, as the iodide salt, and is dissolved in sterile water for injection. It is also known as succinylcholine. Suxamethonium chloride is supplied as a solution and deteriorates with storage, especially in hot countries, and should be stored in a refrigerator at 4° if possible. Suxamethonium bromide is supplied as a powder and dissolved in sterile water just before use, and can be stored for longer. All solutions of suxamethonium are destroyed by alkali, and should not be mixed with thiopentone.

Uses. Suxamethonium is a short acting muscle relaxant. The main uses in anaesthesia are to allow intubation of the trachea or to maintain relaxation for short surgical procedures.

Main Effects. Suxamethonium is a muscle relaxant and works by temporarily altering proteins in the muscle fibre membrane such that the muscle is not able to contract. The muscle relaxation may be preceded by brief irregular muscle contractions called fasciculations. The onset of muscle relaxation will be rapid after intravenous injection (30-60 seconds), and lasts 5-10 minutes. The muscle paralysis can be continued with intermittent intravenous boluses, using about 25% of the initial dose. The total dose should not exceed 6-8 mg/kg, or recovery may be very slow. The patient must be kept anaesthetised and the lungs artificially ventilated until recovery occurs.

In an emergency suxamethonium may be administered intramuscularly, but the onset of action is slower and less predictable than when given intravenously.

Dose:

Intravenous 1-2 mg/kg

Intramuscular 3 mg/kg

Contraindications. Suxamethonium is contraindicated in patients with recent burns or spinal cord trauma causing paraplegia (can be given immediately after the injury, but should be avoided from approximately day 10 to day 100 after the injury), raised potassium levels, severe muscle trauma, or a history of malignant hyperpyrexla.

Suxamethonium should be used with caution in patients with atypical plasma cholinesterase, or with muscle diseases. There may be prolonged paralysis or dangerous rises in potassium levels.

Advantages. The advantages of suxamethonium compared with non-depolarising muscle relaxants are the faster onset of relaxation, the greater degree of relaxation, and the short duration. It is suited for rapid sequence inductions where the trachea must be intubated as soon as possible.

Adverse effects

Cardiovascular: suxamethonium can cause bradycardia (= slow heart rate), especially if a second or further doses are given. This can be prevented by the prior administration of atropine. Children develop this complication more commonly than adults.

Metabolic: the potassium level in the serum will rise by about 1 mmol/L in normal patients and by much more in patients with recent burns, paraplegias or severe muscle trauma.

Raised intracranial and intraocular pressure: there is a transient rise in intracranial and intraocular pressure after suxamethonium. This is of no importance in patients without eye or intracranial disease, but the drug should be avoided in patients with these conditions if possible.

Prolonged paralysis: this can occur in patients with abnormal plasma cholinesterases; if suxamethonium is given in excessive doses eg. by repeat injections or infusion; in patients having certain drugs eg. some antibiotics.

Anaphylaxis: suxamethonium can cause allergic reactions, which range in severity from minor flushing of the skin to cardiac arrest and severe bronchospasm.

Malignant hyperthermia: suxamethonium can trigger the onset of malignant hyperthermia in those patients who have this genetic muscle disorder.

Muscle pains: the fasciculations seen before the onset of muscle paralysis can cause muscle pain post-operatively, especially in young adults.

Metabolism. Suxamethonlum is metabolised by an enzyme in the blood called plasma cholinesterase. Metabolism is normally complete within 5-10 minutes. Some patients lack this enzyme or have an altered enzyme that does not metabolise the suxamethonium as rapidly. These patients may remain paralysed for many hours after a standard dose of suxamethonium, and must be kept anaesthetised and ventilated until the suxamethonium has been eliminated by other slower methods.