

**SUXAMETHONIUM CHLORIDE 50MG/ML SOLUTION FOR
INJECTION (PL 00156/0110)**

UKPAR

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**SUXAMETHONIUM CHLORIDE 50MG/ML SOLUTION FOR
INJECTION (PL 00156/0110)**

LAY SUMMARY

On 9th October 2007, the MHRA today granted Martindale Pharmaceuticals Limited a Marketing Authorisation (licence) for the medicinal product Suxamethonium Chloride 50mg/ml Solution for Injection (PL 00156/0110). This is a prescription-only medicine (POM) used as an aid in general anaesthesia to allow insertion of a tube into the windpipe and to relax skeletal muscles during surgery. It is also used to reduce the intensity of muscle contractions associated with drug-induced convulsions or with electroconvulsive therapy.

No new or unexpected safety concerns arose from this applications and it was, therefore, judged that the benefits of taking Suxamethonium Chloride 50mg/ml Solution for Injection outweigh the risks, hence a Marketing Authorisation has been granted.

**SUXAMETHONIUM CHLORIDE 50MG/ML SOLUTION FOR
INJECTION (PL 00156/0110)**

SCIENTIFIC DISCUSSION

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INTRODUCTION

Based on the review of the data on quality, safety and efficacy, the UK granted a marketing authorisation for the medicinal product Suxamethonium Chloride 50mg/ml Solution for Injection (PL 00156/0110) to Martindale Pharmaceuticals Limited on 9th October 2007. The product is a prescription-only medicine.

This was submitted as an abridged application according to Article 10.1 of Directive 2001/83/EC, referring to the original product Anectine Injection 5% (PL 00003/5203), which was originally authorised to The Wellcome Foundation Limited in August 1985.

The product contains the active ingredient suxamethonium chloride, a depolarising neuromuscular blocker.

Suxamethonium Chloride 50mg/ml Solution for Injection is indicated for the following:

To be used in anaesthesia as a muscle relaxant to facilitate endotracheal intubation, mechanical ventilation and a wide range of surgical and obstetrics procedures.

It is also to be used to reduce the intensity of muscular contractions associated with pharmacologically or electrically – induced convulsions.

PHARMACEUTICAL ASSESSMENT

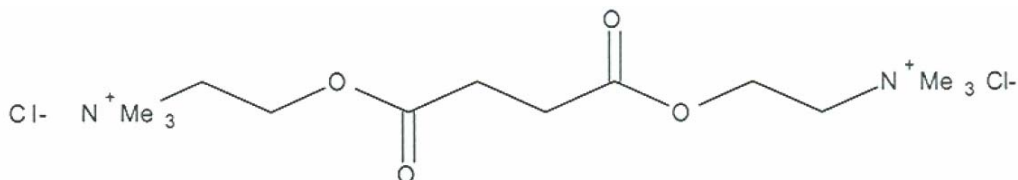
DRUG SUBSTANCE

Suxamethonium Chloride

rINN: Suxamethonium chloride

CAS Number: 306-40-1

Structure:

Formula: $C_{14}H_{30}N_2O_4$

Chemical names: 2,2'-[(1,4-dioxobutane-1,4-diyl)bis(oxy)]bis (N,N,N-trimethylethanaminium)

MW: 290.40

Suxamethonium chloride is a white, crystalline powder. It is odourless, highly soluble in water, soluble in alcohol, slightly soluble in chloroform, and practically insoluble in ether.

The drug substance suxamethonium chloride is the subject of both British and European Pharmacopoeial monographs. The manufacture and specifications for active suxamethonium chloride are controlled by a certificate of suitability.

Suxamethonium chloride is packed in double-sealed clear polyethylene bags, which are placed in fibre drums.

DRUG PRODUCT

Other ingredients

Other ingredients consist of pharmaceutical excipients, namely water for injections, nitrogen and hydrochloric acid dilute.

All ingredients comply with their relevant European Pharmacopoeial monographs, with the exception of hydrochloric acid dilute that is in compliance with a suitable in-house specification. Satisfactory certificates of analysis have been provided for all excipients.

None of the excipients used contain material of animal or human origin.

Impurity profiles

Comparable impurity and assay profiles have been provided for both the proposed product and the originator product.

Manufacture

A description and flow-chart of the manufacturing method has been provided. A satisfactory batch formula has been provided for manufacture of the maximum batch size.

In-process controls are satisfactory based on process validation data and controls on the finished product. Process validation has been carried out on small-scale batches of product and

the results appear satisfactory. The applicant has committed to providing validation data for the first three production-scale batches produced.

Finished product specification

The proposed product complies with the general requirements of the Ph Eur for solutions for injection. The finished product specification provided is satisfactory. Test methods have been described and have been adequately validated, as appropriate. Batch data have been provided and comply with the release specification. Certificates of analysis have been provided for any working standards used.

Container Closure System

The finished product is packaged in 2ml Type I glass ampoules. Specifications and Certificates of Analysis for all packaging types used have been provided. These are satisfactory.

Stability

Finished product stability studies have been conducted in accordance with current guidelines. Based on the results, a shelf-life of 18 months has been set, with the storage conditions “Do not freeze”, “Keep container in the outer carton” and “Store in refrigerator (2-8°C)”. These are satisfactory.

ADMINISTRATIVE INFORMATION

MAA Form

The MAA form is pharmaceutically satisfactory.

Summary of Product Characteristics (SPC)

The SPC is pharmaceutically satisfactory.

Patient Information Leaflet (PIL)

The PIL is pharmaceutically satisfactory.

Packaging

The packaging is pharmaceutically satisfactory.

CONCLUSION

It is recommended that a Marketing Authorisation is granted for this application.

The requirements for essential similarity of the proposed and reference products have been met with respect to qualitative and quantitative content of the active substance, and the similar impurity profiles.

PRECLINICAL ASSESSMENT

This application for a generic product refers to Anectine Injection 5% (The Wellcome Foundation Limited), which has been licensed within the EEA for over 10 years.

No new preclinical data have been supplied with this application and none are required for an application of this type.

CLINICAL ASSESSMENT

1. INDICATIONS

The applicant has submitted the following therapeutic indications:

Used in anaesthesia as a muscle relaxant to facilitate endotracheal intubation, mechanical ventilation and a wide range of surgical and obstetrics procedures.

It is also used to reduce the intensity of muscular contractions associated with pharmacologically or electrically – induced convulsions.

These are consistent with the indications licensed for the UK reference product and are satisfactory.

2. DOSE & DOSE SCHEDULE

The applicant has submitted the following:

Usually by bolus injection.

Adults and Children over 12 years

The dose is dependent on body weight, the degree of muscular relaxation required, the route of administration, and the response of individual patients.

To achieve endotracheal intubation Suxamethonium Chloride is usually administered intravenously in a dose of 1mg/kg. This dose will usually produce muscular relaxation in about 30 to 60 seconds and has a duration of action of about 2 to 6 minutes. Larger doses will produce more prolonged muscular relaxation, but doubling the dose does not necessarily double the duration of relaxation. Supplementary doses of Suxamethonium Chloride of 50% to 100% of the initial dose administered at 5 to 10 minute intervals will maintain muscle relaxation during short surgical procedures performed under general anaesthesia.

For prolonged surgical procedures Suxamethonium Chloride may be given by intravenous infusion as a 0.1% to 0.2% solution, diluted in 5% glucose solution or sterile isotonic saline solution, at a rate of 2.5 to 4mg per minute. The infusion rate should be adjusted according to the response of individual patients.

The total dose of Suxamethonium Chloride given by repeated intravenous injection or continuous infusion should not exceed 500mg per hour.

Children, 1 to under 12 years

1-2mg/kg by intravenous injection.

Suxamethonium Chloride may be given intramuscularly to children at doses up to 4mg per kg. A total dose of 150mg should not be exceeded.

Infants, under 1 year

2mg/kg by intravenous injection.

Suxamethonium Chloride may be given intramuscularly to infants at doses of up to 4 to 5mg per kg. A total dose of 150mg should not be exceeded.

Elderly

As for adults.

The elderly may be more susceptible to cardiac arrhythmias, especially if digitalis-like drugs are also being taken. See also Special Warnings and Precautions for Use.

These are consistent with the indications licensed for the UK reference product and are satisfactory.

3. TOXICOLOGY

No new pre-clinical data have been provided.

4. CLINICAL PHARMACOLOGY

No new data are submitted and none are required for this type of application. A bioequivalence study is not required.

5. EFFICACY

No new data are submitted and none are required for this type of application.

6. SAFETY

No new data are submitted and none are required for this type of application.

7. EXPERT REPORTS

A satisfactory expert report has been written by an appropriately qualified Doctor.

8. PATIENT INFORMATION LEAFLET (PIL)

A full-size colour mock-up of the PIL is supplied. It is consistent with the SPC, complies with current guidelines and is satisfactory.

9. LABELLING

Full-size colour mock-ups of the labelling are supplied. These comply with the current guidelines for a product of this type and are satisfactory.

10. APPLICATION FORM (MAA)

The MAA is medically satisfactory.

11. SUMMARY OF PRODUCT CHARACTERISTICS (SPC)

The SPC is consistent with that licensed for the reference product and is satisfactory.

12. DISCUSSION

As the active ingredient, proposed route of administration and dosage are well-established, no new clinical data have been generated for the purpose of this application and none are required. Bibliographic references have been supplied as supporting data.

Bioequivalence to the claimed essentially similar product has been adequately demonstrated.

The requested indications, SPC, PIL and labelling are satisfactory.

The MAA form is satisfactory.

13. MEDICAL CONCLUSION

Marketing authorisation may be granted for this product.

OVERALL CONCLUSION AND RISK BENEFIT ASSESSMENT

QUALITY

The important quality characteristics of Suxamethonium Chloride 50mg/ml Solution for Injection are well-defined and controlled. The specifications and batch analytical results indicate consistency from batch to batch. There are no outstanding quality issues that would have a negative impact on the benefit/risk balance.

PRECLINICAL

No new preclinical data were submitted and none are required for an application of this type.

EFFICACY

As the product is a simple aqueous solution for injection, with an essentially identical quantitative and qualitative composition to those for the reference product, no bioequivalence data were required. The applicant has demonstrated that Suxamethonium Chloride 50mg/ml Solution for Injection is a generic product of the reference product Robinul Injection.

No new or unexpected safety concerns arise from these applications.

The SPC, PIL and labelling are satisfactory and consistent with that for Anectine Injection 5%.

RISK BENEFIT ASSESSMENT

The quality of the product is acceptable and no new preclinical or clinical safety concerns have been identified. The data supplied supports the claim that the applicant's product and the innovator product are interchangeable. Extensive clinical experience with suxamethonium chloride is considered to have demonstrated the therapeutic value of the compound.

The risk benefit is, therefore, considered to be positive.

SUXAMETHONIUM CHLORIDE 50MG/ML SOLUTION FOR INJECTION (PL 00156/0110)**STEPS TAKEN FOR ASSESMENT**

1	The MHRA received the marketing authorisation applications on 29 th March 2004
2	Following standard checks and communication with the applicant the MHRA considered the applications valid on 28 th April 2004
3	Following assessment of the applications the MHRA requested further information relating to the clinical dossiers on 22 nd November 2004 and further information relating to the quality dossiers on 18 th October 2004, 22 nd November 2005 and 7 th August 2006
4	The applicant responded to the MHRA's requests, providing further information on 28 th April 2005 for the clinical sections, and again on 28 th April 2005, 3 rd August 2006 and 28 th September 2006 for the quality sections.
5	The applications were determined on 9 th October 2007

**SUXAMETHONIUM CHLORIDE 50MG/ML SOLUTION FOR
INJECTION (PL 00156/0110)****STEPS TAKEN AFTER AUTHORISATION - SUMMARY**

Date submitted	Application type	Scope	Outcome

SUMMARY OF PRODUCT CHARACTERISTICS**1 NAME OF THE MEDICINAL PRODUCT**

Suxamethonium Chloride 50mg/ml Solution for Injection.

2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Suxamethonium Chloride 50mg/ml (100mg/2ml).

Each ml contains 50mg of suxamethonium chloride

For excipients, see section 6.1.

3 PHARMACEUTICAL FORM

Solution for Injection.

Clear, colourless solution.

4 CLINICAL PARTICULARS**4.1 Therapeutic indications**

Used in anaesthesia as a muscle relaxant to facilitate endotracheal intubation, mechanical ventilation and a wide range of surgical and obstetrics procedures.

It is also used to reduce the intensity of muscular contractions associated with pharmacologically or electrically – induced convulsions.

4.2 Posology and method of administration

Usually by bolus injection.

Adults and Children over 12 years

The dose is dependent on body weight, the degree of muscular relaxation required, the route of administration, and the response of individual patients.

To achieve endotracheal intubation Suxamethonium Chloride is usually administered intravenously in a dose of 1mg/kg. This dose will usually produce muscular relaxation in about 30 to 60 seconds and has a duration of action of about 2 to 6 minutes. Larger doses will produce more prolonged muscular relaxation, but doubling the dose does not necessarily double the duration of relaxation. Supplementary doses of Suxamethonium Chloride of 50% to 100% of the initial dose administered at 5 to 10 minute intervals will maintain muscle relaxation during short surgical procedures performed under general anaesthesia.

For prolonged surgical procedures Suxamethonium Chloride may be given by intravenous infusion as a 0.1% to 0.2% solution, diluted in 5% glucose solution or sterile isotonic saline solution, at a rate of 2.5 to 4mg per minute. The infusion rate should be adjusted according to the response of individual patients.

The total dose of Suxamethonium Chloride given by repeated intravenous injection or continuous infusion should not exceed 500mg per hour.

Children, 1 to under 12 years

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Suxamethonium Chloride may be given intramuscularly to infants at doses of up to 4 to 5mg per kg. A total dose of 150mg should not be exceeded.

Elderly

As for adults.

The elderly may be more susceptible to cardiac arrhythmias, especially if digitalis-like drugs are also being taken. See also Special Warnings and Precautions for Use.

4.3 Contraindications

Suxamethonium has no effect on the level of consciousness and therefore should not be administered to a patient who is not fully anaesthetised.

Suxamethonium should not be administered to patients who are known to be hypersensitive to the drug.

Suxamethonium is contraindicated in patients with a personal or family history of malignant hyperthermia and if the condition occurs unexpectedly, all anaesthetic agents known to be associated with its development including Suxamethonium must be discontinued straight away. Full supportive measures must be employed immediately.

Intravenous dantrolene sodium is indicated in the treatment of malignant hyperthermia. Suxamethonium is contraindicated in patients with an inherited atypical cholinesterase activity.

An acute transient rise in serum potassium often occurs following the administration of Suxamethonium in normal individuals; the magnitude of this rise is of the order of 0.5 mmol/litre. In certain pathological states or conditions, this increase in serum potassium following Suxamethonium administration may be excessive and cause serious cardiac arrhythmias and cardiac arrest. For this reason the use of Suxamethonium is contra-indicated in:

- Patients recovering from major trauma, or severe burns; the period of greatest risk of hyperkalaemia is from about 5 to 70 days after injury and may be further prolonged if there is delayed healing due to persistent infection.
- Patients with neurological deficits involving spinal cord injury, peripheral nerve injury or acute muscle wasting (upper and/or lower motor neurone lesions); the potential for potassium release occurs within the first 6 months after the acute onset of the neurological deficit and correlates with the degree and extent of muscle paralysis. Patients who have been immobilised for prolonged periods of time may be at similar risk.
- Patients with pre-existing hyperkalaemia. If there is no hyperkalaemia or neuropathy then renal failure is not a contraindication to the administration of a normal single dose of Suxamethonium Injection, but multiple or large doses may cause clinically significant rises in serum potassium and should not be used.

Suxamethonium causes a slight transient rise in intra-ocular pressure and is therefore contraindicated in the presence of open eye injuries unless the potential benefit outweighs the potential risk to the eye.

Suxamethonium is contraindicated in patients with congenital myotonic diseases such as myotonia congenita and dystrophia myotonica as it is associated with rigidity and severe spasms.

Suxamethonium is contraindicated in patients with Duchenne muscular dystrophy since its administration may be associated with cardiac arrest, hyperkalaemia, hyperthermia, myoglobinaemia, post-operative respiratory depression and rigidity.

4.4 Special warnings and precautions for use

Suxamethonium should be administered under the supervision of an anaesthetist familiar with it and who is skilled in the management of artificial respiration and only where there are adequate facilities for immediate endotracheal intubation with administration of oxygen by intermittent positive pressure ventilation.

The patient must be monitored fully with a peripheral nerve stimulator during prolonged administration of suxamethonium in order to avoid overdosage.

Intensified and prolonged neuromuscular blockade following suxamethonium injection may occur secondary to reduced plasma cholinesterase activity in the following states: - pregnancy, abnormal plasma cholinesterase, tetanus, tuberculosis, burns, debilitating disease, malignancy, chronic anaemia and malnutrition, hepatic failure, renal failure, autoimmune diseases such as myxoedema and collagen diseases, following plasma exchange, plasmapheresis, cardiopulmonary bypass and as a result of drug interactions.

If Suxamethonium Chloride is given over a prolonged period, the characteristic depolarising neuromuscular (or Phase I) block may change to one with characteristics of a non-depolarising (or Phase II) block. Although the characteristics of a developing Phase II block resemble those of a true non-depolarising block, the former cannot always be fully or permanently reversed by anticholinesterase agents. When a Phase II block is fully established, its effects will then usually be fully reversible with standard doses of neostigmine accompanied by an anticholinergic agent.

In healthy adults, suxamethonium occasionally causes a mild transient slowing of the heart rate on initial administration. Bradycardias are more commonly observed in children and on repeated administration of suxamethonium in both children and adults. Pre-treatment with intravenous atropine or glycopyrrolate significantly reduces the incidence and severity of suxamethonium-related bradycardia.

In the absence of pre-existing or evoked hyperkalaemia, ventricular arrhythmias are rarely seen following suxamethonium administration. Patients taking digitalis-like drugs are however more susceptible to such arrhythmias. The action of suxamethonium on the heart may cause changes in cardiac rhythm including cardiac arrest.

Suxamethonium must not be administered to patients with advanced myasthenia gravis as the patients may develop Phase 2 block which can result in delayed recovery. Patients with myasthenic Eaton Lambert syndrome are more sensitive than normal to Suxamethonium which demands a reduction in dose.

Tachyphylaxis occurs after repeated administration of suxamethonium.

Some authorities advocate routine premedication of paediatric patients with intravenous atropine. Intramuscular atropine is not effective. Pretreatment with intravenous atropine or glycopyrrolate significantly reduces the incidence and severity of suxamethonium-related bradycardia. Extra care or monitoring must be carried out on infants and children being given suxamethonium, due to the increased risks of undiagnosed muscular disorders or unknown predisposition to malignant hyperthermia.

Suxamethonium Chloride should not be mixed in the same syringe with any other agent, especially thiopental.

In patients with severe sepsis, the potential for hyperkalaemia seems to be related to the severity and duration of infection.

4.5 Interaction with other medicinal products and other forms of interaction

Suxamethonium, a depolarising muscle relaxant of short duration, may interact with the following:

Anti-arrhythmics: lidocaine, procaine, procainamide, chlorprocaine, cocaine, quinidine and verapamil enhance muscle relaxant effect.

Antibacterials: effect of muscle relaxants is enhanced by aminoglycosides such as dibekacin, kanamycin, neomycin, ribostamycin and streptomycin, the effect of suxamethonium is also enhanced by vancomycin, azlocillin, clindamycin, colistin, piperacillin and polymyxin B.

Anticholinesterases: Cholinesterase and pseudocholinesterase both degrade suxamethonium. Therefore anticholinesterases will enhance suxamethonium. Examples of anticholinesterases include aprotinin, cyclophosphamide, dexpanthenol, ecothiopate, metoclopramide (non-selective drug), neostigmine, phenelzine (MAOI), promazine, quinine and chloroquine (antimalarials), tacrine and trimetaphan (ganglion blocking drug), oestrogen and testosterone. Exposure to pesticides may also reduce pseudocholinesterase activity such as diazinon, malathion and sheep dips.

Antiepileptics: effect of muscle relaxants antagonised by carbamazepine and phenytoin (recovery from neuromuscular blockade accelerated).

Antihypertensives: trimetaphan can increase the effects of suxamethonium.

Antineoplastics (anticancer drugs): cyclophosphamide, chlormethine, thiotepa and tretamine all reduce pseudocholinesterase activity.

Beta-blockers: propranolol enhances muscle relaxant effect.

Benzodiazepines: diazepam and midazolam may alter the depth/duration of suxamethonium.

Calcium-channel Blockers: nifedipine and verapamil enhance effect of non-depolarising muscle relaxants; hypotension, myocardial depression, and hyperkalaemia reported with intravenous dantrolene and verapamil.

Cardiac Glycosides: arrhythmias if suxamethonium given with digoxin.

Cytotoxics: cyclophosphamide and thiotepa enhance effect of suxamethonium.

General Anaesthetics: propofol can cause serious bradycardia if given with suxamethonium and fentanyl citrate-droperidol (Innovar) enhances the effects of suxamethonium. Suxamethonium also interacts with halothane, isoflurane, enflurane, cyclopropane, propanidid and ether.

Histamine Antagonists: high concentrations of cimetidine may inhibit pseudochoolinesterase.

Lithium: lithium enhances muscle relaxant effect.

Magnesium Salts: parenteral magnesium enhances effect of suxamethonium.

Parasympathomimetics: demecarium and ecothiopate eye-drops, neostigmine and pyridostigmine, and possibly donepezil enhance effect of suxamethonium but antagonise effect of non-depolarising muscle relaxants.

Sympathomimetics: bambuterol enhances effect of suxamethonium.

4.6 Pregnancy and lactation

Suxamethonium should not be administered to a pregnant or lactating woman.

Suxamethonium has no direct action on the uterus or other smooth muscle structures. In normal therapeutic doses it does not cross the placental barrier in sufficient amounts to affect the respiration of the infant. The benefits of the use of suxamethonium as part of a rapid sequence induction for general anaesthesia normally outweighs the possible risk to the foetus. Plasma cholinesterase levels fall during the first trimester of pregnancy to about 70 to 80% of their pre-pregnancy values; a further fall to about 60 to 70% of the pre-pregnancy levels occurs within 2 to 4 days after delivery. Plasma cholinesterase levels then increase to reach normal over the next 6 weeks. Consequently, a high proportion of pregnant and puerperal patients may exhibit mildly prolonged neuromuscular blockade following suxamethonium injection.

It is not known whether suxamethonium or its metabolites are excreted in human milk

4.7 Effects on ability to drive and use machines

Do not attempt to drive or operate machinery.

4.8 Undesirable effects

Muscle pains are frequently experienced after administration of suxamethonium and most commonly occur in ambulatory patients undergoing short surgical procedures under general anaesthesia. There appears to be no direct connection between the degree of visible muscle fasciculation after suxamethonium administration and the incidence or severity of pain. The use of small doses of non-depolarising muscle relaxants given minutes before suxamethonium administration has been advocated for the reduction of incidence and severity of suxamethonium-associated muscle pains. This technique may require the use of doses of suxamethonium in excess of 1mg/kg to achieve satisfactory conditions for endotracheal intubation.

The following adverse reactions have been reported after administration of suxamethonium:
Cardiovascular: bradycardia, tachycardia, hypertension, hypotension, arrhythmias;

Respiratory: bronchospasm, prolonged respiratory depression and apnoea;

Musculoskeletal: muscle fasciculation, post-operative muscle pains, myoglobinaemia, myoglobinuria;

Other: anaphylactic reactions, hyperthermia, increased intra-ocular pressure, increased intragastric pressure, rash, skin flushing, excessive salivation.

There are case reports of hyperkalaemia-related cardiac arrests following the administration of suxamethonium to patients with congenital cerebral palsy, tetanus, Duchenne muscular dystrophy, and closed head injury.

4.9 Overdose

Profound, prolonged muscle paralysis with respiratory depression are manifestations of a suxamethonium overdose. Ventilatory support is required.

The decision to use neostigmine to reverse a Phase II suxamethonium-induced block depends on the judgement of the clinician in the individual case. Valuable information in regard to this decision will be gained by monitoring neuromuscular function. If neostigmine is used, its administration should be accompanied by appropriate doses of an anticholinergic agent such as atropine.

5 PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Suxamethonium is closely related in structure to acetylcholine. Suxamethonium is quickly hydrolysed by plasma cholinesterase. Suxamethonium acts on the skeletal muscle motor endplate just like acetylcholine as an agonist, to cause flaccid paralysis of muscle (phase 1 block). Suxamethonium diffuses slowly to the endplate and the concentration at the endplate persists for long enough to cause loss of electrical excitability. The depolarization of the muscle endplate establishes a voltage gradient and this causes opening of voltage-dependent ion channels of the muscle leading to transient contraction of the muscle. Although the end-plate stays depolarised, the muscle membrane accounts for this depolarization and remains flaccid. If suxamethonium is kept continuously present during infusion, the junctional membrane slowly regains its resting potential with the return of neuromuscular transmission; to maintain the effect, a higher infusion rate is required (tachyphylaxis). With continued infusion, neuromuscular transmission will fail again (phase 2 block) even though the membrane potential of the end-plate stays unchanged and normal or near normal. A phase 2 block has clinical characteristics of a non-depolarizing block. A phase 2 block may be associated with prolonged neuromuscular blockade and apnoea. The mechanism of this block is not known but channel blocking by penetration of suxamethonium into the sub-end plate cytoplasm, intracellular accumulation of calcium and sodium, the loss of intracellular potassium, and activation of Na,K-ATPase all contribute.

5.2 Pharmacokinetic properties

Neuromuscular-blocking drugs are used mainly in anaesthesia to produce muscle relaxation. Although complete relaxation can be produced by anaesthetic drugs alone, the concentrations needed to obliterate spinal reflexes are high and it is much more satisfactory to produce paralysis by blocking neuromuscular transmission. The drugs are given intravenously, and act within about 30 to 60 seconds. Suxamethonium acts for about 2 to 6 minutes, being hydrolysed by plasma cholinesterase (pseudocholinesterase). One molecule of choline is split off rapidly to form succinylmonocholine (a weak muscle relaxant), which is then slowly hydrolysed to succinic acid and choline. Only a small proportion of suxamethonium is excreted unchanged in the urine.

5.3 Preclinical safety data

There is no pre-clinical data of relevance to the prescriber which is additional to that already included in other sections of the SPC.

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Hydrochloric Acid
Water for Injections
Nitrogen

6.2 Incompatibilities

None known.

- 6.3 Shelf life**
18 months.
- 6.4 Special precautions for storage**
Store at 2°C - 8°C. Do not freeze.
Keep container in the outer carton.
- 6.5 Nature and contents of container**
Type I clear glass 2 ml ampoule
- 6.6 Special precautions for disposal and other handling**
Use once and discard any remaining solution.
Not for dilution.
- 7 MARKETING AUTHORISATION HOLDER**
Martindale Pharmaceuticals Ltd
Bampton Road
Harold Hill
Romford
Essex RM3 8UG
- 8 MARKETING AUTHORISATION NUMBER(S)**
PL 00156/0110
- 9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION**
09/10/2007
- 10 DATE OF REVISION OF THE TEXT**
09/10/2007

Patient Information Leaflet

C91170

Suxamethonium Chloride 50 mg/ml Solution for Injection

Please read this leaflet carefully before you start receiving this medicine. It gives a brief outline of the more important things you should know. If you want to know more about this medicine, or you are not sure about anything, ask your doctor or nurse.

WHAT IS YOUR MEDICINE?

The name of your medicine is Suxamethonium Chloride 50 mg/ml Solution for Injection. It is a solution for injection. The active ingredient in this injection is Suxamethonium Chloride. Each ampoule contains 100mg of Suxamethonium Chloride in 2ml of Water for Injections. Hydrochloric Acid may be present as a pH adjuster.

The active ingredient, Suxamethonium Chloride, is a drug that is administered to relax the muscles of the body. The muscle controlling breathing will also become relaxed and your breathing will be assisted or controlled until Suxamethonium is inactivated.

Suxamethonium Chloride 50 mg/ml Solution for Injection is licensed to be available in a 2ml ampoule.

WHO MAKES IT?

PRODUCT LICENCE HOLDER
Martindale Pharmaceuticals Ltd
Bampton Road, Harold Hill
Romford, Essex, RM3 8UG

MANUFACTURER
Macarthy Laboratories Ltd
Bampton Road, Harold Hill
Romford, Essex, RM3 8UG

WHAT IS THIS MEDICINE FOR?

Suxamethonium is used as an aid to general anaesthesia to allow the insertion of a tube into the windpipe and to relax skeletal muscles during surgery. It is also used to reduce the intensity of muscle contractions associated with drug-induced convulsions or with electroconvulsive therapy.

BEFORE USING THIS MEDICINE

Please tell your doctor, nurse or pharmacist if you are pregnant or breast feeding.

Please tell your doctor, nurse or pharmacist if you have:

- rare or deficient pseudocholinesterase - the enzyme which breaks down suxamethonium
- burns
- massive trauma
- liver disease
- kidney impairment with a raised plasma-potassium concentration
- long-lasting sepsis
- severe hyperkalaemia - high blood levels of potassium or history of it
- a penetrating eye injury or glaucoma or you are about to undergo eye surgery
- a bone fracture
- personal or family history of malignant hyperthermia or feeling hot
- hypersensitivity (or a previous reaction) to suxamethonium

Also, please tell your doctor, nurse or pharmacist if you are receiving:

- anti-arrhythmics (drugs used to alter the rhythm of the heart): Lidocaine, procaine, procainamide, chlorprocaine, cocaine, quinidine and verapamil enhance muscle relaxant effect
- antibacterials (drugs able to kill bacteria): effect of muscle relaxants is enhanced by aminoglycosides such as dibekacin, kanamycin, neomycin, ribostamycin and streptomycin, the effect of suxamethonium is also enhanced by vancomycin, azlocillin, clindamycin, colistin, piperacillin and polymyxin B
- anticholinesterases: Cholinesterase and pseudocholinesterase both degrade suxamethonium. Therefore anticholinesterases will enhance suxamethonium. Examples of anticholinesterases include aprotinin, cyclophosphamide, dextranthenol, ecotiopate, metoclopramide (non-selective drug), neostigmine, phenelzine (MAOI), promazine, quinine and chloroquine (antimalarials), tacrine and trimetaphan (ganglion blocking drug), oestrogen and testosterone. Exposure to pesticides may also reduce pseudocholinesterase activity such as diazinon, malathion and sheep dips
- anti-epileptics: effect of muscle relaxants antagonised by carbamazepine and phenytoin (recovery from neuromuscular blockade accelerated)
- anti-hypertensives (drugs used to lower blood pressure): trimetaphan can increase the effects of suxamethonium
- anti-neoplastics (anticancer drugs): cyclophosphamide, chlormethine, thiotepa and tretamine all enhance effect of suxamethonium
- benzodiazepines (drugs which act as minor tranquilisers and hypnotics): diazepam and midazolam may alter the depth/duration of suxamethonium
- beta-blockers (drugs which decrease the activity of the heart): propranolol enhances muscle relaxant effect
- calcium-channel blockers (drugs which reduce the strength of the heart): nifedipine and verapamil enhance effect of non-depolarising muscle relaxants; low blood pressure, heart muscle depression, and high potassium level have been reported with intravenous dantrolene and verapamil

TECHNICAL LEAFLET**Suxamethonium Chloride 50mg/ml Solution for Injection****QUALITATIVE AND QUANTITATIVE COMPOSITION**

Suxamethonium Chloride 50mg/ml.
Each 2ml ampoule contains 100mg of Suxamethonium Chloride.

PHARMACEUTICAL FORM

Solution for Injection.
Clear, colourless solution.

CLINICAL PARTICULARS**Therapeutic indications**

Used in anaesthesia as a muscle relaxant to facilitate endotracheal intubation, mechanical ventilation and a wide range of surgical and obstetrics procedures.

It is also used to reduce the intensity of muscular contractions associated with pharmacologically or electrically - induced convulsions.

Posology and method of administration

Usually by bolus injection

Adults and Children over 12 years

The dose is dependent on body weight, the degree of muscular relaxation required, the route of administration, and the response of individual patients.

To achieve endotracheal intubation Suxamethonium Chloride is usually administered intravenously in a dose of 1mg/kg. This dose will usually produce muscular relaxation in about 30 to 60 seconds and has a duration of action of about 2 to 6 minutes. Larger doses will produce more prolonged muscular relaxation, but doubling the dose does not necessarily double the duration of relaxation. Supplementary doses of Suxamethonium Chloride of 50% to 100% of the initial dose administered at 5 to 10 minute intervals will maintain muscle relaxation during short surgical procedures performed under general anaesthesia.

For prolonged surgical procedures Suxamethonium Chloride may be given by intravenous infusion as a 0.1% to 0.2% solution, diluted in 5% glucose solution or sterile isotonic saline solution, at a rate of 2.5 to 4mg per minute. The infusion rate should be adjusted according to the response of individual patients.

The total dose of Suxamethonium Chloride given by repeated intravenous injection or continuous infusion should not exceed 500mg per hour.

Children, 1 to under 12 years

1-2mg/kg by intravenous injection.
Suxamethonium Chloride may be given intramuscularly to children at doses up to 4mg per kg. A total dose of 150mg should not be exceeded.

Infants, under 1 year

2mg/kg by intravenous injection.
Suxamethonium Chloride may be given intramuscularly to infants at doses of up to 4 to 5mg per kg. A total dose of 150mg should not be exceeded.

Elderly

As for adults.

The elderly may be more susceptible to cardiac arrhythmias, especially if digitalis-like drugs are also being taken. See also Special Warnings and Precautions for Use.

Contraindications

Suxamethonium has no effect on the level of consciousness and therefore should not be administered to a patient who is not fully anaesthetised.

Suxamethonium should not be administered to patients who are known to be hypersensitive to the drug.

Suxamethonium is contraindicated in patients with a personal or family history of malignant hyperthermia and if the condition occurs unexpectedly, all anaesthetic agents known to be associated with its development including Suxamethonium must be discontinued straight away. Full supportive measures must be employed immediately.

Intravenous dantrolene sodium is indicated in the treatment of malignant hyperthermia.

Suxamethonium is contraindicated in patients with an inherited atypical cholinesterase activity.

An acute transient rise in serum potassium often occurs following the administration of Suxamethonium in normal individuals; the magnitude of this rise is of the order of 0.5 mmol/litre. In certain pathological states or conditions, this increase in serum potassium following suxamethonium administration may be excessive and cause serious cardiac arrhythmias and cardiac arrest. For this reason the use of suxamethonium is contra-indicated in:

- Patients recovering from major trauma, or severe burns; the period of greatest risk of hyperkalaemia is from about 5 to 70 days after injury and may be further prolonged if there is delayed healing due to persistent infection.
- Patients with neurological deficits involving spinal cord injury, peripheral nerve injury or acute muscle wasting (upper and/or lower motor neurone lesions); the potential for potassium release occurs within the first 6 months after the acute onset of the neurological deficit and correlates with

the degree and extent of muscle paralysis. Patients who have been immobilised for prolonged periods of time may be at similar risk.

- Patients with pre-existing hyperkalaemia. If there is no hyperkalaemia or neuropathy then renal failure is not a contraindication to the administration of a normal single dose of Suxamethonium Injection, but multiple or large doses may cause clinically significant rises in serum potassium and should not be used.

Suxamethonium causes a slight transient rise in intra-ocular pressure and is therefore contraindicated in the presence of open eye injuries unless the potential benefit outweighs the potential risk to the eye.

Suxamethonium is contraindicated in patients with congenital myotonic diseases such as myotonia congenita and dystrophia myotonica as it is associated with rigidity and severe spasms. Suxamethonium is contraindicated in patients with Duchenne muscular dystrophy since its administration may be associated with cardiac arrest, hyperkalaemia, hyperthermia, myoglobinuria, post-operative respiratory depression and rigidity.

Special warnings and precautions for use

Suxamethonium should be administered under the supervision of an anaesthetist familiar with it and who is skilled in the management of artificial respiration and only where there are adequate facilities for immediate endotracheal intubation with administration of oxygen by intermittent positive pressure ventilation. The patient must be monitored fully with a peripheral nerve stimulator during prolonged administration of suxamethonium in order to avoid overdosage. Intensified and prolonged neuromuscular blockade following Suxamethonium Injection may occur secondary to reduced plasma cholinesterase activity in the following states: - pregnancy, abnormal plasma cholinesterase, tetanus, tuberculosis, burns, debilitating disease, malignancy, chronic anaemia and malnutrition, hepatic failure, renal failure, autoimmune diseases such as myxoedema and collagen diseases, following plasma exchange, plasmapheresis, cardiopulmonary bypass and as a result of drug interactions.

If Suxamethonium Chloride is given over a prolonged period, the characteristic depolarising neuromuscular (or Phase I) block may change to one with characteristics of a non-depolarising (or Phase II) block. Although the characteristics of a developing Phase II block resemble those of a true non-depolarising block, the former cannot always be fully or permanently reversed

by anticholinesterase agents. When a Phase II block is fully established, its effects will then usually be fully reversible with standard doses of neostigmine accompanied by an anticholinergic agent.

In healthy adults, suxamethonium occasionally causes a mild transient slowing of the heart rate on initial administration. Bradycardias are more commonly observed in children and on repeated administration of suxamethonium in both children and adults. Pre-treatment with intravenous atropine or glycopyrrolate significantly reduces the incidence and severity of suxamethonium-related bradycardia.

In the absence of pre-existing or evoked hyperkalaemia, ventricular arrhythmias are rarely seen following suxamethonium administration. Patients taking digitalis-like drugs are however more susceptible to such arrhythmias. The action of suxamethonium on the heart may cause changes in cardiac rhythm including cardiac arrest.

Suxamethonium must not be administered to patients with advanced myasthenia gravis as the patients may develop Phase 2 block which can result in delayed recovery. Patients with myasthenic Eaton Lambert syndrome are more sensitive than normal to suxamethonium which demands a reduction in dose. Tachyphylaxis occurs after repeated administration of suxamethonium. Some authorities advocate routine premedication of paediatric patients with intravenous atropine. Intramuscular atropine is not effective. Pretreatment with intravenous atropine or glycopyrrolate significantly reduces the incidence and severity of suxamethonium-related bradycardia. Extra care or monitoring must be carried out on infants and children being given suxamethonium, due to the increased risks of undiagnosed muscular disorders or unknown predisposition to malignant hyperthermia. Suxamethonium Chloride should not be mixed in the same syringe with any other agent, especially thiopental.

Suxamethonium Chloride is acidic and should not be mixed with highly alkaline solutions, e.g. barbiturates.

In patients with severe sepsis, the potential for hyperkalaemia seems to be related to the severity and duration of infection.

Interaction with other medicinal products and other forms of interaction

Suxamethonium, a depolarising muscle relaxant of short duration, may interact with the following:

Anti-arrhythmics: Lidocaine, procaine,

procainamide, chlorprocaine, cocaine, quinidine and verapamil enhance muscle relaxant effect.

Antibacterials: effect of muscle relaxants is enhanced by aminoglycosides such as dibekacin, kanamycin, neomycin, ribostamycin and streptomycin, the effect of suxamethonium is also enhanced by vancomycin, azlocillin, clindamycin, colistin, piperacillin and polymyxin B.

Anticholinesterases: Cholinesterase and pseudocholinesterase both degrade suxamethonium. Therefore anticholinesterases will enhance suxamethonium. Examples of anticholinesterases include aprotinin, cyclophosphamide, dextranthenol, ecotiopate, metoclopramide (non-selective drug), neostigmine, phenelzine (MAOI), promazine, quinine and chloroquine (antimalarials), tacrine and trimetaphan (ganglion blocking drug), oestrogen and testosterone. Exposure to pesticides may also reduce pseudocholinesterase activity such as diazinon, malathion and sheep dips.

Anti-epileptics: effect of muscle relaxants antagonised by carbamazepine and phenytoin (recovery from neuromuscular blockade accelerated).

Anti-hypertensives: trimetaphan can increase the effects of suxamethonium.

Antineoplastics (anticancer drugs): cyclophosphamide, chlormethine, thiotepa and tretamine all reduce pseudocholinesterase activity.

Beta-blockers: propranolol enhances muscle relaxant effect.

Benzodiazepines: diazepam and midazolam may alter the depth/duration of suxamethonium.

Calcium-channel Blockers: nifedipine and verapamil enhance effect of non-depolarising muscle relaxants;

hypotension, myocardial depression, and hyperkalaemia reported with intravenous dantrolene and verapamil.

Cardiac Glycosides: increased risk of arrhythmias if suxamethonium is given with digoxin.

Cytotoxics: cyclophosphamide and thiotepa enhance effect of suxamethonium.

General Anaesthetics: propofol can cause serious bradycardia if given with suxamethonium and fentanyl citrate-droperidol (Innovar) enhances the effects of suxamethonium.

<p>Suxamethonium also interacts with halothane, isoflurane, enflurane, cyclopropane, propanidid and ether.</p> <p>Histamine Antagonists: high concentrations of cimetidine may inhibit pseudochoolinesterase.</p> <p>Lithium: lithium enhances muscle relaxant effect.</p> <p>Magnesium Salts: parenteral magnesium enhances effect of suxamethonium.</p> <p>Parasympathomimetics: demecarium and ecothiopate eye-drops, neostigmine and pyridostigmine, and possibly donepezil enhance effect of suxamethonium but antagonise effect of non-depolarising muscle relaxants.</p> <p>Sympathomimetics: bambuterol enhances effect of suxamethonium.</p> <p>Pregnancy and lactation</p> <p>Suxamethonium should not be administered to a pregnant or lactating woman. Suxamethonium has no direct action on the uterus or other smooth muscle structures. In normal therapeutic doses it does not cross the placental barrier in sufficient amounts to affect the respiration of the infant. The benefits of the use of suxamethonium as part of a rapid sequence induction for general anaesthesia normally outweighs the possible risk to the foetus. Plasma cholinesterase levels fall during the first trimester of pregnancy to about 70 to 80% of their pre-pregnancy values; a further fall to about 60 to 70% of the pre-pregnancy levels occurs within 2 to 4 days after delivery. Plasma cholinesterase levels then increase to reach normal over the next 6 weeks. Consequently, a high proportion of pregnant and puerperal patients may exhibit mildly prolonged neuromuscular blockade following Suxamethonium Injection. It is not known whether suxamethonium or its metabolites are excreted in human milk.</p> <p>Effects on ability to drive and use machines</p> <p>Do not attempt to drive or operate machinery.</p> <p>Undesirable effects</p> <p>Muscle pains are frequently experienced after administration of suxamethonium and most commonly occur in ambulatory patients undergoing short surgical procedures under general anaesthesia. There appears to be no direct connection between the degree of</p>	<p>visible muscle fasciculation after suxamethonium administration and the incidence or severity of pain. The use of small doses of non-depolarising muscle relaxants given minutes before suxamethonium administration has been advocated for the reduction of incidence and severity of suxamethonium-associated muscle pains. This technique may require the use of doses of suxamethonium in excess of 1mg/kg to achieve satisfactory conditions for endotracheal intubation.</p> <p>The following adverse reactions have been reported after administration of suxamethonium:</p> <p>Cardiovascular: bradycardia, tachycardia, hypertension, hypotension, arrhythmias;</p> <p>Respiratory: bronchospasm, prolonged respiratory depression and apnoea.</p> <p>Musculoskeletal: muscle fasciculation, post-operative muscle pains, myoglobinuria;</p> <p>Other: anaphylactic reactions, hyperthermia, increased intra-ocular pressure, increased intragastric pressure, rash, skin flushing, excessive salivation.</p> <p>There are case reports of hyperkalaemia-related cardiac arrests following the administration of suxamethonium to patients with congenital cerebral palsy, tetanus, Duchenne muscular dystrophy, and closed head injury.</p> <p>Overdose</p> <p>Profound, prolonged muscle paralysis with respiratory depression are manifestations of a suxamethonium overdose. Ventilatory support is required.</p> <p>The decision to use neostigmine to reverse a Phase II suxamethonium-induced block depends on the judgement of the clinician in the individual case. Valuable information in regard to this decision will be gained by monitoring neuromuscular function. If neostigmine is used, its administration should be accompanied by appropriate doses of an anticholinergic agent such as atropine.</p> <p>PHARMACOLOGICAL PROPERTIES</p> <p>Pharmacodynamic properties</p> <p>Suxamethonium is closely related in structure to acetylcholine. Suxamethonium is quickly hydrolysed by plasma cholinesterase. Suxamethonium acts on the skeletal muscle motor endplate just like acetylcholine as an agonist, to cause flaccid paralysis of muscle (phase 1 block). Suxamethonium diffuses slowly to the endplate and the concentration at the</p>	<p>endplate persists for long enough to cause loss of electrical excitability. The depolarization of the muscle endplate establishes a voltage gradient and this causes opening of voltage-dependent ion channels of the muscle leading to transient contraction of the muscle. Although the end-plate stays depolarised, the muscle membrane accounts for this depolarization and remains flaccid. If suxamethonium is kept continuously present during infusion, the junctional membrane slowly regains its resting potential with the return of neuromuscular transmission; to maintain the effect, a higher infusion rate is required (tachyphylaxis). With continued infusion, neuromuscular transmission will fail again (phase 2 block) even though the membrane potential of the end-plate stays unchanged and normal or near normal. A phase 2 block has clinical characteristics of a non-depolarizing block. A phase 2 block may be associated with prolonged neuromuscular blockade and apnoea. The mechanism of this block is not known but channel blocking by penetration of suxamethonium into the sub-end plate cytoplasm, intracellular accumulation of calcium and sodium, the loss of intracellular potassium, and activation of Na,K-ATPase all contribute.</p> <p>Pharmacokinetic properties</p> <p>Neuromuscular-blocking drugs are used mainly in anaesthesia to produce muscle relaxation. Although complete relaxation can be produced by anaesthetic drugs alone, the concentrations needed to obliterate spinal reflexes are high and it is much more satisfactory to produce paralysis by blocking neuromuscular transmission. The drugs are given intravenously, and act within about 30 to 60 seconds. Suxamethonium acts for about 2 to 6 minutes, being hydrolysed by plasma cholinesterase (pseudochoolinesterase). One molecule of choline is split off rapidly to form succinylmonocholine (a weak muscle relaxant), which is then slowly hydrolysed to succinic acid and choline. Only a small proportion of suxamethonium is excreted unchanged in the urine.</p> <p>Preclinical safety data</p> <p>There is no pre-clinical data of relevance to the prescriber which is additional to that already included in other sections of the leaflet.</p>	<p>PHARMACEUTICAL PARTICULARS</p> <p>List of excipients</p> <p>Hydrochloric Acid Water for injections Nitrogen</p> <p>Incompatibilities</p> <p>None known</p> <p>Shelf life</p> <p>18 months</p> <p>Special precautions for storage</p> <p>Store at 2°C - 8°C. Do not freeze. Keep container in the outer carton.</p> <p>Nature and contents of container</p> <p>Type I clear glass 2 ml ampoule</p> <p>Special precaution for disposal and other handling</p> <p>Use once and discard any remaining solution. Not for dilution.</p> <p>MARKETING AUTHORISATION HOLDER</p> <p>Martindale Pharmaceuticals Ltd Bampton Road Harold Hill Romford Essex RM3 8UG</p> <p>MARKETING AUTHORISATION NUMBER</p> <p>PL 00156/0110</p> <p>DATE OF FIRST AUTHORISATION/RENEWAL OF AUTHORISATION</p> <p></p> <p>DATE OF REVISION OF THE TEXT</p> <p></p> <p>PHARMACEUTICAL PARTICULARS</p> <p>List of excipients</p> <p>Hydrochloric Acid Water for injections Nitrogen</p> <p>Incompatibilities</p> <p>None known</p> <p>Shelf life</p> <p>18 months</p> <p>Special precautions for storage</p> <p>Store at 2°C - 8°C. Do not freeze. Keep container in the outer carton.</p> <p>Nature and contents of container</p> <p>Type I clear glass 2 ml ampoule</p> <p>Special precaution for disposal and other handling</p> <p>Use once and discard any remaining solution. Not for dilution.</p> <p>MARKETING AUTHORISATION HOLDER</p> <p>Martindale Pharmaceuticals Ltd Bampton Road Harold Hill Romford Essex RM3 8UG</p> <p>MARKETING AUTHORISATION NUMBER</p> <p>PL 00156/0110</p> <p>DATE OF FIRST AUTHORISATION/RENEWAL OF AUTHORISATION</p> <p></p> <p>DATE OF REVISION OF THE TEXT</p> <p></p>	<ul style="list-style-type: none"> • cardiac glycosides (drugs which increase heart muscle contraction): increased risk of arrhythmias if suxamethonium is given with digoxin • general anaesthetics: propofol can cause serious bradycardia if given with suxamethonium and fentanyl citrate-droperidol (Innovar) enhances the effects of suxamethonium. Suxamethonium also interacts with halothane, isoflurane, enflurane, cyclopropane, propanidid and ether • histamine antagonists (e.g. antacids): high concentrations of cimetidine may inhibit pseudochoolinesterase • lithium (a drug used to control over-excitement and/or depression): lithium enhances muscle relaxant effect • magnesium salts: parenteral magnesium enhances effect of suxamethonium • parasympathomimetics: demecarium and ecothiopate eye-drops, neostigmine and pyridostigmine, and possibly donepezil enhance effect of suxamethonium but antagonise effect of non-depolarising muscle relaxants • sympathomimetics: bambuterol enhances effect of suxamethonium <p>You must make sure to tell your doctor, nurse or pharmacist if you feel any of the above apply to you as this may require your medicines to be changed.</p> <p>HOW DO I RECEIVE SUXAMETHONIUM CHLORIDE INJECTION?</p> <p>Your doctor or nurse will administer into a vein (intravenous) and/or into muscle (intramuscular). The dose depends on your individual needs, body weight, the degree of muscular relaxation required and the route of administration of the drug.</p> <p>a) By intravenous injection <i>Adults and the Elderly:</i> 1mg/kg, usual range 20-100mg; supplementary doses of 50% to 100% of the initial dose administered at 5 to 10 minute intervals will maintain muscle relaxation. Maximum 500mg/hour.</p> <p><i>Children (1-12 years):</i> 1-2mg/kg, maximum 150mg/hour.</p> <p><i>Infants (under 1 year):</i> 2mg/kg, maximum 150mg/hour.</p> <p>b) By intravenous infusion 0.1-0.2% solution, 2.5-4mg/minute; maximum 500mg/hour.</p> <p>c) By intramuscular injection <i>Children (1-12 years):</i> up to 4mg/kg; maximum 150mg.</p> <p><i>Infants (under 1 year):</i> up to 4-5mg/kg; maximum 150mg.</p> <p>AFTER USING SUXAMETHONIUM CHLORIDE INJECTION</p> <p>Like many medicines, Suxamethonium Chloride may cause adverse effects in some patients when treatment is started. Please tell your doctor, nurse or pharmacist if you have:</p> <ul style="list-style-type: none"> • postoperative muscle pain or stomach ache • a very slow or fast heart beat or irregular heart beats • difficulty in breathing • a feeling of being very hot • any signs of an allergic reaction such as skin rash • blurred vision or problems with your eyes • increased saliva or mucus production <p>WHAT IF I RECEIVE TOO MUCH?</p> <p>If you experience any other side effects or think you may be reacting badly in any way, inform your doctor, nurse or pharmacist immediately.</p> <p>HOW TO STORE THIS MEDICINE</p> <p>You should not be given the injection if the expiry date on the label has passed or if it shows signs of deterioration. The doctor or nurse will check that the expiry date on the label has not passed and that the injection does not show signs of deterioration. Store at 2°C - 8°C. Do not freeze. Keep container in the outer carton. Keep out of the reach and sight of children.</p> <p>FURTHER INFORMATION</p> <p>If you require any further information, please do not hesitate to ask your doctor, nurse or pharmacist.</p> <p>Date of Preparation September 2006 Product Licence No. PL 00156/0110</p> <p>Suxamethonium Chloride 50 mg/ml Solution for Injection</p> <p>Martindale Pharmaceuticals Ltd. Bampton Road, Harold Hill, Romford, Essex RM3 8UG C91170</p>
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MARTINDALE
Suxamethonium Chloride
50 mg/ml Solution for Injection
 100mg in 2ml
 For IV or IM use

PL00156/0110
 Exp. Lot

POM

Suxamethonium Chloride
 50mg/ml Solution for Injection
 for IV or IM use

*Contains:
 Suxamethonium Chloride in Water for Injections
 May contain Hydrochloric Acid*

*If only partly used, discard remaining solution
 Protect from light
 Patient information leaflet enclosed
 Store at 2 – 8°C
 Keep out of the reach and sight of children*

Martindale Pharmaceuticals, Romford, Essex RM3 8UG, UK.
 PL0156/0110

100mg
in
2ml
 10 x 2ml ampoules

Suxamethonium Chloride
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