SUMMARY OF PRODUCT CHARACTERISTICS

1 NAME OF THE MEDICINAL PRODUCT

Calcium Chloride 10% w/v Intravenous Infusion

2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Each ml contains 100mg of Calcium Chloride dihydrate

One pre-filled syringe of 10ml contains 1g of Calcium Chloride dihydrate

For the full list of excipients, see section 6.1

3 PHARMACEUTICAL FORM

Sterile solution for slow intravenous infusion

Clear and Colourless, and free from visible solid particles

4 CLINICAL PARTICULARS

4.1 Therapeutic indications

Calcium Chloride Injection is indicated for use in Cardio-pulmonary Resuscitation where there is also hyperkalaemia or hypocalcaemia or calcium channel block toxicity.
It is also used for the treatment of hypocalcaemia and of calcium deficiency states (a decrease in plasma-calcium concentration below the normal range of 2.15-2.60 mmol/L) as a result of impaired or reduced absorption from the gastrointestinal tract, increased deposition in bone, or to excessive losses, for instance during lactation.
Additionally, hypocalcaemia may develop during transfusions utilising citrated blood or during long-term parenteral nutrition unless prophylactic calcium supplementation is employed. Other causes of hypocalcaemia include decreased parathyroid hormone activity, vitamin D deficiency and hypomagnesaemia.

4.2 Posology and method of administration

This medicinal product is not intended to deliver volumes of less than 2 mL

Adults and elderly

In Cardiopulmonary Resuscitation (CPR) a single dose of 10ml (10% w/v) should be considered, according to the algorithm recommended by the European Resuscitation Council & the Resuscitation Council (UK).

Adults in acute hypocalcaemia, a typical dose is 2.25 to 4.5 mmol (approximately 3-7ml of a 10% w/v solution) of calcium given by slow intravenous infusion and repeated as required.

Paediatric population
This medicine is not recommended for use in children.

Method of administration
For slow intravenous infusion only. Not for intramuscular use, or subcutaneous use

4.3 Contraindications

Hypersensitivity to the active substance or to any of the excipients listed in section 6.1

In cardiac resuscitation, the use of calcium is contraindicated in the presence of ventricular fibrillation.

Calcium chloride is also contraindicated in those patients with conditions associated with hypercalcaemia and hypercalcuria (e.g. some forms of malignant disease) or in those with conditions associated with elevated vitamin D levels (e.g. sarcoidosis) or in those with renal calculi or a history of calcium renal calculi.

The treatment of asystole and electromechanical dissociation.

Parenteral calcium therapy is contraindicated in patients receiving cardiac glycosides, because calcium enhances the effects of digitalis glycosides on the heart and may precipitate digitalis intoxication.

Calcium chloride, because of its acidifying nature, is unsuitable for the treatment of hypocalcaemia caused by renal insufficiency or in patients with respiratory acidosis or failure.

4.4 Special warnings and precautions for use

Calcium chloride must be administered slowly through the vein.

The prefilled syringes must be used with compatible needle-free connectors (NFCs).
Using an incompatible NFC may lead to blockages, potentially delaying the delivery of emergency medication.
To avoid such issues, ensure compatible NFCs are procured in advance and stored together with the Aurum range of prefilled syringes.
List of compatible NFCs can be found in the link below:
https://ethypharm.co.uk/files/aurum-connector-compatibility-chart.pdf

Field Code Changed

Too rapid intravenous injection may lead to symptoms of hypercalcaemia.

The use of calcium chloride is undesirable in patients with respiratory acidosis or respiratory failure due to the acidifying nature of the salt.

In patients of any age ceftriaxone must not be mixed or administered simultaneously with any calcium-containing IV solutions, even via different infusion lines or at different infusion sites. However, in patients older than 28 days of age ceftriaxone and calcium-containing solutions may be administered sequentially one after another if infusion lines at different sites are used, or if the infusion lines are replaced or thoroughly flushed between infusions with physiological salt-solution to avoid precipitation. In patients requiring continuous infusion with calcium-containing TPN solutions, healthcare professionals may wish to consider the use of alternative antibacterial treatments which do not carry a similar risk of precipitation**.** If use of ceftriaxone is considered necessary in patients requiring continuous nutrition, TPN solutions and ceftriaxone can be administered simultaneously, albeit via different infusion lines at different sites. Alternatively, infusion of TPN solution could be stopped for the period of ceftriaxone infusion, considering the advice to flush infusion lines between solutions.

A moderate fall in blood pressure due to vasodilation may attend the injection. Since calcium chloride is an acidifying salt, it is usually undesirable in the treatment of hypocalcaemia of renal insufficiency.

Calcium chloride injection is irritating to veins and must not be injected into tissues, since severe necrosis and sloughing may occur. Great care should be taken to avoid extravasation or accidental injection into perivascular tissues. Should perivascular infiltration occur, IV administration at that site should be discontinued at once. Local infiltration of the affected area with 1 % procaine hydrochloride, to which hyaluronidase may be added, will often reduce venospasm and dilute the calcium remaining in the tissues locally. Local application of heat may also be helpful.

Excessive amounts of calcium salts may cause hypercalcaemia. Careful monitoring of serum-electrolyte concentrations is essential throughout therapy.

It is particularly important to prevent a high concentration of calcium from reaching the heart because of danger of cardiac syncope. If injected into the ventricular cavity in cardiac resuscitation care must be taken to avoid injection into the myocardial tissue.

Care should be taken not to infiltrate the perivascular tissue due to possible necrosis. Solutions should be warmed to body temperature. Injections should be made slowly through a small needle into a large vein to minimize venous irritation and avoid undesirable reactions.

Calcium Chloride is generally considered to be the most irritant of the commonly used calcium salts.

4.5 Interaction with other medicinal products and other forms of interaction

For interaction between calcium containing products and ceftriaxone, please see sections 4.4 above.

Calcium-containing products may decrease the effectiveness of calcium channel blockers.

Large intravenous doses of calcium can precipitate arrhythmias by interacting with cardiac glycosides (e.g. digitoxin and digoxin).

Because of the danger involved in the simultaneous use of calcium salts and drugs of the digitalis group, a digitalized patient should not receive an intravenous injection of a calcium compound unless the indications are clearly defined.

Calcium salts should not generally be mixed with carbonates, phosphates, sulfates or tartrate in parenteral mixtures.

Calcium salts reduce the absorption of bisphosphonates (in the treatment of Paget's disease or hypercalcaemia of malignancy) and must be given at least 12 hours apart.

Thiazide diuretics may increase the risk of hypercalcaemia.

Calcium salts reduce the absorption of tetracyclines.

4.6 Fertility, pregnancy and lactation

Studies on the effects of calcium chloride on pregnant women have not been carried out and problems have not been documented. Calcium crosses the placenta. The benefits of administration must outweigh any potential risk. Calcium is excreted in breast milk but there are no data on the effects, if any, on the infant.
It is recommended in the UK for an increase in calcium intake during lactation. Furthermore, the absorption of calcium is increased during pregnancy and lactation.

4.7 Effects on ability to drive and use machines

No adverse effects have been reported.

4.8 Undesirable effects

Rapid intravenous injections may cause the patient to complain of tingling sensations, a calcium taste, and a sense of oppression or “heat wave”. Injections of calcium chloride are accompanied by peripheral vasodilation as well as a local burning sensation and there may be a moderate fall in blood pressure.

Necrosis and sloughing with subcutaneous or intramuscular administration or if extravasation occurs have been reported. Soft tissue calcification, bradycardia or arrhythmias have also been reported.

Hypertension

Venous thrombosis

Excessive amounts of calcium salts may lead to hypercalcaemia. Symptoms of hypercalcaemia may include:

- anorexia,
- nausea,
- vomiting,
- constipation,
- abdominal pain,
- muscle weakness,
- mental disturbances,
- polydipsia,
- polyuria,
- bone pain,
- nephrocalcinosis,
- renal calculi, and,
- in severe cases, cardiac arrhythmias and coma.

Too rapid intravenous injection of calcium salts may also lead to many of the symptoms of hypercalcaemia as well as a chalky taste, hot flushes and peripheral vasodilation.

Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the Yellow Card Scheme at: www.mhra.gov.uk/yellowcard or search for MHRA Yellow Card in the Google Play or Apple App Store.

4.9 Overdose

Symptoms:

An overdose of Calcium Chloride would lead to hypercalcaemia and produce the signs and symptoms described above (see Section 4.8).

Treatment:

Initial management of hypercalcaemia should include withholding calcium administration, this will usually resolve mild hypercalcaemia in asymptomatic patients, provided renal function is adequate. When serum calcium concentrations are greater than 12mg per 100ml, immediate measures may be required such as rehydration by either the oral or intravenous route. In severe hypercalcaemia, administration of sodium chloride by intravenous infusion to expand the extracellular fluid may be necessary.

Intravenous rehydration may be given with, or followed by, furosemide or other loop diuretics to increase calcium excretion. Thiazide diuretics should be avoided as they may increase the renal absorption of calcium.

Other drugs which may be used if this treatment proves unsuccessful include calcitonins, the bisphosphonates, chelating agents, corticosteroids and plicamycin.

Phosphates may be useful, but should be given by mouth and only to patients with low serum phosphate concentrations and normal renal function.

Haemodialysis may be considered as a last resort.

5 PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Calcium is the most abundant mineral in the body, and is an essential body electrolyte. Homeostasis is mainly regulated by the parathyroid hormone, by calcitonin, and by the activated form of vitamin D.

Parathyroid hormone is released when the calcium blood level is low. It stimulates osteoclasts to release calcium into the blood, and increases the absorption of calcium from the gastrointestinal tract.

Calcitonin, from the thyroid gland, decreases the blood level of calcium by stimulating osteoblasts and inhibiting osteoclasts. In the presence of calcitonin, osteoblasts remove calcium from the blood and deposit it in the bone.

Calcium is a structural component of bones and teeth. It is also required for blood clotting, neurotransmitter release, muscle contraction and normal heartbeat.

Calcium ions increase the force of myocardial contraction. In response to electrical stimulation of muscle, calcium ions enter the sarcoplasm from the extracellular space. Calcium ions contained in the sarcoplasmic reticulum are rapidly transferred to the sites of interaction between the actin and myosin filaments of the sarcomere to initiate myofibril shortening. Thus, calcium increases myocardial function. Calcium's positive inotropic effects are modulated by its action on systemic vascular resistance. Calcium may either increase or decrease systemic vascular resistance. In the normal heart, calcium's positive inotropic and vasoconstricting effect produces a predictable rise in systemic arterial pressure.

5.2 Pharmacokinetic properties

The body contains about 1200g of calcium (or 300 to 500 mmol per Kg body weight), approximately 99% of which is found in the skeleton. The normal concentration of calcium in plasma is between 2.15 to 2.60 mmol per litre.

Calcium is absorbed from the small intestine. The amount of calcium absorbed varies depending on several factors including the requirements of the body, but is normally only about 30% of the dietary intake.

The absorption of calcium is increased during periods of high physiological requirement such as during pregnancy and lactation.

The amount of dietary calcium required by an adult is about 700 to 800 mg (17.5 - 20 mmol) per day.

After absorption calcium is eventually incorporated into bones and teeth with 99% of the body's calcium content being present in such skeletal tissue. The remaining calcium is present in both the intra- and extracellular fluids.

About 50% of the total blood-calcium content is in the physiologically active ionised form with 5% being complexed to citrate, phosphate or other anions and 45% being bound to proteins.

Excretion of calcium occurs in the urine although a large proportion is reabsorbed in the renal tubules. Excretion also occurs in the faeces, this consisting of unabsorbed calcium as well as that secreted in the bile and pancreatic juice. Minor amounts are lost in the sweat. Calcium crosses the placenta and is also excreted in breast milk.

5.3 Preclinical safety data

Calcium Chloride has been used for many years and has a proven safety record. No pre-clinical safety data is supplied.

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Water for injections
Dilute Hydrochloric acid (for pH-adjustment)
Calcium Hydroxide Solution (for pH-adjustment)

6.2 Incompatibilities

Calcium salts should not be mixed with carbonates, phosphates, sulfates, tartrates or tetracycline antibiotics in parenteral mixtures.

Calcium containing solutions should not be mixed with Ceftriaxone because a precipitate can form. Calcium containing solutions should not be administered simultaneously with Ceftriaxone (see section 4.4).

Calcium salts have been reported to be incompatible with a wide range of drugs (see section 4.5). Complexes may form resulting in the formation of a precipitate.

6.3 Shelf life

3 years.

6.4 Special precautions for storage

Do not store above 25°C.

6.5 Nature and contents of container

Type 1 glass pre-filled syringe, containing 10ml of a 10% w/v Calcium Chloride sterile solution for slow intravenous infusion only.

6.6 Special precautions for disposal

Discard any contents after use in appropriate manner.

7 MARKETING AUTHORISATION HOLDER

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8. MARKETING AUTHORISATION NUMBER

PL 12064/0020

9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 9 May 1997

10 DATE OF REVISION OF THE TEXT

25/03/2025