PRESCRIBING INFORMATION

Calcium Gluconate Injection, USP 10%

Solution, 100 mg / mL (0.465 mEq / mL)

For Intravenous Use

Single use vial: 1 000 mg per 10
Single use vial: 5 000 mg per 50 mL
Pharmacy bulk package: 10 000 mg per 100 mL

ATC Code: B05BB01

Electrolyte Replenisher

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TABLE OF CONTENTS

1. INDICATIONS 3

2. CONTRAINDICATIONS 3

3. DOSAGE AND ADMINISTRATION 3
3.1 Recommended Dose and Dosage Adjustment 3
3.2 Administration 4
3.3 Reconstitution 5

4. OVERDOSAGE 5

5. DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING 5

6. WARNINGS AND PRECAUTIONS 6
6.1 Special Populations 7
6.1.1 Pregnant Women 7
6.1.2 Breast-feeding 7

7. ADVERSE REACTIONS 7

8. DRUG INTERACTIONS 8
8.1 Drug-Drug Interactions 8
8.2 Drug-Laboratory Test Interactions 8

9. ACTION AND CLINICAL PHARMACOLOGY 9

10. STORAGE, STABILITY AND DISPOSAL 9

11. MORE INFORMATION 9

1. INDICATIONS

Calcium Gluconate Injection, USP 10% is used:

- for acute treatment of conditions arising from calcium deficiencies such as hypocalcemic tetany, hypocalcemia related to hypoparathyroidism and hypocalcemia due to rapid growth or pregnancy.
- In hyperkalemia, Calcium Gluconate Injection, USP 10% may aid in antagonizing the cardiac toxicity, provided the patient is not receiving digitalis therapy.

2. CONTRAINDICATIONS

Calcium Gluconate Injection, USP 10% is contraindicated in patients with:

- hypersensitivity to the active substance or to any of the excipients
- ventricular fibrillation
- hypercalcemia
- severe renal failure
- hypercalciuria
- galactosaemia
- Patients taking cardiac glycosides (see WARNINGS AND PRECAUTIONS and DRUG INTERACTIONS)
- Neonates (28 days of age or younger) receiving ceftriaxone (see WARNINGS AND PRECAUTIONS)

Calcium Gluconate Injection, USP 10% should not be given via the intramuscular or subcutaneous routes, as necrosis or sloughing may occur.

This product contains aluminum that may reach toxic levels (see WARNINGS AND PRECAUTIONS).

3. DOSAGE AND ADMINISTRATION

3.1 Recommended Dose and Dosage Adjustment

To assist in the calculation of dosing, Table 1 shows the calcium level in different volumes of Calcium Gluconate Injection, USP 10%.

Table 1 – Calcium ion levels in Calcium Gluconate Injection, USP 10%

Calcium Ion Levels	1 mL	5 mL	10 mL	20 mL	50 mL	100 mL
Milligrams of calcium ions	9.3 mg	46.5 mg	93 mg	186 mg	465 mg	930 mg
Milliequivalents of calcium ions	0.465 mEq	2.3 mEq	4.65 mEq	9.3 mEq	23.2 mEq	46.4 mEq

The dose is dependent on the requirements of the individual patient. However, recommended doses are indicated in Table 2.

Table 2 – Dosing Recommendations in mg of calcium ion for Neonate, Pediatric, and Adult Patients

Patient Population	Initial Dose	Subsequent Doses (if needed)	
		Bolus	Continuous Infusion
Neonate (≤ 1 month)	100 – 200 mg/kg	100 – 200 mg/kg every 6 hours	Initiate at 17 – 33 mg/kg/hour
Pediatric (> 1 month to < 17 years)	29 – 60 mg/kg	29 – 60 mg/kg every 6 hours	Initiate at 8 – 13 mg/kg/hour
Adult	1000 – 2000 mg	1000 – 2000 mg every 6 hours	Initiate at 5.4 – 21.5 mg/kg/hour

3.2 Administration

Dilute Calcium Gluconate Injection, USP 10% prior to use in 5% dextrose or normal saline and assess for potential drug or intravenous fluid incompatibilities. As with all parenteral drug products, intravenous admixtures should be inspected for clarity of solutions, particulate matter, precipitate, discolouration and leakage prior to administration, whenever solution and container permit. Solutions showing haziness, particulate matter, precipitate, discolouration or leakage should not be used.

Administer Calcium Gluconate Injection, USP 10% intravenously via a secure intravenous line to avoid calcinosis cutis and tissue necrosis (see WARNINGS AND PRECAUTIONS).

Administer Calcium Gluconate Injection, USP 10% by bolus administration or continuous infusion (Table 3) immediately after dilution of the recommended dose.

Table 3 – Administration notes for bolus or continuous infusion

	Diluted concentration	Administration and Monitoring notes
Bolus Intravenous	10 – 50 mg/mL	DO NOT exceed an infusion rate of: • 100 mg/minute in pediatric patients • 200 mg/minute in adult patients Measure serum calcium every 4 to 6 hours. Monitor patients, vitals, and electrocardiograph (ECG) during administration.
Continuous Infusion	5.8 – 10 mg/mL	Adjust rate as needed based on serum calcium levels. Measure serum calcium every 1 to 4 hours. Monitor patients, vitals, and electrocardiograph (ECG) during administration.

To avoid undesirable reactions that may follow rapid intravenous administration of calcium gluconate, the Calcium Gluconate Injection, USP 10% should be given slowly, e.g., approximately 1.5 mL over a period of one minute.

No preservative added. Discard unused portion**.**

3.3 Reconstitution

Directions for Dispensing from Pharmacy Bulk Package - Not for Direct Infusion:
The pharmacy bulk package is for pharmacy single use only. The pharmacy bulk package should be suspended as a unit in a laminar flow hood. Entry into the vial must be made with a sterile transfer set or other sterile dispensing device and contents dispensed in aliquots using aseptic technique. Use of syringe/needle is not recommended as it may cause leakage. Any unused portion should be discarded within 24 hours after initial entry.

Supersaturated solutions are prone to precipitation. The precipitate, if present, may be dissolved by warming the vial to 60 °C to 80 °C, with occasional agitation, until the solution becomes clear. Shake vigorously. Allow to cool to room temperature before dispensing. Use only if solution is clear immediately prior to use.

4. OVERDOSAGE

Overdosage of Calcium Gluconate Injection, USP 10% may result in hypercalcemia. Symptoms of hypercalcemia typically develop when the total serum calcium concentration is ≥12 mg/dL. Symptoms include anorexia, nausea, vomiting, abdominal pain, constipation, depression, mental disturbances, polydipsia, weakness, bone pain, fatigue, and confusion at lower levels, with patients experiencing hallucinations, disorientation, hypotonicity, seizures, and coma. Effects on the kidney include diminished ability to concentrate urine and diuresis, nephrocalcinosis, renal calculi. In severe cases, symptoms include cardiac arrythmias and cardiac arrest.

If overdose of Calcium Gluconate Injection, USP 10% occurs, immediately discontinue administration and provide supportive treatments to restore intravascular volume as well as promote calcium excretion in the urine if necessary.

For management of a suspected drug overdose, contact your regional poison control centre.

5. DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING

Table 4 – Dosage Forms, Strengths, Composition and Packaging.

Route of Administration	Dosage Form / Strength/Composition	Non-medicinal Ingredients
Intravenous	10 % Solution Ca^{++} 0.465 mEq / mL	Sodium hydroxide and/or hydrochloric acid for adjustment to a final value of pH 6 to 8.2, water for injection. Aluminum not more than 512 mcg / L.

Calcium Gluconate Injection, USP 10% is a sterile, preservative free, nonpyrogenic supersaturated solution of calcium gluconate that is stabilized with Calcium Saccharate, which provides 6% of the total calcium.

Each mL contains:
Calcium Gluconate (monohydrate), USP ..... 98 mg
Calcium Saccharate (tetrahydrate), USP ..... 4.5 mg
Total elemental Calcium…… 9.3 mg (0.465 mEq)

Calcium Gluconate Injection, USP 10% is supplied in flip-top single use plastic vials and pharmacy bulk packages.

Single use vials: Packaged in 25 vials per tray.			
Product No.	**Fill Volume**	**Vial Size**	**Calcium Gluconate**
C360019	10 mL	10 mL	1000 mg
C360059	50 mL	50 mL	5000 mg

Pharmacy bulk package: Packaged in 20 vials per tray.			
Product No.	**Fill Volume**	**Vial Size**	**Calcium Gluconate**
C360161	100 mL	100 mL	10 000 mg

6. WARNINGS AND PRECAUTIONS

For intravenous use only. Subcutaneous or intramuscular injection may cause severe necrosis and sloughing.

General: Plasma calcium levels and calcium excretion should be monitored when calcium is administered parenterally, especially in children, in chronic renal failure or where there is evidence of calculi formation within the urinary tract.

Aluminum Toxicity: This product contains aluminum that may be toxic. Aluminum may reach toxic levels with prolonged parenteral administration if kidney function is impaired. Premature neonates are particularly at risk because their kidneys are immature, and they require large amounts of calcium and phosphate solutions which contain aluminum. Research indicates that patients with impaired kidney function, including premature neonates, who receive parenteral levels of aluminum at greater than 4 to 5 mcg per kg per day accumulate aluminum at levels associated with central nervous system and bone toxicity.

Concomitant Cardiac Glycoside Use: Because of the danger involved in 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 indications are clearly defined (See CONTRAINDICATIONS and DRUG INTERACTIONS; Drug-Drug Interactions).

Concomitant Ceftriaxone Use: Concurrent use of intravenous ceftriaxone and Calcium Gluconate Injection, USP 10% can lead to formation of ceftriaxone-calcium precipitates.

Concomitant use of ceftriaxone and intravenous calcium-containing products is contraindicated in neonates (28 days of age or younger) (See CONTRAINDICATIONS).

In patients older than 28 days of age, ceftriaxone and calcium-containing products may be administered sequentially, provided the infusion lines are thoroughly flushed between infusions with a compatible fluid. Ceftriaxone must not be administered simultaneously with intravenous calcium-containing solutions via a Y-site in any age group.

6.1 Special Populations

6.1.1 Pregnant Women

It is not known whether calcium gluconate can cause fetal harm when administered to a pregnant woman or whether it can affect reproduction capacity. Animal reproduction studies have not been conducted with calcium gluconate. Calcium gluconate should be given to a pregnant woman only if clearly needed.

Infants born to mothers with hypocalcemia can have associated fetal and neonatal hyperparathyroidism, which in turn can cause fetal and neonatal skeletal demineralization, subperiosteal bone resorption, osteitis fibrosa cystica and neonatal seizures. Infants born to mothers with hypocalcemia should be carefully monitored for signs of hypocalcemia or hypercalcemia, including neuromuscular irritability, apnea, cyanosis and cardiac rhythm disorders.

6.1.2 Breast-feeding

It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when Calcium Gluconate Injection, USP 10% is administered to a nursing woman.

7. ADVERSE REACTIONS

Administration site reactions: Local soft tissue inflammation, local necrosis, calcinosis cutis and calcification due to extravasation. Local necrosis and abscess formation may occur with intramuscular injection.

Cardiovascular: Vasodilation, decreased blood pressure, bradycardia, cardiac arrhythmias, syncope and cardiac arrest. Use in digitalized patients may precipitate arrhythmias.

Neurologic: Tingling sensations, a sense of oppression or heat wave, calcium or chalky taste.

Reporting Side Effects

You can report any suspected side effects associated with the use of health products to Health Canada by:

- Visiting the Web page on Adverse Reaction Reporting (https://www.canada.ca/en/health-canada/services/drugs-health-products/medeffect-canada/adverse-reaction-reporting.html) for information on how to report online, by mail or by fax; or

- Calling toll-free at 1-866-234-2345.

NOTE: Contact your health professional if you need information about how to manage your side effects. The Canada Vigilance Program does not provide medical advice.

8. DRUG INTERACTIONS

8.1 Drug-Drug Interactions

Calcium Gluconate Injection, USP 10% has been reported to be physically incompatible with intravenous solutions containing various drugs, including ceftriaxone, amphotericin, cephalothin sodium, cephazolin sodium, cephamandole nafate, novobiocin, dobutamine, prochlorperazine, and fluids containing oxidising agents, citrates, soluble carbonates, bicarbonate, phosphates, tartrates and sulfates. Calcium salts can form complexes with many drugs, and this may result in a precipitate. Published data are too varied and/or limited to permit generalization, and specialized reference should be consulted for specific information.

Table 5 – Established or Potential Drug-Drug Interactions

Proper/Common name	Clinical Comment
Cardiac glycosides	The ionotropic and toxic effects of cardiac glycosides and calcium are synergistic and arrhythmias may occur if these drugs are given together (particularly when calcium is given intravenously). Intravenous administration of calcium is contraindicated in patients receiving cardiac glycosides; if considered necessary, administer Calcium Gluconate Injection, USP 10% slowly in small amounts and monitor ECG closely.
Tetracycline antibiotics	Calcium complexes tetracycline antibiotics rendering them inactive. The two drugs should not be given at the same time orally, nor should they be mixed for parenteral administration.
Calcium Channel Blockers	Administration of calcium may reduce the response to calcium channel blockers.
Drugs that may cause Hypercalcemia	Vitamin D, vitamin A, thiazide diuretics, estrogen, calcipotriene and teriparatide administration may cause hypercalcemia. Monitor plasma calcium concentrations in patients taking these drugs concurrently.
Epinephrine	Co-administration of calcium and epinephrine attenuate epinephrine's β-adrenergic effects in postoperative heart surgery patients.
Magnesium	Calcium and magnesium mutually antagonise their effects.

8.2 Drug-Laboratory Test Interactions

Transient elevations of plasma 11-hydroxycorticosteroid levels (Glenn-Nelson technique) may occur when intravenous calcium is administered, but levels return to control values after one hour.

Intravenous Calcium Gluconate Injection, USP 10% can produce false-negative for serum and urinary magnesium.

9. ACTION AND CLINICAL PHARMACOLOGY

Calcium is the fifth most abundant element in the body and is essential for maintenance of the functional integrity of nervous, muscular and skeletal systems, and cell membrane and capillary permeability. It is also an important activator in many enzymatic reactions and is essential to a number of physiologic processes including transmission of nerve impulses; contraction of cardiac, smooth and skeletal muscles; renal function; respiration and blood coagulation. Calcium also plays regulatory roles in the release and storage of neurotransmitters and hormones, in the uptake and binding of amino acids, and in cyanocobalamin (vitamin B_{12}) absorption and gastrin secretion.

10. STORAGE, STABILITY AND DISPOSAL

Store at 15 °C to 30 °C. Do NOT freeze.

11. MORE INFORMATION

If you want more information about Calcium Gluconate Injection, USP 10%:

- Talk to your healthcare professional.
- Find the full prescribing information that is prepared for healthcare professionals by visiting the Health Canada website (https://health-products.canada.ca/dpd-bdpp/index-eng.jsp); the manufacturer's website (https://www.fresenius-kabi.com/en-ca), or by calling 1-877-821-7724.

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