

Calcium Chloride

Brand names	Generics
Medication error potential	Look-alike, sound-alike drug names USP reports that calcium chloride has been confused with calcium gluconate. Patient harm resulted. ⁽¹⁾
Contraindications and warnings	<p>Contraindications: Calcium chloride should not be used during CPR when ventricular fibrillation is present or in patients with the risk of existing digitalis toxicity.⁽²⁾</p> <p>Neonates receiving ceftriaxone should not be given calcium-containing fluids (e.g., Ringer's solution, Hartmann's solution, and PN formulations that contain calcium) because of the risk for precipitation of ceftriaxone–calcium salt.⁽³⁾</p> <p>Cases of fatal reactions with ceftriaxone–calcium precipitates in lungs and kidneys in neonates have been described.^(3,4) In some cases the infusion lines and the times of administration of ceftriaxone and calcium-containing solutions differed.^(3,4) Ceftriaxone and products that contain calcium may be administered sequentially to patients outside the neonatal period, as long as the infusion lines are thoroughly flushed between infusions with a compatible fluid.⁽³⁾ Ceftriaxone should not be administered simultaneously with any calcium-containing solution via Y-site in any patient.⁽³⁾</p> <p>Warnings: Several different salt forms of calcium are available. Attention must be paid to the salt during product ordering, selection, and administration.</p>
Infusion-related cautions	Small veins (scalp, small hand, or foot) should not be used for infusion. ⁽²⁾ The infusion should be stopped if the patient complains of discomfort. Extravasation may cause tissue sloughing and necrosis. ⁽⁶⁻⁹⁾ If extravasation occurs, local infiltration of the affected area with 1% procaine hydrochloride, with or without hyaluronidase, may reduce venospasm and will dilute the calcium in the tissues. Local application of heat may be helpful. ⁽²⁾ (See Appendix E for management of extravasation.)
Dosage	<p>10% (100 mg/mL) calcium chloride (CaCl₂) solution provides approximately 1.36 mEq/mL or 27.3 mg/mL of elemental calcium.^(2,17) 1 mEq is equivalent to 20 mg elemental calcium.</p> <p>Dosing recommendations are expressed as mg or mg/kg of calcium chloride, or as mEq or mEq/kg of calcium.</p> <p>Hypocalcemia in critically ill infants and children: 10–20 mg/kg of calcium chloride q 4–6 hr.^(2,10,17) Ionized calcium measurements may be helpful in determining subsequent doses.⁽²⁾</p> <p>Hypocalcemia secondary to infusion of blood products</p> <p>Neonatal exchange transfusion with citrated blood: 0.45 mEq (0.33 mL of 10% CaCl₂) after each 100 mL blood exchanged.⁽¹¹⁾</p> <p>Citrated blood transfusion in adults: 1.35 mEq (1 mL of 10% CaCl₂) per 100 mL blood transfused, administered concurrently with transfusion.⁽¹¹⁾</p> <p>CaCl₂ infusion (5 mg/kg of calcium chloride) during fresh frozen plasma administration decreased citrate-induced hypocalcemia in children with thermal injury.⁽¹²⁾</p> <p>Cardiac arrest with documented hypocalcemia, hypermagnesemia, hyperkalemia, or calcium channel blocker overdose: (Routine administration during CPR is no longer recommended. Infusion through a central line is preferred.)⁽¹³⁾</p> <p>Pediatric patients: 20 mg/kg of calcium chloride (0.2 mL/kg of 10% CaCl₂; 0.272 mEq/kg) not to exceed 2000 mg/dose of calcium chloride.^(2,13,14) If beneficial, a continuous infusion of 20–50 mg/kg/hr of calcium chloride may be infused. Titrate infusion according to hemodynamic parameters; avoid hypercalcemia.⁽¹³⁾</p> <p>Adults: ACLS Guidelines recommend against routine administration during CPR and suggest consideration of calcium administration for <i>adults</i> with cardiac arrest in the following scenarios⁽¹⁵⁾:</p>



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Dosage (cont.)	Hyperkalemia or hypermagnesemia: 500–1000 mg of calcium chloride infused over 2–5 minutes. ⁽¹⁵⁾ Beta-blocker overdose or shock refractory to other measures: 20 mg/kg of calcium chloride over 5–10 minutes followed by a continuous infusion of 20 mg/kg/hr. Titrate infusion according to hemodynamic parameters; avoid severe hypercalcemia (ionized calcium greater than twice the upper limit or normal). ⁽¹⁵⁾
Dosage adjustment in organ dysfunction	Urinary excretion accounts for 20% of calcium elimination. ⁽²⁾ Calcium concentrations should be monitored closely in patients with renal dysfunction who require calcium. ⁽¹¹⁾
Maximum dosage	1000 mg of calcium chloride/dose in <i>adults</i> . ⁽²⁾ 2000 mg of calcium chloride/dose for children and adolescents in cardiac arrest. ⁽¹³⁾
Additives	Aluminum is present as a contaminant. ⁽²⁾
Suitable diluents	Most standard dextrose- and/or saline-containing IV fluids ⁽⁵⁾
Maximum concentration	Undiluted, 100 mg/mL of calcium chloride ⁽²⁾
Preparation and delivery	Compatibility: Often incompatible with bicarbonate, sulfate- or phosphate-containing fluids; consult a detailed reference and consider other additives' impact on solubility. ⁽¹⁶⁾ Calcium-containing fluids should not be co-infused with ceftriaxone. ⁽³⁾ Calcium-containing fluids should not be co-infused with PN because of the risk for precipitation with the phosphate component. If no other IV access is available and the two must be co-infused, consult a detailed compatibility reference that considers the parenteral protein formulation and concentrations of PN additives. ⁽¹⁶⁾
IV push	Slow, over 3–5 minutes; not to exceed 100 mg/min of calcium chloride. ⁽²⁾
Intermittent infusion	Dilute to a final concentration of 20 mg calcium chloride/mL. ⁽⁵⁾
Continuous infusion	20 mg calcium chloride/mL ^(5,13)
Other routes of administration	IM or sub-Q administration should not be used. ⁽²⁾ IO administration may be used during CPR. ⁽¹³⁾
Comments	Drug interactions: IV calcium should be used cautiously in patients receiving cardiac glycosides because of the potential for development of arrhythmias. ⁽²⁾ Osmolarity: 10% calcium chloride solution is 2.04 mOsmol/mL (2040–2050 mOsmol/L). ^(2,17)

REFERENCES

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