Calcium gluconate Intravenous for Adults



Who can administer

May be administered by registered competent doctor or nurse/midwife

Important information

- Do **NOT** administer through same line as solutions containing **phosphate**, **bicarbonate or sulphates**
- Must not be administered simultaneously with ceftriaxone (even via a different site or infusion line).
 May be given sequentially, provided the infusion lines are thoroughly flushed between infusions or different infusion sites are used (ref 5)
- AVOID rapid administration: may cause hot flushes, peripheral vasodilation, hypotension, nausea and vomiting, cardiac arrhythmias and arrest

Available preparations

• Calcium gluconate 10% (2.25mmol) per 10ml plastic ampoule (Braun) - unlicensed

Reconstitution

Already in solution

Infusion fluids

Sodium chloride 0.9% or Glucose 5%

Methods of intravenous administration

Intravenous infusion (administer using an electronically controlled infusion device) (preferred method)

- Add required dose to a suitable volume of infusion fluid and administer as per 'Dose' overleaf
- If a 50ml infusion volume is used, the residual volume in the infusion line must be flushed through at the same rate to avoid significant underdosing

Slow intravenous injection (in emergency- eg severe acute hypocalcaemia, cardiac resus) (ref 1)

- Administer very slowly (at least 5 minutes for 10ml) (ref 1)
- Administer via a central line or large peripheral vein (ref 1)
- There is a **risk of arrythmias** if the drug is given too quickly
- If injection is administered too rapidly, nausea, vomiting, hot flushes, sweating, hypotension and vasomotor collapse, **possibly fatal**, may occur

Dose in adults

Severe acute hypocalcaemia/hypocalcaemic tetany (ref 2)

- Give 10 to 20ml of injection solution (2.25 to 4.5mmol calcium) with plasma calcium and ECG monitoring each 10ml over five minutes (ref 1) (risk of arrythmias if given too rapidly)
- This can be repeated as required or, if only temporary improvement, can be followed by an infusion of

22.5mmol (100ml injection solution) added to 900ml Sodium chloride 0.9% or Glucose 5%. Initial rate 50ml/hour, adjusted according to response (ref 2) (use electronically controlled infusion device)

- Measure serum calcium levels every four to six hours (ref 4,5)
- Seek urgent Endocrinology team input

Hyperkalaemia with ECG changes or if K+ greater than 6mmol/L- myocardial protection (ref 3)

- Give 30ml of injection solution (6.75mmol calcium), preferably diluted in 50 to 100ml infusion fluid over 10 minutes
- Give over 30 minutes if on digoxin
- Doses may be repeated if no ECG improvement within 5 to 10 minutes of first dose completed

As an antidote to magnesium in severe hypermagnesaemia (ref 5)

• Doses similar to those used in severe acute hypocalcaemia (see above) have been used

Post-parathyroidectomy- where corrected calcium is 1.9mmol/L or less. High dose regimen (ref 6,7) - administer using an electronically controlled infusion device

- Should be used only under the guidance of the Endocrinology Consult Service
- This guideline is only used if severe symptoms and corrected Calcium 1.9mmol/L or less
- Preferably- administer in **HDU/ICU setting**. If no bed available in ICU/HDU, can administer on a ward with **telemetry** monitoring
- Can cause tissue necrosis, so administer via central line or large patent IV access
- Calculate the dose of Calcium gluconate 10% in mL = 1.7x patients weight in kg, and dilute as
 follows:
- Withdraw this volume of fluid from a 1,000ml infusion bag of Sodium chloride 0.9% or Glucose 5% and replace with the calculated dose/volume of calcium gluconate 10% injection solution
- Administer over four to six hours (ref 6,7). The rate of infusion may be reduced if the calcium levels improve
- Example patient weighs 72kg, dose is 1.7x72 = 122.4ml calcium gluconate 10%. Withdraw 122ml from a 1,000mL bag, and add 122ml Calcium Gluconate 10% injection (i.e. over 12 ampoules) solution back into the bag
- Monitoring- see over

Cardiac Resuscitation

As per resuscitation guidelines

Renal impairment

Prolonged infusions or repeated doses should be avoided

Monitoring

- Monitor U&E's four to six hourly (ref 4,5)
- Monitor heart rate, blood pressure (ref 1)
- Check magnesium and phosphate at baseline (ref 8)
- Post-parathyroidectomy- High dose regimen monitor ionised calcium every two hours. Telemetry monitoring required. (ref 7)
- The infusion site must be monitored to ensure extravasation injury has not occurred
- **ECG** monitoring is required for intravenous injection as there is a risk of arrythmias if given too guickly

Further information

- Do not give with phosphates, bicarbonates or sulphates
- Patient should remain lying down for a short time after administration of intravenous calcium
- 2 milliequivalent (mEq) Calcium = 1mmol (mmol) Calcium
- Calcium gluconate 1g is equivalent to 93mg, 4.5mEq, 2.25mmol calcium (ref 1,8)
- Note: GUH use unlicensed plastic ampoules exclusively to avoid aluminium exposure risk which has been associated with glass ampoules.

Storage

Store below 25°C

References

- 1. Injectable medicines administration guide, Medusa, Downloaded 19/01/2024
- 2. BNF- accessed online via ClinicalKey 19/01/2024
- 3. GUH guide to hyperkalaemia management (Adults)- December 2023
- 4. Injectable Drugs guide- accessed via Medicinescomplete 19/01/2024
- 5. Martindale accessed via Medicinescomplete 14/03/2024
- 6. Barts Endocrine e-Protocols Calcium disorders and bone. December 2009- accessed online 19/01/2024
- 7. Dr Marcia Bell, Expert opinion 13th July 2016
- 8. UptoDate- accessed online 14/03/2024