# 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 quickly

# 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 $25^{0}$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