Management of Hypocalcaemia in Secondary Care

Clinical Guideline Summary

- This is a guideline for the management of hypocalcaemia in secondary care adult patients.

Severe, acute hypocalcaemia can be life-threatening. In moderate or severe hypocalcaemia, paraesthesia and tetany may occur, and rarely, seizures. Establishing the underlying cause and specific treatment is essential, however intravenous (IV) calcium replacement may be required to correct the acute deficiency.

Causes of hypocalcaemia include Vitamin D deficiency, hypomagnesaemia, renal disease and hypoparathyroidism following neck surgery.

Adjusted calcium (adj Ca) is reported (total calcium is also reported for patients in ITU) and the normal range is 2.2 – 2.6mmol/L. An adjusted calcium result may be invalid where albumin concentrations are very low (<15g/L) or high (>50g/L).

SAFETY NOTE: calcium gluconate 10% injection is NOT equivalent to calcium chloride 10% injection. *Calcium chloride should NOT be used for calcium replacement*. If calcium gluconate 10% injection is not available please contact your Pharmacy Department for advice as soon as possible.

Further investigations:

- Exclude artefact i.e. contamination from EDTA in the FBC tube, drip arm sample or mis-sample in laboratory (should be identified by laboratory, but send repeat sample if in doubt)
- Review history for obvious causes, including previous thyroid/ parathyroid surgery, malabsorption, renal impairment, treatment with bisphosphonates
- Take TWO yellow top tubes and TWO EDTA tubes for repeat Ca, U&Es, Mg, phosphate, vitamin D, FBC and PTH (ideally prior to commencing therapy)

Treatment of symptomatic patients with adj Ca <1.9 mmol/L - *urgent action required after excluding an artefactual result, especially if patient is asymptomatic:*

- ensure potassium and magnesium have been measured, these can be added by the lab if not requested initially
- these patients should have prompt investigation, including 12 lead ECG/ cardiac monitoring if required
    - IV replacement with **calcium gluconate 10% (2.2mmol of calcium in 10ml) injection** is indicated first line [1]
    - give 10 – 20mL (2.2-4.4mmol of calcium) of calcium gluconate 10% injection diluted in 50-100ml of glucose 5% or sodium chloride 0.9% intravenously over 10 mins, with ECG monitoring. This can be repeated until patient is asymptomatic
    - follow this with a continuous IV infusion – dilute 100ml calcium gluconate 10% injection (10 x 10mL ampoules = 22mmol of calcium) in 1000ml of sodium chloride 0.9% or glucose 5% and infuse at 50 – 100ml/ hour
    - The rate should be titrated to achieve normocalcaemia and continued until the underlying cause has been identified and treatment commenced

Treatment of mild hypocalcaemia (adj Ca 1.9 – 2.2mmol/L and asymptomatic)

- Commence oral calcium supplementation e.g. Adcal® 1500mg tablets THREE tablets TWICE daily (unlicensed dose) or Calvive® effervescent tablets TWO tablets TWICE daily (unlicensed dose) and adjust to patient's individual requirements
- Adcal® contains 15 mmol of calcium per tablet and should be chewed, not swallowed whole. It should be taken with or after food.
- Calvive® contains 25 mmol of calcium per tablet and should be dissolved in water. It should be taken with or after food
- *Note: if Calvive® tablets are to be given via an enteral feeding tube, this is an unlicensed method of administration. Further information can be found here:* MedicinesComplete — Drug Administration via Enteral Feeding Tubes

If patient is post-thyroidectomy and asymptomatic, repeat calcium 24 hours later then: [1]

- if adjusted calcium is >2.1mmol/L, patient can be discharged and calcium checked within 1 week
- If calcium remains between 1.9 and 2.1mmol/L, increase Adcal® to FOUR tablets TWICE daily (unlicensed dose) or Calvive® to THREE tablets TWICE daily (unlicensed dose)

- If patient remains in mild hypocalcaemic range beyond 72 hours post-operatively, despite supplementation, start alfacalcidol orally at 250 nanograms per day (note: specialist advice required) with close monitoring

Other relevant information:

- Hypomagnesaemia should be treated before hypocalcaemia, as the calcium will often correct upon replacement of magnesium (assuming calcium >1.9mmol/L and patient asymptomatic) Hypomagnesaemia in primary or secondary care
- Calcium should be monitored daily initially, then 3 times weekly once stable. Following discharge, fortnightly measurements should be checked until stable
- Patients with vitamin D deficiency should be treated as per Vitamin D prevention and treatment of deficiency
- Patients with low PTH concentrations should be referred to endocrinology for investigation of hypoparathyroidism

References:

1. *Society for Endocrinology. Emergency Management of Acute Hypocalcaemia in Adult Patients 2016. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5314808/pdf/ec-5-G7.pdf Last accessed November 2024.*

Appendices

1. Governance information for Guidance document

Lead Author(s):	Sarah Cleary & Zoe Cousland
Endorsing Body:	Area Drug and Therapeutics Committee
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Responsible Person (if different from lead author)	

CONSULTATION AND DISTRIBUTION RECORD	
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Consultation Process / Stakeholders:	Ruth Waters, Principal pharmacist, University Hospital Hairmyres Sean Haughey, Clinical pharmacist, University Hospital Hairmyres
Distribution	All at UHH, UHW, UHM acute sites Right Decisions website

CHANGE RECORD			
Date	**Lead Author**	**Change**	**Version**
Feb 2021	Sarah Clearly Zoe Cousland	New guideline	1.0
Nov 2024	Sarah Clearly Zoe Cousland	Update into new template Added strength of calcium gluconate injection in mmol/ ml and safety note re. avoidance of use of calcium chloride 10% for replacement	2.0
Jan 2025	Sarah Clearly Zoe Cousland	Removed Victoria Gemmell as stakeholder and added Sean Haughey as collaborator (for review process) Switched oral calcium supplements around to be Adcal first line (Formulary choice) then Calvive	3.0