Society for Endocrinology

EMERGENCY
ENDOCRINE GUIDANCE

ACUTE HYPERCALCAEMIA

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Introduction

Under physiological conditions, serum calcium concentration is tightly regulated. Abnormalities of parathyroid function, bone resorption, renal calcium reabsorption or dihydroxylation of vitamin D may cause regulatory mechanisms to fail and serum calcium may rise. Serum calcium is bound to albumin, and measurements should be adjusted for serum albumin. This guideline aims to take the non-specialist through the initial phase of assessment and management.

Severity of hypercalcaemia

<3.0 mmol/l: often asymptomatic and does not usually require urgent correction.	**3.0 to 3.5 mmol/l:** may be well tolerated if it has risen slowly, but may be symptomatic and prompt treatment is usually indicated.	**>3.5 mmol/l:** requires urgent correction due to the risk of dysrhythmia and coma.

Clinical features of hypercalcaemia

- Polyuria and thirst
- Anorexia, nausea and constipation
- Mood disturbance, cognitive dysfunction, confusion and coma
- Renal impairment
- Shortened QT interval and dysrhythmias
- Nephrolithiasis, nephrocalcinosis
- Pancreatitis
- Peptic ulceration
- Hypertension, cardiomyopathy
- Muscle weakness
- Band keratopathy

Causes

Ninety percent of hypercalcaemia is due to primary hyperparathyroidism or malignancy.

Less common causes include:

- Thiazide diuretics
- Rhabdomyolysis
- Tertiary hyperparathyroidism
- Thyrotoxicosis
- Hypervitaminosis D
- Lithium
- Immobilisation
- Non-malignant granulomatous disease
- Adrenal insufficiency
- Milk-alkali syndrome
- Hypervitaminosis A
- Theophylline toxicity
- Familial hypocalciuric hypercalcaemia
- Phaeochromocytoma

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Investigation

1. History
- Symptoms of hypercalcaemia and duration
- Symptoms of underlying causes – e.g. weight loss, night sweats, cough
- Family history
- Drugs including supplements and over-the-counter preparations

2. Examination
- Assess for cognitive impairment
- Fluid balance status
- For underlying causes – including neck, respiratory, abdomen, breasts, lymph nodes

3. ECG
- Look for shortened QT interval or other conduction abnormalities

4. Bloods
- Calcium adjusted for albumin
- Phosphate
- PTH
- Urea and electrolytes

High calcium and high PTH = primary or tertiary hyperparathyroidism

High calcium and low PTH = malignancy or other rarer causes

Management

Rehydration:

Intravenous 0.9% saline 4-6 litres in 24h

- Monitor for fluid overload if renal impairment or elderly
- Loop diuretics rarely used and only if fluid overload develops; not effective for reducing serum calcium
- May need to consider dialysis if severe renal failure

After rehydration: intravenous bisphosphonates

Zoledronic acid 4mg over 15 mins

Or Pamidronate 30 to 90mg (depending on severity of hypercalcaemia) at 20mg/hr
Or Ibandronic acid 2 to 4mg

- Give more slowly and consider dose reduction in renal impairment
- Monitor serum calcium response -will reach nadir at 2 to 4 days
- Can cause *hypocalcaemia* if vitamin D deficiency or suppressed PTH

Second line treatments:

Glucocorticoids (inhibit 1,25OHD production)
- In lymphoma, other granulomatous diseases or 25OHD poisoning
- Prednisolone 40mg daily
- Usually effective in 2 to 4 days

Calcitonin
- Can be considered if poor response to bisphosphonates

Calcimimetics
- Licensed for hypercalcaemia due to primary hyperparathyroidism, parathyroid carcinoma or renal failure

Parathyroidectomy
- Can be considered in acute presentation of primary hyperparathyroidism if severe hypercalcaemia and poor response to other measures

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This information is provided by the Society for Endocrinology's Clinical Committee, February 2013, and will be reviewed annually. If any changes occur a revised version will be made available.

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