Investigation of Suspected Familial Hypocalciuric Hypercalcaemia: Urine Calcium Excretion Index (Ca_E)

Indication

This test is performed in hypercalcaemic patients for the investigation of familial benign hypocalciuric hypercalcaemia (FBHH). It is important to differentiate this condition from primary hyperparathyroidism (PHPT).

Patient Preparation

The patient must be fasted overnight.

Ideally patients should not be receiving any diuretic therapy. Loop diuretics produce a hypercalciuric effect whereas thiazide diuretics produce a hypocalciuric effect which may affect interpretation of the test.

Sample Requirements

A second-void spot urine should be collected into a plain universal container for analysis of urine calcium and creatinine.
A simultaneous serum sample is required for creatinine analysis (brown-top tube).
Send samples with a request form to the laboratory requesting 'Urine calcium; urine creatinine; calcium excretion index – for attention of duty biochemist.'

Interpretation

Following a urine calcium excretion request, the laboratory will calculate Ca_E as follows:

$$Ca_E \text{ (umol/L GFR)} = \frac{\text{Fasting urine calcium (mmol/L)}}{\text{urine creatinine (mmol/L)}} \times \text{serum creatinine (umol/L)}$$

*CaE (umol/L GFR)	Sensitivity for diagnosing FBHH (%)	Specificity for excluding PHPT (%)
<6	15	99
<14	62	95
<27	95	84
<34	99	70

*Gun and Gaffney. Calcium-sensing receptor disorder *Ann Clin Biochem* 2004; 41: 441-458
Figures established from a meta-analysis of 176 patients (51 FBHH, 115 PHPT).

Care is required when interpreting results from the following groups of patients:

- Any patient receiving diuretic therapy as outlined above.
- Patients with type 1 diabetes which studies show to have increased urinary calcium excretion.
- Acute or chronic alcohol use which has a significant hypercalciuric effect.