VAQ 2009.2.6 (Bloods)

A 65 year old woman with a history of osteoporosis and depression presents with two weeks of increasing confusion and malaise.

Observations on arrival:

GCS	13	
HR	100	/min
BP	130/85	mmHg supine
Temperature	36	°Celsius

Serum biochemistry

			Reference Range
Na+	144	mmol/L	134-146
K+	4.2	mmol/L	3.4-5
Cl-	98	mmol/L	98 - 106
HCO3-	38	mmol/L	22-32
Urea	17.2	mmol/L	3-8
Creatinine	58	micromol/L	45-90
Glucose	5.4	mmol/L	3.5-5.5
Calcium	4.47	mmol/L	2.1 – 2.5
Phosphate	0.92	mmol/L	0.75 – 1.4
Albumin	40	g/L	35 - 50

Describe and interpret her investigations (100%)

The significant abnormalities are hypercalcaemia, metabolic alkalosis, and uraemia, with an insidious onset of confusion. The normal creatinine suggests against renal failure as a cause of hypercalcaemia, and the normal phosphate suggests against hyperparathyroidism but does not exclude it. These abnormalities in a depressed osteoporotic patient are concerning for deliberate overdose of prescribed calcium and bicarbonate (i.e. the milk alkali syndrome), but the commonest causes are of hypercalcaemia are malignancy and hyperparathyroidism.

Abnormalities
- markedly raised bicarbonate
  - suggests metabolic alkalosis (or chronic respiratory acidosis – check ABG if suspected)
    - upper GI losses (vomiting not mentioned in history unless concealed)
    - addition of base (ingestion – may be on calcium carbonate for osteoporosis/dyspepsia)
    - mineralocorticoid excess not supported by normal potassium
- markedly raised urea with normal creatinine
  - hypovolaemia / pre-renal impairment
  - supported by raised hypercalcaemia
  - GI bleed / protein load not suggested by history
- normal glucose
  - not cause for confusion
- severe hypercalcaemia
  - could explain symptoms and confusion
  - commonest causes in ED - malignancy
  - history and exam +/- imaging may suggest
    - primary hyperparathyroidism
      - serum parathyroid hormone
    - other causes - ingestion of calcium
- normal phosphate/albumin
  - calcium does not need correction
  - suggests against hyperparathyroidism