

**Please read this bit first**

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a "Journal Club" activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out "correct" answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

## **November 2006**

### **Hypermagnesaemia**

#### **Case Study:**

A known alcoholic (40 years of age) was admitted to hospital after an alcoholic binge. The first set of biochemistry values given below were those on admission; the second set, those two days later, after potassium (300 mmol) and magnesium (40 mmol) replacement:

<b>Plasma</b>	<b>At Admission</b>	<b>Two days later</b>	<b>Ref. range</b>
Na	140 mmol/L	146 mmol/L	(132-144)
K	1.0 mmol/L	1.7 mmol/L	(3.2-4.8)
Cl	105 mmol/L	104 mmol/L	(98-108)
HCO <sub>3</sub>	21 mmol/L	22 mmol/L	(23-33)
Urea	1.3 mmol/L	1.0 mmol/L	(3.0-8.0)
Creat	1400 µmol/L	130 µmol/L	(0.06-0.12)
Ca	1.61 mmol/L	1.93 mmol/L	(2.15-2.55)
PO <sub>4</sub>	1.20 mmol/L	0.94 mmol/L	(0.65-1.25)
Mg	0.29 mmol/L	1.09 mmol/L	(0.75-1.0)
Alb	35 g/L	37 g/L	(30-50)

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## **Comment:**

This patient presents several interesting features:

1. *Magnesium depletion:* This is due to decreased intake (poor diet) and increased renal excretion due to alcohol (McCollister R., et al, 1958).
2. *Magnesium deficiency* induces renal potassium loss and may result in hypokalaemia (Whang R. et al, 1984)
3. *Low Urea:* reflects low protein intake (poor diet, vomiting).
4. *High Creatinine:* indicates moderate dehydration.
5. *Low Calcium:* Mg deficiency causes (a) decreased PTH secretion and (b) decreased calcium resorption from bone.

Note the relatively normal calcium level after magnesium repletion (no calcium was given).

(See also the following references: Anast C. S. et al, 1972; Heaton F. W. et al, 1962).

## **Treatment of magnesium deficiency:**

In the acute situation magnesium can be given intravenously (25 mmol of magnesium sulphate in one litre of saline over three hours, repeated if necessary), or orally (up to 10 mg of magnesium four times daily).

## **CPD QUESTIONS**

1. Investigate methods for measuring plasma magnesium, standing with your own laboratory's method. What principle is being used?
2. What are the major problems caused by low potassium levels?