Woman with Hypomagnesemia and Hypocalcemia

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CASE DESCRIPTION

A 71-year-old woman was referred to the endocrinology clinic after several years of unresolved hypomagnesemia that required numerous hospital admissions to receive intravenous magnesium. She previously presented with palpitations on 3 occasions, and once with diarrhea and vomiting. The blood tests on all 4 presentations demonstrated severe hypomagnesemia (Table 1).

Her medical history included type 2 diabetes mellitus and hiatal hernia. Her regular medications included simvastatin, esomeprazole, verapamil, pioglitazone, gliclazide, metformin, and calcium, magnesium, and vitamin D supplementation. Clinical examination in the endocrinology clinic was unremarkable, and no abnormality was demonstrated on electrocardiogram. An echocardiogram was normal.

Laboratory results at this visit included serum magnesium 0.52 mg/dL (0.21 mmol/L) [reference interval 1.7–2.4 mg/dL (0.7–1.0 mmol/L)] and serum calcium 6.84 mg/dL (1.71 mmol/L) [reference interval 8.8 –10.6 mg/dL (2.20 –2.65 mmol/L)]. Serum albumin was 35 g/L (reference interval 35–52 g/L). The results of her other biochemical tests were unremarkable. Twenty-four- hour urine magnesium excretion was undetectable [reference interval 0.5–1.2 mg/dL (0.2–5.0 mmol/24 h)], as was random urine magnesium [<0.25 mg/dL (<0.1 mmol/L)]. Intact parathyroid hormone (PTH) was 20 ng/L (reference interval 15– 88 ng/L), inappropriately low in the presence of hypocalcemia. All analytes were measured with a Beckman Olympus AU2700 general chemistry analyzer with the exception of intact PTH, which was measured with a Beckman Coulter Access II.

The patient gave full written consent for the use of her clinical information and laboratory tests for the purposes of a case report in the medical literature.

Table 1. Laboratory results during previous visits.[a]

Analyte	Reference interval	February 2008	October 2010	December 2010	March 2011
Magnesium, mg/dL	1.7–2.5	**0.7**	**0.54**	**0.74**	**0.71**
Total calcium, mg/dL	8.8–10.6	**8.04**	**6.32**	8.88	**7.92**
Albumin, g/L	35–52	41	**34**	38	39
Inorganic phosphate, mg/dL	2.5–4.6	3.1	**4.8**	NA	NA
Potassium, mmol/L	3.6–5.2	4.0	3.7	4.5	3.8

[a] Values in bold are outside the reference interval. NA, not available.

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Questions to Consider
• What are the common causes of hypomagnesemia?
• Are any of the patient's medications potential causes of hypomagnesemia?
• What effect does magnesium have on calcium and parathyroid hormone?

Final Publication and Comments

The final published version with discussion and comments from the experts will appear in the May 2015 issue of *Clinical Chemistry*. To view the case and comments online, go to http://www.clinchem.org/content/vol61/issue5 and follow the link to the Clinical Case Study and Commentaries.

Educational Centers

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