

Abnormal calcium level in a psychiatric presentation? Rule out parathyroid disease

Amandeep Singh Bains, MD, Anoop Narahari, MD, Shama Panjwani, MD, and Steven Lippmann, MD

In some patients, symptoms of depression, psychosis, delirium, or dementia exist concomitantly with, or as a result of, an abnormal (elevated or low) serum calcium concentration that has been precipitated by an unrecognized endocrinopathy. The apparent psychiatric presentations of such patients might reflect parathyroid pathology—not psychopathology.

Hypercalcemia and hypocalcemia often are related to a distinct spectrum of conditions, such as diseases of the parathyroid glands, kidneys, and various neoplasms including malignancies. Be alert to the possibility of parathyroid disease in patients whose presentation suggests mental illness concurrent with, or as a direct consequence of, an abnormal calcium level, and investigate appropriately.

The *Table*¹⁻⁹ illustrates how 3 clinical laboratory tests—serum calcium, serum parathyroid hormone (PTH), and phosphate—can narrow the differential diagnosis when the clinical impression is parathyroid-related illness. Seek endocrinology consultation whenever a parathyroid-associated ailment is discovered or suspected. Serum calcium is routinely assayed in hospitalized patients; when managing a patient with treatment-refractory psychiatric illness, (1) always check the reported result of that test and (2) consider measuring PTH.

Case reports¹

Case 1: Woman with chronic depression.

The patient was hospitalized while suicidal. Serial serum calcium levels were 12.5 mg/dL

Drs. Bains, Narahari, and Panjwani are Observer Physicians, and Dr. Lippmann is Professor, University of Louisville School of Medicine, Department of Psychiatry and Behavioral Sciences, Louisville, Kentucky.

Disclosures

The authors report no financial relationships with any company whose products are mentioned in this article or with manufacturers of competing products.

Table

Using the lab to narrow the differential diagnosis of parathyroid-related illness¹

Diagnosis	Test		
	Calcium ^a (reference range, 8.5–10.5 mg/dL)	Parathyroid hormone (reference range, 29–85 pg/mL)	Phosphate ^{b2} (reference range, 2.5–4.5 mg/dL)
Primary hyperparathyroidism	Increased	Increased	Decreased ³
Malignancy	Increased	Decreased	Decreased ⁴
Sarcoidosis	Increased	Decreased	Variable ⁵
Vitamin D toxicity	Increased ⁴	Decreased ⁴	Normal or increased ⁴
Vitamin D deficiency	Decreased	Increased	Decreased ⁶
Renal failure	Normal or decreased	Increased	Increased ⁷
Hypoparathyroidism	Decreased	Decreased	Increased ⁸
Pseudohypoparathyroidism	Decreased ⁸	Increased ⁸	Increased ⁸
Pseudopseudohypoparathyroidism	Normal or decreased ⁹	Normal ⁹	Normal or increased ⁹

^aCorrected for albumin
^bFasting

Use serum calcium, serum PTH, and phosphate tests to narrow the differential diagnosis

and 15.8 mg/dL (reference range, 8.2–10.2 mg/dL). The PTH level was elevated at 287 pg/mL (reference range, 10–65 pg/mL).

After thyroid imaging, surgery revealed a parathyroid mass, which was resected. Histologic examination confirmed an adenoma.

The calcium concentration declined to 8.6 mg/dL postoperatively and stabilized at 9.2 mg/dL. Psychiatric symptoms resolved fully; she experienced a complete recovery.

Case 2: Man on long-term lithium maintenance. The patient was admitted in a delusional psychotic state. The serum calcium level was 14.3 mg/dL initially, decreasing to 11.5 mg/dL after lithium was discontinued. The PTH level was elevated at 97 pg/mL at admission, consistent with hyperparathyroidism.

A parathyroid adenoma was resected. Serum calcium level normalized at 10.7 mg/dL; psychosis resolved with striking, sustained improvement in mental status.

Full return to mental, physical health

The diagnosis of parathyroid adenoma in these 2 patients, which began with a psychiatric presentation, was properly made after an abnormal serum calcium level

was documented. Surgical treatment of the endocrinopathy produced full remission and a return to normal mental and physical health.

Although psychiatric manifestations are associated with an abnormal serum calcium concentration, the severity of those presentations does not correlate with the degree of abnormality of the calcium level.¹⁰

References

1. Velasco PJ, Manshadi M, Breen K, et al. Psychiatric aspects of parathyroid disease. *Psychosomatics*. 1999;40(6):486-490.
2. Harrop JS, Bailey JE, Woodhead JS. Incidence of hypercalcaemia and primary hyperparathyroidism in relation to the biochemical profile. *J Clin Pathol*. 1982; 35(4):395-400.
3. Assadi F. Hypophosphatemia: an evidence-based problem-solving approach to clinical cases. *Iran J Kidney Dis*. 2010; 4(3):195-201.
4. Ozkhan B, Hatun S, Bereket A. Vitamin D intoxication. *Turk J Pediatr*. 2012;54(2):93-98.
5. Studdy PR, Bird R, Neville E, et al. Biochemical findings in sarcoidosis. *J Clin Pathol*. 1980;33(6):528-533.
6. Geller JL, Adam JS. Vitamin D therapy. *Curr Osteoporos Rep*. 2008;6(1):5-11.
7. Albaaj F, Hutchison A. Hyperphosphatemia in renal failure: causes, consequences and current management. *Drugs*. 2003;63(6):577-596.
8. Al-Azem H, Khan AA. Hypoparathyroidism. *Best Pract Res Clin Endocrinol Metab*. 2012;26(4):517-522.
9. Brown H, Englert E, Wallach S. The syndrome of pseudo-pseudohypoparathyroidism. *AMA Arch Intern Med*. 1956; 98(4):517-524.
10. Pfitzenmeyer P, Besancenot JF, Verges B, et al. Primary hyperparathyroidism in very old patients. *Eur J Med*. 1993;2(8):453-456.