



Hypomagnesemia with Hypocalcemia and Vitamin D Deficiency with Secondary Hypoparathyroidism

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Abstract

The divalent cations, calcium and magnesium play vital role in neuromuscular function and cellular metabolism. Hypocalcemia related to parathyroid disorder, renal failure and bone disorders.

The recent availability of ionized calcium measurement is helping to increase the accuracy of detection of this state. Evidence suggests that hypomagnesemia is a significant presence of refractory hypocalcemia, particularly in critical ill patient, with clinical significance relating mainly to concomitant electrolyte deficiency such hypokalemia.

Case History

A 10 year old child has come with generalized tonic-clonic convulsion first episode no history aura, loss of consciousness, bowel bladder incontinence was associated with up-rolling of eye balls, no froth from mouth no post seizure weakness or confusion, no history of precipitating factors dehydration, fever. Convulsion lasted for 4 min, normal birth history, and no similar episode in past, no history of convulsion in family, immunized up to age and normal development history. Past history of frequent spasms of hand peri-oral tingling, numbness. On clinical examination Chvostek's sign and Trousseau's sign positive. Examination of central nervous system and endocrine was unremarkable, other system no abnormality, no abnormality in echocardiogram.

Investigations

Serum calcium 6.35 mg/dl, (8.4 mg/dl to 10.4 mg/dl), Ionized calcium 3.7 meq/l (4.3 meq/l to 5.3 meq/l), magnesium 1.2 mg/dl (1.7 mg/dl to 2.4 mg/dl), Serum alkaline phosphatase ALP 340 µ/L, Inorganic phosphorus 4.2 mg/dl (2.4 mg/dl to 4.5 mg/dl) serum albumin 3.75 gm/dl (3.2 gm/dl to 5 gm/dl).

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Renal function normal Vitamin D level 6.4 ng/ml (30 ng/ml to 100 ng/ml) results of others biochemical tests were unremarkable, 24 h urine magnesium excretion was undetectable, no hypercalciuria, intact Parathyroid (PTH) was 20 ng/L inappropriately low in presence of hypocalcemia and hypomagnesemia. Low potassium level 2.8 meq/dl in renal function test, Echocardiogram normal.

Clinical expression

Parasthesias, perioral tingling, Muscle cramps tetany, Laryngospasm, Trousseau's sign, Chvostek's sign, Seizures, Irritability abnormal mental function.

Approach to Hypocalcemia

Low corrected calcium Corrected calcium = Measured total calcium + 0.8 (4-serum albumin).

	Order	
	Parathyroid hormone, Intact	
Low	Normal	High
Creatinine normal	Creatinine normal	creatinine normal
Phosphorus normal or high	Phosphorus low or normal	Phosphorus low or normal
Magnesium low	Magnesium normal	Magnesium normal
Magnesium deficiency	Albumin low	Order Vitamin D 25-hydroxy
Magnesium normal	Hypoalbuminemia	Low
Hypoparathyroidism	(Pseudohypocalcemia)	Vitamin D deficiency

Parathyroid hormone high

Creatinine high, Phosphorus normal or high, Magnesium normal, Pseudohypoparathyroidism, Renal disease.

Concluding Remarks

- Low serum magnesium should be investigated when first discovered.

- Considered medical history while investigating.
- Considered drug history when investigating hypomagnesemia.
- Considered hypomagnesemia when investigating refractory hypocalcemia.