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# Rhabdomyolysis As a cause of PTH independent hypocalcemia in a child with acute influenza infection

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# Rhabdomyolysis As A Cause Of PTH-independent Hypocalcemia In A Child With Acute Influenza Infection

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No conflict of interest to disclose

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## Case presentation

- A 12-year-old female presented to emergency room with poor oral intake and vomiting.
- She had additional concerns of difficulty in bearing weight, cramping of legs and reported shaking episodes at home.
- Initial evaluation showed Influenza A positive.
- Labs noted severely low calcium level with elevation of iPTH level as well.
- Creatinine kinase (CK) was elevated.
- Subsequently, 25-OH Vitamin D was noted to be severely deficient.

## Labs and Imaging

| Laboratory result | Value | Reference Range |
|---|---|---|
| Serum calcium | 4.8 mg/dl | 8.6-10.5 mg/dl |
| iPTH | 609.4 pg/mL | 10-89 pg/mL |
| 25-OH Vitamin D | <5 ng/mL | 30-80 ng/mL |
| 1,25 OH Vitamin D | 16 pg/mL | 24-86 pg/mL |
| Alkaline phosphatase | 334 unit/L | 105-420 unit/L |
| Magnesium | 2.0 mg/dL | 1.6-2.3 mg/dL |
| Phosphorus | 6.0 mg/dL | 2.5-5.0 mg/dl |
| Ionized calcium | 0.65 mmol/L | 1.13-1.37 mmol/L |
| Albumin | 4.7 gm/dl | 3.0-5.1 gm.dl |
| Urine ca/cr ratio | <0.01 | |
| TSH | 0.84 mcIU/mL | 0.35-5.5 mcIU/mL |
| Free T4 | 1.7 ng/dL | 0.7-1.9 ng/dL |
| Transglutaminase IgA | <1.23 unit | 0.00-3.99 unit |

X-ray of tibia/fibula: Normal

## Discussion

- Rhabdomyolysis causes cell membrane destruction which impairs the normal function of Na-K-ATPase channel leading to increase in intracellular sodium activating Na/Ca exchanger. This in turn causes influx of calcium intracellularly causing hypocalcemia.
- Tissue injury leads to high phosphorus release from cells due to its lysis. High phosphorus is also caused by reduced oxidative metabolism in muscles impairing phosphate use.
- This injury leads to high phosphorus release from cells due to its lysis
- This excess of phosphate then combines with calcium and causes calcium-phosphate complex in soft tissues. Hyperphosphatemia additionally inhibits 1 alpha hydroxylase limiting formation of calcitriol leading to hypocalcemia. [ii]

## Conclusion

- Our patient had severe hypocalcemia due to influenza-related rhabdomyolysis. Rhabdomyolysis is an important cause of hypocalcemia in children, especially with acute viral illness. Accordingly, it is also important to obtain serum electrolytes in patients presenting with rhabdomyolysis as hypocalcemia may lead to complications like seizures and cardiac arrhythmia.

**Reference:**
Roizen, Jeffrey & Shah, Vipul & Levine, Michael & Carlow, Dean. (2013). Determination of Reference Intervals for Serum Total Calcium in the Vitamin D-Replete Pediatric Population. The Journal of clinical endocrinology and metabolism. 98. 10.1210/jc.2013-3105.[ii] Ding LN, Wang Y, Tian J, Ye LF, Chen S, Wu SM, Shang WB. Primary hypoparathyroidism accompanied by rhabdomyolysis induced by infection: A case report. World J Clin Cases. 2019 Oct 6;7(19)

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