Question: 74

A 9-month-old girl is brought to the emergency department by her middle eastern immigrant parents, who have observed an episode of twitching of her extremities. On physical examination, the infant has prominent wrists (Item Q74) and ankles and an open fontanelle. The parents tell you through an interpreter that she is exclusively breastfed and neither she nor her mother takes vitamins. You note that the mother is partially veiled.

Of the following, the MOST likely cause of the twitching is

A. hypercalcemia
B. hypocalcemia
C. hypomagnesemia
D. hypophosphatemia
E. vitamin D deficiency
Question: 74

(Courtesy of M Rimsza)
Prominent wrists, as described for the infant in the vignette.
The child described in the vignette has clinical signs of rickets, and her mother is protected from sunlight by veiling. Neither mother nor child takes supplemental vitamins. Therefore, the child likely has vitamin D deficiency as a result of poor stores at birth and continued poor vitamin D intake and production. However, vitamin D deficiency alone does not cause the twitching reported for the girl. Twitching is a sign of hypocalcemia caused by vitamin D deficiency.

Hypocalcemia induces neuromuscular irritability that can manifest as a positive Chvostek sign, carpopedal spasm, or a positive Trousseau sign. Approximately 10% of individuals who have normal calcium concentrations have positive Chvostek signs. A positive Trousseau sign is induced by the tissue hypoxia caused by a tight blood pressure cuff and causes enough discomfort that this test rarely is performed when a laboratory assessment of calcium is so easily confirmatory. Severe hypocalcemia induces paresthesias (oral, finger, and toe tingling), twitching, and seizures. Hypocalcemia also can lead to diarrhea. One of the most common causes of hypocalcemia is vitamin D deficiency rickets, either when it is very severe or during the initial phases of recovery when calcium is being taken up rapidly by healing bone.

Hypercalcemia can cause slowed mentation, stupor, constipation, polyuria, renal calculi, and extreme thirst but does not cause twitching. Hypomagnesemia may cause neuromuscular irritability similar to that seen in hypocalcemia but is much less common and is accompanied by nausea and loss of appetite. Magnesium interferes with release of stored parathyroid hormone and, therefore, can cause hypocalcemia. The signs and history typical for vitamin D deficiency rickets reported for this girl make this less probable. Hypophosphatemia causes muscle weakness and changes in mental status. It also may be seen in rickets but is not associated with neuromuscular irritability.

Suggested reading:

Agus Z. Clinical manifestations of hypercalcemia. UpToDate Online 17.3. 2009. Available at: http://www.utdol.com/online/content/topic.do?topicKey=calcium/5007&selectedTitle=4%7E150&source=search_result4

Agus ZS. Diagnosis and treatment of hypophosphatemia. UpToDate Online 17.3. 2009. Available at: http://www.uptodateonline.com/online/content/topic.do?topicKey=calcium/5885&selectedTitle=37%7E150&source=search_result

Agus ZS. Diagnosis and treatment of hypomagnesemia. UpToDate Online 17.3. 2008. Available at: http://www.uptodateonline.com/online/content/topic.do?topicKey=calcium/5547&selectedTitle=9%7E150&source=search_result

