Case Report
Proximal Muscle Weakness—An Unusual Presentation of Celiac Disease

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Summary
The identification of the etiology of metabolic bone disease that leads to myopathy is important as this type of muscle weakness often responds fully to treatment. We present the case history of an 11-year-old girl with celiac disease who had rickets masquerading as muscle weakness and bone pains.

Introduction
Rickets, although uncommonly associated with celiac disease, can at times manifest predominantly as proximal muscle weakness in these patients.1,2 We had the occasion to manage an 11-year-old girl who had marked proximal muscle weakness and bone pains, suspected to be rheumatological in origin by the referring physician, but subsequently found to be due to underlying celiac disease and rickets.

Case Report
An 11-year-old girl presented with a history of bone pains for 18 months and progressively increasing muscle weakness with an inability to squat or get up from a sitting position for 8 months. Six months prior to presentation she had sustained a supracondylar fracture of the right humerus following a trivial injury. The fracture healed with malunion. She had no history suggestive of a malabsorptive state. Her parents felt that her appetite had always been inadequate since early childhood and that her growth was lagging behind her peer group. She was a vegetarian with a preference for rice-based food, although wheat was the staple diet of the family. Her outdoor activities prior to this illness were normal.

Her weight was 18 kg (expected 36 kg) and her height was 112 cm (expected 143 cm), both of which were significantly below the 3rd percentile. She had mild pallor, deformity of the right elbow, widened wrists and rachitic rosary. There was generalized muscle wasting, more prominent in the proximal muscle groups. Neurological examination revealed predominant weakness of the proximal muscles of the lower limbs with preserved reflexes. She had a waddling gait and the Gower’s sign was positive. There was no significant organomegaly. In view of this prominent bone pains, muscle weakness and history of fracture following trivial trauma, a clinical possibility of primary hyperparathyroidism was considered.

Investigations showed hemoglobin of 9 g/dl with peripheral blood film suggestive of dimorphic anemia. She also had hypocalcemia (6.6 mg/dl, normal 9–11 mg/dl) and hypoalbuminemia (2.0 mg %) with normal serum inorganic phosphorus (4.6 mg/dl, normal 4–6 mg/dl). Serum creatinine kinase (280 U/l, normal value < 175 U/l), lactate dehydrogenase (277 U/l, normal < 200 U/l) and alkaline phosphatase (56 KAU, normal < 15 KAU) were also increased, as were the serum parathormone levels (96 pg/ml, normal 12–72 pg/ml). Her serum biochemistry was not suggestive of any renal dysfunction (serum urea 25 mg %, serum creatinine 0.6 mg %). Her blood gas pH was 7.38. Radiograph of the wrist confirmed the clinical suspicion of rickets while that of the right elbow showed malunited supra-condylar fracture. Ultrasound abdomen revealed normal sized kidneys. Myopathic changes were present in electromyogram (EMG) of the right vastus lateralis. The muscle biopsy carried out from the left vastus lateralis showed well-organized fascicles on light microscopy, with normal sized fibres. Thus because of her short stature, nutritional anemia and associated rickets with no obvious elicitable cause, malabsorptive work-up was done to rule out celiac disease. Urine D-xylose excretion was 0.7 g/5 g/5 h (normal excretion, > 1 g/5 g/5 h) while fecal fat excretion was 8 g/day (normal excretion, < 6 g/day). Her serum IgA antigliadin antibody levels were significantly raised, 45 IU/l (normal, 5 IU/l). Duodenal biopsy revealed subtotal villous atrophy with mild lymphocytic infiltrate.

She was started on a gluten-free diet, vitamin D...
and calcium supplements. She has shown significant improvement over the last 2 months. Her appetite, although voracious after the initial gluten restriction, has now normalized. She has gained 3.5 kg weight in the last 2 months. Bone pains and muscle weakness are now passive. Her gait has also normalized. Her serum alkaline phosphatase, parathormone level and muscle enzyme levels have normalized. Bone changes on follow-up radiograph of the wrist after 6 weeks of therapy have healed.

Discussion

Classic presentation of celiac disease with diarrhea and failure to thrive is less frequently encountered in late childhood. In older children monosymptomatic presentation with short stature and constipation has been more commonly reported. Rickets has been associated with celiac disease, although rarely as the predominant manifestation. Deficiency of vitamin D in celiac patients occurs due to malabsorption because of intestinal atrophy, which is further compounded by a diet lacking in an adequate quantity of vitamin D.

Muscle weakness as the predominant presenting manifestation is distinctly unusual in celiac disease with associated rickets. To the best of our knowledge this is only the third case report in a child where rickets-associated myopathy is the presenting complaint of celiac disease. In our patient muscle weakness, bone pains and fracture following trivial injury had initially aroused a suspicion of primary hyperparathyroidism, but her subsequent investigations had ruled out this possibility. Secondary hyperparathyroidism, due to calcipenic rickets, can explain the mildly elevated serum parathormone levels in this child.

Myopathy due to rickets can even precede osteoarticular manifestations, with the most common presentation being proximal muscle weakness associated with limb pains and tenderness. As there is a striking improvement with vitamin D therapy, it has been suggested that myopathy develops due to hypocalcemia associated with vitamin D deficiency. Proximal myopathy as an isolated presentation of rickets in the absence of symptoms or signs of bone disease may simulate primary muscle disorders. But the histopathological changes in the muscle fibre of these patients have varied from normal to diffuse atrophy of muscle fibres with no myopathic changes. The atrophy results from the disuse of painful weak muscles and the malnutrition of underlying musculature. Thus awareness of this entity may help in avoiding unnecessary investigations, and complete recovery can be expected following dietary modification thus predicting a much better prognosis in comparison to hereditary myopathies.

It must be noted that high prevalence of gluten sensitivity has also been noted in patients with primary neuromuscular dysfunction of obscure etiology. This form of neuromuscular involvement is believed to be triggered by traces of gluten due to heightened immunological reactivity. Thus in celiac patients presenting with proximal muscle weakness, these autoimmune disorders must be ruled out by muscle biopsy.

Treatment of rickets-associated myopathy in celiac disease is essentially dietary with complete resolution of muscle weakness with vitamin D, calcium supplementation and a gluten-free diet, as in our case. But it needs to be stressed that a strict adherence to a gluten-free diet is essential, as non-adherence may lead to delayed response even if vitamin D and calcium are supplemented adequately.

In conclusion, rickets-associated myopathy due to underlying celiac disease, should always be considered in the differential diagnosis of patients presenting with proximal muscle weakness as this weakness resolves completely with adequate treatment.

References