SPORADIC ADULT-ONSET HYPOPHOSPHATEMIC OSTEOMALACIA — A REPORT OF TWO CASES

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ABSTRACT

Two cases of sporadic adult onset hypophosphatemic osteomalacia are described. Both patients initially presented with intractable low backache and had lumbar laminectomies. In retrospect, they both had typical clinical and biochemical features of hypophosphatemic osteomalacia prior to surgery. Medical treatment resulted in rapid relief of symptoms in both patients.

Key Words: Hypophosphatemic Osteomalacia, Phosphate, 1, 25-Dihydroxyvitamin D.

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INTRODUCTION

Sporadic adult-onset hypophosphatemic osteomalacia is now a well known disease entity (1). It may be part of a generalised renal tubular disorder, occurs as a primary or isolated defect of renal tubular reabsorption of phosphate or arises in association with a tumour; usually a benign mesenchymal tumour (tumour osteomalacia) (1, 2, 3).

Unlike the clinical x-linked dominant variety of hypophosphatemic rickets, sporadic hypophosphatemic osteomalacia present predominantly in adult, have no familial nor genetic tendencies, lack the classic bone deformities of rickets and have marked proximal myopathy (1, 4, 5). Owing to its rarity and sometimes prominent rheumatic manifestations (6), this condition is often initially not thought of, resulting in unnecessary protracted morbidity.

Two cases of sporadic adult-onset hypophosphatemic osteomalacia presenting with rather similar skeletal symptoms and treated with laminectomies are described.

CASE 1

A 52-year old Chinese female was admitted with a 2 year history of progressive muscular weakness and low back pain. Prior to presentation she had been unsuccessfully treated by various physicians and surgeons for intractable low back pain. She eventually underwent a lumbar laminectomy for a diagnosis of prolapsed intervertebral disc. Her dietary history was unremarkable and there was no malabsorption. There was no family history of muscular or skeletal disorders.

At presentation, in addition to being confined to a wheelchair because of severe proximal muscular weakness, there was generalised bone tenderness. Otherwise she appeared well, with no skeletal deformities and was of normal height.

Investigations on admission showed very low serum phosphate of 0.57 mmol/l (Normal Range: 0.80-1.45 mmol/l), a urinary phosphate excretion of 13.2 mmol/24 hour (NR: less than 30 mmol/24 h) and markedly elevated serum alkaline phosphatase of 315 U/L (NR: 30 — 115 U/L). Serum calcium adjusted for albumin was within the normal range but urinary calcium excretion was low at 0.1 mmol/24 h. Arterial blood pH, serum electrolytes and urea, and D-xylose absorption study were all normal. There was no aminoaciduria or glycosuria. Radiology showed multiple ribs fractures and generalised osteopenia. Radioisotope bone scanning revealed multiple focal areas of increased uptake throughout the skeleton, most marked over the ribs and long bones.

A diagnosis of sporadic adult-onset hypophosphatemic osteomalacia was made and treatment started with 1 -hydroxyvitamin D 1 ug/day, phosphate-Sandoz 4 tablets/day (2g phosphorous) and Sandocal 2 tablets/day (800 mg calcium). Serum phosphate normalized within 4 months of treatment and alkaline phosphatase steadily decreased. Serum calcium was largely unchanged throughout treatment (Fig 1). She regained full muscular power and had maximal relief of bone pain 6 months after starting treatment.

CASE 2

A 28-year old Malay male presented with severe muscular weakness and had been treated for chronic low backache for 3 years. A laminectomy had been previously performed for a prolapsed intervertebral disc at L4-5. This was followed by rapid deterioration of symptoms and generalized bone pain. He was also 7 cm shorter than he was 3 years before. He had no significant dietary or family history and had no symptoms of malabsorption. Examination revealed kyphoscoliosis unassociated with other skeletal abnormalities. His crown to pubis length was 11 cm shorter than his pubis to heel length. Marked bone tenderness was noted over his axial skeleton, ribs, pelvis and sternum. Muscular weakness of grade 2/5 was confined to the proximal muscles.

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Figure 1:
Biochemical response to treatment with calcium, vitamin D and phosphate in case 1

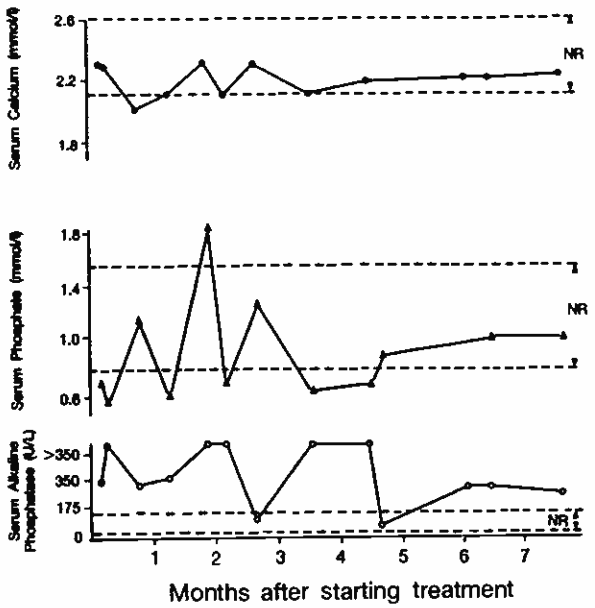
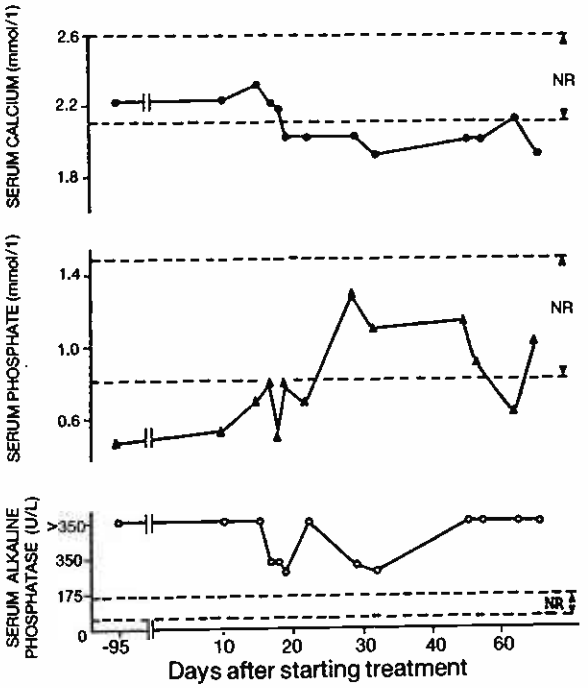


Figure 2:
Biochemical response to treatment with phosphate and vitamin D in case 2



His biochemistry showed very low serum phosphate (0.52 mmol/l), urinary phosphate of 18 mmol/24 hour and elevated alkaline phosphatase (350 U/L). Adjusted serum calcium, electrolytes, urea and arterial pH were all within normal limits. There was no renal tubular leakage of glucose or amino acids. Urinary calcium was 1.5 mmol/24 h. Skeletal radiographs showed generalised osteopenia.

After two weeks of starting 0.5 ug/day of 1, 25-dihydroxyvitamin D and 8 tablets/day of phosphate-Sandoz, his serum phosphate normalized. Alkaline phosphatase, however, remained persistently elevated (Fig 2). The renal phosphate leak was then unmasked as repeated urinary phosphate excretions showed persistent hyperphosphaturia (90 — 124 mmol/24 h). There was also rapid recovery of muscle power and relief of bone pain.

DISCUSSION

The presentation in both the cases was remarkably similar and interestingly they were both subjected to lumbar laminectomy for the identical diagnoses of prolapsed intervertebral discs. The biochemical tetrad of hypophosphatemia, normocalcemia, decreased renal tubular reabsorption of phosphate and decreased intestinal absorption of calcium which typifies this disorder (7-10) is shown in both the cases. The decreased intestinal calcium absorption, which was indirectly demonstrated by the low 24-hour urinary calcium in both cases, is a result of impaired 1-hydroxylation of 25-hydroxyvitamin D (11, 12). This is in contrast with the other causes of phosphate depletion where absorptive hypercalciuria occurs secondary to increased renal 1 hydroxylation of 25-hydroxyvitamin D to its active metabolite (11). Tumorigenic osteomalacia has biochemical pictures identical to the condition discussed (2,3). The former can only be excluded by a thorough search for these tumours which are often benign and of mesenchymal origin.

The treatment of sporadic adult-onset hypophosphatemic osteomalacia is well-established (1, 5, 13, 14). This comprises lifelong administration of both oral phosphate and vitamin D in addition to oral calcium supplementation during the initial phase of treatment when the healing osteomalacic bones are undergoing rapid mineralization. This phase, as indicated by the persistently raised alkaine phosphatase (Figs 1 and 2), usually last several months. Omitting the calcium may lead to mild hypocalcemia (Fig 2). These two cases highlight the importance of being aware of and appreciating the varied manifestations of the highly treatable disorder.

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