UNUSUAL AND MEMORABLE

Oncogenic hypophosphataemic osteomalacia mimicking bone metastases on isotope bone scan

A 61-year-old man presented with an 18-month history of musculoskeletal pain affecting the dorsolumbar spine, ribs and thighs, and a 6-month history of pain and swelling of the left foot. Examination showed rib tenderness, and mild swelling and tenderness of the left foot. The only abnormality detected on initial investigations was a raised alkaline phosphatase of level 266 U/l (normal range 37–170 U/l). Plain radiographs of the lumbar spine and foot were normal, but an isotope bone scan showed extensive hot spots in the left foot and in the ribs bilaterally, which were highly suggestive of metastases (fig 1).

An extensive search for malignancy was negative. Serum levels of 25 hydroxyvitamin D₃ (25.OHD₃), parathyroid hormone and calcium were normal, but serum phosphate was consistently low (0.5–0.7 mmol/l). Further, vitamin D₃ analysis showed a low 1,25(OH)₂D₃ (calcitriol) level of 16 pg/ml (normal range 20–50 pg/ml). This biochemical profile of normal 25.OHD₃, calcium and parathyroid hormone levels with hypophosphataemia and low serum 1,25(OH)₂D₃ is characteristic of oncogenic hypophosphataemic osteomalacia. Treatment with oral calcitriol and phosphate led to the complete resolution of symptoms and isotope bone scan abnormalities over 6–12 months. Almost 5 years later, we have not identified any tumour, and the patient remains on calcitriol and phosphate.

DISCUSSION

Oncogenic hypophosphataemic osteomalacia is a rare paraneoplastic syndrome due to renal phosphate wasting.¹ It is characterised by hypophosphataemia, excessive urinary phosphate excretion and reduced 1,25(OH)₂D₃ but normal 25.OHD₃ levels. Although the exact mechanism causing this abnormality is not proven, studies have suggested that this biochemical picture is caused by a circulating phosphaturic factor released by the tumour, which inhibits 1 α -hydroxylase, the enzyme responsible for the conversion of 25.OHD₃ into 1,25(OH)₂D₃. Fibroblast growth factor 23 may be implicated.² A similar

biochemical abnormality is found in X-linked hypophosphataemic osteomalacia of infancy.³

The traditional name for this disorder connoting its classification as a paraneoplastic phenomenon is slightly misleading,³ as most of the tumours associated with oncogenic hypophosphataemic osteomalacia are benign and mesenchymal in nature. This disorder can, however, rarely be associated with carcinomas of epidermal and endodermal origin,⁴ multiple myeloma and chronic lymphatic leukaemia.⁵ A diligent search for an underlying tumour is therefore indicated. If identified, tumour resection should lead to complete symptomatic and biochemical improvement. However, if it is not possible to identify the culprit tumour, as in our patient, the patient will need pharmacological treatment with phosphate and calcitriol and long-term surveillance, as oncogenic hypophosphataemic osteomalacia may present several years before the tumour source is identified.³

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REFERENCES

- 1 Fukumoto S, Takeuchi Y, Nagano A, Fujita T. Diagnostic utility of magnetic resonance imaging skeletal survey in a patient with oncogenic osteomalacia. *Bone* 1999;**25**:375–7.
- 2 Shimada T, Mizutani S, Muto T, Yoneya T, Hino R, Takeda S. FGF-23 is a potent regulator of vitamin D metabolism and phosphate homeostasis. *J Bone Miner Res* 2004;**19**:429–35.
- 3 Carpenter T. Oncogenic osteomalacia—a complex dance of factors. *N Engl J Med* 2003;**348**:1705–8.
- 4 Lyles KW, Berry WR, Haussler M, Herrelson JM, Drezner MK. Hypophosphataemic osteomalacia: association with prostatic carcinoma. *Ann Intern Med* 1980;**93**:275–8.
- 5 Stewart I, Roddie C, Gill A, Clarkson A, Mirams M, Nelson A. Elevated serum FGF23 concentrations in plasma cell dyscrasias. *J Bone Mineral Res* 2005;**20**:S116.

Figure 1 An isotope bone scan showing hot spots in the left foot and in the ribs, suggestive of metastases.