EVOLUTION AND REGRESSION IN BONE-PRIMARY HYPERPARATHYROIDISM

MAHESH D M
Department of Endocrinology,
CHRISTIAN MEDICAL COLLEGE

Abstract:
Primary hyperparathyroidism is still predominantly a symptomatic disease in India, though largely asymptomatic in the western world. The bone is the most commonly affected organ and the classic bone disease of primary hyperparathyroidism, osteitis fibrosa cystica, is characterized by subperiosteal bone resorption, osteopenia, and brown tumors. Regression and healing of these lesions are expected after normalization of hyperparathyroidism subsequent to parathyroidectomy, however in some cases these brown tumours may grow despite normalization of parathyroid hormone. We describe this phenomenon of evolution and regression of brown tumors in a young lactating lady who presented to us with a pathological fracture of the femur and brown tumours scattered throughout the skeletal system.

Case: A 21-year-old lady, who was 5 months postpartum and lactating, presented with complaints of swelling of the right knee, pain in the lower limbs with impaired mobility of 6 months duration. She had a pathological fracture in the shaft of the right femur during the 5th month of pregnancy and an implant was subsequently placed in-situ.
She had no history of abdominal pain, renal stones or altered behaviour. On examination, she was normotensive with a BMI of 19 kg/m². Examination revealed severe proximal myopathy. Biochemical evaluation demonstrated hypercalcaemia related to primary hyperparathyroidism with a serum calcium of 10.8 (8.5-10.4mg/dl), phosphorus of 1.0 (2.5-4.5mg/dl), Albumin of 4.1g/dl, an alkaline phosphatase of 493 (<120 u/L), serum parathormone of 1050 (14-72 pg/ml) and a vitamin D level of 6.85 (>20 ng/dl). Her hemogram and renal function were normal. Screening for MEN-1 was negative. Ultrasound and Technetium Sestamibii scans (figure 1a,b respectively) localized a right inferior parathyroid adenoma. The Technetium-99m methylene diphosphonate (MDP) bone scan (figure 2) revealed multiple brown tumours. She subsequently underwent right inferior parathyroidectomy. Her radiology of the chest and femur, prior to (figure 3a,c) and 3 months after surgery (figure 3b,d) revealed brown tumours resolving in case of the chest and appearing at the knee. The differential diagnoses considered for the thoracic lesion were: a thymic tumour, lymphoma or a germ cell tumour. However computerized tomography of the thorax confirmed that it was a brown tumour of the mediastinum. Her bone mineral density improved both at the femoral neck and at the lumbar spine: the Z-score increased in 3 months from minus 3.8 and 4.5 to minus 2.5 and 2.9 at the two sites respectively. There was not much change at the forearm (Z-score remained at minus5.3).

After 3 months her mobility improved dramatically and she was able to walk without support. At follow up, the serum calcium was 8.5mg/dl, phosphorus 4.5mg/dl, alkaline phosphatase 243u/L with a vitamin D level of 39.49ng/dl. She had no family history of primary hyperparathyroidism or Multiple endocrine neoplasia-1 or 2 (MEN-1 or MEN-2).

Primary hyperparathyroidism (PHPT), a disease characterized by hypercalcaemia due to autonomous overproduction of parathyroid hormone (PTH) is present in 1% of the adult population, with an incidence that increases to 2% after the age of 55 years (1). It is predominantly an asymptomatic disease in the western world. However, the same phenomenon is not observed in India; symptomatic disease characterized by skeletal manifestations in 77% with renal stones (36%), pancreatic disease (8%) still dominate the presentation, and only a small proportion (5.6%) are asymptomatic (1,2). The age at presentation is relatively younger as noted in the present case, in comparison to the western series, with a higher mean calcium, parathyroid hormone (PTH), alkaline phosphate levels, and lower vitamin D levels (1). Skeletal manifestation includes osteitis fibrosa cystica (OFC) also known as brown tumours along with pathological fractures and was the main presenting feature in the present case. They are rare, with a prevalence of 0.1% and are three times more common in women (3). Our subject had multiple brown tumours involving the skull, sternum, left proximal humerus, ribs, and lower end of right femur. These are localized focal regions in the skeleton where bone loss is particularly rapid and associated with active, vascular, proliferating fibrous tissue along with haemorrhage, reparative granulation tissue that may replace the normal marrow contents, resulting in a brown tumor (4). Haemosiderin imparts the brown colour. In our patient following parathyroidectomy, 3 months after surgery brown tumours showed resolution in case of the sternum and re-appearance.
at the knee, a pattern described earlier (figure 3b,d). In most cases marked recovery of bone disease occurs with regression of osteitis fibrosa cystica (brown tumours) within a mean duration of 10 months, though with disorderly remineralisation (5). Bones that may be nearly invisible owing to severe osteopaenia have shown dramatic “lighting up” of the brown tumours, with hyperdensities evolving in 3 months and existing hyper-dense lesions showing improvement. Occasionally, contour defects and bony tumors may persist and need corrective osteotomies (5). Densitometric recovery is rapid at the lumbar spine, but not at the cortical (forearm) bone sites as seen in our patient. Three months after surgery her mobility improved dramatically and she was able to walk without support. This case highlights the need for considering hyperparathyroidism as a differential in any patient with suspected giant cell tumour of the bones or reparative granulomas involving the maxilla. Furthermore, brown tumours represent a reparative cellular process rather than a neoplastic one that resolves spontaneously after resolution of hyperparathyroidism and hence unnecessary surgical intervention must be avoided.

REFERENCES:


