OSTEOBLASTOMA OF THE HUMERUS ASSOCIATED WITH TYPE-I GAUCHER’S DISEASE

A CASE REPORT

SAMUEL KENAN, IBRAHIM F. ABDELWAHAB, GEORGE HERMANN, MICHAEL KLEIN, GREGORY PASTORES
From the Mount Sinai School of Medicine, New York, USA

We report a unique case of juxtacortical osteoblastoma of the humeral shaft, which simulated the appearance of an extraosseous extension of Gaucher-cell deposits. The tumour was treated successfully by curettage and bone grafting. We can find no previous report of this association between osteoblastoma and Gaucher’s disease.

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Gaucher’s disease is an autosomal recessive disorder characterised by the accumulation of glycosylceramide in the reticuloendothelial cells. The clinical features vary, and include anaemia, thrombocytopenia, hepatosplenomegaly and skeletal involvement. Neoplastic disorders have been reported to be more common in patients with Gaucher’s disease.

CASE REPORT

A 27-year-old man with mild type-I Gaucher’s disease complained of constant disabling pain in his left arm for ten months. At first this was considered to be a Gaucher-related bone pain. It increased but was not associated with activity, and there was no history of trauma. The patient had mild hepatosplenomegaly, a normal haemoglobin and mild thrombocytopenia. A nuclear bone-marrow scan revealed slight peripheral marrow expansion.

He was Jewish of Ashkenazy descent, and under supervision at the Clinical Research Centre at Mount Sinai Hospital, New York. His left arm was tender with a deep, large, firm, fixed mass near the midshaft of the humerus. Radiographs showed a juxtacortical expansile lesion 4 cm in diameter surrounded by thick periosteal new-bone formation (Fig. 1). MRI revealed a destructive process in the cortex with a large subperiosteal mass and an intramedullary extension (Fig. 2). Bone scans showed intense uptake over the mid-segment of the humerus (Fig. 3).

Radiographs taken ten months earlier had shown a periosteal reaction over the humeral diaphysis (Fig. 4), and bone scans had revealed intense focal uptake in the area of the periosteal reaction. These initial radiological and clinical findings suggested a bone crisis of Gaucher’s disease. The patient had been treated with non-steroidal anti-inflammatory drugs with only a partial response; ten months later he was referred to us for further investigation.

We considered the diagnoses of a Gaucher-related bone crisis with an extraosseous extension of Gaucher-cell deposits or of a true neoplasm, and advised exploration.

At operation we found a highly-vascularised juxtacortical bone tumour eroding the outer cortex. The lesion was curetted thoroughly and packed with cortical bank bone graft. Histological examination showed a vascularised fibro-osseous tumour, producing bone spicules lined by osteoblasts. These had a normal nucleus-to-cytoplasm ratio, showed no nuclear hyperchromasia and had very few mitoses. The lesion was well marginated, with no bone permeation. A diagnosis of juxtacortical osteoblastoma was made (Fig. 5a). Fragments from the medullary cavity contained Gaucher-cell deposits (Fig. 5b). The patient’s symptoms settled completely soon after surgery (Fig. 6).

DISCUSSION

In Gaucher’s disease, the accumulation of glycosylceramide in reticuloendothelial cells is related to deficiency of the lysosomal glucocerebrosidase required for the degradation of glucosylceramide to glucose and ceramide (Beutler 1991). The disease primarily affects Jews of Ashkenazy descent (Zimran et al 1991), and its severity varies. The skeletal manifestations include acute bone crises, ischaemic
necrosis, osteopenia and fractures. Yossipovitch, Herman and Makin (1965) and Yossipovitch and Katz (1990) pointed out the clinical similarity between an episode of acute bone crisis in Gaucher’s disease and haematogenous osteomyelitis. A bone crisis presents with acute pain, swelling, oedema and skin erythema. It is associated with moderate leucocytosis and a raised ESR. In the early stages, radiographs are not diagnostic and MRI is the best imaging technique to demonstrate medullary oedema or haemorrhage (Horev et al 1991). Within two weeks of the acute onset the periosteum mineralises and repeated plain radiographs show periosteal elevation. A bone crisis is secondary to infiltration of the medullary cavity by Gaucher cells, causing increased intramedullary pressure which blocks the sinusoidal venous drainage and leads to thromboses and medullary and subperiosteal haemorrhage. The acute pain is due to ischaemic necrosis and oedema. Lymphoproliferative diseases such as multiple myeloma (Garfinkel et al 1982), chronic lymphoblastic leukaemia (Kaufman et al 1986), Hodgkin’s disease (Bruckstein, Karanas and Dire 1980) and sarcomatous degeneration associated with a bone crisis.

Figure 1 – Radiograph of the left humerus showing a juxtacortical destructive process surrounded by thick periosteal new bone. Figure 2 – MRI shows subperiosteal expansion with cortical destruction and medullary involvement. Figure 3 – A radionuclide scan using $^{99m}$Tc methylene diphosphonate shows intense uptake in the midshaft of the left humerus.

A radiograph taken ten months before presentation showed a periosteal reaction in the humerus with no obvious cortical destruction (arrow). The endosteal scalloping in the distal humerus is possibly related to Gaucher’s disease.
Infarct are reported to be more common in Gaucher’s disease (Pins et al 1995). Extraskeletal extension of Gaucher deposits, with cortical destruction producing a large mass, has also been described previously (Hermann et al 1994).

In Gaucher’s disease, the pain during an acute bone crisis may be similar to that associated with osteoid osteoma or osteoblastoma, but in the latter conditions radiographs show solid periosteal bone formation around the nidus, and a bone scan demonstrates focal uptake.

Osteoid osteoma and osteoblastoma are similar benign bone-forming tumours and occasionally their size and shape may make a distinction difficult (Schajowicz and Lemos 1970), since cases of periosteal and cortical osteoblastoma have been reported (Farman, Nortje and Grotepass 1976; Tanaka et al 1983; Gentry, Schechter and Mirra 1989; Kenan et al 1994). Osteoblastoma is not as benign as osteoid osteoma and may behave in an aggressive fashion (Schajowicz and Lemos 1970). Intracortical osteosarcoma must be included in the differential diagnosis, since it may have a similar radiological appearance as a lytic intracortical lesion surrounded by thickened reactive bone formation. The diagnosis is made by biopsy in which the lack of permeation of vascular canals, atypical mitoses and the presence of atypical nuclei support the diagnosis of periosteal osteoblastoma (Mirra et al 1991). Surface lesions may primarily be periosteal or intracortical and for these the term juxtacortical is appropriate (Kenan et al 1993). The periosteum is a multipotential membrane that may give rise to a variety of true neoplasms and tumour-like conditions.
Lesions originating from the inner layer of the periosteum produce a periosteal reaction and its extent is an index of the activity of the underlying process (Kenan et al 1993).

Enzyme replacement therapy for Gaucher’s disease has recently been developed, and the regular intravenous infusion of glucerase (Ceredase; Genzyme Corporation, Cambridge, Massachusetts) has been shown to result in haematopoietic reconstitution and the resolution of hepatosplenomegaly. Its impact on bone disease remains to be established (Pastores, Sibille and Grabowski 1993).

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