Extraosseous Extension Caused by Epidural Hematoma in Gaucher Disease Mimicking Malignant Bone Tumor

Tadahiko Kubo • Shoji Shimose • Jun Fujimori •
Ryo Shimizu • Mitsuo Ochi

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Abstract Gaucher disease is an inherited autosomal-recessive disorder caused by the defective hydrolysis of glucocerebroside. The resultant hepatosplenomegaly, hematological changes, and orthopedic complications are the predominant symptoms. However, extraosseous manifestation of Gaucher disease, mimicking malignant bone tumor, is supposed to be rare. No reports of extraosseous manifestation of Gaucher disease caused by epidural hematoma were identified in the English literature. A 64-year-old man visited a nearby clinic for low back pain and was referred to our tumor clinic on suspicion of malignant bone tumor on sacral MRI. MRI revealed a demarcated solid lesion extending into the surrounding soft tissues on both sides of the sacral roots. During preoperative examination, he suffered from pathologic fracture in right mid-femur. We performed internal fixation with intramedullary nailing, simultaneously harvesting tissue specimens. Histopathological analysis showed aggregates of Gaucher cells in the right femur and hematoma in the sacrum. Epidural hematoma in Gaucher disease, usually attributed to thrombocytopenia, is a rare manifestation of skeletal complication, mimicking malignant processes.

Introduction

Gaucher disease is an inherited autosomal recessive disorder characterized by a heterogeneous set of signs and symptoms caused by the defective hydrolysis of glucocerebroside. A deficiency in the enzyme glucocerebrosidase (glucosylceramidase, acid β -glucosidase) leads to the accumulation of glucocerebroside in the spleen, liver, and bone marrow. The resultant hepatosplenomegaly, hematological changes, and orthopedic complications are the predominant symptoms. For many years, knowledge regarding the hematological and visceral aspects of this condition has exceeded knowledge regarding its skeletal manifestations. Today bone involvement is known to be frequent. Especially it occurs in approximately 75 % of Gaucher disease type I, the most frequent type of Gaucher disease. Bone lesions range from mild osteopenia, medullary expansion and remodeling defects to osteonecrosis of the femur or humeral heads and spinal cord compression from vertebral collapse (Lutsky and Tejwani 2007; Mikosch and Hughes 2010). Extraosseous manifestation of Gaucher disease, mimicking malignant bone tumor, is supposed to be rare. We here report the first case in which extraosseous manifestation is caused by not Gaucher cell deposits but epidural hematoma.

Case Report

About 20 years previously, a 64-year-old man was diagnosed as having Gaucher disease type I, based on findings of thrombocytopenia associated with hepatosplenomegaly, although he had not received any enzyme therapy. He visited a nearby clinic for low back pain and was referred to our tumor clinic on suspicion of malignant

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T. Kubo (✉) • S. Shimose • J. Fujimori • R. Shimizu • M. Ochi
Department of Orthopaedic Surgery, Graduate School of Biomedical
Sciences, Hiroshima University, 1-2-3 Kasumi, Minami-ku, Hiroshima
734-8551, Japan
e-mail: kubot@hiroshima-u.ac.jp

Fig. 1 CT scan demonstrates large bone destruction around both iliosacral joint in axial view (a) and frontal view (b). (c) T1-weighted image shows iso-high-mixed masses extending into the surrounding

soft tissues on both sides of the sacral roots, consistent with hematoma. (d) T2-weighted image shows the masses become slightly heterogeneous

bone tumor. Physical examination showed a palpable hard mass in both gluteal region and no neurological defects. CT scan demonstrated large bone destruction around both iliosacral joint and MRI revealed a demarcated solid lesion extending into the surrounding soft tissues on both sides of the sacral roots (Fig. 1). The differential diagnoses were malignant bone tumors, Gaucher cell deposits, and chronic hematoma. During preoperative examination for open biopsy, he suffered from a pathologic fracture in the right mid-femur. We performed internal fixation with intramedullary nailing (Fig. 2), simultaneously harvesting tissue specimens of both tumors in the right femur and the sacrum. Histopathological analysis showed aggregates of Gaucher cells in the right femur and hematoma in the sacrum (Fig. 3). Low back pain was improved without

further surgical intervention, and he received enzyme replacement therapy.

Discussion

Lysosomal storage occurs in reticuloendothelial cells and leads to hepatomegaly and splenomegaly, which causes hypersplenism and cytopenia. Bleeding is a frequent symptom in Gaucher disease type I. It is usually attributed to thrombocytopenia, although deficiencies of various coagulation factors and platelet dysfunctions have been reported. A spontaneous bleeding etiology as one of the musculoskeletal complications is extremely rare and very few case series have been reported. Six patients with Gaucher disease have been reported to present spontaneous iliopsoas hematoma (Flipo et al. 1992;

Fig. 2 Radiography of the right femur shows several osteolytic lesions and a pathological fracture (a) and intramedullary nailing fixation (b)

Fig. 3 Histopathological examination shows aggregates of histiocytes with striated cytoplasm, typical of Gaucher cells, in bone marrow of the right femur (a) and blood clot (b) without any cells in the sacrum (H&E, x300)

Jmoudiak et al. 2003; Lesić et al. 2006; Selton et al. 2011). Horev et al. reported that MRI examination revealed an unexpected high intramedullary as well as subperiosteal signal, suggesting a subacute hemorrhage or hematoma in five Gaucher disease patients (Horev et al. 1991). Grewal et al. described that a patient with Gaucher disease type I

suffered from a spontaneous hematomyelia (Grewal et al. 1991). We here report the first case in which Gaucher disease should lead to epidural hematoma. Generally, an epidural hematoma causes serious findings in the lower extremities with neurological deficits and requires emergency evacuation of the hematoma. But this patient did not have severe

physical and neurological problems. The speculated reason is that repetitive bleeding in our case resulted in chronic asymptomatic epidural hematoma, showing gradually progressing bone destruction of the sacrum and slowly growing mass extending into surrounding soft tissues.

Patients with Gaucher disease type I frequently have diffuse hypergammaglobulinemia or monoclonal gammopathy of undetermined significance, and many case reports have documented the cooccurrence of Gaucher disease type I with hematological and nonhematological malignancies including primary malignant bone tumors (Shiran et al. 1993; Böhm et al. 2001; Choy and Campbell 2011). In Bohn's review (Böhm et al. 2001) of the literature, approximately 33 % of the malignancies in patients with Gaucher disease originated from the bone, which indicates a higher relative risk of developing malignant disorders of the bone to patients with Gaucher disease than to the general population. Extraosseous manifestation of Gaucher disease is supposed to be rare, but when cortical destruction with coexisting soft tissue mass is observed in patients with Gaucher disease, this benign process is difficult to differentiate from malignant bone tumors (Hermann et al. 1994). To the best of our knowledge, all reported cases described that extraosseous manifestations of Gaucher disease were caused by Gaucher cell deposits in the spine or extremities (Katz et al. 1993; Hermann et al. 1994; Kenan et al. 1996; Poll et al. 2000; Barone et al. 2000). There have been no previous descriptions that cortical destruction is due to epidural hematoma.

In conclusion, epidural hematoma in Gaucher disease is a rare manifestation of skeletal complication, mimicking malignant processes.

Conflict of Interest

Tadahiko Kubo, Shoji Shimose, Jun Fujimori, Ryo Shimizu, and Mitsuo Ochi declare that they have no conflict of interest.

Informed Consent

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from the patient for being included in the study.

Contributions of Individual Authors

Tadahiko Kubo contributed to the conception and design.

Shoji Shimose contributed to the analysis and interpretation of data.

Jun Fujimori contributed to the analysis and interpretation of data.

Ryo Shimizu contributed to drafting the article.

Mitsuo Ochi declares contributed to revising it critically.

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