Progression of a Lumbar Spinal Osteoblastoma
—Case Report—

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Abstract
A 24-year-old woman presented with a lumbar spinal osteoblastoma manifesting as a 5-year history of low back pain radiating to the left foot. Neuroimaging showed suspicious hypertrophy of the left L4-5 facet which transformed in 3 years to an expansile mass lesion that compressed the dura mater and neural structures. Primary benign bone tumors such as osteoblastoma and osteoid osteoma should be considered in the differential diagnosis of back pain and the patients should be followed up carefully.

Key words: osteoblastoma, back pain, bone tumor

Introduction
Osteoblastoma is a benign primary bone neoplasm that accounts for approximately 3% of benign and 1% of all primary bone tumors.1,2,5,6,15) Osteoblastoma is a rare benign tumor mostly seen in children and young adults, with a male to female ratio of approximately 2 to 1.4,12,15,16,20) Spinal involvement occurs in 34% to 41% of cases.6,13) Spinal osteoblastomas are located in the lumbar spine in 7–25% of cases, in the neural arch in 66%, in the posterior elements in 24%, and in the vertebral body in 3%.14,15) Associated scoliosis is the major problem in more than half of the patients with spinal osteoblastoma.19) The posterior elements of the spine tend to be involved.15) Spinal osteoblastoma is similar to osteoid osteoma in many ways but is distinguished by pain refractory to salicylate treatment, larger radiological size, and absence of reactive perifocal bone formation. Osteoblastomas of the spine average approximately 3 cm in diameter.15) Here we describe the progression of a lumbar spinal osteoblastoma in a young woman which was smaller than average, as a result of early diagnosis and follow up.

Case Report
A 24-year-old woman was admitted with a history of low back pain persisting for 5 years. Physical and neurological examinations found no abnormalities. The patient was treated with non-steroid analgesics and muscle relaxants under a diagnosis of postural low back pain. One year after her first visit she was readmitted as the symptoms remained unchanged and she had additional nocturnal low back pain that was also evident in the morning and aggravated by movement.

Neurological examination only found restriction of spinal movements in the lumbar region. Lumbar computed tomography (CT) showed hypertrophy of the left L4-5 facet, and a suspicious small (1 × 0.5 cm) lytic lesion with central ossification in the lamina and superior articular process of the L-5 vertebra (Fig. 1). Magnetic resonance (MR) imaging revealed expansion and abnormal signal intensity changes in the left L4-5 facet and the lamina of the L-5 vertebra (Fig. 2). Whole body bone scintigraphy showed increased focal uptake in the left side of the L-4 and L-5 vertebrae (Fig. 3). The diagnosis was osteoblastoma or osteoid osteoma. Exploration and biopsy was planned but the patient refused.

Nearly 2 years later, she was readmitted again with severe low back pain that reflected to the left thigh and posterior lateral of her leg. Neurological examination revealed positive left straight leg raising at 30 degrees, and weakness in dorsiflexion (3/5) of the left foot with L4-5 hypesthesia. Lumbar CT showed that the lesion had enlarged (1.5 cm diameter) with prominent expansion of the bone,
Fig. 1 Computed tomography scans demonstrating hypertrophy of the left L4-5 facet and a well-defined lytic lesion in the lamina and superior articular process of the L-5 vertebra. The lesion is very small (1 × 0.5 cm) and contains ossification.

Fig. 2 Axial T₁-weighted magnetic resonance image showing expansion and abnormal signal intensity changes in the L4-5 facet and the lamina of the L-5 vertebra on the left side.

Fig. 3 Radionuclide bone scan showing increased focal uptake in the left side of the L4–5 vertebrae.

Fig. 4 Follow-up computed tomography scan after 3 years showing the lesion had enlarged (1.5 cm diameter) with prominent expansion of the bone, and ossification within the lesion associated with prominent surrounding sclerosis.

and ossification within the lesion associated with prominent surrounding sclerosis (Fig. 4). MR imaging showed that the expansile lesion had compressed the thecal sac and narrowed the neural foramina, with associated reduced signal intensity of the left L4-5 facet and the lamina of the L-5 vertebra consistent with sclerosis (Fig. 5). She finally agreed to undergo surgery.

Left L-4 laminectomy, L4-5 medial facetectomy, and gross total excision of the mass lesion were performed. A well-defined, soft, highly vascularized mass lesion with epidural extension was observed during the operation. Histological examination of the tumor found randomly interconnecting trabeculae of woven bone prominently rimmed by osteoblasts. The osteoblasts appeared plump and active, and the nuclei had regular contours with a single nucleolus. The stroma consisted of loosely fibrovascular tissue, with many thin-walled capillaries. There were several multinucleated giant cells (Fig. 6). The histological diagnosis was osteoblastoma.

Follow-up MR imaging obtained 4 months after the operation showed postoperative changes and no
Fig. 5  Axial $T_1$-weighted (A) and sagittal $T_2$-weighted (B) magnetic resonance images showing the expansile lesion as intermediate and low signal intensity, respectively. Compression of the thecal sac and narrowing of the neural foramina have occurred. Associated reduced signal intensity of the left L4-5 facet and the lamina of the L-5 vertebra is consistent with sclerosis. There is no associated soft tissue component.

Fig. 6  upper: Photomicrograph showing randomly interconnecting trabeculae of woven bone and local aggregates of osteoblasts, and the stroma consisting of loosely fibrovascular tissue. HE stain, original magnification $\times 40$. lower: Photomicrograph showing a giant cell (arrow), focal rimming of osteoblasts around the bone component (arrowhead), and bone tissue (thick arrow). HE stain, original magnification $\times 100$.

residual lesion (Fig. 7). Her neurological deficits had resolved after 1 year. There has been no complaint or recurrence at follow up for 2 years.

Discussion

Patients with spinal osteoblastoma show a wide variety of usually mild neurological deficits. Most patients have localized dull pain and tenderness which gradually increase in intensity and are usually not relieved by salicylates, unlike patients with osteoid osteoma. Diagnosis may be difficult unless the significance of the association between the pain and neurological deficit is appreciated. The correct diagnosis has required 3 months to 2 years to establish.

Histological differentiation of osteoblastoma from osteoid osteoma and osteosarcoma is essential. Osteoblastoma is defined as a vascular, osteoid, and bone-forming tumor containing numerous benign-appearing osteoblasts. Histologically, osteoid osteo-
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H. Emmez et al.

Fig. 7 Follow-up axial T1-weighted magnetic resonance images (left) and with contrast medium (right) obtained 4 months after the operation showing the laminectomy defect and enhancement of the granulation tissue at the operation site. There is no residual lesion.

Osteoblastoma is characterized by scanty stromal reaction and rare multinucleated giant cells, and osteosarcoma by significant cellular atypia, mitotic figures, and thick osteoid and woven bone.6 We believe that except for the associated scoliosis in more than 50% of patients,15 the most important problem with spinal osteoblastoma is the delay in diagnosis. Generally, a young outpatient who is admitted with a complaint of back pain without neurological deficits is not evaluated in detail, if radiography shows no abnormalities. Since the pain responds well to analgesics, patients do not pay any attention to persistent pain for a long duration. The present case demonstrated the transformation of a suspicious hypertrophic lesion in the L4-5 facet to an expansile mass lesion, suggesting that osteoblastoma could act as a “ghost tumor” in the early stages. The diagnosis of “spinal osteoblastoma” should always be considered in young patients with back pain to establish an early diagnosis, and requires further investigation with bone scintigraphy even if MR imaging and CT identify no abnormalities. The increased focal radioactivity on bone scintigraphy in osteoblastomas, as in our case, may be the only positive finding. Positive bone scintigraphy and CT or MR imaging findings of a suspicious lesion should be followed by CT-guided biopsy to confirm the diagnosis. However, total excision should be attempted for curative treatment.

References


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