

Osteoblastoma Of The Cervical Spine. Histopathological and Radiological Correlation

Servikal Omurga Osteoblastomu. Radyolojik ve Histopatolojik Bulgu İlişkisi

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Abstract: This is the case report of an eight-year old boy with a benign osteoblastoma of the C3 vertebra. The clinical, radiological, gross and histopathological findings concerning the tumor are sufficiently characteristic and exclusive to justify the diagnosis of "osteoblastoma".

Key Words: Osteoblastoma, scintigraphy, spine, surgery.

Özet: Servikal üçüncü omurgada benign osteoblastomu olan sekiz yaşında bir erkek hasta sunulmaktadır. Bu tümörün klinik, radyolojik, makroskopik ve mikroskopik patolojik bulguları 'osteoblastoma' tanısını kesinlikle koyduracak kadar kendine özgüdür.

Anahtar sözcükler: Cerrahi, omurga, osteoblastoma, sintigrafi

INTRODUCTION

Osteoblastoma is a rare, vascular, and progressively expansive, benign tumor of the bone, and has a 34.41 % predilection for the spine (7,8,15). Since the lesion is histologically indistinguishable from osteoid osteoma, a differential diagnosis was made on the basis of natural history, lesion size and radiological images (3,7,8,15,16). The majority of the cases is under the age of 30, with a peak in the second decade of life (8,15). In this report, it is aimed to draw attention to the application of vertebral angiography in primary cervical spine neoplasms, for ascertaining the existence or absence of any vascular complications

CASE REPORT

An eight-year old child with a history of neck pain over a six month period was admitted to the Neurosurgical Department of Medical Faculty of Osmangazi University in December 1994. He was

suffering insidious pain during the day which intensified at least twice during the night. Salicylates provided some relief from the pain. The neurological examination showed no abnormality; however, a cervical postero-anterior plain radiogram revealed a well-circumscribed oval lesion on the pedicles of the C2, C3, and C4 vertebrae on the right (Figure 1). Further, although the tumor itself was not visible in the other projections, a narrowing second intervertebral foramen appeared on the right oblique film, and the lateral radiogram revealed loss of cervical curvature.

A whole-body scintigram performed three hours after an intravenous injection of 10 mCi Tc-99 m methylene diphosphonate (MDP) revealed a well-demarcated, hyperactive round lesion on the third cervical vertebral body (Figure 2).

A computerized tomography (CT) scan of the cervical spine showed a patchy, ossified nidus, surrounded by a bone shell, situated on all the

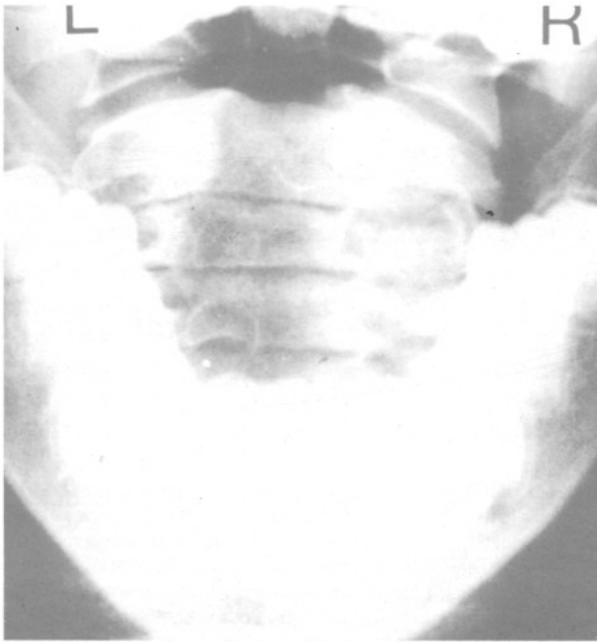


Figure 1: Posterior- anterior radiogram of the cervical spine shows the radiolucent area surrounded by a slight sclerotic rim on the right pedicle of C2, C3 and C4 vertebrae.

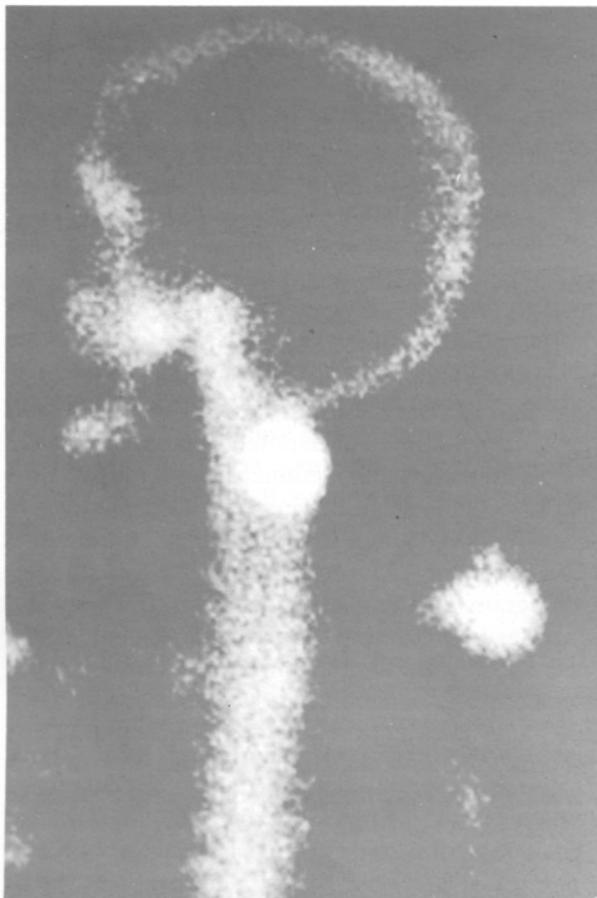


Figure 2: Bone scintigraphy showing an intense focal uptake of radionuclide by lesion on the C3 vertebrae.

transverse processes and one third of the lamina of C3 vertebra with connection to C2 and C3 vertebrae. A soft component of the mass was visible between the posterior border of nidus and lamina. A reactive bone formation at the lamina and the tip of the transverse process of the C3 vertebra was also observed (Figure 3).

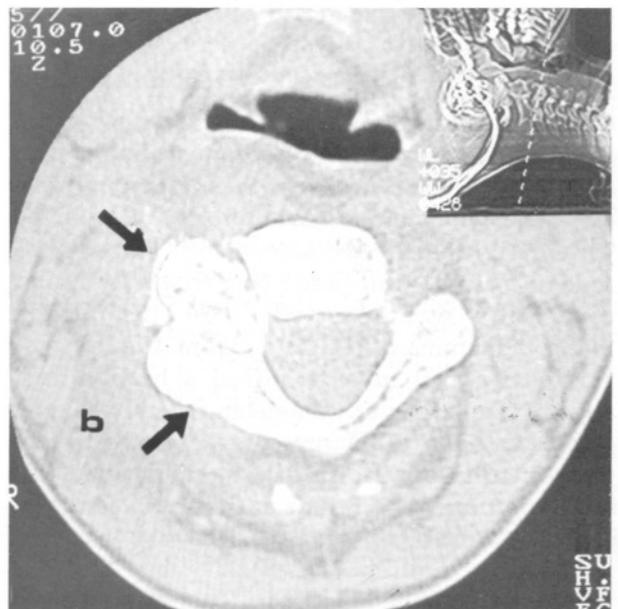
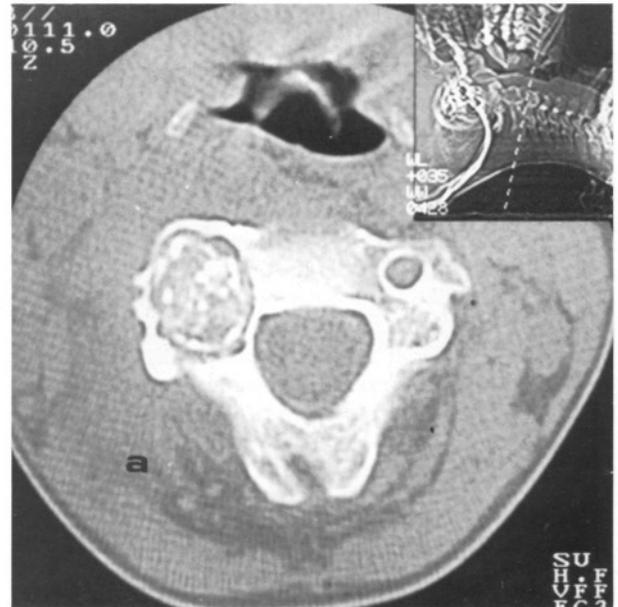


Figure 3: CT scan showing a) the ossificated nidus of the lesion on the lateral part of C3 vertebra, and b) the new bone formation at the lamina and the tip transverse process (arrows). The soft mass between lamina and nidus is also observed.

As the tumor destroyed the right foramen transversarium, a vertebral angiogram was performed. This showed that the mass had caused vertebral artery displacement, with a segmental narrowing at the tumor level (Figure 4).

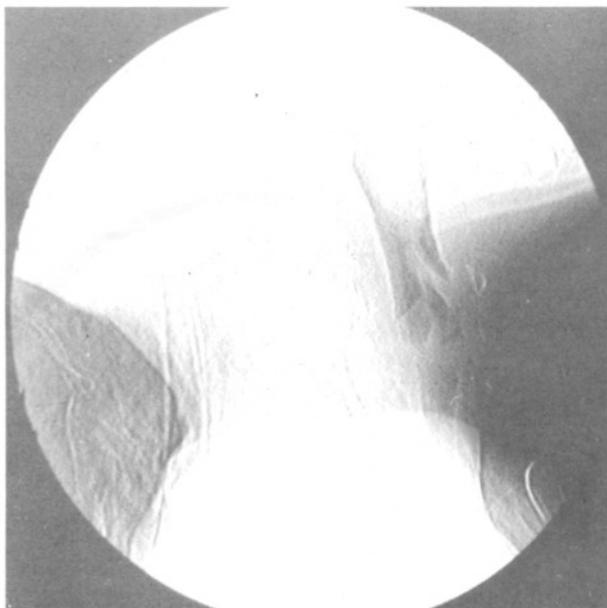


Figure 4: Right vertebral angiogram shows that the tumor causes vertebral artery displacement anteriorly with a segmental narrowing at the tumor level.

To explore the vertebral artery in the upper cervical region, a far lateral approach with the patient in sitting position, as defined by Spetzler and Graham, was found to be the most appropriate (24). On removing laminae of C1, C2, and C3 vertebra on the affected side, a soft, yellow-grey-reddish pathological tissue of a friable, granular consistency was observed, most distinctively under the lamina of the C3 vertebra. Curettage of this entire soft mass exposed a hard nidus, approximately 2 cm in diameter, which was then completely removed. During surgery vertebral artery was seen to have been displaced anteriorly under this hard component of tumor and so was carefully separated from it.

A subsequent histopathological examination of the tumor confirmed it to be osteoblastoma (Figure 5). A CT scan and wholebody scintigram were performed one month after operation, and no residual tumor was detected. During the one year of follow-up, the patient remained in good health.



Figure 5: Histopathological examination of the lesion showing the following: 1. Well separated, irregularly serrated osteoid and woven bone trabeculae. 2. One to three cell layers of plump osteoblasts in close apposition to woven bone trabeculae. 3. Numerous osteoclasts sprinkled on the surface of the trabeculae. 4. Stroma composed of loose spindle cells and prominent capillaries (H&E, X 200).

DISCUSSION

Osteoblastoma of the spine arises most commonly from the posterior elements (15,16,19,22). In this case, however, the tumor involved the posterolateral aspect of the vertebrae, and had caused vertebral artery displacement, with a segmental narrowing, without causing any clinical symptom. Vertebral artery involvement generally occurs in malignant neoplasms, as well as in massive benign tumors, such as osteoblastoma, aneurysmal bone cysts and giant cell tumors of the cervical spine (1,2,4,6,23). Bohlman et al. noted a complication due to vertebral artery distraction during removal of the neoplasm in the cervical spine, and suggested that in cases where the tumor is located laterally, the extent of vertebral artery involvement should be defined by arteriogram (2). This is of benefit to surgical planning, as well as to preserving the artery during surgery. In cases with vertebral artery involvement the anterolateral or postero-lateral routes are used (2,23); in this case, a far lateral approach was found appropriate, not only to remove the laminae on the affected side, but also in order to gain a better view on the transverse processes and pedicles.

Histologically, osteogenic sarcoma may be misdiagnosed as an osteoblastoma (14). In some cases of recurrent osteoblastoma sarcomatous changes are

found that are probably due to initial misdiagnosis of a low-grade malignant lesion (9). The features that were helpful in distinguishing this particular case from osteosarcoma were 1) absence of anaplasia, 2) focal osteoblastic rimming, 3) absence of cartilage production, and 4) sharply circumscribed edge of the lesion from the host lamellar bone, and the lack of permeative pattern (17). On the other hand, several cases of osteoblastoma with same features have shown an aggressive behaviour to justify the clinical term "aggressive" as opposed to "malignant" (10). Osteoblastoma must also be differentiated from fibrous dysplasia; in the latter, new bone growth is not usually rimmed by a prominent, single-row osteoblast (17). In our case there was a rim of osteoblasts 1-3 cells in thickness.

Although osteoblastoma in the thoracic and lumbar spine is frequently associated with painful scoliosis (1,11,19,22), neck pain may be the only sign in a cervical lesion (5). Of patients with osteoblastoma in the spine, including the subject of this report, 13 % were reported to have nocturnal pain (16).

On plain radiogram, osteoblastoma is generally found to be osteolytic, although some cases are osteosclerotic and some show a combination of two. A well-circumscribed radiolucent area surrounded by a slight sclerotic rim is also generally observed (3,12,15,16,21). The fact that this image appeared clearly on posteroanterior film in this case, suggests that radiograms should be taken at four projections.

Bone scintigraphy is recommended where there is a suspicion of osteoblastoma or osteoid osteoma, even if these are not visible on the plain radiograms (13,18,20). No false negative results have been reported (1,19,22). Bone scintigraphy was applied intraoperatively and postoperatively, for detection of any residual tumor tissue (13,25). In this case, the technique was used not only for supporting the diagnosis but also for evaluating the extent of the tumor removal.

According to Mohan et al., it is possible to make a differential diagnosis between osteoblastoma and osteoid osteoma by CT scan; osteoblastoma is distinguished by an expanding lesion, with evidence of new bone formation and varying degrees of calcification (18). Our case conforms with previous reports with respect to scanty ossification of matrix, surrounded by a shell of bone and a soft component of lesion that are only visible by CT scan (12,18).

Osteoblastoma can be completely cured by en-bloc resection (8,9,15). In conclusion, early detection of osteoblastoma in the spine is essential for the prevention of neural or vascular complications, and for preserving the stability of the spinal column.

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