Current problem cases

Clinicoradiological diagnosis of benign osteoblastoma of the spine in children

V. Mohan¹, T. Sabri², T. Marklund¹, M. Sayed³, and R. P. Gupta²

Departments of ¹Radiology, ²Orthopaedics, and ³Pathology, Al Razi and Al Sabah Hospitals, Kuwait

Summary. Three cases of benign osteoblastoma of the spine in children are reported, diagnosed on the basis of clinicoradiological findings and confirmed at surgery and by histopathology. The authors feel that in all cases of painful scoliosis and painful torticollis, a careful search should be made for any suspicious area of sclerosis, especially in the posterior elements of the vertebrae, and all the positive or suspected cases should undergo nuclear bone scanning. All patients whose bone scan is positive should be subjected to computed tomography for differential diagnosis between osteoid osteoma and benign osteoblastoma.

Benign osteoblastoma is an interesting but rare tumour that accounts for fewer than 1% of all bone tumours [13]. However, more than 40% of reported cases have been located in the spine, and benign osteoblastoma and osteoid osteoma are considered the two most important causes of painful scoliosis [16]. Clinical and radiological diagnosis of these tumours can be elusive, and a delay in diagnosis of between a few months and a few years after the onset of symptoms is not uncommon [1, 8].

In this paper, we report three new cases of benign osteoblastoma diagnosed preoperatively on the basis of various clinical and radiographic findings and confirmed at surgery and by histopathological examination.

Case reports

Case 1

An 11-year-old boy was brought to the neurosurgical clinic, having had pain in the neck and left shoulder for the previous year and progressive left-sided torticollis for the last 6 months. Pain used to radiate to the left upper arm, was greater at night, and used to be temporarily relieved with analgesics. The patient started keeping his head obliquely to the left side and used to pull his left shoulder up to relieve the pain which was triggered by sneezing and coughing.

Clinical examination revealed a healthy child with left sided torticollis. Neck movements were restricted and painful. The left trapezius muscle showed increased tone. Motor and sensory capacity were normal. The results of the routine blood and urine investigations were within normal limits.

The patient has three times undergone roentgenography of the cervical spine (routine views) at different intervals and at different clinics, the findings of which had been reported as normal. On review, one of the roentgenograms revealed a suspicious area of patchy sclerosis near the left pedicle of C6, which was confirmed by an oblique-view roentgenogram (Fig. 1) and by a bone scan with technetium 99 which revealed high uptake in the same region. Computed tomography (CT) confirmed the observations by revealing an expansile destructive lesion with areas of calcification (Fig. 2).

By correlating the clinical and roentgenological findings, a confident preoperative diagnosis of benign osteoblastoma of the sixth cervical vertebra was made. At surgery, a well-defined tumour was found, arising from the lateral part of the left spinal arch of C6 and having richly vascularized spongiosa. The lateral part of the arch, the pedicle and the articular process were excised. The left roots of C6 and C7 were explored but were found to be normal. Postoperative recovery was uneventful. The pain disappeared within 32 h after the surgical excision and the normal range of neck movements were restored within 3 weeks. During a total follow-up of more than 3 years there has been no clinical or radiological evidence of recurrence and the child is free of symptoms. Histopathological examination of the excised tumour confirmed the diagnosis of benign osteoblastoma (Fig. 3).

Case 2

S. H., a 15-year-old girl, was referred to the spine clinic with a history of chronic back pain for the last 2 years and scoliotic deformity of the spine of almost the same duration. The pain was moderate in intensity and used to be relieved with common anti inflammatory drugs. The patient and the parents, however, were more worried about the deformity of the spine, which was progressive.

The general physical examination contributed nothing, there being no clinical evidence of neurofibromatosis. Local examination revealed a thoracolumbar scoliotic deformity most prominent at the T10–L4 level. The deformity was greater when the patient bent forward with a stiff spine. The spine was tender in the T12–L1 region. She was neurologically free of symptoms.

Roentgenograms of the erect thoracolumbar spine showed a scoliotic deformity and increased density of the right pedicle of L1, which was confirmed by a tomogram (Fig. 4). Bone scanning re-
vealed increased uptake in the same region (Fig. 5). CT scan showed an expansile lesion with areas of sclerosis and new bone formation (Fig. 6). With a preoperative diagnosis of benign osteoblastoma made on the basis of clinical and roentgenological findings, the patient was operated upon and the tumour removed completely. The girl was free of pain within 1 week after surgery and the scoliotic deformity started improving gradually. Histopathological examination of the excised tumour confirmed the diagnosis of benign osteoblastoma. With a follow-up of more than 2 years, the girl is totally pain-free and the deformity is fully corrected. Repeat bone scanning and CT scanning 2 years after surgery revealed no evidence of recurrence.

**Case 3**

A.F., an 8-year-old boy, was admitted to another hospital, the chief complaint being pain in the lumbosacral region for the last 4–5 months. At first, the pain had been moderate, but it was gradually becoming more severe with the passage of time. There was no history of local trauma. Initially the child had had fever for about 1 week, but the fever receded afterwards. The spinal movements were reported to be restricted. Clinically, the child was diagnosed as suffering from acute brucellosis and was given anti-brucella treatment for 2 months, which consists of combined injection of streptomycin and tetracycline. Laboratory investigations gave the erythrocyte sedimentation rate as 22 mm/h, haemoglobin concentration as 12.5 g/100 ml and total white cell count as 6500/μl. Brucella aggregate testing was, however, repeatedly negative.

On admission to our hospital, the roentgenograms were reviewed by one of the authors (V.M.). Plain roentgenograms of the lumbosacral spine revealed irregular dense sclerosis in the region of the left pedicle of L5 (Fig. 7), while the bone scan revealed high uptake in the same area (Fig. 8). On the basis of the clinical history, plain roentgenographic and bone scan findings, and the presence of quite severe pain, a diagnosis of osteoid osteoma was made. However, CT scanning revealed an area of expansion and destruction with scattered new bone formations, characteristics of benign osteoblastoma (Fig. 9). The tumour was removed surgically and the patient became totally free of pain within 1 week of the operation. Repeat CT scanning 1 year later revealed no evidence or recurrence and the child is symptom-free although still being regularly followed up.

**Discussion**

Osteoblastoma is a benign and rare tumour. It commonly affects the posterior elements of the vertebrae and various sites in long bones and the pelvis [4, 23]. Many workers consider osteoblastoma and osteoid osteoma as variants of the same basic tumour, and even their histological appearance and clinical manifestations may be very similar when these involve the vertebrae [2, 5, 10, 21]. It is probably for this reason that most authors have treated their experience of these two entities together in their published papers [3, 12, 19].