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Cervical spine osteoblastoma presenting as mechanical neck pain: a case report

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Osteoblastoma is a benign bone-forming tumor that represents approximately 1% of all primary bone tumors. It occurs 40% of the time in the spine, most commonly in the posterior elements. The clinical presentation in this case is of chronic neck pain and stiffness. Although most lesions are well visualized on plain films, a bone scan or CT scan may be of better diagnostic value. Treatment is via surgical excision. In this report we present a case of cervical osteoblastoma mistaken for mechanical neck pain.
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KEY WORDS : osteoblastoma, cervical spine, neck pain.

L'ostéoblastome est une tumeur ostéoblastique bénigne qui représente approximativement 1 % de toutes les tumeurs osseuses primaires. Elle se retrouve dans 40 % des cas dans la colonne vertébrale, généralement dans les éléments postérieurs. La présentation clinique de ce cas se résume en une douleur cervicale chronique et des raideurs. Bien que la plupart des lésions soient détectées sur les radiographies, un scan osseux, ou TACO, représente une meilleure valeur diagnostique. Le traitement est chirurgical. Le rapport suivant présente un cas d'ostéoblastome cervical confondu avec une douleur au cou d'origine mécanique.
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MOTS CLÉS : ostéoblastome, rachis cervical, douleur au cou.

Introduction

Osteoblastomas are uncommon benign tumors that represent 1% of all primary bone tumors and 3% of all benign tumors.[1] Approximately 360 cases of osteoblastoma have been reported in the world literature.[2] Osteoblastomas have a predilection for the axial skeleton, more specifically, within the spinous and transverse processes.[3] Huvos[2] and Marsh[4] reported that the vertebral column is involved 34% and 41% of the time respectively. Nemoto et al.[5] reviewed 75 cases of osteoblastoma of the spine and found that 39% occurred in the cervical spine. These tumors are frequently seen in long bones, hands and feet.[1]

These lesions occur predominately in the second and third decade of life; however, the age can range from 5–50 years.[5,6,7] Men are affected two times more frequently than women.[4,5,6]

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Pain is the predominant reason for presenting to a clinician. In most studies approximately two-thirds of the patients complain of pain for longer than one year.[5,6,8] Diagnostic delay is usually attributable to the nonspecificity of the symptoms and the initial normal films.[5] Once the diagnosis is confirmed with imaging, surgical excision is required for pain relief and to prevent further complications. At times, more aggressive treatment such as radiation therapy may be necessary.

The purpose of this case report is to alert clinicians that prolonged neck pain in children is rare and a thorough investigation for underlying pathology should be performed in such cases.

Case report

A 14-year-old girl was referred to the Paediatric Orthopaedic Outpatient Clinic for the complaint of neck pain. On initial presentation to her family doctor, fourteen months earlier, she had severe right neck spasm. She denied any trauma. The family doctor suspected a viral infection. He prescribed Motrin, exercises and rest. Although initially this helped, throughout the next year she complained of severe neck spasms and debilitating pain.

Approximately six months later she developed constant neck pain that was aggravated by left rotation, coughing, sneezing and any jarring motion. She had been treated with heat, physio-

therapy and chiropractic manipulation, all of which gave her minimal relief. She had also been seen by an Adult Orthopaedic surgeon who thought that there was nothing structurally wrong with her neck and that her pain would resolve. She was having difficulty sleeping and complained of right sided posterior headaches. Her systems review was otherwise unremarkable and she was in good general health.

On examination, the patient appeared in moderate distress. She cried easily and she appeared depressed. Neurological examination of the upper and lower limbs was unremarkable. Cervical spine range of motion was restricted and painful in all directions. There was moderate tenderness in the right sternocleidomastoid muscle as well as at C2 on the right.

Cervical spine x-rays taken on presentation at the outpatient clinic were initially read as showing no abnormalities or presence of infection (Figure 1). It was decided that she was suffering from mechanical neck pain with some functional overlay. Blood work and a bone scan were arranged to rule out any underlying pathology. She was also referred to a pediatrician to help clarify her easy tendency to tears.

The bone scan showed a well defined focal uptake in the upper right cervical spine (Figure 2). Review of the cervical spine films revealed a slightly expansile lesion of the right C2 pedicle and lamina (Figure 3). Both an MRI and a CT scan showed evidence of a well-circumscribed lesion in the lamina of C2 (Figure 4).

A tentative diagnosis of osteoblastoma was made. Surgical excision was performed and surgical pathology confirmed the diagnosis of osteoblastoma.

The patient was placed in a Philadelphia collar. Follow-up two weeks after surgery showed a patient in no apparent distress. There was mild neck stiffness due to wearing the collar. Otherwise she was symptom free. Six months post excision she was active with no neck or head pain and had full range of motion.

Discussion

Approximately 40% of all osteoblastomas occur within the spine. In a chart review of 23 patients, Beauchamp et al.[9] found that the location of the lesion was widely distributed. Boriani et al.,[6] in a study of 65 patients with a pathological diagnosis of osteoblastoma, found that 46% of osteoblastomas were located in the spine, with the cervical spine accounting for only 20% of spinal lesions. However, a chart review by Nemoto et al.[5] found

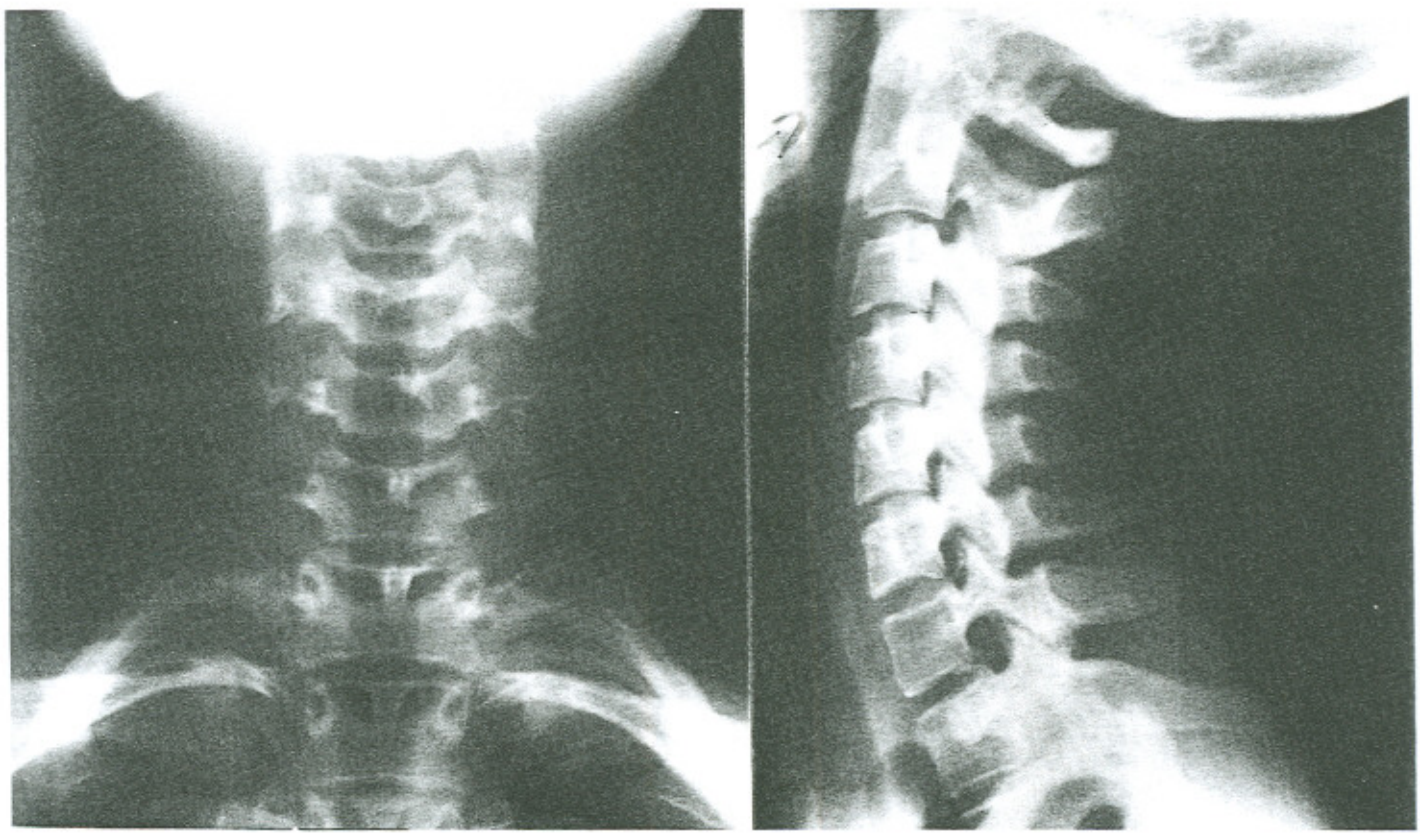

Figure 1 An anterposterior and lateral cervical spine radiograph illustrates the slightly expansile lesion in the right C2 pedicle. This lesion was initially missed at the time of the examination.

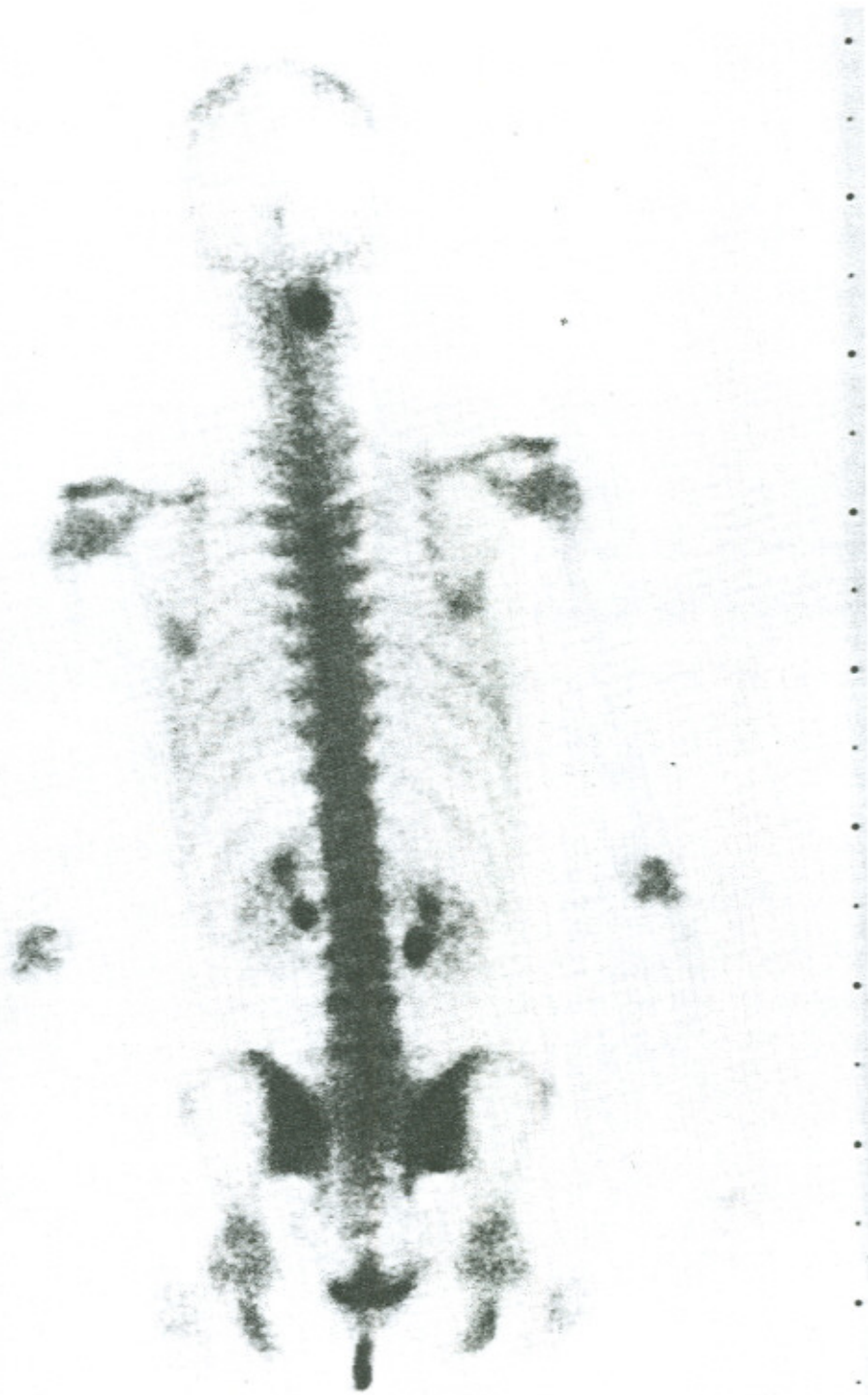

Figure 2 A bone scan shows a well-defined intense uptake in the upper cervical region.

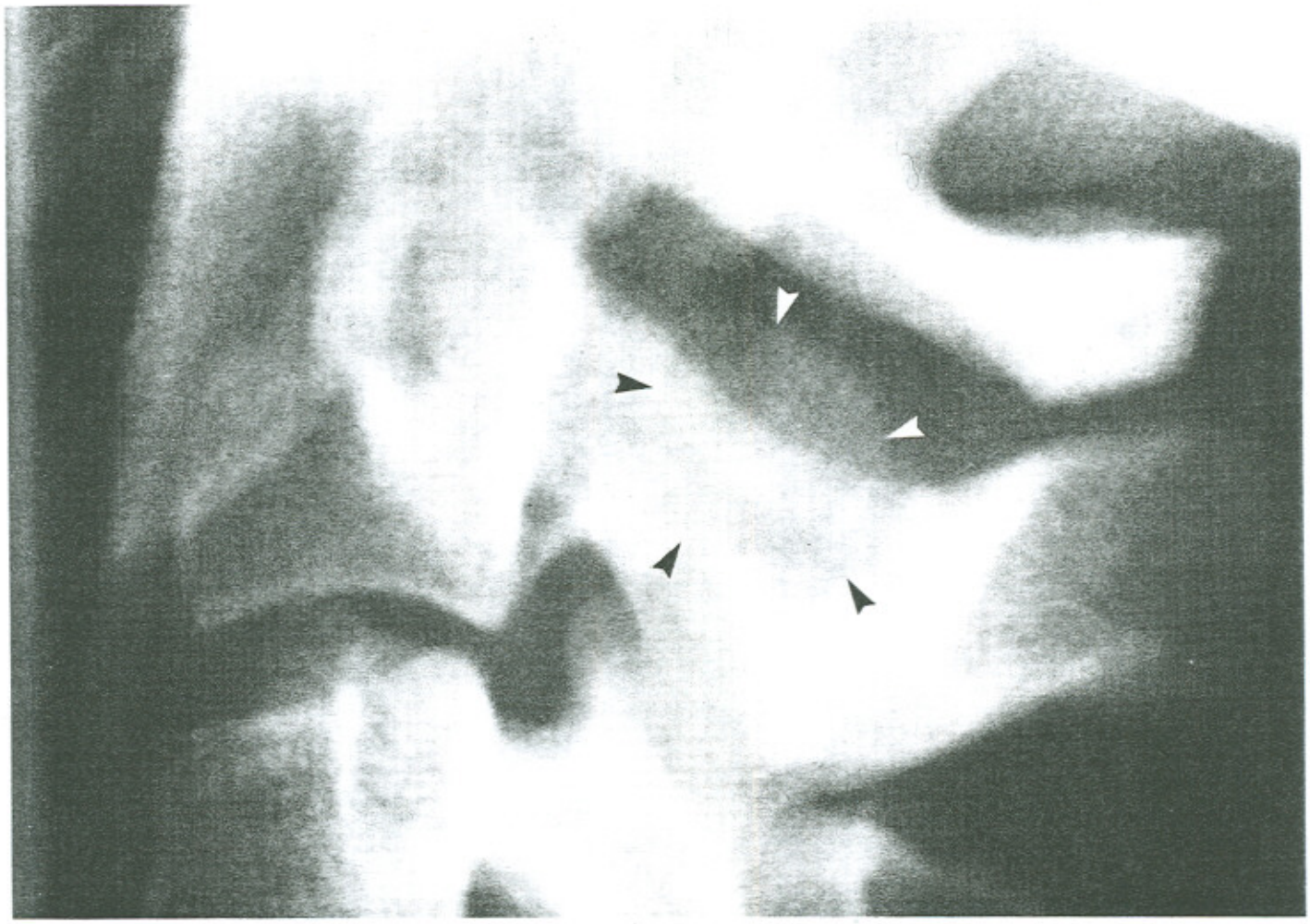

Figure 3 An enlarged photograph of the lateral cervical spine better illustrates the expansile lesion in the C2 lamina. (arrows)

the cervical spine as the most frequent spinal location, with 39% of the lesions discovered in this region.

Posterior element involvement is most common, with figures as high as 97%.[4,5] Due to the expansile nature of these lesions, osteoblastomas can invade the posterior aspect of the vertebral body. Also, soft tissue masses can develop that encroach the interverterbal foramina and compress the spinal nerves. However this is more common in thoracic spine lesions.[6]

The lesion is most commonly seen in people less than 30 years of age, with 19 years being the average at presentation.[4,5,6] Up to 15% of patients can present younger than 10 years of age.[5] Duration of time from onset to diagnosis is usually greater than 12 months.[6,10]

The most common presentation is neck pain and stiffness. Other common signs and symptoms include torticollis, night pain and local tenderness[7,8,10] (Table 1). Radicular signs are also seen, with up to 30% of the patients with spinal osteoblastomas having mild neurological deficit.[5] However, this occurs more commonly in the thoracic and lumbar spine. Of interest is a study by Nemoto et al.[8] in which they looked at 75 spinal osteoblastoma cases and found that 13 out of 49 patients who complained of pain obtained relief by ingesting aspirin.

The differential diagnosis depends on the radiographic appearance and the patient's age. It should include, osteoid osteoma, aneurysmal bone cyst, giant cell tumor, cartilaginous tumors and metastasis. An osteoid osteoma is characterized by night pain, relief by ASA ingestion, sclerosis, and limited growth potential (usually less than 1.5 cm).[9] Historically these two lesions are almost indistinguishable and differentiation is based more on the characteristic radiographic appearance of each tumor. The final diagnosis of an osteoblastoma is based on histopathology. An osteoid or woven bone matrix, combined

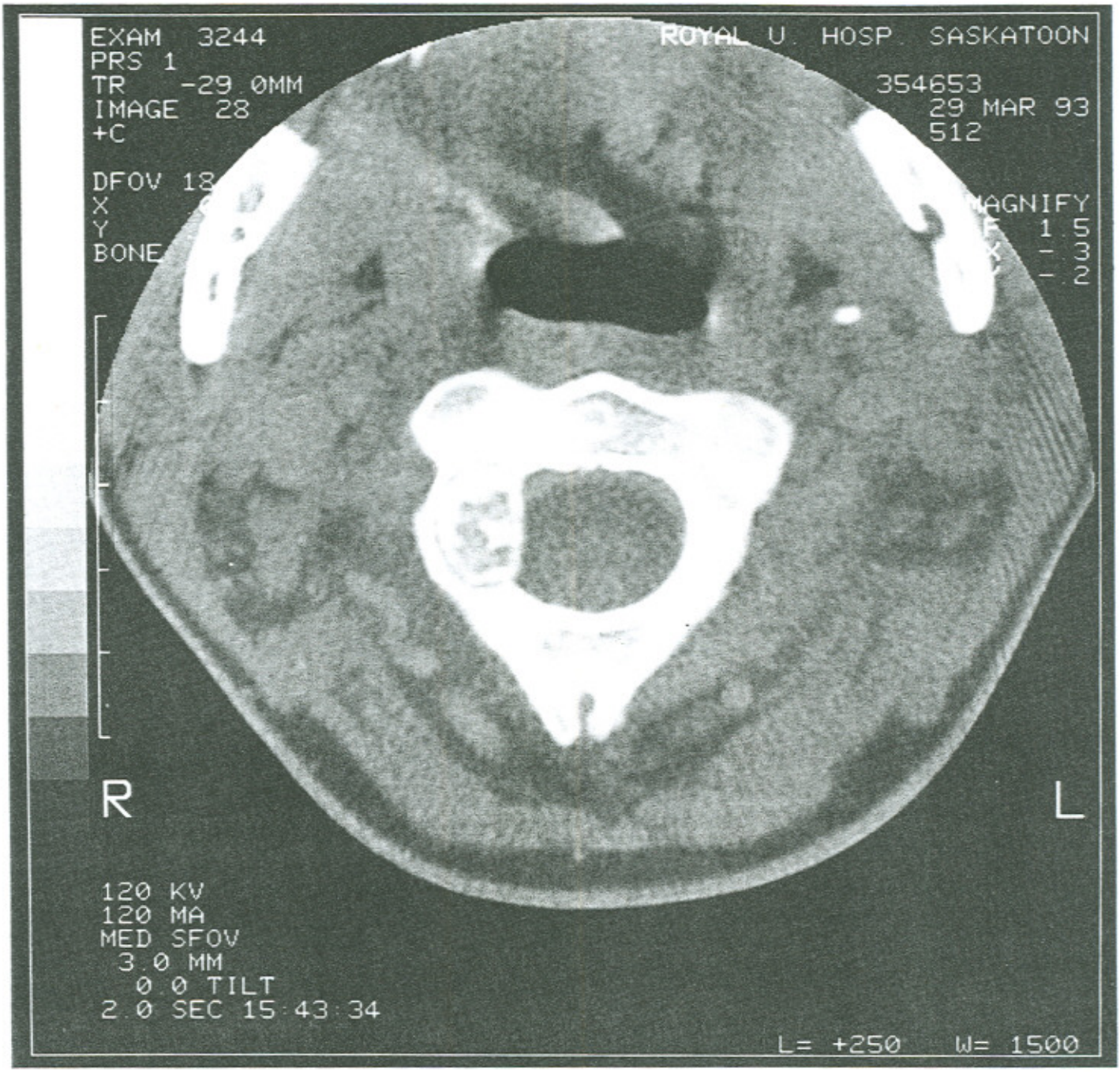

Figure 4 A CT scan illustrates a 1 cm lesion in the lamina of C2. It is well circumscribed and it is not displacing the spinal cord.

with or without calcification, is typical.

The majority of lesions are well visualized on plain-film x-rays. However early in the clinical course, the x-ray may be negative. Levine et al.,[10] in a study of 41 patients with benign cervical tumors, found that many patients were initially treated conservatively because either no films were taken or the lesion was too small to visualize on x-ray. The tumors often produce pain prior to being visualized on plain films. If there is a high

TABLE 1
Signs and Symptoms of Cervical Spine Osteoblastoma[1,8]

Pain*
Decrease range of motion
Local tenderness
Torticollis
Nocturnal pain
Usuallly not relieved by salicylate

* most common

TABLE 2
Plain Film Findings of Osteoblastoma[1,8]

Spinous process and neural arch – most common location
Lytic lesion (most common, but can be sclerotic)
Well circumscribed sclerotic border
Expansile
Round or oval
Size 1–3 cm

index of suspicion, then a bone scan or CT is warranted.

On plain film x-rays, the lesion is a well-defined, expansile lesion that is usually lucent (Table 2). However, a blastic or mixed appearance is not unusual.[5] The average size is 3 cm, with a range of 2–6.5 cm.[5,6] Pathological fracture is unusual.

Treatment is dependant upon the aggressiveness of the lesion. Most lesions are properly treated via excisional biopsy. Non-aggressive lesions are treated by curettage with a high cure rate. Aggressive lesions are treated via marginal resection, with or without adjunctive therapy (i.e. radiation).

Surgery alleviates the pain in the majority of patients.[10] Within six weeks, normal cervical spine range of motion is usually restored. Levine et al.[10] found that at final follow-up (mean = 51 months) in 41 patients with benign tumors of the cervical spine, 80% of the patients were pain free. A study by Marsh et al.[4] analyzed 27 patients with spinal osteoblastoma. Follow-up revealed that 24 patients were symptom-free. Three others experienced recurrences, two of which were following radiation treatment.

Local recurrence is not the norm and the recurrence rate varies on the reported series. Beauchamp et al.[9] found that two in twenty-three patients had recurrences. According to Jackson et al.,[11] after reviewing studies totalling 184 cases of incompletely excised osteoblastomas, the recurrence rate was 9.8%. Malignant transformation is unusual, and some authors feel that such lesions are initially misdiagnosed, or the result of radiation treatment.

Conclusion

Young patients with chronic neck pain should carefully be evaluated for underlying pathology. Early diagnosis is the key in resolving pain and associated torticollis. When plain films are normal, a bone scan can aid in detection of supected pathology. Most neck pain in children resolves quickly with rest or treatment. If it persists, further evaluation is necessary.

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References

1 Kroom HM, Schurmans J. Osteoblastoma: clinical and radiographic findings in 98 new cases. Radiology 1990; 175:783–790.
2 Huvos AG. Bone tumors: diagnosis, treatment and prognosis. Philadelphia: W.B. Sanders Co., 1991, 67–83.
3 Healey JH, Ghelman B. Osteoid osteoma and osteoblastoma: current concepts and recent advances. Clin Orthop 1986; 204:76–85.
4 Marsh BW, Bonfiglio M, Brady LP, Enneking WF. Benign osteoblastoma: range of manifestations. J Bone Joint Surg 1975, 57A:1–9.
5 Nemoto O, Moser RP, Van Dam BE, Aoki J, Gilkey FW. Osteoblastoma of the spine. A review of 75 cases. Spine 1990; 15:1271–1278.
6 Boriani S, Capanna R, Donati D, Levine A, Picci P, Savini R. Osteoblastoma of the spine. Clin Orthop 1992; 278:37–45.
7 Shikata J, Yamamuro T, Iida H, Kotourna Y. Benign osteoblastoma of the cervical vertebra. Surg Neuro 1987; 27:381–385.
8 Myles ST, MacRae ME. Benign osteoblastoma of the spine in childhood. J Neurosurg 1988; 68:884–888.
9 Beauchamp CP, Duncan CP, Dzus AK, Morton KS. Osteoblastoma: experience with 23 patients. CJS 1992; 35:199–202.
10 Levine AM, Boriani S, Donati D, Campanacci M. Benign tumors of the cervical spine. Spine 1992; 17:S399–S406.
11 Jackson RP, Reckling FW, Mantz FA. Osteoid osteoma and osteoblastoma: similar histologic lesions and different natural histories. Clin Orthop 1977; 128:303–313.