Neuroradiology (2000) 42: 458–461

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Two rare lumbar tumours with unusual MRI characteristics

Received: 25 August 1999
Accepted: 3 September 1999

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Abstract We present two rare lumbar lesions with similar MRI features: high signal on T1-weighted and proton density images and low signal on T2-weighted images; a melanotic schwannoma, and a giant-cell tumour-like lesion. Melanin in the first case and haemosiderin and metahaemoglobin in the second were responsible for the MRI characteristics.

Key words Spine, primary neoplasms · Magnetic resonance imaging

Introduction

We present two cases of a lumbar mass with similar CT and MRI characteristics.

Case reports

Case 1

A 70-year-old woman presented with a 3-year history of recurrent, progressive, low back and right leg pain. By the time of admission she was bedridden. Examination revealed paraparesis and bilateral hyperalgesia; the knee and ankle jerks were absent. Laségue's sign was positive at about 45°.

CT showed a right-sided mass at L3, isodense with the intervertebral disc and denser than the dural sac, with no osteolysis (Fig. 1a).

MRI confirmed the presence of a mass, mainly posterior (Fig. 1b), oriented longitudinally, completely separated from the intervertebral disc with well-defined borders and a plane of cleavage between it and the adjacent structures. Its signal intensity was dyshomogeneously higher than that of muscle on T1-weighted (Fig. 1b,c) and proton-density (PD) (Fig. 1d) images, and dyshomogeneously lower on T2-weighted images (Fig. 1e). No significant contrast enhancement was detected, probably because of the intrinsic high signal. CT and MRI suggested a benign extradural tumour. A bilateral L3 and partial right L2 and L4 laminectomy was performed. An extensive extradural lesion was observed, compressing the theca to the left and penetrating into the right intervertebral foramen. The black tumour, adherent to the right L3 root, was completely removed.

Macroscopically, the mass was elongated, soft, intensely black and 1 cm in maximum diameter. Microscopically, it was hypocellular, composed of elongated cells, sometimes showing palisading, immersed in pale and homogeneous intercellular matrix. Nuclei were elongated, with rounded tips and an undulating profile; chromatin was finely dispersed and no nucleoli were apparent. The cytoplasm showed finely granular, Schmorl-positive pigment. The cells were positive with S-100 antibody and negative for HMB45. No mitoses or psammoma bodies were seen. The diagnosis was melanotic schwannoma (Fig. 2).

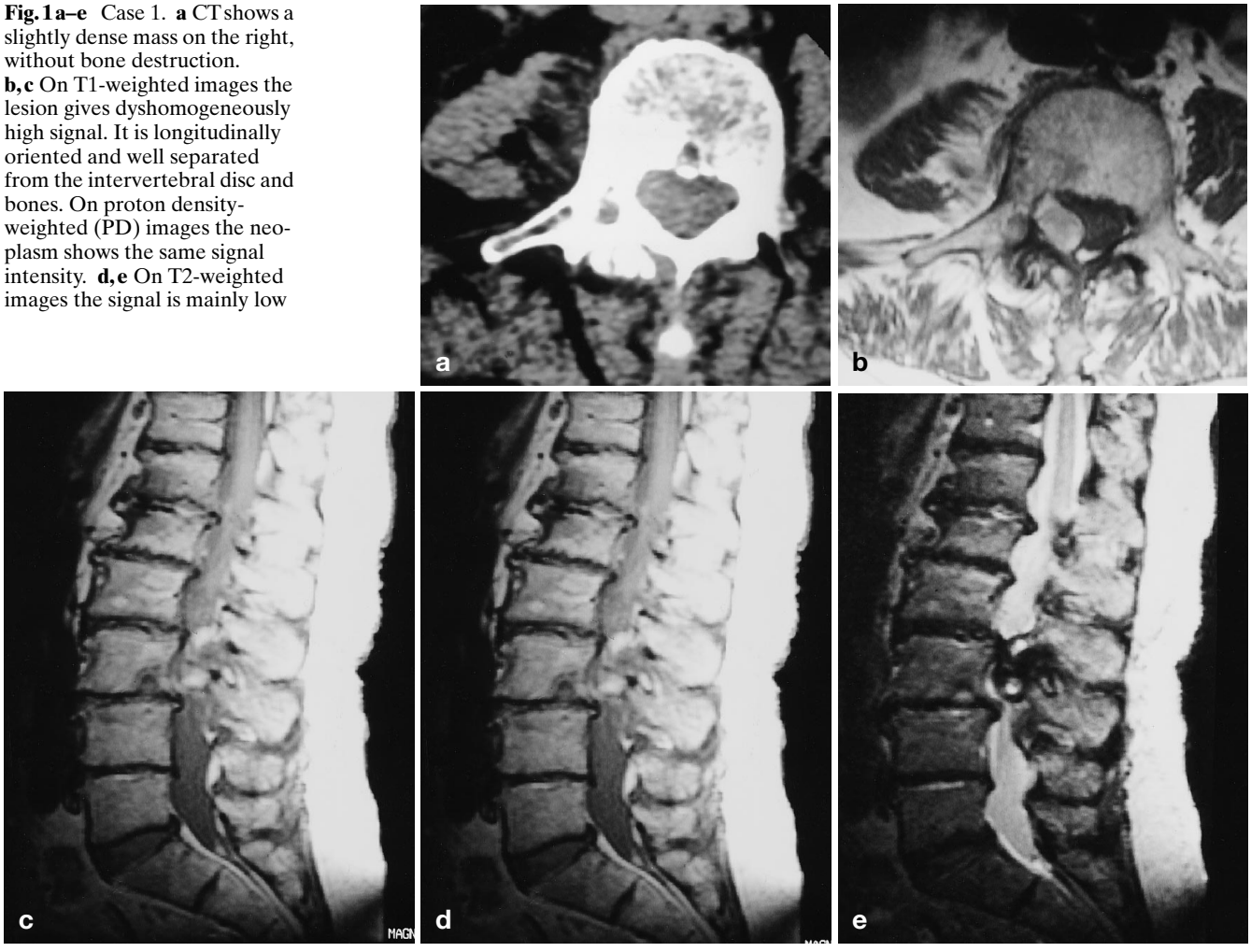


Fig. 1 a–e Case 1. **a** CT shows a slightly dense mass on the right, without bone destruction. **b, c** On T1-weighted images the lesion gives dyshomogeneously high signal. It is longitudinally oriented and well separated from the intervertebral disc and bones. On proton density-weighted (PD) images the neoplasm shows the same signal intensity. **d, e** On T2-weighted images the signal is mainly low

Case 2

A 60-year-old man, admitted to hospital following acute lumbar pain, gave a 3-year history of polymyalgia rheumatica and a 1-year history of intermittent, progressive pain in the left leg. Examination revealed hyperalgesia of the leg and hypoaesthesia radiating into the L5-S1 region.

CT (Fig. 3 a) showed a left-sided extradural mass at the L4–5, partially within the intervertebral foramen and lying near the intervertebral joint. It was slightly denser than the dural sac and isodense with the intervertebral disc.

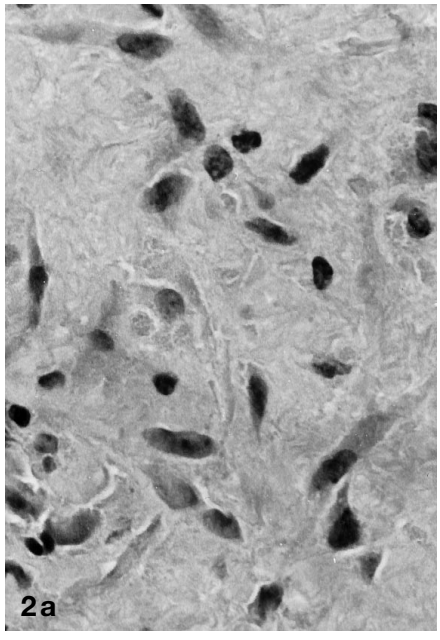
MRI confirmed the presence of a lesion with clearly defined edges and a plane of cleavage between it and the adjacent tissues (Fig. 3 b). Signal intensity was dyshomogeneously high on T1-weighted and PD images (Fig. 3 b–d) and dyshomogeneously low on T2-weighted images (Fig. 3 e). Again, no evident contrast enhancement was seen. The neuroradiological diagnosis was a benign neoplasm.

A wide left L5-S1 interlaminar approach with partial left L5 hemilaminectomy was performed. A black extradural mass was encountered, adherent to the L5 root by a pedicle, and partially encapsulated. Complete excision of the lesion was performed.

Three specimens sent for histological examination were all composed of dense tissue with bone fragments. One specimen consisted of fibrous lamellar tissue rich in extracellular, Perls-positive haemosiderin pigment. The other two were composed of fragments of bone trabeculae surrounding hypocellular lacunae, fragments of cartilage and aggregates of small, polygonal cells, among which multinucleate giant cells were evenly distributed. One of these aggregates showed a central space lined by fibrinoid deposits, with adjacent small venules with an intensely eosinophilic, periodic acid-Schiff-positive content. A small amount of haemosiderin pigment was also evident within the aggregates. Given the hystory, the diagnosis was a giant-cell tumour-like lesion with features of a necrobiotic granuloma (Fig. 4).

Discussion

Melanotic schwannoma was first described by Hellas as "malignant melanotic tumor of ganglion cells" [1]; it usually arises from spinal or autonomic nerves, near the midline, although cases have been described in the stomach, bones and soft tissues. About half of patients have evidence of Carney's syndrome (myxomas, spotty pigmentation, endocrine hyperfunction, including



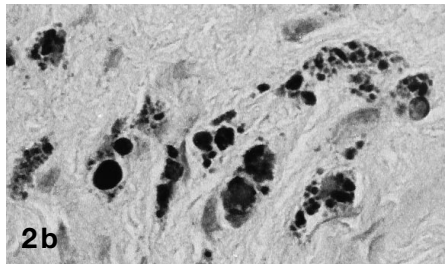
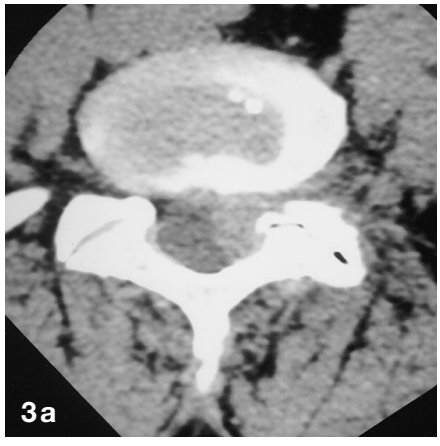
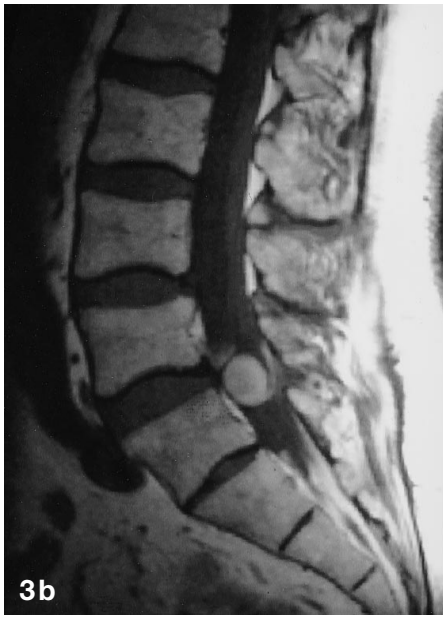
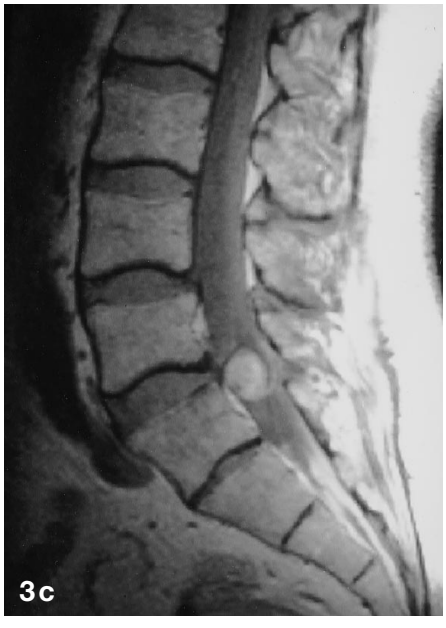


Fig. 2a,b Case 1. **a** The lesion is hypocellular, composed of elongated cells with oval nuclei sometimes showing an undulating profile (haematoxylin and eosin, original magnification, × 40). **b** Schmorl's stain demonstrates intracytoplasmic granular melanin deposits (original magnification, × 40)







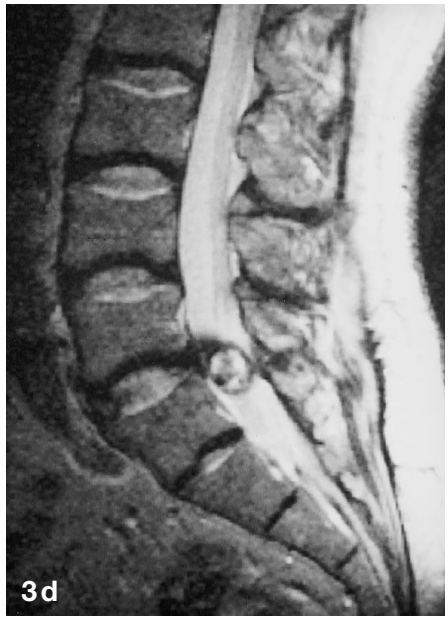


Fig. 3a–d Case 2. **a** On CT the lesion is dense and lies partially within the left intervertebral foramen. **b** On a T1-weighted image the mass gives mainly high signal. Its borders are clearly defined and a plane of cleavage separates it from the adjacent tissues. **c** On a PD image the lesion gives high signal, while a T2-weighted image **d** shows dyshomogeneous signal with both high- and low-signal areas

Cushing's syndrome) and 20% of these have multiple melanotic schwannomas. The tumours are typically well-circumscribed, made up of polygonal or spindles cells with heavy melanin deposits. Most are slowly growing and benign, although four cases with metastases have been described [1].

Morphologically, the lesion in the second patient was composed of tightly packed, small, polygonal cells among which giant multinucleate cells were diffusely distributed, without showing any clear relation to the bone particles in the specimen. Abundant haemosiderin was present at the periphery of the lesion and focally within it. Giant cell tumours of bone and tendon sheaths have been described, together with many giant-cell tumour-like lesions (foreign-body granuloma, necrobiotic granuloma, pigmented villonodular synovitis, intra-articular haemorrhage, solitary bone cyst, osteitis fibrosa cystica of hyperparathyroidism, aneurysmal

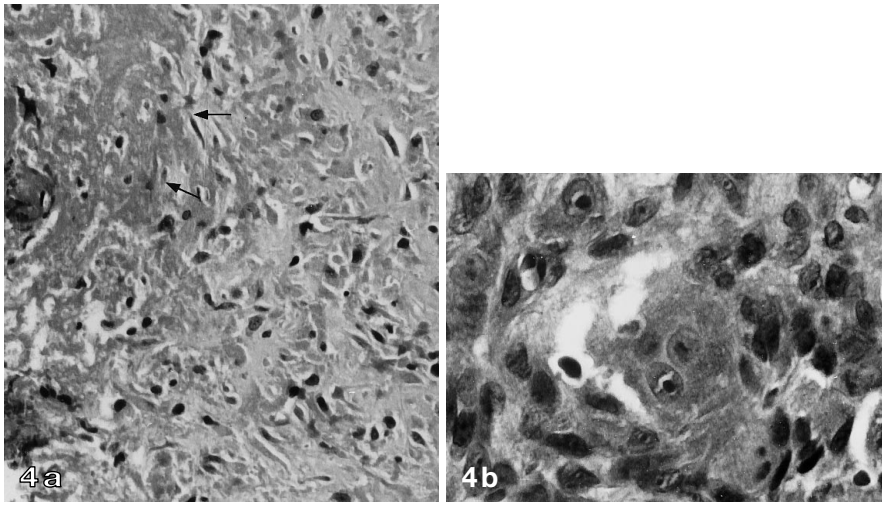


Fig. 4a, b Case 2. **a** Histiocytes surround area of fibrinoid degeneration *(arrows)* (haematoxylin and eosin, original magnification, × 10). **b** Detail of histiocytes surrounding a multinucleated giant cell (original magnification, × 40)

bone cyst) [2, 3]. Giant cells do not differ morphologically, histochemically or immunohistochemically in true neoplastic lesions and in tumour-like lesions, although it is said that, when they are unevenly spaced, a tumour-like lesion ought to be considered [2]. The extraosseous location of the lesion, clearly evident radiologically and at surgery, excluded giant-cell tumour of bone, aneurysmal bone cyst, osteitis fibrosa cystica and solitary bone cyst [2]. Giant-cell tumour of the tendon sheath, typically a lesion of the hands and feet is presumably also excluded. It was not until it was discovered that the patient had polymyalgia rheumatica that a diagnosis of necrobiotic granuloma could be suggested [3].

High signal on T1-weighted and PD images and low signal on T2-weighted images are due to teratomatous adipose tissue, mucin-filled cystic or pseudocystic lesions, melanin, or blood products (haemosiderin and metahaemoglobin) [4–8].

Lumbar teratomas are developmental, congenital lesions, commonly associated with spina bifida and occurring along the midline within the dura mater. Given the age of both patients, the laterality of the masses and their extradural location, a teratoma was considered highly unlikely.

Juxta-articular cystic spinal lesions filled with mucin and corresponding histologically to ganglia or bursae [2] have been described as showing this signal pattern [8]. In both our cases, neuroradiological features did not exclude mucin-filled cysts.

Melanin-containing lesions within the spinal canal are more frequently metastases from malignant melanomas or clear-cell sarcomas of soft tissues [9]; rarely they prove to be primary melanocytic tumours of the central nervous system coverings (melanocytomas, melanomas) or melanotic schwannomas [1]. Neither lesion showed features suggesting a malignant tumour or an origin from the dural sac; the possibility of a melanotic schwannoma was therefore considered preoperatively in both cases.

Haemosiderin and its metabolic byproducts may be found in a great variety of intraspinal lesions: vascular tumours, intensely vascular neoplasms with fragile vessel walls, or traumatic or inflammatory lesions. In both our cases a lesion rich in haemosiderin and metahaemoglobin was among possible differential diagnoses.

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