

Imaging of vertebral haemangiomas - contribution of MR imaging

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Introduction

Vertebral haemangioma is the most common benign tumour of the spine.¹ The prevalence of spinal haemangiomas varies from 10% to 12% from postmortem and radiographic studies.^{1,2} Sixty per cent of patients with haemangiomas are asymptomatic and are discovered as incidental findings on imaging.³ Twenty per cent of patients present with pain, which is usually not related to the spinal haemangioma.³ However approximately 20% of patients become symptomatic with increasing pain related to the haemangioma, or less commonly with progressive neurological signs with or without signs of spinal cord com-



Fig.1a. In case 1 lateral thoracic radiograph demonstrates typical vertical sclerotic striated pattern of a haemangioma.

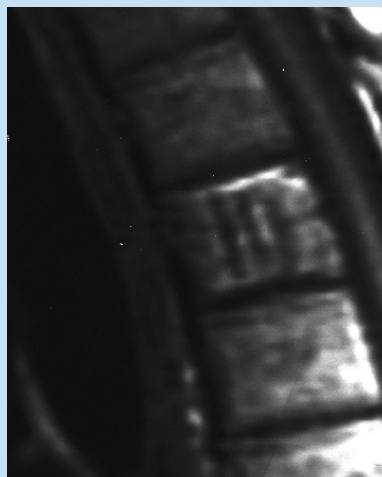


Fig. 1b,c. In case 1 on T1 and T2-weighted sagittal scans there are hyperdense striated lesions in the body of T5 and T6 typical of haemangiomas.



Fig. 1c.

pression.^{3,4} We present 4 cases to demonstrate the clinical spectrum and imaging findings of spinal haemangiomas.

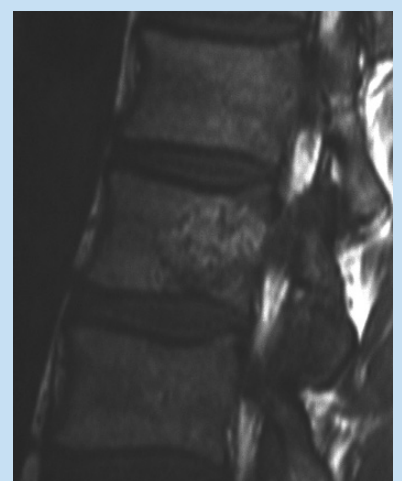
Case 1

A 32-year-old man presented with a long history of backache. Clinical examination was unremarkable. Focal sclerosis in the T6 vertebral body was detected on the

thoracic spine radiographs (Fig 1a). MR demonstrated replacement of the T6 body by a heterogeneous hyperdense lesion with vertical hypodense striations on both T1 and T2-weighted images (Figs 1b,c). A smaller identical focal lesion was detected in the T5 body. A diagnosis of multiple spinal haemangiomas was made. The patient responded well to analgesics.

Case 2

A 52-year-old man complained of localised severe upper lumbar backache and episodes of rectal bleeding. Clinical examination was normal. A barium enema demonstrated sigmoid diverticular disease. The thoracic spine radiographs were unremarkable. A technetium 99m pyrophosphate bone scan demonstrated a focus of increased activity in the left pedicle of the L1 vertebra and solitary metastasis was suspected. A MR scan demonstrated a focal lesion in the left body, pedicle and transverse process of L1. The lesion was hyperintense on both T1 and T2-weighted images with a heterogeneous speckled appearance on both axial and sagittal images (Figs 2a-c). These features were considered typical of spinal haemangioma. The patient's pain settled on analgesics and physiotherapy. A repeat study 8 weeks later demonstrated no interval change in the appearance of the haemangioma.



Figs 2a-c. In case 2 on T1 and T2-weighted MR scans the heterogeneous hyperdense haemangioma is noted replacing the left side of the L1 body, pedicle and transverse process. This is best visualised on the transverse image on Fig.2c.

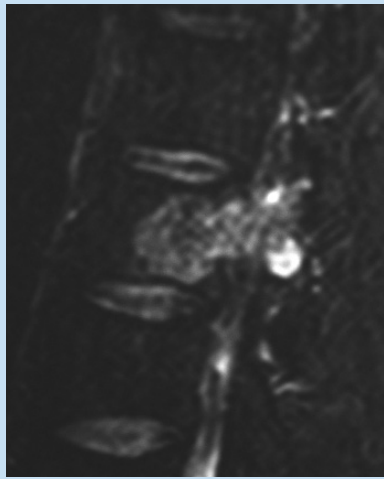


Fig. 2b.

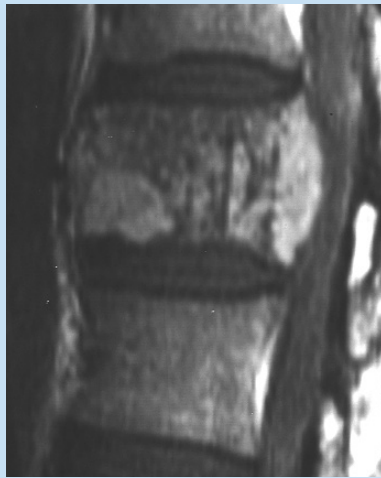


Fig. 2c.

Case 3

A 36-year-old painter fell off a step ladder, injuring his back. He complained of severe upper lumbar back pain with difficulty walking. Clinically he had severe localised spinal tenderness over L1 with decreased power (2/5) and reflexes in both legs. Spine radiographs demonstrated an ill-defined sclerotic lesion in the body of L1. MR imaging demonstrated a hyperintense lesion replacing the whole of the L1 body, with vertical hypointense striations on T1 and T2-weighted images. There was an extradural haematoma causing thecal sac and conus compression (Figs 3a-c). A diagnosis of a pathological fracture of a vertebral haemangioma was made. This

patient underwent a laminectomy and spinal fusion.



Figs 3a-c. In case 3 on T1 and T2 images a pathological fracture of the L1 body haemangioma is noted with intraosseous and extradural haematoma (arrows) causing thecal compression.



Fig. 3b.

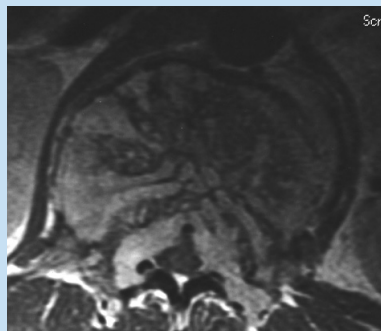


Fig. 3c.

Case 4

A 25-year-old man presented with gradual onset of paraparesis. Clinical examination confirmed weakness in the lower limbs. Subcutaneous telangiectasia were noted over the chest. T1 and T2-weighted MR images of the spine (Figs 4a and b) demonstrated a low signal intensity lesion in the C6 vertebral body on T1 and a high intensity signal on T2. The lesion had the classic celery-stalk appearance on the axial T2-weighted image (Figs 4a-d) with contrast enhancement following gadolinium enhancement (Fig. 4d). There was a focal intramedullary lesion at T1 with a heterogeneous appearance on T2 in keeping with a spinal cord haemangioma.



Figs 4a-d. In case 4 on T1 and T2 images an 'aggressive haemangioma' with low intensity on T1 and high intensity on T2 is demonstrated at the C6 level with an associated spinal cord haemangioma at T1.

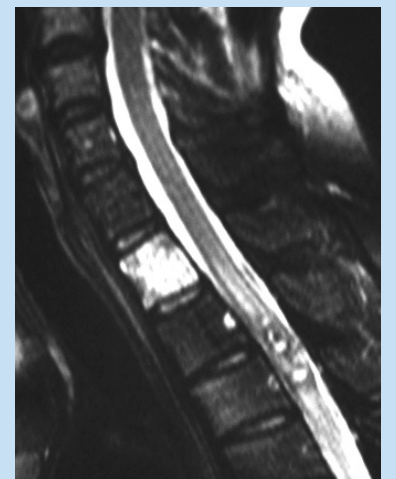


Fig. 4b.

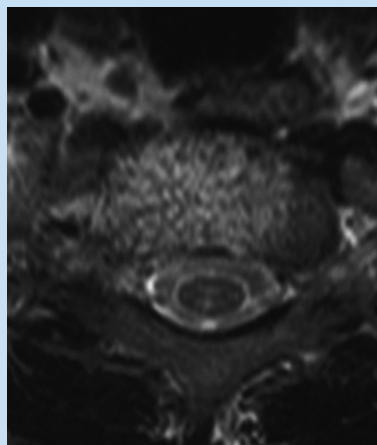


Fig. 4c.

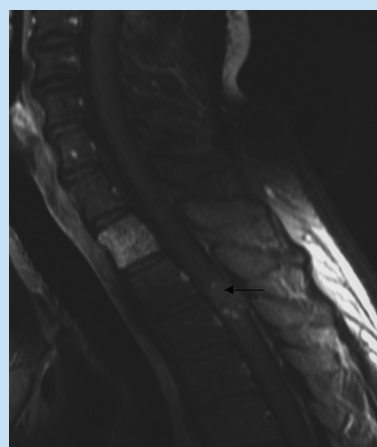


Fig. 4d.

Discussion

The importance of making a radiological diagnosis of spinal haemangioma is that the majority of lesions, as in cases 1 and 2, require no further investigation or any form of treatment. The MR findings are characteristic with a heterogeneous hyperdense appearance on both T1 and T2-weighted scans.⁵ There is often vertical hypodense striations on sagittal MR and a celery-stalk appearance on axial images

which are characteristic. These represent thickened vertical bony trabeculae within the haemangioma.⁶ Spinal metastases are the main differential diagnosis, however they usually extend into the pedicles unlike haemangiomas, and are hypodense on T1-weighted images while asymptomatic haemangiomas are usually hyperdense on T1-weighted images. Focal fatty marrow may be round and conspicuous on MR imaging and could be confused with haemangiomas, however there are no vertical low-density striations within the fatty marrow and they normally become very hypointense on a fat saturation sequence.

On histological examination most spinal haemangiomas are cavernous but can also be capillary or venous in origin.⁶ They are usually thin-walled endothelium-lined sinuses interspersed with bony trabeculae and fat. They are most common in the thoracic spine involving the whole or part of a vertebral body while posterior element or pedicle involvement is uncommon (10 - 15%).⁶ Multiple involvement is common in the thoracic spine, occurring in 25 - 30% of patients.⁷

Symptomatic or 'aggressive' spinal haemangiomas present with intense localised pain, myelopathy and/or radiculopathy from osseous expansion, pathological fracture or extradural haematoma. Symptoms are often acute with sudden haemorrhage and mass effect. These tumours usually contain less fat and more vascular stroma than asymptomatic haemangiomas. They tend to be more hypodense on T1-weighted and hyperdense on T2-weighted images due to the presence of interstitial oedema.⁵ This pattern is demonstrated in case 4.

Treatment options for symptomatic haemangiomas include: surgical decompression, radiotherapy, endovascular embolisation using particles, direct CT-guided alcohol injection and vertebroplasty.^{3,8-10} Surgical decompression is necessary when there is compression of the spinal cord although embolisation is usually

required to reduce intra-operative blood loss. In the largest series of 86 patients,⁸ there was a 6% mortality due to haemorrhage. Vertebroplasty using methyl methacrylate glue has been used with some success although no large series are available at this time.¹⁰

Haemangiomas are the commonest benign tumour of the spine that are often confused with spinal metastases. Uncommonly they may bleed or cause a pathological fracture resulting in spinal cord compression. Imaging with MR, although an expensive investigation, will usually give the correct diagnosis and prevent the patient from undergoing unnecessary further investigations including spinal biopsy.

References

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