CASE REPORT

A contrast-enhancing lumbar ligamentum flavum haematoma

Finn Ghent,¹ Xuan Ye,¹ Max Yan,² Ralph J Mobbs¹

¹Department of Neurosurgery, Prince of Wales Hospital, Sydney, New South Wales, Australia

²Department of Pathology, Prince of Wales Hospital, Sydney, New South Wales, Australia

Correspondence to

Dr Finn Ghent,
finnghent@gmail.com

Accepted 18 February 2014

SUMMARY

We present a case of lower back pain with lumbar nerve compromise due to a ligamentum flavum haematoma which was successfully treated surgically. A 62-year-old man was evaluated for lower back pain with associated leg pain and early signs of cauda equina syndrome. MRI of the lumbar spine demonstrated a contrast-enhancing mass adjacent to the lamina of L3 which was causing severe canal stenosis. Surgical excision of the lesion was recommended. The patient underwent an L3 laminectomy with excision of the epidural lesion. Histopathology showed it to be a haematoma of the ligamentum flavum with no untoward features. The patient recovered without complication.

BACKGROUND

Ligamentum flavum haematoma (LFH) is a rare cause of lumbar nerve root compression. It presents similarly to common causes (eg, primary or secondary malignancy and bulging intervertebral disc) and may mimic more ominous lesions on imaging studies.

CASE PRESENTATION

A 62-year-old man was referred for evaluation of back pain and worsening leg pain, which included neurogenic claudication and radicular pain in the left L3 distribution. The duration of his symptoms was approximately 2 months. There was erectile dysfunction and recent changes to his bowel habit. The patient noted that he had suffered a vertebral fracture (L2) after a fall several years previously, but could not identify any trauma at the time his symptoms began. He reported no history of fever and no difficulty with urination. Significant medical history was hypertension and lower limb deep venous thrombosis, for which he was treated with warfarin for 6 months during the preceding year. There was no history of malignancy.

On examination, there was full power in all lower limb myotomes. There was a patchy decrease in sensation to the left lower limb. Reflexes were symmetric, and his gait was unremarkable.

INVESTIGATIONS

A CT scan of the lumbar spine showed an extradural lesion at L3 with adjacent ligamentum flavum hypertrophy and significant canal stenosis. There was an old compression fracture noted at the superior end plate of L2. MRI confirmed the presence of a solitary, well-defined lesion measuring 26×15×12 mm (craniocaudal×transverse×anteroposterior) adjacent to the lamina of L3 with intermediate intensity on T1-weighted and T2-weighted images. There was significant enhancement with gadolinium-based contrast (figure 1). These findings were suggestive of an extradural tumour.

CT of the chest, abdomen and pelvis was performed. No evidence of malignancy was observed.

DIFFERENTIAL DIAGNOSIS

The traditional differential diagnosis of a spinal mass divides lesions into three groups according to their location. Intradural intramedullary masses arise within the spinal cord itself. Intradural extramedullary masses arise outside of the spinal cord but within the thecal sac. Extradural (or epidural) masses arise outside the thecal sac, for example, in vertebral bone.

Our patient had an extradural mass which showed marked contrast enhancement. Coupled with the history of progressive symptoms, the leading differentials were a metastatic lesion, extradural meningioma or other extradural primary tumour. A facet joint cyst, with or without haemorrhagic complication, was also considered, although the radiological findings were atypical.

Figure 1 Sagittal T1, T1 with gadolinium contrast and T2-weighted MRIs of the lumbar spine, demonstrating the lesion adjacent to the L3 lamina.

CrossMark

To cite: Ghent F, Ye X, Yan M, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-202521

Figure 2 (A) Organising haematoma, blood and organising granulation tissue, H&E, $\times 100$ and (B) haemosiderin deposits, H&E, $\times 400$.

TREATMENT

Surgery was recommended for two reasons: to prevent progression of symptoms and to obtain a diagnosis. In the operating theatre, an L3 laminectomy was performed. A discreet, well-circumscribed epidural lesion was excised. Pathological examination showed extravasated fibrin, blood and haemosiderin deposits with organisation consistent with LFH. Occasional fragments of bone and degenerative cartilage were also observed. Importantly, there was no evidence of infection, neural tissue, abnormal blood vessels, synovium or malignancy (figure 2).

OUTCOME AND FOLLOW-UP

The patient recovered rapidly after surgery, with resolution of his neurological symptoms and back pain. At 6-month follow-up he remained symptom free.

DISCUSSION

Lumbar radiculopathy and cauda equina syndrome are common presentations. LFH ranks among the rarest causes, with approximately 65 cases described since the first in 1992.^{1 2} The reported age range is 30–89 years; however, the majority of cases affect men in their seventh decade. Ligamentum flavum haematomata are often preceded by minor back injury or physical exertion but may occur without provocation. The lumbar spine is affected in 89% of cases, with thoracic and cervical cases making up 6% and 4%, respectively.²

MRI signal characteristics of LFH are those of blood, with intensity changing over time as oxy-haemoglobin degrades to haemosiderin. The location and shape of LFH suggest an extradural tumour, and 25–44% of patients with LFH are provisionally diagnosed with a tumour preoperatively.² Contrast enhancement has been reported with LFH; however, it is a rare finding and is usually seen as only a slight to moderate enhancement in the periphery of the lesion.^{2–5} Facet joint cysts usually do not enhance, but may show rim enhancement.^{6 7} The case we have presented showed marked enhancement with sparing of only a small inferior fragment (figure 1), which strengthened our preoperative suspicion that the lesion was likely to be neoplastic.

Owing to scarcity and the need for surgery to obtain a diagnosis, no prospective randomised trials exist. Standard care is surgical excision with laminectomy or hemilaminectomy. There is one case report of endoscopic treatment with a good outcome.⁸

Ligamentum flavum haematomata are thought to be degenerative in origin, with disruption of secondarily formed proliferating blood vessels due to trauma or hypertension precipitating bleeding.⁹ Lee *et al*¹⁰ reported the occurrence of a LFH as a complication of epidural anaesthesia, and Gazzeri *et al*¹¹

reported a case secondary to haemorrhage into a ligamentum flavum cyst. The role of spinal alignment and axial loading due to lordosis has also been suggested by Miyakoshi *et al*⁹ who reported a spontaneous case of LFH in a patient with rigid thoracic spinal segments. In the case we have presented, the patient's prior anticoagulation and fall resulting in an L2 fracture did not fit with the course of his symptoms. Although not diagnostic, we feel that the finding of degenerative cartilage in the haematoma substance suggests degenerative spinal disease as the underlying pathology. This is supported by MRI evidence of facet joint degeneration and ligamentum flavum hypertrophy at the L3/4 level, as well as degenerative intervertebral discs at L4/5 and L5/S1 (figure 1). The patient's hypertension and/or unrecognised minor trauma may also have contributed to the pathogenesis of his haematoma.

Learning points

- Non-neoplastic conditions should be considered in the differential diagnosis of a spinal mass.
- Haematomas of the ligamentum flavum are rare compressive lesions of the spine which may occur without provocation.
- Ligamentum flavum haematoma may mimic tumours on imaging studies, including contrast enhancement.

Acknowledgements Dr Darryl Raley, who sadly passed away before this report was submitted.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Sweasey TA, Coester HC, Rawal H, *et al*. Ligamentum flavum hematoma. Report of two cases. *J Neurosurg* 1992;76:534–7.
- 2 Takahashi M, Satomi K, Hasegawa A, *et al*. Ligamentum flavum hematoma in the lumbar spine. *J Orthop Sci* 2012;17:308–12.
- 3 Kim HS, Kim SW, Lee SM, *et al*. Ligamentum flavum hematoma in the adjacent segment after a long level fusion. *J Korean Neurosurg Soc* 2011;49:58–60.
- 4 Sudo H, Abumi K, Ito M, *et al*. Spinal cord compression by ligamentum flavum hematoma in the thoracic spine. *Spine (Phila Pa 1976)* 2009;34:E942–4.
- 5 Takeno K, Kobayashi S, Miyazaki T, *et al*. Microsurgical excision of hematoma of the lumbar ligamentum flavum. *Joint Bone Spine* 2010;77:351–4.
- 6 Tillich M, Trummer M, Lindbichler F, *et al*. Symptomatic intraspinal synovial cysts of the lumbar spine: correlation of MR and surgical findings. *Neuroradiology* 2001;43:1070–5.
- 7 Trummer M, Flaschka G, Tillich M, *et al*. Diagnosis and surgical management of intraspinal synovial cysts: report of 19 cases. *J Neurol Neurosurg Psychiatry* 2001;70:74–7.

- 8 Ohba T, Ebata S, Ando T, *et al.* Lumbar ligamentum flavum hematoma treated with endoscopy. *Orthopedics* 2011;34:e324–7.
- 9 Miyakoshi N, Shimada Y, Okada K, *et al.* Ligamentum flavum hematoma in the rigid thoracic spinal segments: case report. *J Neurosurg Spine* 2005;2: 495–7.
- 10 Lee HW, Song JH, Chang IB, *et al.* Spontaneous ligamentum flavum hematoma in the rigid thoracic spine: a case report and review of the literature. *J Korean Neurosurg Soc* 2008;44:47–51.
- 11 Gazzeri R, Canova A, Fiore C, *et al.* Acute hemorrhagic cyst of the ligamentum flavum. *J Spinal Disord Tech* 2007;20:536–8.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow