



Case Reports & Case Series

Non-traumatic rupture of the ligamentum flavum with symptomatic spontaneous lumbar epidural hematoma: A case report[☆]



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ABSTRACT

We present a case of a healthy 31 year-old male plumber who presented to the emergency room with acute onset back pain that acutely developed after simply bending over. He developed radiculopathy and cauda equina syndrome over a period of hours. An MRI demonstrated an acute lumbar epidural hematoma and a disruption of the ligamentum flavum, suggesting that he may have torn the ligament with lumbar flexion. The patient was taken to the operating room for an emergent lumbar decompression and recovered full neurological function post-operatively. To our knowledge, this is the first report of a spontaneous symptomatic lumbar epidural hematoma resulting from a non-traumatic ligamentum flavum rupture.

1. Introduction

We present a case of a young, healthy male who presented to the emergency room after suddenly experiencing back pain when bending down. He did not have any focal neurological signs or “red flag” findings concerning for a serious underlying problem such as epidural abscess, pathological vertebral body fracture, or osteomyelitis [1]. Within hours, he developed cauda syndrome. MRI showed an acutely evolving lumbar epidural hematoma and a disrupted ligamentum flavum. He was taken emergently for a decompressive laminectomy, where hemorrhage was noted within the ligament. This is a rare case of a non-traumatic ligamentum flavum rupture causing cauda equina syndrome.

2. Case report

A 31-year-old male with an unremarkable medical history presented to the authors' institution with the complaint of lower back pain. The patient works as a plumber and was bending over holding a flashlight when he suddenly developed sharp pain in his lower back. The pain radiated down to his left leg and he felt as though his left leg “fell

asleep.” He denied any recent trauma or changes in bowel or bladder function. He also denied recent constitutional symptoms, intravenous (IV) drug abuse, history of cancer, or any anticoagulant or corticosteroid use. On physical exam, he was noted to have midline tenderness to palpation of the lumbar spine, but at initial presentation was noted to have full strength in all four extremities and intact sensation to light touch. He had intact perianal sensation and normal rectal tone. The patient's pain was treated with an oral analgesic regiment. At this time, a magnetic resonance imaging (MRI) scan was deferred given the patient's benign neurological exam, and absence of any “red flag” signs.

On subsequent reassessment, the patient developed numbness and weakness in his right leg. An emergent MRI was ordered and the neurosurgery service was consulted, approximately 2 h after initial admission. When the patient was seen at this point, he was in obvious distress, lying on his right side on the stretcher, with his left hip partially flexed. He complained of severe pain radiating down his left leg and was unable to lay flat. On examination, he had mild right leg weakness in hip flexion, knee extension and plantar flexion but had more severe weakness in dorsiflexion. He had diminished sensation to light touch in his entire right leg. He had normal reflexes throughout

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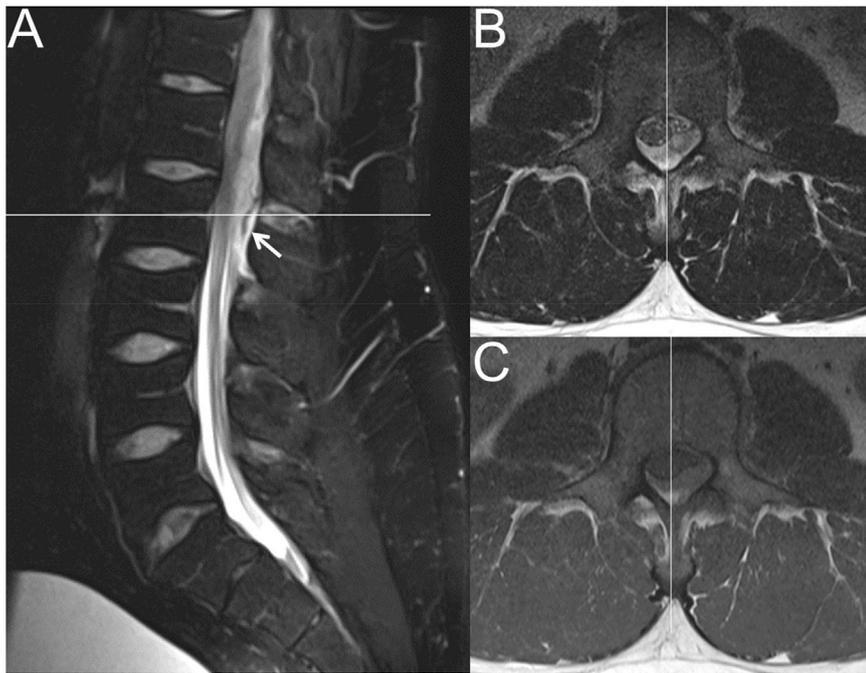


Fig. 1. Lumbar MRI on admission. A. Sagittal T2-weighted MRI B. Axial T2-weighted MRI, and C. Axial T1-weighted MRI. Representative images demonstrating a collection in the left posterolateral epidural space from L1–L3 compressing the thecal sac and the L1–2 neural foramen at the level of the conus medullaris, concerning for an acute epidural hematoma. Also shown is the discontinuity of the ligamentum flavum at L2–3 suggesting complete disruption (white arrow). See main text for further discussion.

the upper and lower extremities, and had no clonus and no Babinski sign. Rectal exam revealed normal voluntary tone and no saddle anesthesia. He had the urge to void, but had not been able to void since he presented to the hospital despite trying. A bladder scan revealed 562 cc of urine in his bladder, suggesting urinary retention. MRI demonstrated a collection in the left posterolateral epidural space from L1–L3 that compressed the thecal sac at the level of the conus medullaris and also the L1–2 neural foramen (Fig. 1). It was hyperintense on T2-weighted imaging and isointense on T1-weighted imaging. The lesion had a small area of contrast enhancement with gadolinium administration concerning for active contrast extravasation. There was also discontinuity of the ligamentum flavum at L2–3 suggesting complete disruption. These findings were concerning for an evolving epidural hematoma likely from ligamentum flavum rupture. His laboratory values at the time showed a platelet count of 256,000/ μL , an international normalized ratio of 1.1, and activated partial thromboplastin time of 28.4 s. His vital signs and remaining lab values were unremarkable.

The patient was consented and emergently taken to the operating room for a lumbar decompression. The patient placed under general anesthesia, intubated and positioned prone. A laminectomy was initially performed at L1 and L2. There was a discontinuity within the ligament flavum suggesting a rupture. Hemorrhagic material was clearly noted within the ligament flavum and extruding ventrally into the epidural space. Following the hematoma superiorly and inferiorly, the decompression was extended to include a T12 laminectomy and removal of the superior edge of the L3 lamina. After the visible clot was removed, the epidural space at the levels above and below were copiously irrigated by passing a ventriculostomy catheter underneath the lamina, however, no further blood return was observed. An intraoperative ultrasound was then used to confirm that the spinal cord and nerve roots were decompressed and there was no subdural hematoma present. A subfascial drain was left in place and the wound was closed in multiple layers in standard fashion. Pathology report of the intra-operative sample revealed hemosiderin, but was otherwise unremarkable.

The patient was extubated and taken to the ICU post-operatively. The next morning, he was noted to have full strength in his lower extremities. A post-operative MRI/MRA of the thoracic and lumbar spine was performed to rule out possible vascular etiology (Fig. 2). Imaging revealed resolution of the hematoma, expected post-surgical changes,

and no evidence of a vascular malformation. This was subsequently confirmed by conventional angiogram with bilateral spinal segmental artery injections from T12 to L2 demonstrating normal vasculature and an anterior spinal artery arising from the L2 level. His post-operative course was complicated by continued back pain and urinary retention that resolved by post-operative day 5. He was discharged neurologically intact from the hospital on post-operative day 6. At 1 month follow-up, the patient demonstrated normal strength and bladder function. At his 3 month follow-up visit, he had returned to work as a plumber, however, he continued to have back pain.

3. Discussion

The initial presentation of back pain is typically benign in nature, but in rare cases can be the sentinel symptom of a serious underlying pathology such as cauda equina syndrome (CES). The patient we describe initially presented severe back pain and some radicular symptoms, two of the most common presenting features of CES [1]. He went on to develop progressive weakness in his legs and urinary retention over a period of hours, suggesting an acutely evolving process. Given the absence of major trauma or coagulopathy, we speculate that the patient tore his ligamentum flavum while bending down with a flash-light, resulting in an acutely evolving epidural hematoma causing CES. To our knowledge, this particular clinical entity has not previously been described in the literature.

Two closely-related but distinct clinical entities have been described – spontaneous spinal epidural hematoma (SSEH) and ligamentum flavum hematomas (LFH). SSEH are rare phenomena with a calculated incidence of 0.1 in 100,000 [2,3]. As with SSEH, these are exceedingly rare phenomena with fewer than 50 cases reported in the literature [4]. The clinical case we describe appears to represent a SSEH that resulted from a non-traumatic rupture of the ligamentum flavum, a novel clinical entity. The hematoma we observed was in direct contact with the thecal sac and thus should be considered an epidural hematoma, however the presence of a torn ligamentum flavum suggests that the blood originated from the ligamentum flavum rupture. Unlike typical presentations of SSEH or LFH that present in a subacute or chronic fashion, our patient presented with neurological decline over a period of hours.

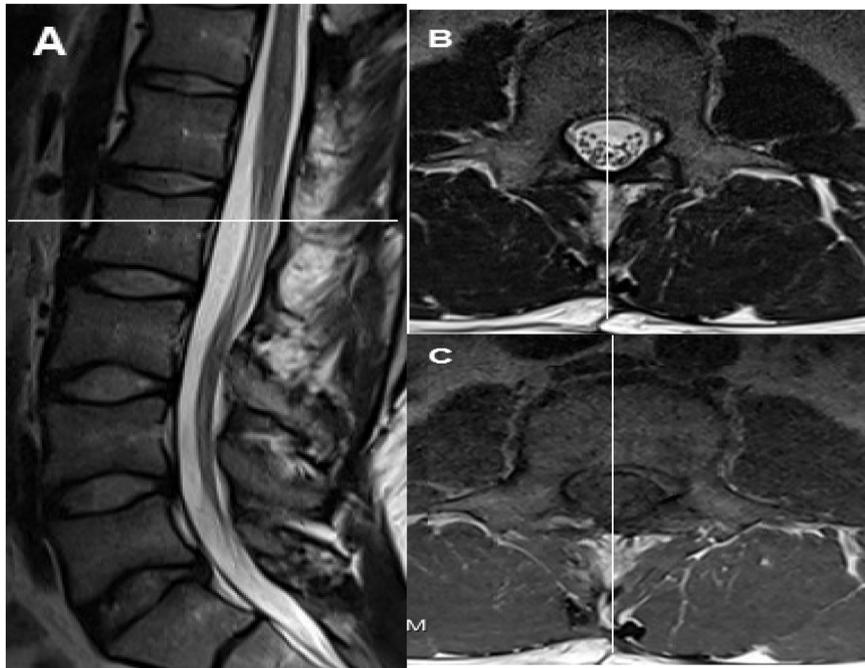


Fig. 2. Post-operative lumbar MRI. A. Sagittal T2-weighted MRI B. Axial T2-weighted MRI, and C. Axial T1-weighted MRI. Representative images demonstrating adequate decompression and evacuation of hematoma shown in Fig. 1.

4. Conclusion

This patient presented with a sudden onset of back pain in the setting of daily activity and did not initially demonstrate any “red flag symptoms” or risk factors for a serious pathology. Persistent pain and a worsening neurological exam triggered an appropriate diagnostic workup and urgent surgical intervention, resulting in a good outcome. Although this case represents an extremely rare phenomenon, it argues in favor of careful reassessment for patients with sudden onset, severe back pain who are initially managed without imaging.

Disclosures/conflicting interests

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