

# Spinal Spot Sign

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**Introduction:** A marker predictive of hematoma expansion in the central nervous system could aid the selection of patients for hemostatic or surgical treatment.

**Case Report:** Here, we present a 83-year-old patient with acute spinal subdural hematoma with paraparesis progressing to paraplegia. A contrast extravasation within the intraspinal hematoma was visualized on spinal MR indicating active bleeding (spinal spot sign). A second acquisition of contrast-enhanced MR images showed progression of contrast extravasation helping to differentiate active bleeding from spinal arteriovenous malformations/fistula.

**Conclusions:** A “spinal spot sign” may be important for treatment decisions, notably in patients with incomplete neurological deficits at the time of imaging.

**Key Words:** spinal hemorrhage, MRI, acute subdural hematoma

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A marker predictive of hematoma expansion in the central nervous system could aid the selection of patients for hemostatic or surgical treatment. One such important surrogate for identification of continued bleeding is contrast extravasation. The “spot sign” refers to 1 or more foci of contrast enhancement within an acute primary parenchymal brain hematoma visible on the source images of CT angiography.<sup>1</sup> Recent data show that spot sign is a marker of increased risk of hemorrhage growth and is predictive of adverse outcome.<sup>1,2</sup> In the diagnostic workup of acute spinal cord lesions, MRI is most informative and superior to CT imaging in detecting intraspinal hematoma. Here, we present a “spinal spot sign” visualized as a contrast extravasation during spinal MRI in a patient with acute spinal subdural hematoma with paraparesis progressing to paraplegia.

## CASE REPORT

An 83-year-old man was admitted with clinical deficits of urinary retention and a sensorimotor paraparesis progressing over 2 days. He felt belt-like thoracic pain but no pain in his legs. No focal motor, sensory, and bladder disturbances, epistaxis, skin hematoma, or hematuria had been noted before this acute event, though he experienced recurrent abdominal pain and had been able to walk with walking aids only during the past months. His personal history was positive for a seropositive rheumatoid arthritis, a myocardial infarction in 2001, and

a mechanical aortic valve replacement due to severe aortic valve stenosis in 1997. Since 1997, he took phenprocoumon for oral anticoagulation. His international normalized ratio of partial thromboplastin time was 4 upon admission. The neurological findings were paraplegia, including loss of upper abdominal muscle strength, loss of bladder and bowel control, and bilateral Babinski signs. The most caudal segment with normal sensory and motor function, that is, the neurological level, was Th8. According to the classification of the American Spinal Injury Association (ASIA), the muscle function grading of the upper limbs scored 50, whereas the lower limbs scored 0.<sup>3</sup> The light touch and pin-prick scores were 68 each. The spinal cord injury was complete and therefore the ASIA impairment scale (AIS) was “A.” Spinal MRI revealed a subdural mass on level Th 5-9 with compression of the thoracic spinal cord from right lateral and dorsal. Inhomogenous hypointense and hyperintense signal on T2-weighted images (Figs. 1A, E) and isointense signal to myelon on T1-weighted images without contrast agent (Figs. 1B, F) indicate hyperacute state of the hematoma at the level Th7/8. The diagnosis was a complete spinal cord injury caused by spontaneous subdural bleedings under oral anticoagulation. After administration of gadolinium, a spot of progressive contrast extravasation at the anterior surface of the hematoma became visible (Fig. 1C at 10:54 PM and Figs. 1D, G at 11:07 PM). Intraspinal mass with T2-hypointensity and T1-isointensity to spinal cord at level Th4-9 are suggestive for portions of the hematoma in the acute phase (12 h to 3 d); T2 hyperintense signal of the caudal spinal cord indicates extensive myelopathy (Fig. 1). An arteriovenous malformation or fistula could be excluded by spinal catheter angiography, which confirmed a normal venous drainage of the spinal cord following selective angiography of the arteria radicularis magna (Adamkiewicz), arising from the left intercostal artery T9.

## DISCUSSION

Nontraumatic spinal hematoma is a rare cause of spinal cord compression. MRI gives accurate information not only of the location and extension of the hematoma, but also of the degree of the cord compression and any preexisting lesion that might be the source of the bleeding.<sup>4</sup> Here, we report a complete spinal cord compression at the level of Th8 caused by spontaneous subdural bleedings associated with oral anticoagulation. The extravasation of contrast agent during imaging indicates active bleeding. In the brain, this has been called “spot sign” and recent reports establish the prognostic value of this imaging feature for hematoma progression and clinical outcome.<sup>1,2</sup> Similarly, our MR images show spinal contrast extravasation as “spinal spot sign.” A spinal spot sign may be important for treatment decisions, notably in patients with incomplete neurological deficits at the time of imaging.<sup>5,6</sup> In such patients, recovery of clinical deficits might be more likely after surgical decompression on an emergency basis as compared with conservative treatment and time to decompression might be even more important for outcome in patients with a spinal spot sign.<sup>4,7</sup> A similar observation of contrast extravasation on CT imaging in a case of spontaneous epidural hematoma has been published recently.<sup>8</sup> In the present case, the second acquisition of contrast-enhanced images showing progression of contrast extravasation helps in differentiating active bleeding from spinal arteriovenous malformations/fistula.

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**FIGURE 1.** A, Sagittal T2-weighted image of the thoracic spinal cord shows multisegment subdural high-signal intensity mass compressing the spinal cord from dorsal on level Th 7-9 corresponding to a subdural spinal hematoma in the hyperacute phase. Cranial and caudal portion of the subdural mass are T2 hypointense, T1 isointense to spinal cord suggestive of acute stage of hematoma. Arrow indicates the level of acquisition of Fig. 1E. B, Sagittal T1-weighted image. Arrow indicates the level of acquisition of Fig. 1F. C, Sagittal T1-weighted image with contrast agent at 10:54 PM showing contrast extravasation at the anterior border of the hematoma on Th8. D, Sagittal T1-weighted image with contrast agent at 11:07 PM showing slight progression of the contrast agent extravasation (spinal spot sign). Arrow indicates the level of acquisition of Fig. 1G. E, Axial T2-weighted image at Th 8 level. F, Axial T1-weighted image at Th 8 level. G, Axial T1-weighted image with contrast Th 8 level.

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