Case 16999

Eurorad

Unstable cervical fracture with a posterior epidural hematoma in ankylosing spondylitis

Published on 21.10.2020

DOI: 10.35100/eurorad/case.16999
ISSN: 1563-4086
Section: Musculoskeletal system
Area of Interest: Emergency Musculoskeletal spine
Neuroradiology spine
Imaging Technique: CT
Imaging Technique: MR
Case Type: Clinical Cases
Authors: Guillaume Vangrinsven1, Carine Petré1, Filip Vanhoenacker1,2,3
Patient: 80 years, male

Clinical History:

The patient was admitted to the emergency department with neck pain after a minor fall. There was no relevant past medical history except atrial fibrillation for which he took anticoagulants. Repeated anamnesis after discharge, however, revealed a history of inflammatory back pain. Clinical examination revealed no neurological deficit.

Imaging Findings:

Conventional radiography revealed bridging syndesmophytes and ankylosis of most apophyseal joints in the cervical spine and ankylosis of both sacro-iliac joints (SIJ), in keeping with previously unknown advanced ankylosing spondylitis (AS) (Fig. 1a-b). Cervical radiography was of poor quality due to difficult patient positioning related to spinal stiffness and high-riding shoulders. Subsequent CT confirmed the severe cervical changes and showed a fracture through the anterior column at level C5-C6, the C6 vertebral body, the spinous process of C5 and the left facet joint C5-C6, involving the three spinal columns (Fig. 2a-c). In addition, there was enlargement of the posterior epidural space from C2 to Th1 causing compression on the spinal cord (Fig. 2d). MRI confirmed the presence of an acute spinal epidural hematoma which was isointense to muscle on T1-weighted images (WI) and slightly hyperintense to the spinal cord on T2-WI and short tau inversion recovery (STIR) images (Fig. 3a-d).

Discussion:

AS is a seronegative spondyloarthropathy with chronic inflammation of the sacroiliac joints (SIJ) and the spine. Advanced disease is characterized by ankylosis, radiographically known as a “bamboo spine”. Ankylosis is associated with an increased risk of traumatic spinal fractures due to the rigid spine acting as a lever arm and the high prevalence of disuse osteopenia impairing vertebral mechanical strength. Fractures occurring even after minor trauma are often unstable. They most often involve the cervicothoracic junction and are prone to primary and secondary spinal cord injuries (SCI). The most common fracture mechanism is a hyperextension injury. Flexion injuries causing unstable chance-like fractures are less common. Unstable cervical fractures need urgent surgical fixation to prevent neurological damage [1-3].

Standard radiography has a low sensitivity and is of limited use for evaluation of spinal fractures in longstanding AS. Up to 60% of cervical fractures are missed due to the superimposition of the shoulders and distortion of normal cervical anatomy [2]. Multidetector computed tomography (MDCT) is the modality of choice for fracture. Vertebral body and spinous process fractures as well as tearing of ossified ligaments can be appreciated. Fracture extension should carefully be assessed to identify unstable fractures. MRI, however, is more valuable to evaluate soft tissue injuries and the contents of the spinal canal. Therefore, MRI should always be performed when a SCI is suspected [1,4,5].

Spinal epidural hematoma is an unusual complication of vertebral fractures although it is more common in patients with AS. The use of anticoagulants is an additional risk factor. The majority of posttraumatic spinal epidural hematomas are located posteriorly. A spinal epidural hematoma will appear spontaneously hyperdense compared to the spinal cord on CT. To evaluate spinal cord compression, extension of the hematoma and to assess any associated soft tissue injuries, MRI is the gold standard. Early detection and urgent decompression is needed to prevent further neurological damage [1,6].

Although our patient had no neurological deficit at presentation, the unstable fracture and spinal epidural hematoma required urgent surgical care. An anterior cervical fusion C5-C7 was successfully performed and the patient remained free of neurological symptoms.

In conclusion, patients with a rigid spine due to long-lasting AS should be considered at high- risk for unstable fractures, even after minor trauma. Standard radiography has low sensitivity, especially in the lower cervical spine. Whereas CT may evaluate the extent of the fracture, MRI is the preferred modality for evaluation of spinal cord damage.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Unstable cervical fracture complicating ankylosing spondylitis , Unstable vertebral fracture complicating ankylosing spondylitis. , Unstable vertebral fracture complicating DISH, Pathological vertebral fracture, Osteoporotic compression fracture

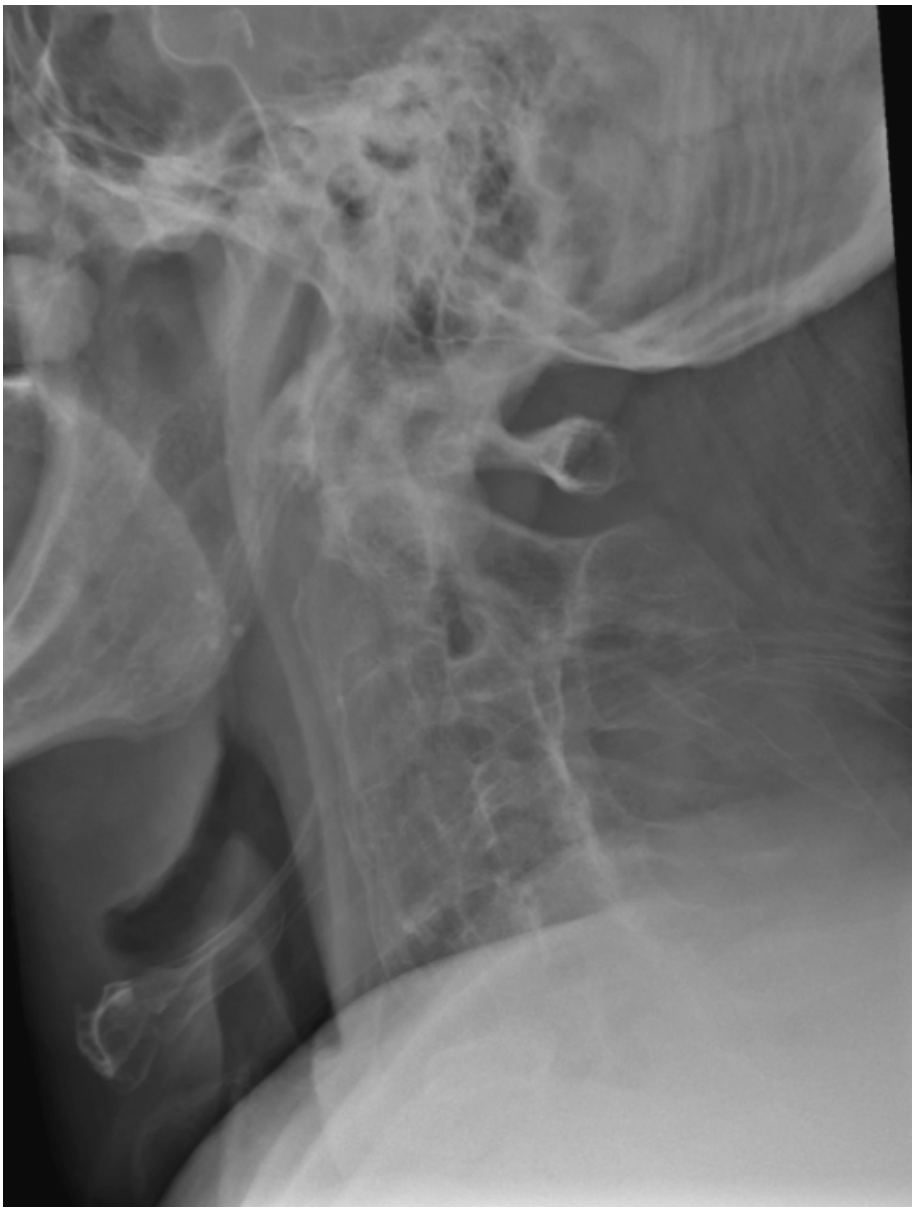
Final Diagnosis: Unstable cervical fracture complicating ankylosing spondylitis

References:

Leone A, Marino M, Dell'Atti C, Zecchi V, Magarelli N, Colosimo C (2016) Spinal fractures in patients with ankylosing spondylitis. Rheumatol Int 36(10):1335-46 (PMID: 27379763)
Anwar F, Al-Khayer A, Joseph G, Fraser MH, Jigajinni MV, Allan DB (2011) Delayed presentation and diagnosis of cervical spine injuries in long-standing ankylosing spondylitis. Eur Spine J 20(3):403-7 (PMID:21127920)
Westerveld LA, Verlaan JJ, Oner FC (2009) Spinal fractures in patients with ankylosing spinal disorders: a systematic review of the literature on treatment, neurological status and complications. Eur Spine J 18(2):145-56 (PMID: 18791749)
Koivikko MP, Kiuru MJ, Koskinen SK (2004) Multidetector computed tomography of cervical spine fractures in ankylosing spondylitis. Acta Radiol 45(7):751-9 (PMID: 15624519)
Tavolaro C, Ghaffar S, Zhou H, Nguyen QT, Bellabarba C, Bransford RJ (2019) Is routine MRI of the spine necessary in trauma patients with ankylosing spinal disorders or is a CT scan sufficient? Spine J 19(8):1331-1339 (PMID: 30890497)
Tamburrelli FC, Meluzio MC, Masci G, Perna A, Burrofato A, Proietti L (2018) Etiopathogenesis of Traumatic Spinal Epidural Hematoma. Neurospine 15(1):101-107 (PMID: 29656630)

Figure 1

a



Description: Lateral radiograph of the cervical spine. Levels C5-C7 are not entirely visible due to the superimposition of the shoulders. Note the formation of bridging syndesmophytes and ankylosis of most of the visualized facet joints in keeping with advanced ankylosing spondylitis. **Origin:** © Department of Radiology, , Sint-Maarten General Hospital, Mechelen, Belgium 2020

b

Description: AP radiograph of the sacro-iliac joints showing ankylosis of the sacro-iliac joints (white arrows), in line with sacroiliitis grade IV (New York criteria). **Origin:** © Department of Radiology, , Sint-Maarten General Hospital, Mechelen, Belgium 2020

Figure 2

a

Description: Sagittal CT image (bone window) of the cervical spine showing a fracture through the bridging syndesmophytes at level C5-C6 (white arrow), a decreased height C6 and a fractured spinous process of C5 (black arrow). **Origin:** © Department of Radiology, , Sint-Maarten General Hospital, Mechelen, Belgium 2020

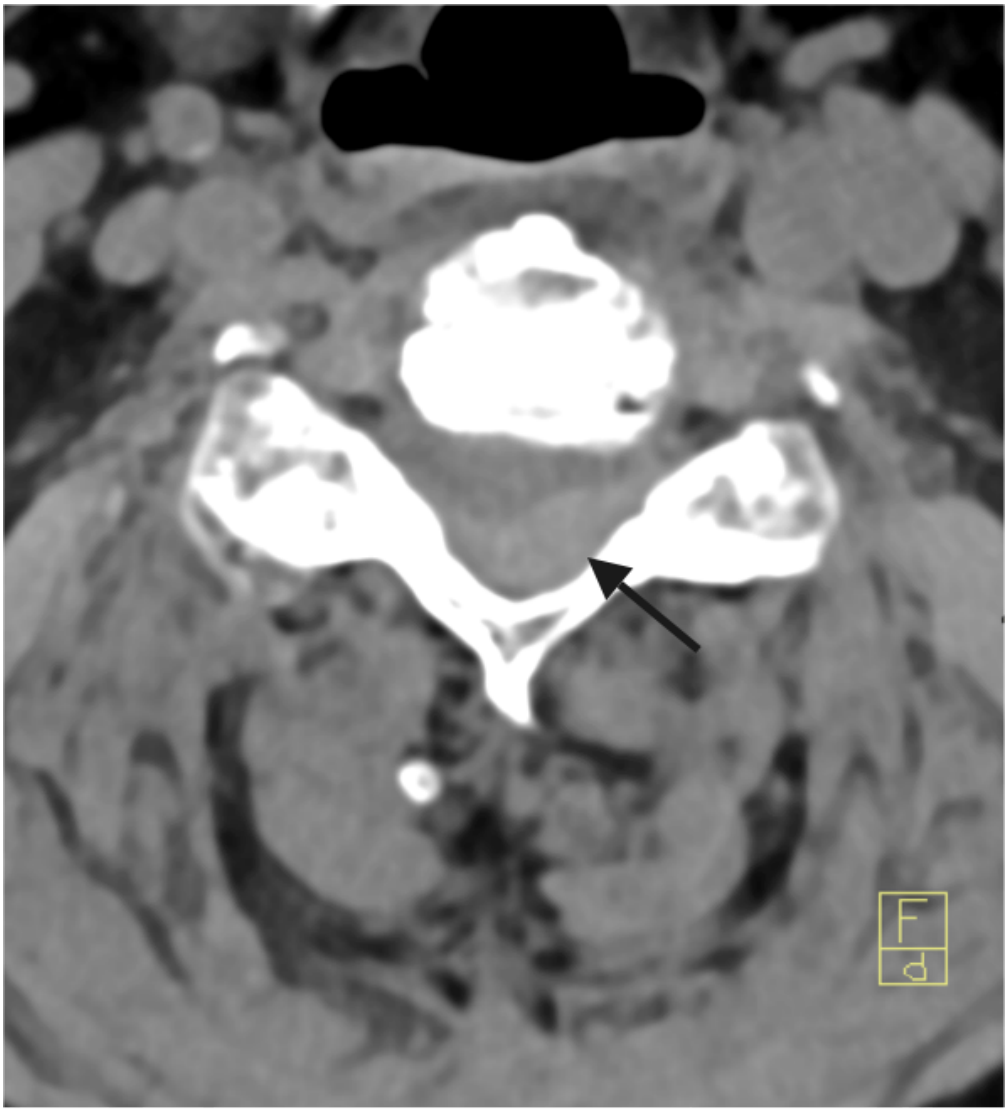
b

Description: Sagittal CT image (bone window) of the cervical spine showing almost complete ankylosis of the left apophyseal joints and a horizontal fracture at level C5-C6 (white arrow). **Origin:** © Department of Radiology, , Sint-Maarten General Hospital, Mechelen, Belgium 2020

c

Description: Sagittal CT image (bone window) of the cervical spine showing almost complete ankylosis of the right apophyseal joints. **Origin:** © Department of Radiology, , Sint-Maarten General Hospital, Mechelen, Belgium 2020

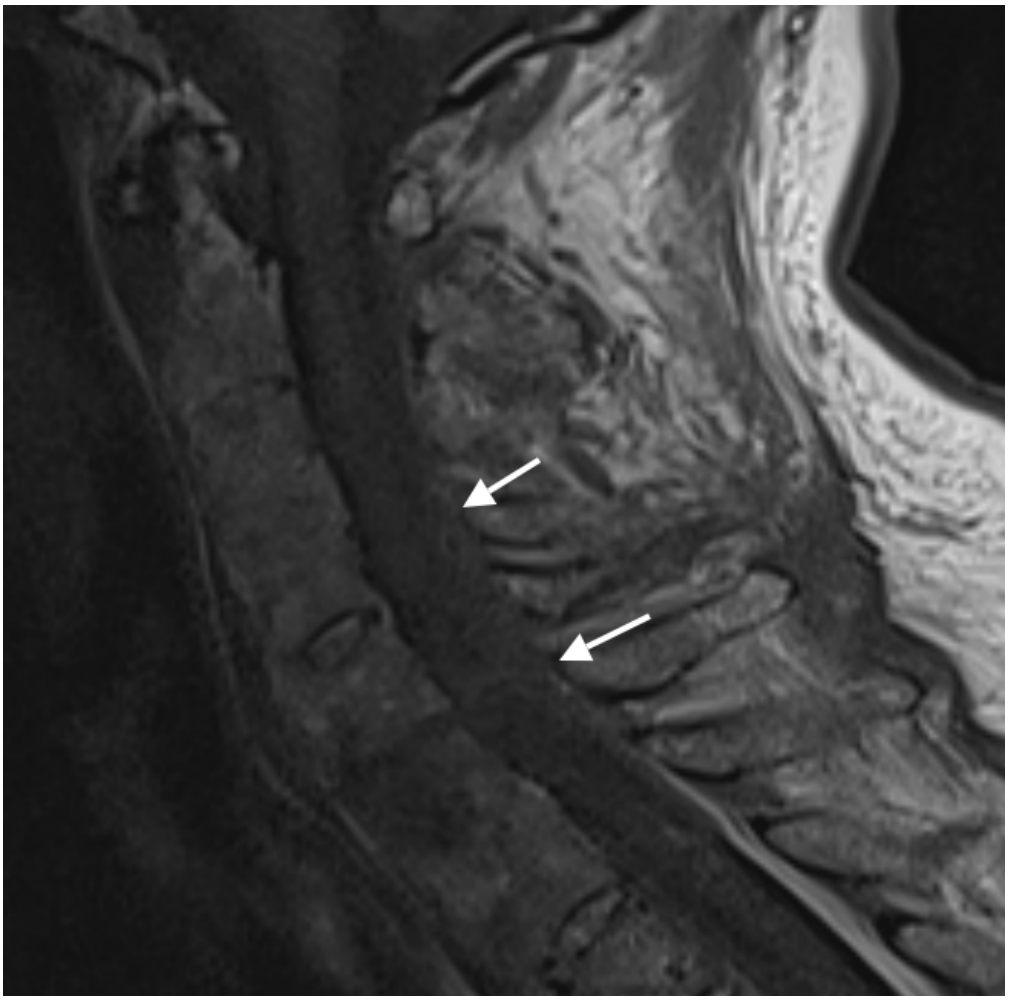
d



Description: Axial CT image (soft tissue window) through C5 showing an asymmetric enlarged and hyperdense posterior epidural space causing compression on the spinal cord (black arrow).**Origin:**

Figure 3

a

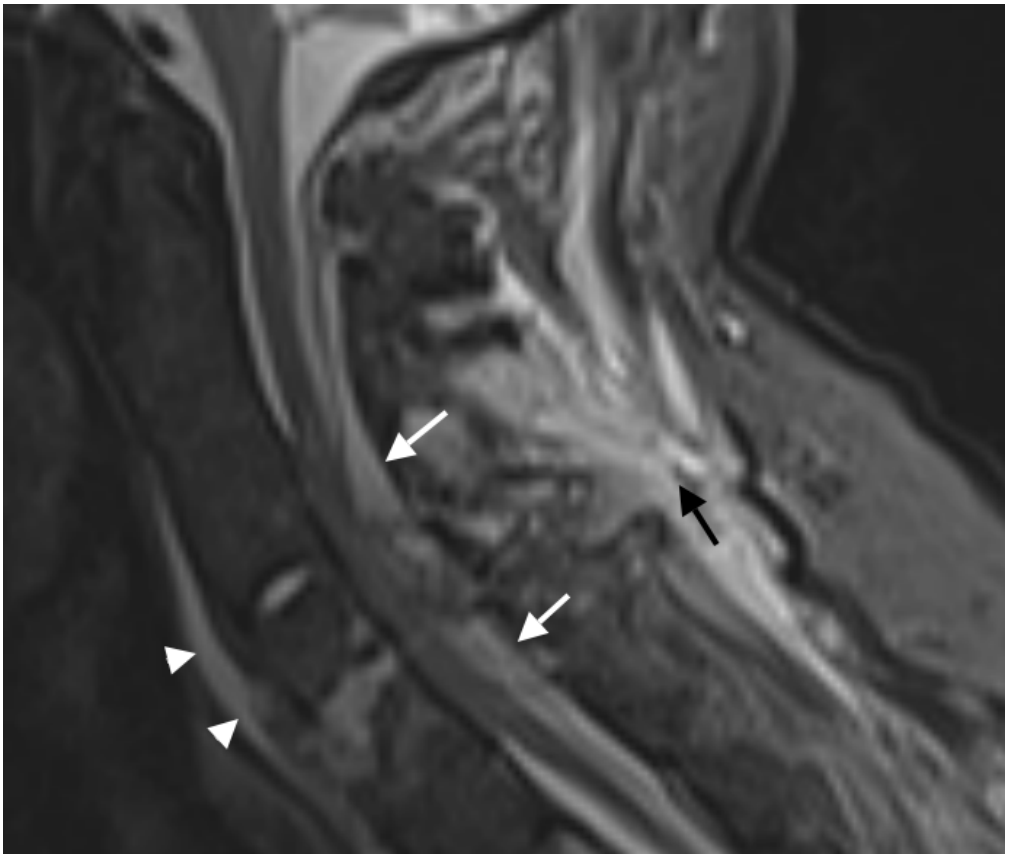


Description: Sagittal T1-(a) and T2-(b) WI, sagittal STIR (c) and axial T2* spoiled gradient echo sequence (d) MR images showing enlargement of the posterior epidural space from C2 to Th1 causing compression on the spinal cord (white arrows). The lesion is isointense to muscle on T1-WI and slightly hyperintense to the spinal cord on T2-WI in keeping with an acute spinal epidural hematoma. STIR images show extensive soft tissue lesions with disruption of the interspinous and supraspinous ligaments (black arrow), a prevertebral hematoma (arrowheads) and bone marrow edema C6.**Origin:**

b

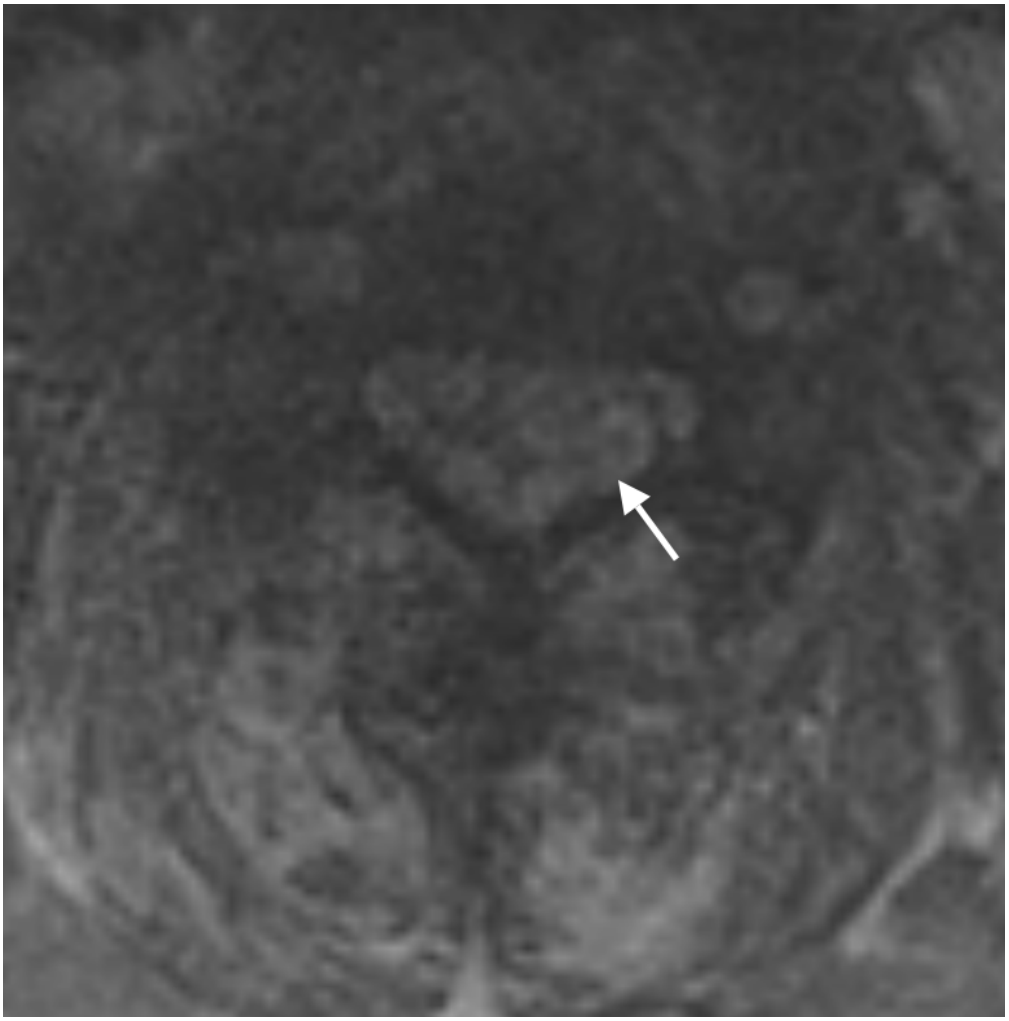
Description: Sagittal T1-(a) and T2-(b) WI, sagittal STIR (c) and axial T2* spoiled gradient echo sequence (d) MR images showing enlargement of the posterior epidural space from C2 to Th1 causing compression on the spinal cord (white arrows). The lesion is isointense to muscle on T1-WI and slightly hyperintense to the spinal cord on T2-WI in keeping with an acute spinal epidural hematoma. STIR images show extensive soft tissue lesions with disruption of the interspinous and supraspinous ligaments (black arrow), a prevertebral hematoma (arrowheads) and bone marrow edema C6.**Origin:**

c



Description: Sagittal T1-(a) and T2-(b) WI, sagittal STIR (c) and axial T2* spoiled gradient echo sequence (d) MR images showing enlargement of the posterior epidural space from C2 to Th1 causing compression on the spinal cord (white arrows). The lesion is isointense to muscle on T1-WI and slightly hyperintense to the spinal cord on T2-WI in keeping with an acute spinal epidural hematoma. STIR images show extensive soft tissue lesions with disruption of the interspinous and supraspinous ligaments (black arrow), a prevertebral hematoma (arrowheads) and bone marrow edema C6.**Origin:**

d



Description: Sagittal T1-(a) and T2-(b) WI, sagittal STIR (c) and axial T2* spoiled gradient echo sequence (d) MR images showing enlargement of the posterior epidural space from C2 to Th1 causing compression on the spinal cord (white arrows). The lesion is isointense to muscle on T1-WI and slightly hyperintense to the spinal cord on T2-WI in keeping with an acute spinal epidural hematoma. STIR images show extensive soft tissue lesions with disruption of the interspinous and supraspinous ligaments (black arrow), a prevertebral hematoma (arrowheads) and bone marrow edema C6.**Origin:**