Spondylotic myelopathy mimicking myelitis: diagnostic clues by magnetic resonance imaging

Adriana Rua, Yolanda Blanco, María Sepúlveda, Núria Sola-Valls, Eugenia Martínez-Hernández, Sara Llufriu, Joan Berenguer, Francesc Graus, Albert Saiz

Introduction. Spondylotic myelopathy is the commonest cause of nontraumatic myelopathy. Radiological features of spondylotic myelopathy can often overlap with inflammatory myelopathies which may lead to a delayed or incorrect diagnosis and therapy. A distinctive gadolinium enhancement pattern recently described may help to differentiate spondylotic from inflammatory myelopathy.

Case reports. Case 1: a 38-years-old man presented with a 2-year history of paresthesias in the upper extremities, and one year later cramps on the right limbs and numbness over right C5 and C6 dermatomes, related to movement of the neck. Case 2: a 44-year-old man presented with a 1-year history of progressive gait difficulties and sensory disturbance in the hands, and a recent onset of bladder dysfunction. In both cases, spinal cord MRI identified a longitudinal cervical T_2-signal hyperintensity associated with a pancakelike transverse band of gadolinium enhancement just below the site of maximum spinal stenosis, and circumferential or hemicord enhancement on axial images.

Conclusions. The radiological features of spondylotic myelopathy may resemble those of inflammatory origin. The recognition of a transverse pancakelike gadolinium enhancement immediately below the site of maximal compression as a typical radiological pattern of spondylotic myelopathy is important to reduce the risk of misdiagnosis and to help in the management of these patients.

Key words. Gadolinium enhancement. Magnetic resonance imaging. Myelitis. Spondylotic myelopathy.

Service of Neurology; Hospital de San António; Centro Hospitalar do Porto; Porto, Portugal (A Rua). Service of Neurology (Y. Blanco, M. Sepúlveda, N. Sola-Valls, E. Martínez-Hernández, S. Llufriu, F. Graus, A. Saiz); Service of Radiology, and Imaging Diagnostic Center (J. Berenguer); Hospital Clínic; Barcelona, Spain.

Corresponding author:
Albert Saiz, MD. Service of Neurology. Hospital Clínic. Villarroel, 170. E-08036 Barcelona (Spain).

Fax:
+34 932 275 783.

E-mail:
asaiz@clinic.ub.es

Accepted:
29.10.15.

How to cite this article:
Rua A, Blanco Y, Sepúlveda M, Sola-Valls N, Martínez-Hernández E, Llufriu S, et al. Spondylotic myelopathy mimicking myelitis: diagnostic clues by magnetic resonance imaging. Rev Neurol 2015; 61: 499-502.

Versión española disponible en www.neurologia.com

Introduction

Cervical spondylosis is a degenerative process ending in myelopathic and/or radiculopathic syndromes. In fact, cervical spondylotic myelopathy is the most common cause of myelopathy in patients older than 55 years [1]. Although compression is often obvious as the cause of myelopathy on magnetic resonance imaging (MRI), spinal stenosis may be moderate rather than severe, and may cause longitudinally extensive T2 hyperintensity, spinal cord swelling and enhancement, that may lead to suspect an inflammatory or neoplastic myelopathy [2-5]. Despite spondylotic contrast-enhanced spinal cord lesions are not common (7.3%), they require more frequently extensive investigation to exclude alternative causes [2,5].

Recently, it was described a radiological pattern of long fusiform T_2 signal abnormality with transverse band or flat 'pancakelike' appearance of gadolinium enhancement just below the site of maximum stenosis in spondylotic myelopathy [2]. The recognition of this pattern may be helpful to identify the cause, to avoid unnecessary diagnostic procedures and therapies, and to consider a potentially beneficial surgical decompression. In this report we describe two further cases in which the myelopathy initially was misdiagnosed as inflammatory.

Case reports

Case 1

A 38-years-old man presented with a 2-year history of tingling in the fingertips of both hands during minutes to hours in relation to movement of the neck. One year later, he experienced cramps on the right limbs and numbness over right C5 and C6 dermatomes, extending to lateral side trunk after a sudden movement. The numbness lasted some hours and worsened on coughing. At examination, the only remarkable finding was a mild touch and pain hypoesthesia in the areas described by the patient. Cervical spine MRI showed a spindle-shaped T_2-signal hyperintensity with pancakelike transverse

Figure 1a. Case 1. Sagittal magnetic resonance imaging shows a T_2-signal hyperintensity (a1), with transverse gadolinium enhancement at the C5-C6 interspace (a2, arrow). Gadolinium-enhanced axial T_1-weighted reveals right hemicord enhancement (a3).

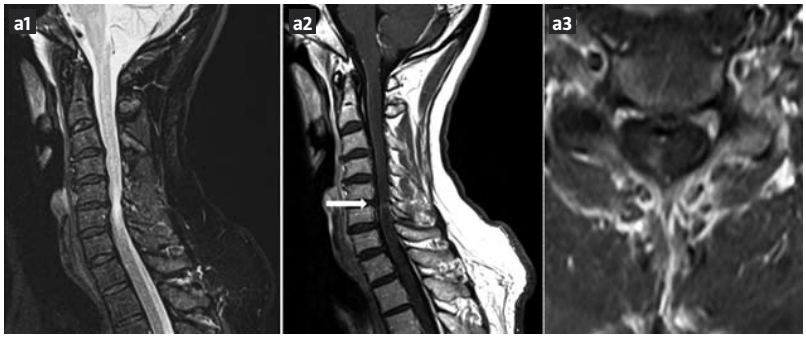
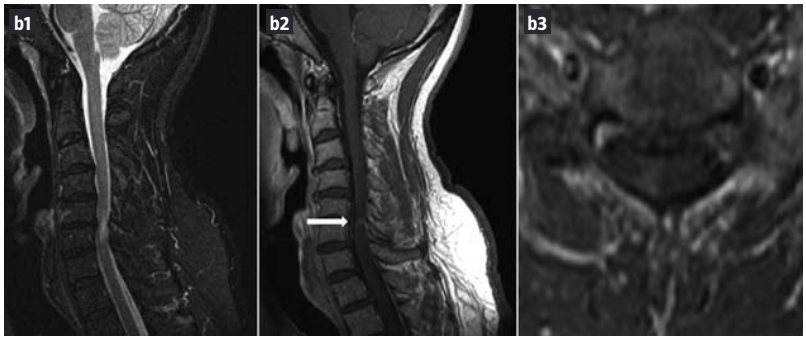


Figure 1b. Magnetic resonance imaging examination 6 months later showed a lesser swelling in T_2-sequences (b1), and persistence of the enhancement (b2, arrow; and b3).



gadolinium enhancement below the site of maximum stenosis at the C5-C6 interspace. Axial MRI revealed a right hemicord enhancement (Fig. 1a). Brain MRI was normal. Cerebrospinal fluid (CSF) showed 20 cells/μL, normal protein, and negative oligoclonal bands. Routine blood analysis, virus serology, antinuclear antibody testing and angiotensin converting enzyme were normal or negative. An electromyography ruled out the existence of a cervical radiculopathy, and the central motor conduction time was normal. Patient was treated with intravenous methylprednisolone (1 g × 3 days), without clinical improvement. Spine MRI performed 6 months later showed persistence of the enhancement but with the aspect of a lesser swelling in T_2-sequences (Fig. 1b). Patient refused decompression surgery and remained stable along 1-year follow-up.

Case 2

A 44-year-old man presented with a 1-year history of progressive gait difficulties and sensory disturbances in hands. The clinical symptoms developed insidiously and followed a progressive course reducing the walking distance and appearing bladder urgency in the last few months. Neurological examination revealed weakness in his right leg (4/5) with extensor plantar response, touch hypoesthesia in the right forearm and both hands, reduced distal vibratory sense in both feet, and spastic-paretic gait. Cervical spine MRI showed an almost 3-vertebral segment T_2-signal hyperintensity in the spinal cord (C4 to C6), and pancakelike transverse gadolinium enhancement below the site of maximum stenosis at the C4-C5 interspace. Axial MRI revealed a peripheral circumferential enhancement (Fig. 2a). Brain MRI was normal. CSF showed 10 cells/μL, elevated proteins (54.1 mg/dL), and negative oligoclonal bands. Routine blood analysis, virus serology, and antinuclear antibody testing were normal or negative. Chest computed tomography was normal as well. Patient was treated with intravenous methylprednisolone (1 g × 3 days), with slight clinical improvement. Spine MRI performed 6 and 12 months later (Fig. 2b) showed persistence of the transverse band of enhancement but the T_2-signal hyperintensity had decreased, and the axial sections only revealed a left peripheral enhancement (Fig. 2b). Patient refused decompression surgery and remained stable along 1-year follow-up.

Discussion

We report two patients who presented with a radiological features of enhancement highly suggestive of spondylotic myelopathy [2]: transverse band appearance, greater in transverse than vertical extent on sagittal images; location just below the site of maximum stenosis at the center of the T_2 hyperintensity; and circumferential enhancement sparing gray matter on axial images. However, the latter is only present in 57% of the patients who have gadolinium enhancement, and it may be incomplete, and occasionally limited to the hemicord [2]. Another important clue was the observation of contrast enhancement at C5 and C6, because C5-C6 are the most common level of involvement in spondylotic myelopathy [2,5,6]. Although persistent enhancement may suggest other alternative diagnosis, this finding is frequently described (40-75%) [2,5], even after decompressive surgery for 1 year or lon-

ger [2,4]. Therefore, the persistence of enhancement in absence of clinical deterioration would be consistent with spondylotic myelopathy [2-4]. The mechanism of contrast uptake in spondylotic myelopathy is not clear, but has been explained as a consequence of a disturbed blood circulation, changes of the perivascular spaces and a changed CSF-pulsation near the point of the stenosis [2,4].

In spondylotic myelopathy, the association of a radicular and myelopathic syndrome facilitates the diagnosis [6]. Although the clinical features of the case 1 were more suggestive of spondylotic myelopathy, because of its relation with flexion/extension movements of the neck, the young age of the patient and the absence of associated radiculopathy led us to consider an inflammatory demyelinating cause for his myelopathy. In case 2, however, the clinical features were suggestive of a primary progressive multiple sclerosis, but brain MRI was normal, and oligoclonal bands were not detected. This case highlights the importance of an accurate application of well recognized clinical criteria [7]. In addition, it is important to bear in mind that the reported radiological features are not pathognomonic of spondylotic myelopathy [2], and alternative causes should be ruled out in cases with less typical features or other abnormal findings. For example, marked CSF pleocytosis (up to 20 cells/μL have been reported in 12.5% of the patients [2]), presence of oligoclonal bands, abnormal brain MRI, pial enhancement or hilar adenopathy. Misapplication of clinical and radiological diagnostic criteria is likely the most important factor for the misdiagnosis.

Figure 2a. Case 2. Sagittal magnetic resonance imaging shows an almost 3-vertebral segments T_2-signal hyperintenisty (from level C4 to C6) (a1), with transverse gadolinium enhancement at the C4-C5 interspace (a2, arrow). Gadolinium-enhanced axial T_1-weighted reveals a peripheral circumferential pattern of enhancement (a3).

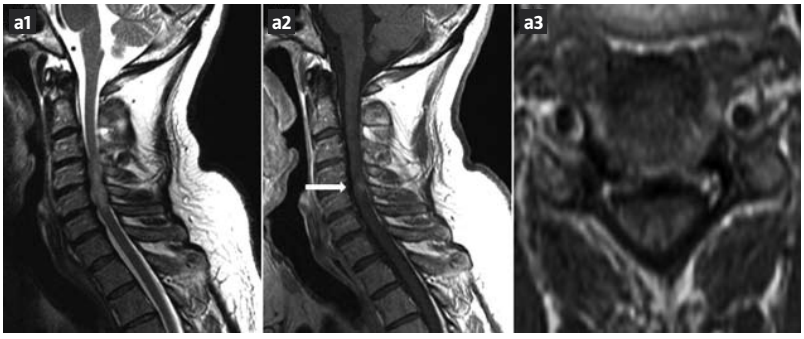
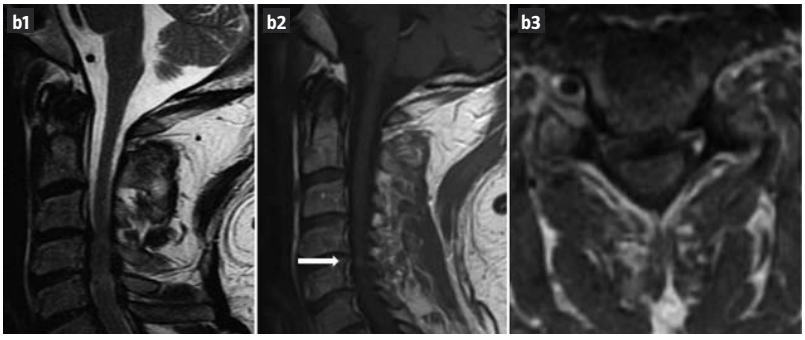


Figure 2b. Magnetic resonance imaging examination 12 months later showed a decrease in the T_2 hyperintensity (b1), persistence of the transverse band (b2, arrow), and left peripheral enhancement in the axial section (b3).



References

1. Fehlings MG, Ibrahim A, Tetreault L, Albanese V, Alvarado M, Arnold P, et al. A global perspective on the outcomes of surgical decompression in patients with cervical spondylotic myelopathy: results from the prospective multicenter AOSpine international study on 479 patients. Spine (Phila Pa 1976) 2015; May 27. [Epub ahead of print].
2. Flanagan EP, Krecke KN, Marsh RW, Giannini C, Keegan BM, Weinshenker BG. Specific pattern of gadolinium enhancement in spondylotic myelopathy, Ann Neurol 2014; 76: 54-65.
3. Boet R, Chan YL, King A, Mok CT, Poon WS. Contrast enhancement of the spinal cord in a patient with cervical spondylotic myelopathy. J Clin Neurosci 2004; 11: 512-4.
4. Cabraja M, Abbushi A, Costa-Blechschmidt C, Van Landeghem FKH, Hoffmann KT, Woiciechowsky C, et al. Atypical cervical spondylotic myelopathy mimicking intramedullar tumor. Spine 2008; 33: e183-7.
5. Ozawa H, Sato T, Hyodo H, Ishii Y, Morozumi N, Koizumi Y, et al. Clinical significance of intramedullary Gd-DTPA enhancement in cervical myelopathy. Spinal Cord 2010; 48: 415-22.
6. Tracy JA, Bartleson JD. Cervical spondylotic myelopathy. Neurologist 2010; 16: 176-87.
7. Polman CH, Reingold SC, Banwell B, Clanet M, Cohen JA, Filippi M, et al. Diagnostic criteria for multiple sclerosis: 2010 revisions to the McDonald criteria. Ann Neurol 2011; 69: 292-302.

Mielopatía espondilótica que simula una mielitis: claves diagnósticas mediante resonancia magnética

Introducción. La mielopatía espondilótica es la causa más frecuente de mielopatía no traumática. Sus características radiológicas en ocasiones son indistinguibles de las de una mielopatía inflamatoria, y pueden ocasionar retrasos diagnósticos o llevar a un diagnóstico y tratamiento incorrectos. La descripción reciente de un patrón característico de realce de gadolinio puede ayudar a diferenciar la mielopatía espondilótica de la causa inflamatoria.

Casos clínicos. Caso 1: varón de 38 años que consultó por historia de dos años de evolución de parestesias en las extremidades superiores, a las que se añadieron un año más tarde calambres en las extremidades derechas y acorchamiento en los dermatomas C5 y C6 en relación con los movimientos del cuello. Caso 2: varón de 44 años que consultó por historia de un año de evolución de alteración progresiva de la marcha con trastorno sensitivo en las manos y disfunción vesical reciente. En ambos casos, la resonancia magnética medular mostró en las secciones sagitales una hiperseñal cervical fusiforme en T_2, asociada a una banda transversa de realce de gadolinio en forma de barra (*pancakelike*) justo por debajo de la zona de máxima estenosis, y un realce circunferencial o hemimedular en los cortes axiales.

Conclusiones. Las características radiológicas de la mielopatía espondilótica pueden parecerse a las de origen inflamatorio. El reconocimiento de un realce transverso en barra inmediatamente por debajo del lugar de máxima compresión como signo radiológico típico de la mielopatía espondilótica es importante para reducir el riesgo de errores diagnósticos, y de utilidad para el manejo de estos pacientes.

Palabras clave. Mielitis. Mielopatía espondilótica. Realce de gadolinio. Resonancia magnética.