



Imaging Sciences Interesting Cases

CASE 12

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Clinical Presentation: A 17-year-old male presented with progressive bilateral lower extremity weakness. MRI of the cervical and thoracic spine was requested to evaluate spinal cord pathology.

Imaging Findings: MRI of the thoracic spine demonstrates a non-enhancing hyperintense intramedullary lesion on STIR sequence (**Fig. 1**) from the level of T8 through the conus which is mildly expanded. Axial T2 weighted image (**Fig. 2**) shows the lesion to be centrally located. There are no significant degenerative changes, central spinal canal stenosis or evidence of spinal dural fistula. MRI of the cervical spine demonstrates no additional abnormality.

A subsequent MRI of the brain (**Fig. 3**) demonstrates T2 and FLAIR hyperintensities in the left thalamus and scattered throughout predominantly subcortical areas without periventricular involvement; features that are consistent with acute disseminated encephalomyelitis (ADEM).



Figure 1

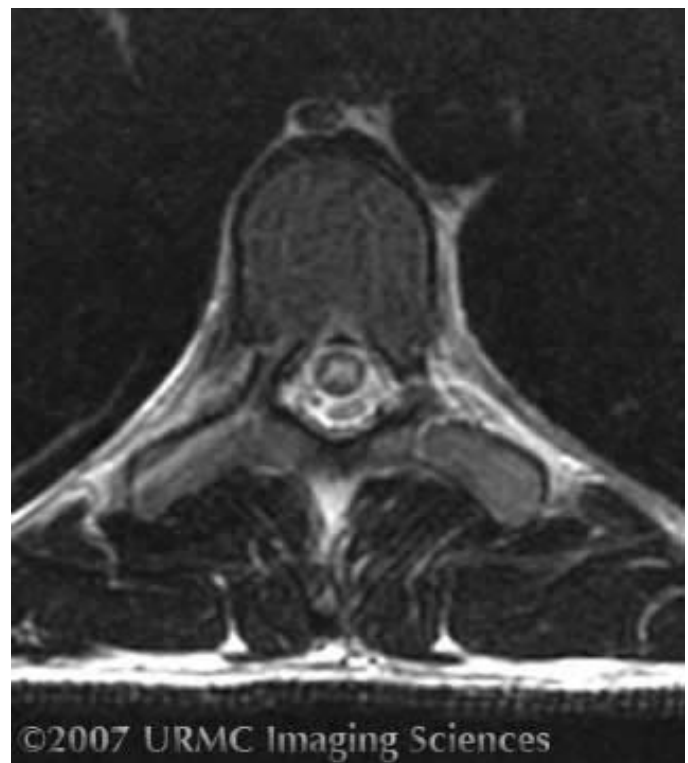


Figure 2

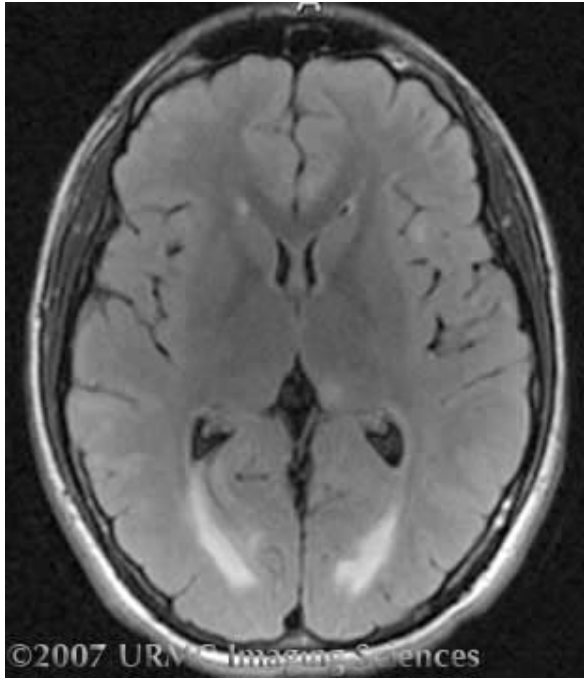


Figure 3



Figure 4

DIAGNOSIS: Acute Transverse Myelitis

DISCUSSION: Transverse myelitis is an inflammatory process that involves both halves of the spinal cord and is characterized by bilateral motor, sensory and autonomic dysfunction. Common presentation is back or radicular pain followed by abrupt onset of bilateral lower extremity paresthesias. Subsequent ascending sensory deficits and paraparesis may eventually progress to paraplegia.

Causes of a transverse myelopathy may include multiple sclerosis, neoplasm, infarction and spinal dural fistulas however, most cases are idiopathic. There are approximately 1,400 new cases each year, the majority of which have been shown to occur in late winter through spring months in one study. All ages are affected however, there is a bimodal peak from ages 10-19 years and 30-39 years. No gender or ethnic associations have been found and the thoracic spinal cord is the most frequent site involved.

Associations with prior viral infection or vaccinations suggest there is an autoimmune process with formation of antigen-antibody complexes. Pathology from biopsy and autopsy specimens demonstrates demyelination and necrosis of gray and white matter with perivascular lymphocytic infiltrates. Some authors believe that most lesions are purely demyelinating and subsequently resolve before tissue is obtained for examination.

Characteristic MRI findings associated with idiopathic transverse myelitis include normal size or segmental swelling of the spinal cord with T2 hyperintensity occupying more than 2/3 of the cross sectional area centrally and usually spanning more than 3-4 vertebral levels (**Fig. 4**). When there is cord enhancement the pattern is focal nodular or diffuse at the periphery of the lesion. Generally, there is a higher prevalence of enhancement when there is cord expansion and lesions show slow improvement with time.

These lesions can be differentiated from multiple sclerosis plaques which commonly involve less than two vertebral segments of the cervical spinal cord and demonstrate T2 hyperintensity occupying less than one half of the cross sectional area of the cord in peripheral locations. Cord expansion may be seen and if there is cord enhancement it is variable and located centrally within the lesion. The presence of concomitant intracranial periventricular lesions is strong evidence to support MS.

Neoplastic spinal cord lesions often demonstrate variable enhancement and heterogeneous T2 hyperintensity occupying the entire cross section of the cord with associated cord expansion. Edema commonly extends beyond the area of contrast enhancement and there may be associated cavitory lesions.

Spinal dural fistulas typically present with slowly progressive symptoms and occur in older men. MRI findings include central T2 hyperintensity extending over several vertebral segments of the cord and significant mass effect. When present, prominent flow voids on T2WI or enhancing vessels visualized along the posterior aspect of the cord represent dilated and tortuous vessels of the venous plexus.

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