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Magnetic Resonance Imaging in Multiple Sclerosis: Results in 32 Cases

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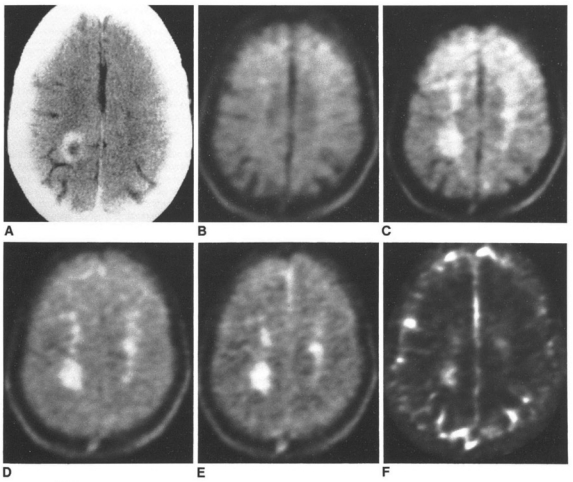
A prospective clinical study was performed in 32 patients with multiple sclerosis (MS) to evaluate the sensitivity of lesion detection and accuracy of lesion localization by neurologic examination, delayed enhanced computed tomography (CT) with a double dose of contrast material, and proton magnetic resonance (MR) imaging. After neurologic examination patients were classified by probability of MS (possible, four patients; probable, three patients; and definite, 25 patients) and by disease activity (acute, chronic with acute exacerbation, or chronic progressive). Subsequently they underwent delayed enhanced CT scanning and MR imaging with more than one spin-echo technique. In five of seven patients with possible or probable MS, both MR imaging and delayed enhanced CT were negative. In 25 cases of definite MS, MR imaging detected pathology in 19 (76%) cases, while CT detected lesions in 15 (60%) of 25 cases. In acute lesions (acute or chronic with acute exacerbation), the two techniques were of similar sensitivity (delayed CT was positive in 55% and MR imaging in 60%), while in chronic progressive MS, MR imaging was superior in lesion detection (MR imaging positive in 75%; delayed CT in 25%). While most lesions (55%) were seen in corresponding locations in both studies, neither MR nor delayed CT correlated well with lesion localization by neurologic examination because a large number of asymptomatic lesions were imaged and many symptomatic lesions were undetected. MS plaques imaged by MR were manifested by prolongation of T2 and were of two varieties: focal, acute lesions (T2 136–260 msec at 0.14 T) and chronic, diffuse, predominantly periventricular lesions (120–231 msec T2 at 0.14 T, normal white matter T2 of 77–118 msec at 0.14 T). Because of these overlapping ranges, chronicity of MS lesions could not be determined by T2 values alone. MR was at least as sensitive as delayed CT in lesion detection, and it was more sensitive in detecting chronic MS plaques. MR imaging is a viable alternative to double-dose delayed CT in the evaluation of patients with MS, particularly in patients in whom intravenous contrast agents are prohibited or unrevealing.



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Demonstration of Diastematomyelia and Associated Abnormalities with MR Imaging

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Three patients were studied with a 0.3 T superconducting magnet to assess the role of magnetic resonance (MR) imaging in the recognition and evaluation of diastematomyelia and associated abnormalities. Comparison was made with other imaging techniques, including metrizamide computed tomographic (CT) myelography. With MR imaging, the divided spinal cord was well imaged in its entire craniocaudal extent, comparable to CT myelography. The bony septum, when it contained a marrow cavity, was also seen well. In two patients, dural ectasia and low position of the spinal cord with and without associated lipoma were clearly imaged. MR imaging demonstrated associated syringohydromyelia in one patient that was not detected by other radiologic studies. This preliminary experience with MR imaging of diastematomyelia suggests that once the bony details of the abnormality are defined, MR imaging can delineate the presence and extent of the divided spinal cord as well as its associated abnormalities adequately, obviating other studies.

The radiologic evaluation of spinal dysraphism, including diastematomyelia, has been heavily dependent on metrizamide computed tomographic (CT) myelography. The risks associated with contrast material (metrizamide), radiation exposure, and the invasiveness of the procedure have been considered to be far outweighed by its tremendous diagnostic value. Clinical experiences with magnetic resonance (MR) imaging have shown it to be truly promising in the evaluation of various abnormalities involving the spinal column [1–5]. Direct visualization of the spinal cord itself is probably the most rewarding feature of MR imaging compared with more conventional techniques. We report three patients with diastematomyelia and associated anomalies who were studied with MR imaging.

Subjects and Methods

Three patients with diastematomyelia identified on conventional radiographic studies were scanned on a cryogenic superconducting magnet (Teslacon, Technicare Corp., Solon, OH), operating at 0.3 T. MR images were obtained using a two-dimensional single-slice technique with about 12 mm section thicknesses. A spin-echo (SE) pulse sequence was chosen, with a repetition time (TR) of 500 msec and echo-delay time (TE) of 30 msec. Using the midline sagittal image as a guide, axial and coronal images were then obtained at appropriate levels. The results of the MR studies were compared and correlated with findings from plain radiographs, metrizamide myelograms, and metrizamide CT myelograms.

Results

Full descriptions of the MR findings from each patient are found in the legends of figures 1–3. A high level of contrast between the spinal cord and surrounding structures was achieved with the SE technique used. In general, axial images demonstrated the split cord as two separate, intermediate-signal-intensity structures in the spinal canal. The coronal images, obtained at several different levels

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