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Celebrating 35 Years of the AJNR

November 1984 edition

Magnetic Resonance Demonstration of Multiple Sclerosis Plaques in the Cervical Cord

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Magnetic resonance imaging (MRI) has been shown to be far more sensitive than computed tomography (CT) in the detection of multiple sclerosis plaques within the brain. Unlike CT, MRI is also able to detect multiple sclerosis in the brainstem and cerebellum. This report is the first description of MRI of multiple sclerosis plaques within the cervical spinal cord. Twenty-one patients with clinically typical multiple sclerosis had characteristic plaques within the brain. In 10 patients one or more plaques were identified in the cervical spinal cord. Plaques in the spinal cord were detected only in the upper cervical region using the 30-cm head radiofrequency coil. No lesions were identified using the larger-diameter body coil because of poorer signal-to-noise ratio. Further improvement in visualization of plaques in the lower cervical and thoracic spinal cord may depend on development of high-quality surface coils.

Multiple sclerosis (MS) is a widespread demyelinating disease of the central nervous system consisting of lesions widely separated in location as well as time of onset. MS has traditionally been a diagnosis of exclusion that has required evaluation of patients with multiple imaging studies including computed tomography (CT) of the head and myelography whenever symptoms attributable to a spinal cord lesion are present.

In recent years, an improved battery of nonimaging studies has been developed that greatly aids in establishing the clinical diagnosis of MS [1, 2]. These tests include visual, auditory, and somatosensory-evoked potentials. Cervical cerebrospinal fluid (CSF) analysis, including measurement of IgG and CSF electrophoresis for the detection of oligoclonal bands, is also extremely helpful. However, while these sophisticated tests increase the sensitivity and accuracy for diagnosing MS, they have several limitations. They are not positive in 100% of patients with MS, and patients with other diseases may have elevated IgG and oligoclonal bands within the CSF leading to false-positive diagnoses. In addition, even though the diagnosis of MS can be implied using a comprehensive battery of n studies, these tests do not provide the information needed for localizing M determining the number and size of lesions, and determining their sites bution. This is important not only for diagnosis but also for determination of the disease and subsequent prognosis. Moreover, this type of infor crucial in following patients, determining their response to therapy, and in e the efficacy of proposed new treatment regimens. Efforts to obtain this in have been greatly hampered by the inability to reliably image MS plaques

CT of the brain, especially with high-dose intravenous contrast enha has been used to detect some MS plaques [3–5], but CT also ha limitations. Small, low-density plaques often are not visualized on the and even large periventricular plaques may not be seen since their de approximate that of CSF within the ventricles, and they may be insepar the outline of the ventricular wall [6]. Partial-volume effects between CS periventricular plaques further diminish the sensitivity of CT. Some dem

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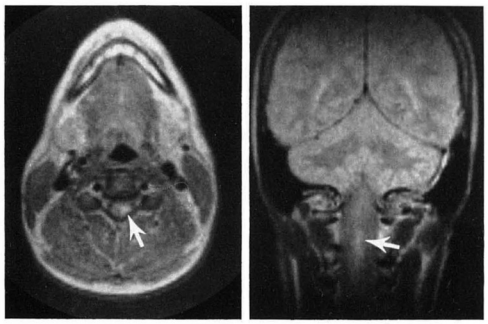

A B

CT of Acquired Immunodeficiency Syndrome

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Thirty patients with acquired immunodeficiency syndrome were examined by computed tomography. In addition to systemic disease, these patients had a variety of neurologic symptoms and signs. Cerebral toxoplasmosis (six cases) was generally manifested by ring-enhancing lesions with surrounding decreased attenuation. Lymphoma (one case) exhibited a solid enhancing nodule, and progressive multifocal leukoencephalopathy (two cases) showed periventricular decreased attenuation. Atrophy (15 cases) was very common and invariably indicated a poor prognosis; the autopsy examinations of the latter cases showed degeneration of gray and white matter with features similar to cytomegalic inclusion encephalitis and subacute sclerosing encephalopathy of measles.

In the spring of 1981, the Centers for Disease Control began to report in alarming numbers healthy homosexual men with infections and Kaposi sarcoma [1–3]. The etiology of this acquired immunodeficiency syndrome (AIDS) is unknown, but has since been reported increasingly outside the homosexual community, in intravenous drug abusers [4–6], Haitians [7], women who are not themselves drug abusers but have sexual contact with addicts [8], and hemophiliacs and other recipients of blood products [9]. Only pulmonary and gastrointestinal changes have been reported in the radiologic literature [10–26]. We are unaware of a comprehensive review of the central nervous system (CNS) manifestations in AIDS. Over the past 2 years we have had the opportunity to study computed tomographic (CT) scans of a number of such patients. It appears that, although a wide spectrum of changes is seen, certain appearances may be characteristic of this disorder. Our study is a report of such changes.

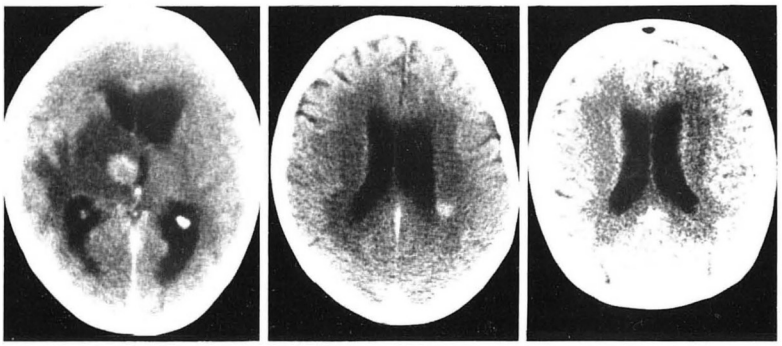
Materials and Methods

Thirty patients with the diagnosis of AIDS admitted to the New York Hospital and Memorial Sloan-Kettering Cancer Center were scanned on a GE 8800 or Technicare 2020 scanner; intravenous contrast material was administered in all cases. Patients were from 26–50 years of age: 22 were sexually active homosexuals, two were intravenous drug abusers who denied homosexuality, and six did not state sexual orientation. Most were admitted for evaluation of underlying malignancy and for overwhelming systemic *Pneumocystis carinii* and cytomegalic viral infections. The indications for CT evaluation were decreased mental status in 18 cases and confusion and changes in the level of consciousness in 12. CT lesions were confirmed by biopsy, autopsy, or clinical response to therapy (table 1).

Results

Six different types of CT abnormalities were observed (table 1):

1. Ring-enhancing lesions with surrounding low attenuation were seen in four cases; three cases had single lesions, one multiple. There was slight mass effect or mass effect disproportional to the size of the area of decreased attenuation



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