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Authors

Dupont, Renee M
Jernigan, Terry L
Gillin, J Christian
et al.

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Letter

Subcortical Signal Hyperintensities in Bipolar Patients Detected by MRI

To the Editors:

Some recent reports have shown increased ventricle-brain ratios (Nasrallah et al., 1984; Pearlson et al., 1984) and altered attenuation values (Coffman and Nasrallah, 1984; Schlegal and Kretzschmar, 1987) in the computed tomographic (CT) scans of bipolar patients compared with controls. Using magnetic resonance imaging (MRI), we have examined 15 bipolar patients and 8 controls for the presence of ventricular enlargement and parenchymal abnormalities.

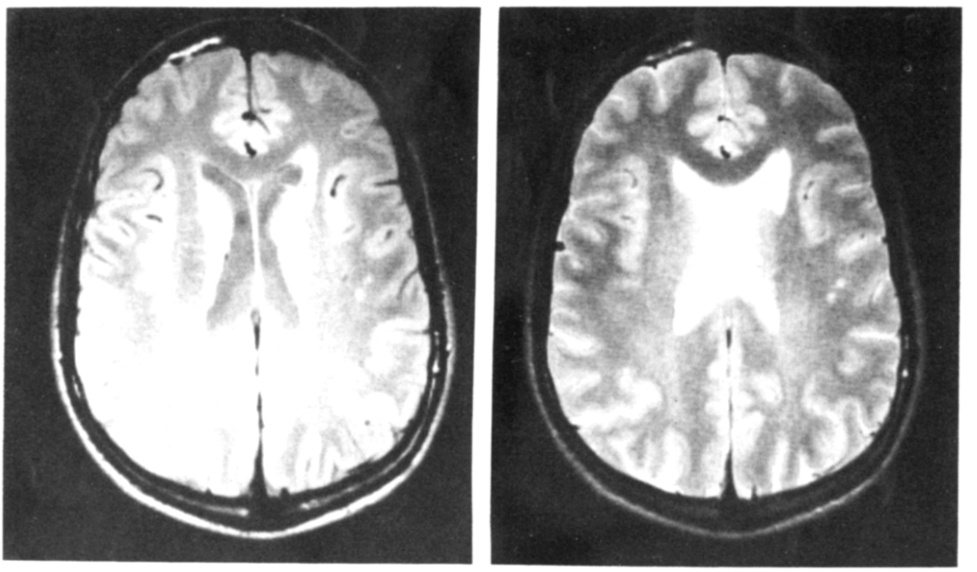
All patients and controls were screened with the Schedule for Affective Disorders and Schizophrenia-Lifetime Version (Endicott and Spitzer, 1978), history, and laboratory and physical examinations. Participants with a history of a neurological disorder, birth trauma, developmental delay, uncontrolled hypertension, or significant alcohol or drug abuse were excluded. Controls were free of personal and family history of psychiatric disorder. All screening was completed before the MRI. Ventricular rank and presence of parenchymal abnormalities were evaluated by experienced observers without knowledge of group membership of the images (T.J. and J.R.H., respectively). Subcortical white matter abnormalities were defined by an increased signal on mixed T_1/T_2 and T_2 weighted images (TR-2,000 ms, TE-25, 70 ms) obtained in axial and coronal planes. Regions of increased signal found normally directly anterior to the frontal horn or posterior to the occipital horn of the lateral ventricle were excluded.

Fifteen bipolar patients met Research Diagnostic Criteria (Spitzer et al., 1978) for the disorder. However, one patient was excluded from analysis due to the presence of a previously undiagnosed arachnoid cyst displacing the left temporal lobe. The remaining bipolar patients were 13 males and 1 female. Seven patients were on lithium alone, two were on lithium plus a tricyclic antidepressant, one was on lithium, benztropine, and fluphenazine HCl, one was on carbamazepine, and three were unmedicated. One bipolar male had recently completed a course of electroconvulsive therapy (ECT). Eight males served as controls. The average age of the patients was 38 ± 8 years, and that of the controls was 41 ± 9 years (NS difference).

Eight of the 14 bipolars and none of the controls exhibited white matter abnormalities ($p < 0.018$, Fisher's exact test, two-tailed). (See Fig. 1.) The areas of signal hyperintensity were located within the deep white matter and periventricular regions. The affected individuals had from one to eight of these lesions. The bipolar patient who had completed a course of ECT was among those with abnormal images. The presence of these signal hyperintensities was associated with a significant increase in the number of hospitalizations (Mann-Whitney U test, $p < 0.01$) and a trend toward increased depression scores ($p < 0.06$) on the Hamilton Rating Scale for Depression (Hamilton, 1960). Patients with MRI-defined lesions did not differ significantly from those without lesions with regard to age, family history of affective disorder, education, age of onset, history of psychosis, or medication use. Ventricular size did not differ between the bipolars and controls in our sample (mean ranks: bipolar = 10.3, control = 10.6, $p > 0.90$).

To our knowledge, this is the first study demonstrating focal parenchymal abnormalities in bipolar patients using MRI. Further studies are underway to evaluate the relationship of these lesions to performance on tests of cognitive functioning.

Fig. 1. Areas of signal hyperintensities in a bipolar patient detected by MRI



The appearance of abnormal foci of signal hyperintensity is demonstrated on this magnetic resonance image (MRI) of a 30-year-old bipolar male. There are 2 small regions of increased signal in a subcortical left temporoparietal distribution, and an area of increased signal anterolateral to the frontal horn of the left lateral ventricle. Shown are mixed and T_2 weighted images of a single axial cut. A T_1/T_2 weighted image is shown on the left, and a T_2 weighted image is shown on the right.

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Renee M. Dupont, M.D.
Terry L. Jernigan, Ph.D.
J. Christian Gillin, M.D.
Nelson Butters, Ph.D.
Dean C. Delis, Ph.D.
John R. Hesselink, M.D.
Department of Psychiatry
University of California
San Diego, and
San Diego VA Medical Center
3350 La Jolla Village Dr.
La Jolla, CA 92161

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