
RSNA Press Release

Imaging Tool May Help Physicians Diagnose Bipolar Disorder

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CHICAGO - Magnetic resonance (MR) spectroscopy may prove to be the definitive diagnostic test for bipolar disorder, a serious brain illness characterized by an alternating pattern of extreme emotional highs and lows, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

Using MR spectroscopy of the brain, researchers at the Mayo Clinic in Rochester, Minn., identified significant differences between the brain chemistries of people with and without bipolar disorder.

"The psychiatric community clearly needs a tool to help diagnose bipolar disorder," said John D. Port, M.D., Ph.D., assistant professor of radiology and consultant at the Mayo Clinic. "We are hopeful that very high-field MR spectroscopy will prove helpful by identifying metabolic markers of the disease."

Currently, bipolar disorder is diagnosed by psychiatrists on the basis of symptoms and, when available, family history. Often patients go undiagnosed for years.

"Bipolar disorder is challenging to diagnose because individuals can cover up the symptoms of the illness or may recognize only their depression, not the manic phase of the disorder," Dr. Port said. "It's also important to be able to distinguish bipolar disorder from major depression because a mistaken diagnosis can result in the wrong therapy and unstable moods for years."

According to the National Institute of Mental Health (NIMH), approximately 2.3 million Americans have bipolar disorder. Left untreated, bipolar episodes typically become more frequent and more resistant to change through medication. Each year, approximately 30,000 depressed individuals commit suicide, according to NIMH.

The researchers studied 21 patients with bipolar disorder who were not taking any

At A Glance

- Magnetic resonance (MR) spectroscopy may provide vital information in the diagnosis of bipolar disorder.
- Bipolar disorder, a serious condition of the brain affecting 2.3 million Americans, is characterized by an alternating pattern of emotional highs and lows.
- Using MR spectroscopy on bipolar patients, radiologists detected four regions of the brain with significant differences in several brain chemicals.

medications or drugs and 21 individuals without the disorder matched to each bipolar patient by age, sex and right- or left-handedness. Study participants ranged from age 18 to 54 and included 26 women and 16 men.

Using MR spectroscopy, a special form of MR imaging that allows researchers to analyze the chemical properties of tissue, Dr. Port and colleagues studied 60 to 70 regions of the brain at a time, gathering thousands of data points. The spectroscopic scans enabled the research team to perform statistical analysis on 14 separate areas of the brain and five metabolites, chemical substances found in brain tissue.

The preliminary findings indicated that certain metabolite levels differed significantly between the bipolar group and control group in four areas of the brain that control behavior, movement, vision and reading, and sensory information.

This is the first study to analyze drug-free bipolar patients using a 3T longbore MR scanner, which has twice the magnetic-field strength of scanners used in recent bipolar disorder studies.

Co-authors of the paper presented by Dr. Port are Joel P. Felmlee, Ph.D., David Mrazek, M.D., Sencan Solay Unal, M.D., and Mandie J. Maroney-Smith, RT(R) (MR).

Abstract:	<ul style="list-style-type: none">• Imaging Markers of Bipolar Disease: Evaluation of Proton Magnetic Resonance Spectroscopic Imaging at 3T
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Video clip (.MPEG format)

1. [The tissue volume correction \(TVC\) accounts for the CSF in the voxels.](#) (1.2 Mbyte)

Images (.JPG format)

Magnetic Resonance Spectroscopy	This adult bipolar MRSI study shows two slices of MRSI data at different levels (15 minutes each).	Adult bipolar MRSI study	Adult bipolar MRSI study
Absolute concentrations and CSF-CSF effectively contains no metabolites	The tissue volume correction (TVC) accounts for the CSF in the voxels.		
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RSNA is an association of more than 37,000 radiologists, radiation oncologists and related scientists committed to promoting excellence in radiology through education and by fostering research, with the ultimate goal of improving patient care. The Society is based in Oak Brook, Ill.