

Abstract

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Measurement of brain metabolites in patients with type 2 diabetes and major depression using proton magnetic resonance spectroscopy.

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BACKGROUND: Type 2 diabetes and major depression are disorders that are mutual risk factors and may share similar pathophysiological mechanisms.

OBJECTIVE: To further understand these shared mechanisms, the purpose of our study was to examine the biochemical basis of depression in patients with type 2 diabetes using proton MRS.

METHODS: Patients with type 2 diabetes and major depression (n=20) were scanned along with patients with diabetes alone (n=24) and healthy controls (n=21) on a 1.5 T MRI/MRS scanner. Voxels were placed bilaterally in dorsolateral white matter and the subcortical nuclei region, both areas important in the circuitry of late-life depression. Absolute values of myo-inositol, creatine, N-acetyl aspartate, glutamate, glutamine, and choline corrected for CSF were measured using the LC-Model algorithm.

RESULTS: Glutamine and glutamate concentrations in depressed diabetic patients were significantly lower ($p < 0.001$) in the subcortical regions as compared to healthy and diabetic control subjects. Myo-inositol concentrations were significantly increased ($p < 0.05$) in diabetic control subjects and depressed diabetic patients in frontal white matter as compared to healthy controls.

CONCLUSION: These findings have broad implications and suggest that alterations in glutamate and glutamine levels in subcortical regions along with white matter changes in myo-inositol provide important neurobiological substrates of mood disorders.

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