

Abnormal Brain MR Signal Intensity in a Patient with Toluene Abuse

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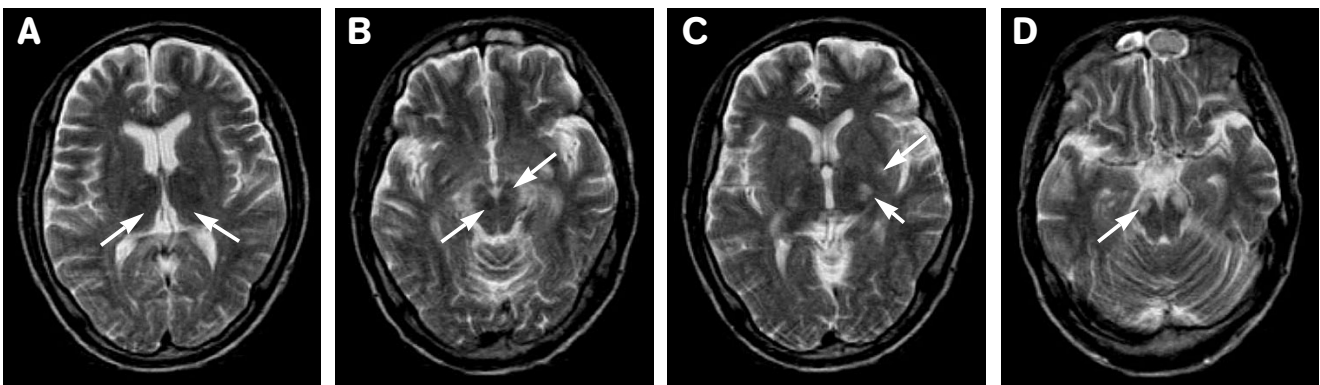


Figure. Axial brain MR images of a 33-year-old man who abused toluene. T2-weighted images show slight hypointensity bilaterally in the thalamus (arrows in A), red nucleus (short arrow in B) and substantia nigra (long arrow in B), and asymmetrically increased signal intensity of posterior limbs of internal capsule and thalamus (short arrow in C), left putamen (long arrow in C), and crus cerebri of midbrain (arrow in D).

A 33-year-old man presented with acute psychomotor retardation and urinary incontinence after daily glue sniffing in recent 2 weeks. He had the medical history of previous transient exposure to amphetamines and chronic glue abuse for years. There was no family history of neurological diseases. One week later, after the manifestation of psychomotor retardation, he was admitted for mild fever and aspiration pneumonia was diagnosed. There was no hypoxia or respiration failure.

On examination, the patient was thin and abulic without verbal output. Occasionally, he could follow some simple orders. There were no signs of parkinson-

ism nor involuntary movements. Normal results were obtained for the following laboratory tests: complete blood count (except leukocytosis), human immunodeficiency virus, serum electrolytes, liver function test, ammonia, blood urea nitrogen, and serum creatinine. The electroencephalogram showed diffuse moderate cortical dysfunction without any epileptiform discharge. T2-weighted brain MR images revealed slight hypointensity bilaterally in the thalamus, red nucleus and substantia nigra, and asymmetrically increased signal intensity of posterior limbs of the internal capsule and thalamus, left putamen, and crus cerebri of the mid-

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brain (Fig.). The patient's condition did not improve despite the cure of pneumonia. After discharge, he did not receive follow-up at our hospital.

The major ingredient of glue is toluene (methyl benzene), which is a neurotoxic organic solvent. The neurological syndrome of long-term sniffers of toluene is characterized by severe cognitive impairment, cerebellar ataxia, corticospinal tract dysfunction, oculomotor abnormalities, tremor, deafness, and hyposmia. The mechanism of toluene neurotoxicity still remains unclear but a strong dose-response relationship is seen in the presence of MRI abnormalities⁽¹⁾.

T2-weighted brain MR images in chronic toluene abusers may show extensive white matter abnormalities involving the capsular and periventricular white matter, the centrum semiovale, and the corticospinal tracts in the brainstem, and hypointensity in the red nucleus and substantia nigra may also be present⁽²⁾. Most of the above are

seen in our patient. The hypointensity areas on T2-weighted images of the brain of toluene abusers are postulated to be caused by iron deposition or partitioning of toluene into the lipid membranes of cells due to its lipophilicity⁽³⁾.

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