

myelin lamellae by splitting of the intraperiod lines. The aggregation of restricted fluid between lamellae layers of myelin might cause increased isotropy of water diffusion of the white matter and responsible for the increased signal intensity on the diffusion-weighted images (DWI) (11).

However, other studies did not confirm their results. For example, in 2007, Dr. Offiah and Dr. Hall evaluated six patients with clinical or histopathological diagnosis of heroin-induced leukoencephalopathy and MRI examinations was done in all of them including DWI and single-voxel MRS. Cerebellar white matter was involved in all six cases demonstrating similar symmetrical white matter involvement with sparing of the dentate nuclei. Brain stem signal was altered in five of the six patient images. There was not any area of signal abnormality with restriction on DWI images (8).

Therefore, DWI and MRI roles are just suspected and other studies did not identify their diagnostic value.

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### Conflict of Interest

The authors declare no conflict of interest.

### References

1. Shams Alizadeh N, Moghadam M, Mohsenpour B, Rostami Gooran N. Prevalence of substance abuse in medical students of Kurdistan University. *Scientific Journal of Kurdistan University of Medical Sciences*. 2008;13:18-26.
2. Ehsan Manesh M, Karimi Keisami I. A review of the history and several studies regarding substance abuse in Iran. *Iranian Journal of Psychiatry and Clinical Psychology (Andeeshah Va Raftar)* 2000; 5:78-62.
3. Akhtar S, South N. Hidden From Heroin's History: Heroin Use and Dealing within an English Asian Community-A Case Study. *Crime Prevention Studies*. 2000;11:153-178.
4. Siu J, Tsui E. Spongiform leukoencephalopathy after intravenous heroin use: evaluation by diffusion-weighted imaging. *Hong Kong J Radiol*. 2004;7:84-87.
5. Keogh CF, Andrews GT, Spacey SD, et al. Neuroimaging features of heroin inhalation toxicity: "chasing the dragon". *Am J Roentgenol*. 2003;180:847-850.
6. Hill MD, Cooper PW, Perry JR. Chasing the dragon-neurological toxicity associated with inhalation of heroin vapour: case report. *Can Med Assoc J*. 2000;162:236-238.
7. Au-Yeung K, Lai C. Toxic leukoencephalopathy after heroin inhalation. *Australas Radiol*. 2002;46:306-308.
8. Offiah C, Hall E. Heroin-induced leukoencephalopathy: characterization using MRI, diffusion-weighted imaging, and MR spectroscopy. *Clin Radiol*. 2008;63:146-152.
9. Zheng W, Zhang X. Characteristics of spongiform leukoencephalopathy induced by heroin: MRI detection. *Chin Med J*. 2001;114:1193-1195.
10. Bega DS, McDaniel LM, Jhaveri MD, et al. Diffusion weighted imaging in heroin-associated spongiform leukoencephalopathy. *Neurocrit Care*. 2009;10:352-354.
11. Chen C-Y, Lee K-W, Lee C-C, et al. Heroin-induced spongiform leukoencephalopathy: value of diffusion MR imaging. *J Comput Assist Tomogr*. 2000;24:735-737.