

6th World Congress on

Addiction Disorder & Addiction Therapy

August 29-31, 2017 | Prague, Czech Republic



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Evidence of brain damage in chronic ketamine users – A brain imaging study

Background and objectives: The objectives of this study were to ascertain the pattern of grey and white matter volume reduction and regional metabolic and activation abnormalities in chronic ketamine users, and to evaluate the correlations between these brain abnormalities and cognitive impairments in chronic ketamine users in Hong Kong.

Design: Cross-sectional observational study.

Setting: Counselling Centre for Psychotropic Substance Abusers in Hong Kong.

Participants: One hundred and thirty-six participants were recruited from October 2011 to April 2014. The participants were divided into two groups: ketamine users (79) and healthy controls (57).

Main outcome measures: All of the participants underwent magnetic resonance imaging of the brain.

Results: Many of the participants in the ketamine group also frequently used cocaine and cannabis. Among the ketamine users, 12.6% were diagnosed with a mood disorder and 8.9% with an anxiety disorder. The participants in the ketamine group had worse performance than the healthy controls on tests of general intelligence, verbal, visual and working memory and executive functioning. In terms of grey matter volumes, the right orbitofrontal cortex, right medial prefrontal cortex, left and right hippocampus and possibly the left orbitofrontal cortex were smaller in the ketamine group. A functional connectivity examination of the default mode network revealed significantly decreased connectivity in the medial part of the bilateral superior frontal gyrus, left middle frontal gyrus, bilateral gyrus rectus, left superior temporal pole, left inferior temporal gyrus, bilateral angular gyrus and bilateral cerebellum crus II in the ketamine group.

Conclusions: Longitudinal or prospective studies would help to strengthen the evidence on the reversibility of the structural and functional brain damage caused by ketamine.

Biography

Wai Kwong TANG was appointed as professor in the Department of Psychiatry, the Chinese University of Hong Kong in 2011. His main research areas are Addictions and Neuropsychiatry in Stroke. He has published over 100 papers in renowned journals, and has also contributed to the peer review of 40 journals. He has secured over 20 major competitive research grants. He has served the editorial boards of five scientific journals. He was also a recipient of the Young Researcher Award in 2007, awarded by the Chinese University of Hong Kong.

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