

The detrimental effects of long-term ketamine with alcohol abuses in mice and its use in an educational program

Executive Summary

This study has two parts. The first part is experimental and used mice to evaluate the damage of organs in the body after long term ketamine treatment (1, 3 and 6 months), with and without alcohol in addition in the last month of ketamine treatment. The nervous system, heart, liver, kidney, urinary bladder, lung and intestine all suffered varying degrees and different modes of damage. In the nervous system, the cerebellum, prefrontal cortex and the midbrain displayed changes. Apoptotic cell death in the nervous system after ketamine plus alcohol could increase by 50% compared with those treated by ketamine only. The heart after long term ketamine demonstrated changes of cellular enzymes along with ischemia ST wave inversion were observed after ketamine plus alcohol treatment. Liver damages included enzyme elevation and subsequent fibrosis. Ketamine plus alcohol treatment could raise enzyme elevation in liver by 30% when compared with ketamine. Proteinuria was common and atresia of kidney glomeruli was observed after combined ketamine plus alcohol treatment. Urinary bladder featured inflammatory changes and fibrosis. Cell death increased by 30% to 50% after ketamine-alcohol combined treatment when compared with ketamine alone. Gastrointestinal system revealed loss of glycogen in liver, increased lactate dehydrogenase after ketamine. With combined ketamine-alcohol, lymphoid nodules in intestine persisted while both ketamine and ketamine alcohol treatment raised cell death. Lung displayed fibrosis after ketamine and ketamine –alcohol treatment.

In the second part of the project, I visited and lectured to 12 schools on the toxicity of ketamine, totaling over 2000 students. The lectures were well received, with students interested to visit our laboratory and some schools would arrange the same lectures for the next year.