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Fatal single-vehicle chrash under the influence of ketamine and alcohol

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INTRODUCTION: Ketamine is a fast-acting general anaesthetic with sedative-hypnotic, analgesic properties. It has also dissociative hallucinogenic properties and therefore can be used as a drug of abuse mainly in rave parties to experience euphoria, "alternate realities" and "near death" sensations. This emerging drug could replace other dance drugs as MDMA by middle-class people who like to party hard at the weekend and go back to work in the week. Ketamine pills on the illegal market came mainly from vets' surgeries. It can also be drunk or sniffed. Recently, British Customs said they were brought in bulk from India, shipped in rosewater and massage oils bottles [1]. The effects of a ketamine "high" usually last one hour but can last as long as 6 hours, while users still report abnormal sensations 48 hours after experimentation. Traffic accidents related to ketamine consumption are uncommonly reported and here we describe the case of a driving man involved in a single-vehicle crash (SVC) under the influence of ketamine and alcohol.

METHODS: A 24-year-old male was found unconscious on an early Saturday morning alone in his car crashed on the roadside near Noumea (New Caledonia). Endotracheal intubation was performed on-site using suxamethonium and etomidate as anaesthetic agents. No ketamine was used. Peripheral blood was sampled at his admission to Emergency Unit (5.45 am.) before any care. He deceased 5 hours later despite intensive care. Laboratory investigations were done on peripheral blood sample using GC-FID for alcohol determination, HPLC-DAD for general toxicological screening, operating with a C8-column (Symmetry-5 µm, 4.6 × 250 mm) in gradient mode (acetonitrile / phosphate buffer 50mM pH 3.6). An immunoassay was performed for cannabinoids (ELISA One-Step International Diagnostic, cut-off: 5 ng/mL). Confirmation and determination of ketamine blood level were carried-out by LC-ESI-MS/MS (triple stage quadrupole Quantum Ultra, ThermoElectron) after basic extraction, with ketamine-d4 and nor-ketamine-d4 as internal standards. Separation was carried out on a C18-column (Uptisphere ODB, 2 × 150 mm) at 30°C. Mobile phase (formate buffer 2mM pH 3 / acetonitrile) was delivered in gradient mode for a total run time of 13 min. The detection was performed in positive and SRM mode.

RESULTS AND DISCUSSION: Blood findings were as follow: alcohol 1.61 g/L; cannabinoids: negative; HPLC-DAD screening: detection of ketamine. Ketamine and nor-ketamine blood concentrations determined by LC-ESI-MS/MS were high: 0.99 µg/mL and 0.33 µg/mL, respectively (LoD: 0.01 ng/mL, LoQ: 0.05 ng/mL). These concentrations are in the range of those found in subjects awaking from anaesthesia (from 0.6 to 1.0 µg/mL) but no ketamine was used during emergency care. These concentrations suggest a recent intake. Cause of death was clearly injuries which occurred during the vehicle crash. Medline was searched from January 1996 through April 2006 for ketamine and traffic accident: one result was found concerning an epidemiological study on deceased drivers in Hong Kong between 1996 and 2000 regarding 197 fatal vehicle crashes [2]. Ketamine was found in only 1 case among 56 % of drivers

- involved in 91 cases of single-vehicle crash (SVC) - positive for alcohol and/or drugs. In that case, according to that study, the risk of a SVC is more than twice higher than the risk of a multiple-vehicle crash.

CONCLUSION: Apart from dissociative hallucinations, ketamine is responsible for major driving impairment induced by lack of eye convergence and horizontal gaze nystagmus. Association with alcohol increases the risk of fatal SVC, as illustrated by the case presented here, with surprisingly high ketamine and alcohol blood concentrations.

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