Driving Impairment from Dextromethorphan Abuse

BARRY K. LOGAN[1] and CHUCK HAYES[2]

[1] Washington State Toxicology Laboratory, Washington State Patrol, 2203 Airport Way S., Seattle WA 98134,

[2] IACP/DRE, PO Box 4597 Salem, OR 97302

Dextromethorphan is an opioid-related compound with no analgesic properties, but which binds to sigma opioid receptors, producing an antitussive effect. Its side-effect profile, especially at higher doses (>240mg) is linked to its NMDA antagonist properties, producing PCP-like perceptual distortion, and dissociative effects. For this reason it is often consumed recreationally. Recreational users report a recreational plateau of effects with complex sensory dissociation (phasing) with images and events appearing in a stopaction, framing, or strobing mode. Visual images may be jumbled together with previous images, with several events seeming to occur at once. Depth perception is often lost, and binocular fusion is impaired leading to diplopia. Balance is severely disrupted, as is body position and kinetic sense. Dextromethorphan is a component of over 140 over-thecounter cough/cold or flu medications, which often contain antihistamines, analgesics, and decongestants. Typical adult dextromethorphan doses for this indication are 15-30 mg every six hours, however in recreational use, doses as high as 720 and 960mg have been consumed. We report a series of cases of impaired driving involving massive doses of dextromethorphan.

Dextromethorphan is metabolized by multiple cytochrome P450 isoforms including CYP2D6, CYP3A4. Rates of metabolism vary as a result of both pharmacogenetic factors with both extensive and poor metabolizers having been identified. Concentrations following therapeutic use (30mg q.i.d. over seven days) averaged between 0.002mg/L and 0.207mg/L in extensive and poor metabolizers respectively.

We reviewed thirteen cases of drivers arrested for DUI with positive toxicology findings for dextromethorphan. Five drivers admitted to massive recreational ingestion of dextromethorphan-containing medications. Blood dextromethorphan concentrations in four of those individuals were 0.47, 0.67, 0.74, and 1.22mg/L. Chlorpheniramine was also present in each case at concentrations of 0.18, 0.23, 0.13, and 0.27mg/L respectively. Driving behaviors included speeding, weaving/lane travel, collisions, and failing to stop at traffic signals or right-of-way. Subjects were generally cooperative, had slurred or low speech, and a flushed appearance. Pulse and blood pressure tended to be elevated. Horizontal gaze nystagmus was noted in most subjects, in many cases, at rest. Vertical nystagmus was frequently present also. Pupil size was normal to variable and, body temperature, hippus, and rebound dilation were infrequently present and not diagnostic. Performance in Field Sobriety Tests was poor, with errors in following instructions, sway, and balance errors manifested by stepping off the line, use of arms for balance. Muscle tone was generally described as flaccid.

Recreational use of dextromethorphan can generally be distinguished from therapeutic use by virtue of blood concentrations. The known effects of recreational use are not consistent with normal driving skills, and may be further compounded by the presence of other drugs with known CNS depressant effects.

KEYWORDS: *Dextromethorphan, chlorpheniramine, Driving impairment*

Corresponding author: barry.logan@comcast.net