K14 Phenazepam and Driving Impairment: A Case Report

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After attending this presentation, attendees will understand the potential for phenazepam, a lesser known 1,4-benzodiazepine to impair driving performance.

This presentation will impact the forensic science community by providing an increased understanding of phenazepam impairment, specifically the extent to which it may impair some individuals at low dose.

Phenazepam is a 1,4-benzodiazepine that is structurally related to lorazepam and bromazepam. It originated in the Soviet Union in the 1970s and recently emerged as a drug of abuse. It is reported to be one of the most frequently prescribed benzodiazepines in Russia and other Commonwealth of Independent State (CIS) countries. Although it has no legitimate clinical uses in the United States, it has been used therapeutically for its sedative hypnotic, anticonvulsant, muscle relaxant, anxiolytic, and for the treatment of alcohol withdrawal overseas. When used therapeutically, it is available as 0.5mg and 1mg tablets, injectable solutions (0.1% and 0.3%) and transdermal patches. Oral doses of 0.5mg (2 – 3 times daily) may be prescribed, but doses up to 10mg/day are reported.

Several eastern European countries have taken steps to control phenazepam. Here in the United States, it is not controlled at the Federal level, although two states (Arkansas and Louisiana) enacted recent legislation to control the drug. Illicitly, it is available as a powder, tablet, and blotters (similar to LSD). Recreational users report doses of 2mg – 10mg of the drug. There have been relatively few pharmacological or toxicological studies involving phenazepam. In one study involving doses of 3mg – 5mg, peak plasma concentrations of 24 ng/mL – 38ng/mL were observed at approximately 4 h with a half-life of approximately 60 h. When 2mg doses were administered intramuscularly in epileptic patients, the half life was estimated to be 15 h. Adverse effects may include somnolence, dizziness, incoordination, and asthenia.

In a report from Finland, 3.4% of all Driving Under the Influence of Drug (DUID) cases were found to contain phenazepam. In the vast majority of cases (77 of 83 positive cases), other drugs were also detected. Multiple drug use can complicate interpretation, particularly for drugs that are less studied. Performance deficits attributed to phenazepam include unstable gait, confusion, impaired balance, slurred speech, memory loss, ataxia, and pupils that are slow to react to light.

A case is reported of a 24-year-old male apprehended for impaired driving. The subject failed to stop at an intersection and was involved in a two-vehicle crash. The subject had slurred speech and profound psychomotor impairment. His balance was poor; he staggered, and after being placed in a chair, was unable to stand without falling. Blood toxicology was initially negative at another laboratory. The sample was sent to SHSU Regional Crime Lab for additional testing due to the inconsistent results. Comprehensive toxicology testing by Solid Phase Extraction (SPE) and Gas Chromatography/Mass Spectrometry (GC/MS) revealed the presence of phenazepam at a concentration of 76ng/mL in blood. No other drugs were detected. Phenazepam was quantitated using an Agilent HP 5975 MSD/6890 GC with a HP-5MS capillary column (30m x 0.25mm x 0.25µm). In the absence of deuterated phenazepam, prazepam was used as the internal standard.

The immunoassay cross-reactivity of phenazepam was investigated and found to be >250% using the immunalysis benzodiazepine Enzyme Linked Immuno-Sorbent Assay (ELISA) used in the laboratory. Due to the high cross-reactivity, the sample screened presumptively positive at the 50ng/mL (oxazepam) cutoff. Initial screening at the first laboratory by Enzyme Multiplied Immunoassay Technique (EMIT) was negative, resulting in no further testing. This case report highlights the importance of cross-reactivity in immunoassay and the need to perform more extensive, broad spectrum screening for impaired driving cases, especially when impairment and toxicology results are inconsistent. In this case report, severe impairment was observed in an individual following phenazepam use. The concentration detected was consistent with a single dose of the drug. Phenazepam is a lesser known low-dose benzodiazepine with the potential for significant traffic safety consequences.

Phenazepam, Impairment, Immunoassay

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