

DRUG FINDINGS IN 'DRIVING UNDER THE INFLUENCE OF DRUGS' CASES: A PROBLEM OF ILLICIT DRUG USE

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SUMMARY

Drug findings in 137 drug positive cases of Driving Under the Influence of Drugs (DUID) occurring in St. Louis, Missouri, U.S.A. from June 1983 through May 1986 are presented. Thirty-two different drugs were detected. A single agent was detected in only 34% (47/137) of cases. The most frequently encountered drugs, expressed as percent of positive cases, were: phencyclidine, 47%; marijuana, 47%; benzodiazepines, 22%; barbiturates, 15%; opiates, 11%; and cocaine, 9%. Most multiple drug cases involved popular illicit drug mixtures, such as cocaine and morphine (speedballs) or phencyclidine on marijuana (whack).

All the drivers in this survey had displayed inappropriate or impaired operation of a motor vehicle to the extent that a law enforcement officer had stopped and charged them for DUID. In at least 81% of the drug positive cases, persons impaired in the operation of a motor vehicle from a drug or drugs other than alcohol, were impaired not as the result of side effects of therapeutic drug use, but as the result of deliberate self intoxication with illicit or controlled substances.

Key words: Impaired driving — Phencyclidine — Marijuana — Motorists — Traffic safety — Drug screening

INTRODUCTION

The detrimental effects of alcohol (ethanol) consumption on the performance of motor vehicle operators is well established [1]. However, in modern society, numerous other psychoactive drugs are widely used both medically

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and non-medically. The ability of these drugs to impair driving performance is a topic of much concern and discussion [2,3]. Many legal and scientific problems concerning drug concentrations and driving impairment have yet to be resolved, such as reliability of analytical methodology, and the demonstration of drug induced driving impairment in controlled tests and/or actual highway experience. Despite these problems, several studies have demonstrated a relatively high occurrence of drugs in impaired [4–6] or fatally injured drivers [7–9]. However, in most of these studies, alcohol was also a factor in the majority of arrests and deaths.

We present drug findings in 168 of (DUID) arrests in Metropolitan St. Louis, Missouri, in which alcohol was not a factor. These data indicate DUID is a problem of illicit drug use and may serve as an epidemiologic indicator of local drug abuse.

MATERIALS AND METHODS

Blood and/or urine specimens obtained from individuals arrested for 'driving under the influence of alcohol' (DUI) or drugs (DUID) in the

Metropolitan St. Louis, Missouri (U.S.A.) area were tested for alcohol by area police laboratories. Those arrested had been stopped with 'probable cause' (excessive speed, weaving across the center line, car accident etc.) and had failed a standard field sobriety test (FST) consisting of; a Romberg test, finger-nose test, reciting the alphabet, standing on one foot and picking coins. If alcohol was detected in the specimens, the individuals were charged with DUI. If alcohol was not detected, the specimens were submitted to our laboratory for drug testing. Over a 3-year period from June 1983 until May 1986, blood and/or urine (Missouri law allows the collection of two separate specimens) from 184 suspected DUID cases with negative blood alcohol were analyzed. These cases represent less than 0.8% of the over 22 000 DUI arrests in Metropolitan St. Louis during periods of this study.

Methods utilized in our laboratory for urine and blood drug screening have been previously outlined [10,11]. In general, initial testing is performed by immunoassay and, thin layer (TLC) and/or gas liquid chromatography. Positive drug findings by initial screening were confirmed by additional analysis. Quantitation of barbiturates [12], benzodiazepines [13], cocaine [14], and phencyclidine [15], in blood was by gas chromatography. Qualitative analysis for cannabinoids (marijuana) was performed on urine specimens by EMIT and TLC [16].

RESULTS AND DISCUSSION

Of the 184 cases of suspected DUID, 137 (75%) of the cases were found positive for psychoactive drugs (Table I). In 47 cases only a single drug was detected (34% of positive cases). Thirty-two different drugs were detected in 137 DUID cases. The most frequently encountered drugs, expressed as per-

TABLE I

FREQUENCY OF DRUGS DETECTED IN DUID CASES WITH NEGATIVE BLOOD ALCOHOL, ST. LOUIS CITY AND COUNTY, JUNE 1983—MAY 1986

Drug	Frequency	Cases present as single agent	Cases present with other drugs
Amphetamines ^a	6	0	6
Barbiturates ^b	20	8	12
Benzodiazepines ^c	30	6	24
Cocaine	13	6	7
Marijuana	64	9	55
Opiates/analgesics ^d	15	0	15
PCP	64	11	53
Sedatives ^e	7	6	1
Others ^f	38	1	37

^a Amphetamine [2]; ephedrine [1]; phenylpropanolamine [3].

^b Amobarbital [4]; barbital [2]; butalbital [2]; pentobarbital [3]; phenobarbital [5]; secobarbital [4].

^c Chlordiazepoxide [6]; clorazepate [2]; diazepam [22].

^d Codeine [2]; meperidine [1]; methadone [4]; morphine [3]; pentazocine [3]; propoxyphene [2].

^e Ethchlorvynol [2]; glutethimide [1]; methaqualone [4].

^f Acetaminophen [9]; caffeine [9]; chlorpheniramine [1]; phenytoin [3]; quinine [3]; tripeleminamine [2]; salicylate [10]; toluene [1].

cent of positive cases, were: phencyclidine (PCP), 47%; marijuana, 47%; benzodiazepines, 22%; barbiturates, 15%; opiates, 11%; and cocaine, 9%.

Particularly alarming is the high incidence of PCP cases in this survey. Forty-five cases in our survey were positive for both PCP and marijuana. Since 1981, the smoking of PCP on marijuana (whack, shermans) has become epidemic among blacks in the lower socioeconomic areas of the city [17]. A review of available DUID arrest records indicates that PCP drivers are young black males; mean age, 26 ± 6 years. Only two black females (20, 26 years) and one white male, 23 years, were positive for PCP.

PCP or whack users uniformly failed FST or were so intoxicated that they were incapable of taking the test. The most common symptoms observed by arresting officers were: nystagmus, blood shot eyes, indifferent attitude, mumbled or slurred speech, staggering or unsure gait, failure to perform finger to nose test, inability to recite the alphabet, and fumbling or inability to pick up different coins. PCP blood concentrations (range, 21–203 ng/ml; $N=42$) were not correlated with symptoms described by police officers. This may be due to the development of tolerance with chronic use, the great variability of PCP effects from one user to the next [21,22], or the additional intoxication from marijuana in 'whack' users. However, clinical experience shows that anyone administered PCP is a potential threat to themselves and others [18–22].

Barbiturates or benzodiazepines were present in 37% of drug positive cases (50/137). Benzodiazepines were present in 50% (10/20) of barbiturate and 53%, (8/15) of opiate analgesic positive cases. The high incidence of benzodiazepines in DUID cases has been previously reported [4–8,23]. Interpretation of benzodiazepine and barbiturate findings are difficult as the drugs are widely used therapeutically as well as subject to illicit abuse [24–27]. In single agent cases (Table I), blood benzodiazepine or barbiturate concentrations were usually consistent with high steady-state therapeutic concentrations [28–30]; however, these values are also the same as one would expect following self administration of the drug for euphoric effects, i.e. drug abuse. For example, diazepam and nordiazepam mean blood concentrations in single agent cases were $0.73 \text{ mg/l} \pm 0.55 \text{ mg/l}$ and $0.24 \pm 0.16 \text{ mg/l}$ ($n = 3$), respectively. Other cases seem to clearly indicate overdose [30]; chlordiazepoxide, 7.4 mg/l ; nordiazepam (clorazepate metabolite), 5.1 g/l . Likewise, when present as a single agent, barbiturate or sedative blood concentrations were often consistent with expected symptoms of sedation and psychomotor skill impairment [6,31–33], for example; barbitol, 93 mg/l ; pentobarbital, 7 mg/l ; and methaqualone, mean $12 \text{ mg/l} + 2.5 \text{ mg/l}$ ($n = 4$).

Marijuana was the sole intoxicant in 9 cases and was present in only 19 cases other than in combination with PCP. Blood concentrations of cannabinoid constituents of marijuana were not determined as physiological correlations are still controversial [34,35]. All 13 cases involving cocaine were the result of illicit drug use. In three of these cases, motorists were driving at an excessive speed. While difficult to interpret as to effect, cocaine blood concentrations, $0.07\text{--}0.20 \text{ mg/l}$ ($n = 4$), were similar to those observed within an hour of intranasal administration of 2 mg/kg [36].

Except for a few cases of therapeutic drugs such as antiepileptic combinations of phenobarbital and phenytoin ($n = 3$), the drugs detected represent instances of non-medical use, i.e. drug abuse. Most multiple drug cases were popular illicit or drug abuse mixtures; PCP/marijuana, cocaine/morphine (speedballs), pentazocine/tripelennamine (T's and Blues) [37], and caffeine/ephedrine mixture from a 'look-alike' drug [38]. One driver was apprehended while deliberately sniffing toluene!

As with previous studies [4–9], this survey demonstrates that alcohol remains the overwhelming concern with impaired driving. Our positive drug/negative alcohol cases represent only 0.62% of all DUI arrests during the 3 years of this survey. However, all the drivers in this survey displayed inappropriate or impaired operation of a motor vehicle to the extent that a law enforcement officer had stopped and arrested them for DUID. Sixty-one percent (84/137) of drug positive/alcohol negative cases involved drugs with no medical use such as PCP, marijuana or toluene. Illicit use of opiates (heroin, pentazocine) or stimulants (amphetamine, cocaine) was indicated in 13% (18/137) of positive drug cases. Therefore, 74% of all drug positive DUID arrests were obvious instances of drug abuse. Additionally, blood concentra-

tions of other drugs were indicative of excessive dosages (drug abuse) in 7% (9/137) of the positive cases. The actual percentage of cases involving instances of drug abuse is probably much higher as in many cases therapeutic use or drug abuse cannot be determined solely by the toxicology findings. However, our findings show that in 81% of the cases, persons impaired in the operation of a motor vehicle from a drug or drugs other than alcohol, were impaired not as the result of side effects of therapeutic drug use, but as the result of deliberate self intoxication with illicit or controlled substances.

Early studies of impaired drivers reported that when alcohol is not present, barbiturates, other sedatives and diazepam were the most often encountered drugs [4,6]. However, recent studies using newer technologies allowing the detection of marijuana, PCP and other psychoactive drugs, have shown marijuana is the most frequently encountered drug when alcohol is not present [7,8]. The high incidence of PCP/marijuana combination in our survey is due to epidemic use of 'whack' in the St. Louis area. Similarly, during the 'angel dust' (PCP) epidemic of the late 1970s [18–22], White et al. found PCP as major factor in DUID arrests in Southern California [5]. Also, McCurdy et al. observed a high incidence of methaqualone in DUID cases during epidemic abuse of drug in Georgia during the late 1970s and early 80s [6]. Our data and that of others indicate DUID is a problem of drug abuse, not therapeutic drug use.

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