

First Experiences with the New Law on DUID in Belgium: Alcohol and Medicines in Drug Negative Cases

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Abstract

In March 1999 a new law prohibiting driving while impaired by illegal drugs was introduced in Belgium. The legal procedure consists of a) a field impairment test, b) a urine immunoassay for 4 drug groups and c) ultimate proof by plasma analysis (GC-MS with fixed cut-offs). Over about two years the analysis of 896 blood samples revealed the presence of illicit drug(s) above cut-off in 85% of the cases. For the 15% “false positives” (failed impairment test and positive urine assay without confirmation in plasma) we investigated the possible reasons for impaired behavior.

The presence of alcohol and psychoactive medication stands for an important number of our ‘false positives’. The results adduce arguments for introducing psychotropic medicines in our traffic law. Our findings further suggest that false positive cases can be reduced by minimizing the delay before blood sampling and optimizing sample preservation.

Harmonization of the strategy for detection and penalization of impaired drivers (alcohol and/or drugs) is highly recommended.

Introduction

In March 1999 a new law on driving under the influence of illegal drugs was introduced in Belgium. The legal procedure is a three-step process: a) a field impairment test, i.e. the assessment of external signs of the presence of drugs by a standardized test battery, b) an on-site immunoassay for amphetamines, cannabinoids, cocaine metabolites or opiates in urine and c) blood sampling for plasma GC/MS analysis with the following analytical cut-offs: THC (tetrahydrocannabinol) 2 ng/mL, free morphine 20 ng/mL, amphetamine, MDMA (ecstasy), MDEA, MBDB, benzoylecgonine (BE) or cocaine 50 ng/mL. The urine test resp. the plasma analysis are performed on the condition that the driver fails the preceding test(s) (1,2).

In 2000-2001 the analysis of 896 blood samples revealed the presence of one or more illicit drug(s) above cut-off in 85% of the cases (2). We investigated the 15% ‘false positives’, i.e. cases where the driver failed the field impairment test and the urine immunoassay test was positive for at least one drug group, but where the plasma GC-MS analysis revealed no prohibited drug above cut-off. In such cases the full legal procedure for driving under the influence of illicit drugs was completed but the driver was not fined or penalized.

Methods

Sample selection

For a more detailed description of the target population in this study (DUID cases in Belgium), we refer to the proceedings article of Willekens et al. in the T2002 issue (2). After the requested GC-MS confirmations for illicit drugs, the plasma samples from all DUID cases were stored at -20°C .

The samples in which no drugs were detected above the legal cut-off values ('false positives') were retrospectively analyzed for the presence of alcohol and psychoactive medicines.

For comparison the same analyses were performed on a 'control group' of 74 plasma samples of legally positive DUID cases. The selection of samples was based on the prevalence of the different illicit drugs in the total DUID population.

Analytical methods

Alcohol was determined by a direct GC-FID method (LOQ 0.05 g/L). The measured plasma alcohol level was converted to the corresponding whole blood concentration by dividing by 1.14 (3). Psychoactive medicines were detected and quantified by an HPLC-PDA method, covering the benzodiazepines, the antidepressants and some neuroleptics and narcotic analgesics.

Results

In 2000-2001, 896 blood samples were transferred to the National Institute of Criminalistics and Criminology for GC-MS analysis of illicit drugs in plasma obtained from drivers with a failed field impairment test and a positive urine immunoassay for at least one drug group. The presence of one or more drugs above the legal cut-off was confirmed in 85% of these cases.

'False positives'

For the 133 cases (15% of total) where the GC-MS analysis revealed no illicit drugs above cut-off the corresponding urine and plasma data are presented in Tables 1-4.

1) Urine tests

No urine sample was provided in 12 cases. Cannabis was most frequently detected (80%) and was the only positive parameter in 61 % of the samples.

Table 1: On-site urine test results of the 'false positive' cases

Drug groups / U	N (= 121)	%
Cnb	74	61.2
Cnb/Amph	10	8.3
Cnb/Opt	7	5.8
Cnb/Coc	1	0.8
Cnb/Opt/Amph	2	1.7
Cnb/Opt/Coc	2	1.7
Cnb/Amph/Coc	1	0.8
Amph	10	8.3
Amph/Coc	2	1.7
Opt	8	6.6
Opt/Coc	2	1.7
Coc	2	1.7

2) Plasma drug levels detected below cut-off

In 39% of the 133 plasma samples one or more drug(s) were detected below the legal cut-off, mostly cannabis and amphetamines; here the presence of the illicit drugs was confirmed but the concentration was below the penalization limit.

Table 2: Number of cases with plasma levels of the target illicit drugs below the legal cut-off

Plasma levels < cut-off	N
THC < 2	32
Amphetamine or MDMA <50	15
Cocaine metabolite <50	10
Morphine <20	3
Total cases	52

3) Presence of alcohol

Of the 123 plasma samples available for alcohol analysis 37% proved to be positive, with a majority (70%) above the legal blood alcohol limit of 0.5 g/L (after conversion of the plasma level to the corresponding whole blood value: range 0.08-2.32 g/L; median 0.82 g/L).

Retrospective checking of the police reports showed that all cases of alcohol levels above 0.5 g/L had been detected by the road-side breath test and penalized accordingly. In 5 cases a positive breath test corresponded to blood alcohol levels slightly below the legal limit, while in 5 cases of negative breath tests a low blood alcohol was measured.

About half (43.5%) of the alcohol positives contained illicit drugs below cut-off, mostly cannabis and amphetamines.

Table 3: Number of cases with positive alcohol findings combined with illicit drug levels below the legal cut-off

		Alcohol > 0.5 g/L	Alcohol < 0.5 g/L
Alcohol + cnb<cut-off	12	9	3
Alcohol + amph<cut-off	5	4	1
Alcohol + cnb/amph<cut-off	1	1	0
Alcohol + coc<cut-off	2	1	1
Alcohol + drugs<cut-off	20	15	5

4) Presence of medication

Psychotropic medicinal drugs were screened in 128 plasma samples: 18 samples (14%) contained one to three medicinal drug(s), mainly benzodiazepines - with nordiazepam and bromazepam as principal compounds - (15 cases), antidepressants (n=5) and methadone (n=5). Benzodiazepine levels were above the therapeutic range in 10 cases (4). Alcohol and medication were combined in only 3 samples.

In 4 cases where the urine test only screened positive result for the opiates class, the corresponding plasma analysis by GC-MS was negative for the controlled substance morphine but picked up the opiate codeine (concentrations ranging from 12 to 62 ng/ml) which is frequently present in mild analgesics and cough suppressants.

Table 3: Detail of medication positives with the results of the urine screening and corresponding alcohol and illicit drug data

Medication ($\mu\text{g/L}$) (<i>supra-therapeutic</i>)	Alcohol (g/L)	On-site urine test	Drug < cut-off plasma
paroxetine (40), clonazepam (21), temazepam (78)		Cnb/Amph	MDMA
sertraline (<20)		Cnb	THC
methadone (82)		Cnb	
diazepam (450)/nordiazepam (425)	0.26	Coc	BE
bromazepam (945)		Cnb	
nordiazepam (12200), cetirizine		Opt/Coc/Cnb	BE, Morphine
bromazepam (540), methadone (<20))		Opt/Coc/Cnb	BE
paroxetine (51)	2.28	Cnb	
bromazepam (360)		Cnb	THC
nordiazepam (1415)		Amph	
nordiazepam (5760), bromaz (885), methad.(220)		Opt	
nordiazepam (<20)		Cnb	
nordiazepam (100)		ND	Morphine
diaz(910)/nordiaz(165), trazodone(230), methad.<20)		Opt	
zolpidem (65)		Cnb	THC
bromazepam (860)	0.08	Amph	
bromazepam (685)		Opt/Coc	BE, Morphine
methadone (110)		Cnb/Amph	THC, MDMA
Total = 18	Total = 3		Total =10

5) No psychoactive substances

In one third (30%) of the ‘false positive’ cases no traces of alcohol, target drugs nor psychoactive medication were found.

‘Drug positive control group’

The selection of a ‘control group’ (n=74) was based on the prevalence of the different illicit drugs in the total DUID population: a large group of cannabis positives, a large one of stimulants (amphetamines and cocaine) and a potentially interesting population of opiate-positives. Detailed data about alcohol levels, psychoactive medicines and the corresponding illicit drugs are given in Tables 4-5.

Table 4: Detail of alcohol positives in the ‘control group’

Alcohol +	Medication	Drugs
0.12	+	THC
0.19		BE, MDMA
0.30		THC, MDMA
0.34		THC, MDMA, Amph
0.43		BE, MDMA
0.51	+	BE, MDMA, Amph
0.89		THC, MDMA
0.92		BE, MDMA
0.99		BE, MDMA

Table 5: Detail of medicine positives in the ‘control group’

Medicines ($\mu\text{g/L}$, <i>supratherapeutic</i>)	Alcohol (g/L)	Drugs
flunitrazepam (92), desmethyl+amino, nordiazepam (95)		THC
diazepam (37), nordiazepam (80)		THC, Amph, MDMA
diazepam (430), nordiazepam (190)	0.51	BE, Amph, MDMA
bromazepam (3100)		Morph
bromazepam (380), methadone (180)		Morph, BE
bromazepam (540), tetrazepam (36), methadone (135)		Morph
nordiazepam (280), methadone (340)		Morph, BE
diaz (75), nordiaz (1500), bromaz (90), alpraz (47), methadone(195), trazodone (300)		BE, MDMA
diazepam (80), nordiazepam (60)		Morph, BE
bromaz (32), diazepam (900), nordiaz (600), lormetaz (47)	0.12	THC
bromazepam (1100)		Morph, THC
bromazepam (415), nordiazepam(3200), tetrazepam (185)		THC
diazepam (420), nordiazepam (500)		Morph, BE, THC
Total = 13	Total = 2	

In all but one of the 9 alcohol positive samples MDMA was detected in combination with THC or benzoylecgonine. An important number of medicine users were also found in the control group; here again preferably benzodiazepines were used and abused.

Discussion

‘False positives’

The validity of the new legal procedure for detecting drivers under the influence of illicit drugs is reflected in the number of positive plasma confirmations. As the 15% of not-confirmed cases seemed rather high we investigated the possible reasons for a failed field impairment test, a positive urine test but no illicit drugs above cut-off in the blood.

- In 39 % of the cases illicit drugs were present in concentrations below cut-off. Shortening the delay for blood sampling may increase legal detection. Moreover, as some analytes e.g. THC and cocaine are unstable in biological matrices, precautions should be taken for storage and transport of the blood samples. Another issue is the possible abolition of the legal cut-off values for drugs in plasma, leading to a real ‘zero-tolerance’ policy following the German example. As a consequence, quality assessment schemes should guarantee consistent results between laboratories.

- About one quarter of the studied population had an alcohol level above the legal 0.5 g/L limit. These drivers appeared to have been detected by the roadside breath test and penalized (no driving for 6 hours + fine). It is clear that here the impairment is mainly due to the influence of alcohol. However it is conceivable that low alcohol levels in combination with low illicit drug concentrations (5 cases) may impair the driver to a degree that is detected by the field sobriety test.

-The results of the medication analyses show that a considerable part of the studied drivers use psychoactive medication - benzodiazepines being very popular -, whether in combination with illegal drugs or not. Except for one driver, no or low levels of alcohol were found in combination with the medicines. The impact of benzodiazepine use on driving behavior was demonstrated in many studies (5). Supra-therapeutic and toxic medication levels are probably responsible for the detected impairment, a valid argument for introducing psychoactive medication in the traffic law as was recently done in Sweden (6).

- Finally, for the remaining third of the study subjects no traces of alcohol, target drugs nor psychoactive medicines were detected in plasma. Possible alternative explanations for their impairment may be: the presence of other drugs not specified in the traffic law (e.g. GHB, LSD); physiological conditions such as illness or fatigue; inefficiently performed field impairment tests due to the inexperience of the police officer.

'Control group'

A large number of THC-only cases were selected from roadblocks for the 'coffee shop' visitors. As expected none of these drivers were positive for alcohol – these shops having no license to sell alcoholic beverages. On the contrary, visitors of 'after-clubs', frequent users of cocaine and other stimulants, do combine these drugs with alcohol.

The results suggest that the majority of the apprehended heroin users proved to drive under the influence of multiple drugs and psychoactive medicines.

The National Circular for Police Services expresses the political will to penalize driving under the influence of alcohol as well as illicit drugs. Thus a failed field impairment test must be followed by a breath test for alcohol and a urine test for drugs, a positive immunoassay leading to a plasma analysis. When following this procedure a number of 'false positives' must be expected, i.e. the alcohol positives where the illegal drugs are no longer detectable or below cut-off in plasma (thus no effect due to the drugs). Introducing the penalization of driving while impaired by psychoactive medicines - primarily the abuse of benzodiazepines - would lead to the removal of another risk population from traffic.

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