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Police custody following driving under the influence of cannabis: A prospective study

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ABSTRACT

Traffic offences are a common cause of detention in police custody. We hypothesized that drug intoxication while driving could correspond to specific medical conditions of the detainees. Our objective was to evaluate medical features and addictive behaviours of suspected drug drivers and to collect data regarding assaults or injuries in these individuals. We conducted a prospective study (April 2010–December 2011) of suspected drug driving arrestees, who were compared to drink drivers or persons aged over 18 detained for other reasons. Data collected concerned persons' characteristics, reported assaults, and observed injuries. A total of 205 drivers were tested positive for drugs in blood, 116 were either positive for drugs in urine or saliva and negative in blood, or negative in urine. Cannabis-only users accounted for 201 of 205 drug drivers (98%). Suspected drug driving arrestees had good overall health rating. Drug drivers were younger than controls and requested more rarely medical examination (12% vs. 44%, $P < 0.0001$). They were rarely involved in addiction treatment (3%) and reported assaults or presented traumatic injuries less often than drink drivers and controls (8% vs. 38% and 25%, $P < 0.0001$). Drug drivers were less often alcohol abusers than controls. Their opinion on custody was better than that of controls and they were considered unconditionally fit for detention more frequently (99% vs. 77%, $P < 0.0001$). We conclude that arrested drug drivers were young, healthy, and infrequently reported assaults or presented traumatic injuries, which does not put them in a high risk medical condition. Medical care could include brief interventions on addictive behaviours.

1. Introduction

Increased attention has focussed on driving under the influence of psychoactive substances in recent years (see, for example, [1,2]). Acute cannabis consumption is associated with an increased risk of a motor vehicle crash, especially for fatal collisions [3]. In France in 2001–2003, 7% of drivers involved in fatal road crashes were positive for cannabis [4] and 6% of drivers involved in road crashes in a series from Italy were positive for drugs, mostly opiates, cannabis, and cocaine [5]. In a survey evaluating the prevalence of drug driving in British Columbia, 10% of randomly selected drivers were tested positive for cannabis in oral fluid [6]. Driving under the influence of cannabis is associated with the perpetration of serious road-rage behaviour, as well as experiencing road-rage victimization and perpetration [7].

Police custody is a detention in response to a suspicion of crime or if the police have 'reasonable grounds' to suspect that someone has committed an offence. Drug driving is a crime. Legal assessment of drug intoxication is based on blood testing. First, police officers expect the driver to perform oral fluid or urine testing. If the screening test is positive, a physician is required for blood testing. The presence of illegal drugs in blood indicates recent use and blood testing is the only available test currently considered by law to prove drug driving. Urine and blood testing are performed during police custody. Few medical data relate to drug issues in police custody [8–11]. Custody following driving under the influence of drugs has never been studied. A recent study showed that detained drink drivers required special medical attention, as about 30% of them had recent traumatic injuries [12]. We hypothesized that drug intoxication while driving could correspond to specific medical conditions of the detainee. Our objective was to evaluate medical features and addictive behaviours of detainees held in police custody for drug driving and to collect data regarding reported assaults or observed injuries in these individuals.

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2. Methods

2.1. Study population

We conducted a prospective monocentric study (April 23, 2010–December 31, 2011) in the forensic medicine unit of a university teaching hospital in France. Physicians from this unit examine arrestees and collect their biological samples from a department with a population of 1.5 million people. We included all patients aged 18 or more held in police custody for proven or suspected driving under the influence of drugs, examined by a physician for assessment of fitness for detention or for urine testing or blood sampling, and for whom our laboratory of forensic toxicology was requested for blood drug testing. According to French law, any persons placed in police custody may, at their request, be examined by a doctor. A medical examination can be also performed at the request of a police officer or of the person's family [13]. We excluded all patients who refused or could not give urine sample and those tested positive for drugs in urine who refused blood test.

2.2. Drug detection process

Detection and quantification of cannabinoids in blood were performed as previously described with minor modifications [14,15]. Deuterated tetrahydrocannabinol (THC-d3), deuterated 11-hydroxy-THC (11-OH-THC-d3) and deuterated 11-nor-9-carboxy-THC (THCCOOH-d3) were used as internal standards. The derivatization procedure for the gas chromatography–mass spectrometry (GC–MS) analysis used trimethylsilyl (TMS) derivatives. Analysis was accomplished by selected ion monitoring (SIM) of ions at m/z 386 and 271 for THC, m/z 389 and 374 for THC-d3, m/z 371 and 474 for 11-OH-THC, m/z 374 and 477 for 11-OH-THC-d3, m/z 371 and 473 for THCCOOH, and m/z 374 and 476 for THCCOOH-d3. The intra-day and inter-day precision studies showed coefficients of variation (CVs) <3% and <5%, respectively. Coefficients of determination (r^2) were >0.99. The limits of detection (LOD) were 0.25 ng/mL for THC and 11-OH-THC, and 1.0 ng/mL for THCCOOH. The limits of quantitation (LOQ) were 0.5 ng/mL for THC and 11-OH-THC, and 2.0 ng/mL for THCCOOH.

Cocaine and related metabolites were detected and quantified in blood as previously described, with minor modifications [16]. Deuterated cocaïne (cocaïne-d3), deuterated benzoylecgonine (benzoylecgonine-d3) and deuterated cocaethylene (cocaethylene-d3) were used as internal standards. The derivatization procedure for the GC–MS analysis used TMS derivatives. Analysis was accomplished by SIM of ions at m/z 182, 303, and 198 for cocaine, m/z 185 and 306 for cocaine-d3, m/z 240, 361, and 256 for benzoylecgonine, m/z 243 for benzoylecgonine-d3, m/z 196, 317, and 272 for cocaethylene, and m/z 199 for cocaethylene-d3. The intra-day and inter-day precision studies showed CVs <6% and <7%, respectively. Coefficients of determination (r^2) were >0.99. The LOD were 5.0 ng/mL for cocaine, benzoylecgonine, and cocaethylene. The LOQ were 10.0 ng/mL for cocaine, benzoylecgonine, and cocaethylene.

Opiates were detected and quantified in blood as previously described, with minor modifications [17]. Deuterated heroin (heroin-d9), deuterated 6-monoacetylmorphine-d3, deuterated codeine (codeine-d3), and deuterated morphine (morphine-d3) were used as internal standards. The derivatization procedure for the GC–MS analysis used TMS derivatives. Analysis was accomplished by SIM of ions at m/z 371, 234, and 78 for codeine, m/z 374 and 237 for codeine-d3, m/z 429, 236, and 414 for morphine, m/z 432 and 239 for morphine-d3, m/z 399, 340, and 287 for 6-monoacetylmorphine, m/z 402 and 343 for 6-monoacetylmorphine-d3, m/z 369 and 327 for heroin, and m/z 378 and 334 for heroin-d9. The intra-day and inter-day precision studies showed CVs <3% and <4%, respectively. Coefficients of determination (r^2) were >0.99. The LOD were 5.0 ng/mL for heroin, 6-monoacetylmorphine, morphine, and codeine. The LOQ were 10.0 ng/mL for heroin, 6-monoacetylmorphine, morphine, and codeine.

Amphetamines were detected and quantified in blood as previously described, with minor modifications [18]. Deuterated amphetamine (amphetamine-d5), deuterated methamphetamine (methamphetamine-d5), and deuterated 3,4-methylenedioxy-methamphetamine (MDMA-d5) were used as internal standards. The derivatization procedure used heptafluorobutyric acid derivatives. Analysis was accomplished by SIM of ions at m/z 123 and 240 for amphetamine-d5, m/z 118, 91, and 240 for amphetamine, m/z 258 for metamphetamine-d5, m/z 254, 210, and 91 for metamphetamine, m/z 258 for MDMA-d5, and m/z 254, 389, and 162 for MDMA. The intra-day and inter-day precision studies showed CVs <2% and <5%, respectively. Coefficients of determination (r^2) were >0.99. The LOD were 10.0 ng/mL for amphetamine, methamphetamine, and MDMA. The LOQ were 20.0 ng/mL for amphetamine, methamphetamine, and MDMA.

All the drivers involved were taken as soon as possible to the hospital. We considered urinary screening for drugs as positive above a concentration of 1000 ng/mL for amphetamines, 300 ng/mL for cocaine and opiates, and 50 ng/mL of tetrahydrocannabinol for cannabis. We considered blood tests, using gas chromatography–mass spectrometry, positive above 50 ng/mL for amphetamines and cocaine, 20 ng/mL for opiates, and 0.5 ng/mL of delta-9 tetrahydrocannabinol for cannabis.

2.3. Measures

During medical examination, we collected data concerning persons' characteristics, their DSM IV-based evaluation of addictive disorders, their own experience of police custody, and reported assaults or observed injuries, as recommended since a national consensus conference [19] and applied in our department [20] (Table 1). We recorded detainees' self-reports of received physical violence, either before being arrested, at the time of the arrest, or during custody. No specific examinations were performed or questions asked for research purposes only.

Perceived health was evaluated by the three global health indicators of the Minimum European Health Module [21]. The question "Do you have a chronic health condition?" could be answered by yes, no, or no opinion expressed. The question "Do you have a severe limitation of at least six months' duration in performing activities people usually engage in?" could be answered by severely limited, limited, or not limited at all, do not know or refusal. The question "How would you rate your overall health?" could be answered by very good, good, fair, bad, very bad, do not know or refusal. Detainee's opinion on custody was requested and rated as very good, good, fair, bad, very bad, do not know or refusal.

2.4. Evaluation

We compared three groups of detainees suspected by police officers to drive under the influence of drugs or alcohol. Drivers tested positive for drugs in both urine and blood, i.e. legally considered as drug drivers, were referred to as group 1. Drivers tested either positive for drugs in urine and negative in blood or tested negative in urine, i.e. who at the time of arrest were suspected to drive under the influence of drugs, but who later revealed not to be under the influence, were referred to as group 2. Drink drivers, evaluated by alcohol blood testing, were referred to as group 3.