Drugs in road traffic accident drivers with low blood alcohol concentrations

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Introduction

A large number of psychotropic drugs reduce driving fitness and have been associated with road traffic accidents (Seppälä, Linnoila, Mattila, 1979; Ferrara et al., 1990; Ferrara, 1992). Further they may interact with alcohol as regards to their effect in traffic.

We have studied the drug use of drivers whose blood alcohol concentration (BAC) was less than the mandatory limit (0.50 o/oo) and who were involved in non-fatal road traffic accidents. Alcohol and drug determinations of all Finnish drunken drivers are centered in our department.

Material

A total of 39,983 road traffic accidents were reported to the police in Finland in 1991. In 9,374 accidents persons were injured and alcohol was involved in 1,554 of these accidents.

Police requested 30,839 analyses from cases in which driving under the influence (DUI) of alcohol and/or drugs was suspected in 1991. After exclusion of other than motor car accidents, non-drivers, cases with no blood sample as well as cases where drinking was claimed to have taken place after driving 21,723 cases were left. Eighteen per cent (3,910) of these drivers had been involved in a traffic accident, and 247 (6.3 %) had a BAC less than 0.50 per mille at the time of the accident. The drugs were analysed in 206 of these cases (83.4 %).

Methods

Blood alcohol concentration (BAC) was determined by using head-space gas
chromatography as described by Machata (1972).

The drugs were primarily screened in urine by thin layer chromatography and immunological assays (Lillsunde and Korte, 1991). The final identification and simultaneous quantitation of benzodiazepines in blood were carried out by using a dual channel gas chromatograph equipped with both EC- and NP-detectors. The other drugs were confirmed by GC/MS and their corresponding levels in blood were determined by chromatographic methods (Lillsunde and Seppälä, 1990).

After determination of drugs the final material were classified into three groups as follows:

Group 1. Drug abuse;
- illegal substances with no (or limited) therapeutic use e.g. cannabis, cocaine, amphetamine, LSD, mescaline, PCP, heroin or morphine and methadone;
- substances used normally only in hospitals e.g. oxycodone, pethidine and fentanyl;
- other drugs (e.g. benzodiazepines and barbiturates) when their concentration in blood exceeded the predefined therapeutic levels (cf. Table 1 in Seppälä et al., these proceedings).

Group 2. Therapeutic drug use;
- other drugs when their concentration in blood did not exceed the predefined therapeutic levels.

Group 3. No drug use (negative result in analysis).

Results and Discussion

BAC. Drivers involved in road traffic accidents had higher BACs compared to all car drivers (Fig. 1.)

Drug use. While drug abuse was indicated in 28 % (N = 57) of samples of the accident involved drivers a therapeutic use of drugs was most probable in 25 % (N = 51). Almost half of the accident drivers had not used drugs (47 %; N = 98).
BAC Distribution of All and Accident Drivers

Fig. 1 Lillsunde, Portman et.al.

Age Distribution of Different Drug User Groups

Fig. 2 Lillsunde, Portman et.al.
A multi-drug use occurred in 75 % (42) and 59 % (30) in drug abuse and therapeutic use groups, respectively. The single vs. multi-use of drugs of the two groups of drivers did not differ significantly.

**Abused drugs.** The drugs which were most often classified as abused included:

- benzodiazepines in 23 % of cases (13)
- cannabis 35 % of cases (20)
- amphetamine 23 % of cases (13) and
- barbiturates 23 % of cases (13)

**Age.** As could be expected the drivers in the Group "therapeutic use" were elder than in the two other groups. The age distribution is shown in Fig. 2.

**Sex.** The percentage of female drivers was 10.8 % and 7.8 % in the accident involved drivers and non-accident involved drivers, respectively. This difference was statistically highly significant (CHI²-test p <0.0005). On the other hand the proportions of women 18 %, 22 % and 20 % in Groups 1 - 3 did not differ significantly and indicated that the drug use pattern was not associated with gender.

The police had requested a drug analysis from accident involved drivers with low BAC in all cases of confirmed drug abuse, in 88% of therapeutic users and in 27% of drug non-users. This shows that drug abusers are recognised by police. Quite likely drivers of this group had been influenced by drugs to a noticeable degree.

Some benzodiazepine abusers might have been erroneously classified to Group 2 because their blood levels of drug were within therapeutic range at the time of sampling. Presumably, however, the drivers of Group 2 used drugs for the treatment of their illness. Their age distribution speaks in favour of this.
Conclusions

Drug abuse is highly associated with road traffic accidents among drivers with a low BAC.

Younger people are often involved in accidents due to drug abuse.

The police recognises well drug abusers.

References


Seppälä T, Lillsunde P, Korte T, Bardy A, Pikkarainen J. Drug abuse among drivers suspected of driving under the influence of drugs in Finland. In: these proceedings.