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Identification of recreational drugs in patients admitted to the emergency department – a retrospective analysis

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Aims: Emergency departments are a useful information source to collect data on acute drug toxicity. We performed a retrospective analysis in order to gather systematic data on acute recreational drug toxicity and analysed the results of toxicological screening assays using immunoassays and a targeted LC-MS/MS method. **Methods:** We included cases in which the patient had symptoms and/or signs consistent with acute recreational drug toxicity and therefore attended the Basel emergency department between 1st October 2013 and 30th September 2014. **Results:** From 47'767 emergency cases, 216 patients were included, 136 underwent an additional toxicological screening for designer drugs using LC-MS/MS. In 83% of the cases at least one toxicological screening method was performed. 63 patients (29%) abused only 1 substance, whereas at least one additional substance was found in 96 cases (44%). **Conclusion:** It is of importance to link symptoms with the ingested drug when it comes to emergency cases. Moreover, in a clinical setting the use of a LC-MS/MS screening method in addition to the immunoassays is necessary to immediately identify recreational drugs.

1. Introduction

The use of classical drugs of abuse in a recreational setting is common. Those drugs can pose a severe risk to physical and psychological health. Cases with negative trips, overdoses, ingestion of unknown substances often end up at the emergency department, making them a useful source to collect data about local prevalence of drug of abuse, drug combinations and drug toxicity symptoms. We performed a retrospective analysis in order to gather systematic data on acute recreational drug toxicity and analysed the results of toxicological screening assays using immunoassays and a targeted LC-MS^n method [1].

2. Material and Methods

Patients attending the emergency department in Basel between 1st October 2013 and 30th September 2014 with symptoms consistent with acute drug toxicity underwent a toxicological screening using automated immunoassays. Blood samples were analysed using CEDIA® and DRI® immunoassay screening for amphetamines, benzodiazepines, cannabis, cocaine, methadone, heroin (6-monoacetylmorphine), opiates and tricyclic antidepressants. A LC-MS^n targeted screening method covering over 700 substances within a single run was used to confirm the immunoassays or to identify other compounds e.g. potentially new designer drugs [1].

3. Results and Discussion

From 47'767 emergency cases, 216 patients with signs or symptoms consistent with acute drug toxicity were included. 136 underwent an additional toxicological screening using LC-

MS^n. In 83% of the cases either an immunoassay or a LC-MS^n screening method was performed. 63 patients (29%) abused only 1 substance, whereas at least one additional substance was found in 96 cases (44%). In up to 22% of the cases with a negative anamnesis for substance use at least one drug was found in serum. In up to 69% of cases with a positive anamnesis, the use of at least one drug was confirmed. The most commonly found recreational drugs in serum samples were cocaine and cannabis.

Amphetamines & Ecstasy	Anamnesis positive (n=34)	Anamnesis negative (n=182)
Positive	14	20
Negative	20	162
Drug indentified	**41%**	**11%**

Benzodiazepines	Anamnesis positive (n=16)	Anamnesis negative (n=200)
Positive	11	31
Negative	5	169
Drug indentified	**69%**	**16%**

Cannabis	Anamnesis positive (n=68)	Anamnesis negative (n=148)
Positive	44	32
Negative	24	116
Drug indentified	**65%**	**22%**

Cocaine	Anamnesis positive (n=77)	Anamnesis negative (n=139)
Positive	52	18
Negative	25	121
Drug indentified	**68%**	**13%**

Heroin	Anamnesis positive (n=15)	Anamnesis negative (n=201)
Positive	4	0
Negative	11	201
Drug indentified	**27%**	**0%**

Methadone	Anamnesis positive (n=9)	Anamnesis negative (n=207)
Positive	6	17
Negative	3	190
Drug indentified	**67%**	**8%**

Opiates	Anamnesis positive (n=4)	Anamnesis negative (n=212)
Positive	2	30
Negative	2	182
Drug indentified	**50%**	**14%**

Positive: Drug presence confirmed with LC-MS
Negative: Absence of drug confirmed with LC-MS

Fig. 1. Comparison of anamnesis with analytical findings.

4. Conclusions

The use of our targeted LC-MS^n screening method was vital for the confirmation of positive and negative anamnesis (Fig.1). LC-MS^n is a reliable tool in clinical setting, not only for confirmation of the immunoassays but also to quickly identify recreational drugs in cases of unknown substances or no available information regarding the substances used. Novel designer drugs seem to play a minor role in Basel, Switzerland, as there were only two cases within one year.

5. References

[1] Mueller DM, Rentsch KM. Online extraction toxicological MS n screening system for serum and heparinized plasma and comparison of screening results between plasma and urine in the context of clinical data. Anal Bioanal Chem 2015;407:1577-1584.