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Does on-site urine toxicology screening have an added diagnostic value in psychiatric referrals in an emergency setting?

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Abstract

Objective: The objective was to examine the added diagnostic value of on-site urine toxicology screening (UTS) in the routine assessment of psychiatric patients in an urban emergency setting.
Method: A naturalistic two-step prospective cohort study design was used enrolling all emergency room (ER) patients referred for psychiatric consultation. In two consecutive cohorts, diagnosis of drug use was assessed based on routine psychiatric interview without (n=64) and with on-site UTS (ACON) (n=56). In both cohorts, drug use was also assessed by post hoc laboratory-based urine immunoassay (Triage) as the gold standard.
Results: Sensitivity and specificity of diagnosis of drug use based on psychiatric interview only varied (0.75 and 1 in the interview-based cohort; 0.5 and 0.75 in the interview+on-site UTS cohort). The sensitivity and specificity of on-site UTS were 0.93 and 0.97.
Conclusions: In an ER setting, the validity of the diagnosis of drug abuse exclusively based on psychiatric interview is low. The use of on-site UTS provides accurate data on drug use and is more practical as compared to post hoc laboratory assessment. On-site UTS has an added diagnostic value of drug use with high sensitivity and specificity.

Keywords: Drug detection; Drug abuse; Emergency setting; Diagnosis; Substance misuse

1. Introduction

Psychotropic substances are widely used among patients with behavior problems presenting in the emergency room (ER) [1]. Incidence rates of substance misuse for individual drugs vary widely: cocaine abuse from 27%–35%, cannabis abuse from 4%–15% and benzodiazepine abuse from 7%–14% [1–3].

Reliable detection of substance misuse at an early stage of psychiatric ER evaluation is essential for adequate medical and psychiatric management in order to decide whether acute medical management is necessary and also to identify substance abuse as possible recurrence of suicidal behavior [4,5]. Nevertheless, test results of substance use are normally not directly available, therefore hampering adequate acute management [6].

Interview-based diagnosis of substance misuse in psychiatric inpatients is unreliable [7], with an especially high false-negative rate of 66% [8]. Self-reported drug use questionnaires during psychiatric evaluation in emergencies are also unreliable and may lead to underdiagnosis of substance misuse [9–12].

The primary goal of this naturalistic study was to investigate whether on-site (direct) urine toxicology screening (UTS) is a sensitive and specific tool in optimizing direct detection of substance use, applicable in a busy urban ER that

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serves an area of 60 000 inhabitants, compared to diagnosis based on routine nonstandardized psychiatric interview only with post hoc standard laboratory testing as the gold standard.

For this purpose, the sensitivity and specificity of psychiatric assessment with and without on-site UTS were tested in a two-step design.

In the first step of the study protocol, routine psychiatric interview-based diagnostic reliability was compared with drug use as assessed with urine immunoassay as the gold standard.

The second step investigated the added value of on-site UTS for psychiatric assessment as compared with psychiatric interview and the urine immunoassay as the gold standard.

2. Materials and methods

2.1. Setting

This naturalistic study was executed at the Emergency Department of the Saint Lucas Andreas Hospital, Amsterdam, the Netherlands, which provides 24-h general emergency care including psychiatric emergencies. The ER serves an urban multicultural catchment area of 60 000 inhabitants with about 150 acute psychiatric referrals each year. About 30% of patients referred for acute psychiatric evaluation are of non-Caucasian origin, mostly Moroccan and Turkish.

2.2. Procedure

As part of standardized routine psychiatric assessment on the ER, during a time frame of 11 months, two consecutive screening procedures of 6 and 5 months' (n=64 vs. n=56) duration were started. All consecutive psychiatric referrals that presented at the general ER during that time frame were included, except patients who were not able or unwilling to produce a urine sample at the ER and patients whose urine samples were lost for laboratory handling.

All subjects were examined following an on-call scheme by one of six psychiatric residents supervised by one of five psychiatrists specializing in hospital psychiatry. For all patients, self-reported drug use, diagnosis and treatment were systematically recorded. In the cohort with only psychiatric interview, urine was collected in the ER and sent to the hospital pharmacy for laboratory-based immunoassay toxicology analysis (Triage Tox Screen). Results of laboratory-based urine analysis were available 24 h after obtaining the urine sample. Therefore, the ER-based drug use diagnoses were blind to the results of the immunoassay toxicology analysis (Triage Tox Screen).

For the interview+on-site UTS-based cohort, psychiatric diagnosis of drug abuse was verified with the on-site UTS at the end of every interview.

In the interview+on-site UTS-based cohort, at the end of the psychiatric interview, UTS was performed on-site done by the resident, and an additional sample was also sent to the laboratory of the hospital pharmacy for toxicology analysis. The on-site UTS (ACON) is an on-site device that gives direct information about the substances that were found in the urine. The toxicology analysis performed by the hospital pharmacist was done using the above-mentioned urine immunoassay (Triage Tox Screen). This is a validated method to measure drug toxicology in urine [13].

The UTS (ACON) tests 12 of the most commonly used drugs in Western countries, including the United States. The device gives, as the urine immunoassay, only qualitative information where there is no quantitative analysis of the positive drug.

ACON: amphetamine, methamphetamine, methylenedioxymethamphetamine, barbiturates, benzodiazepines, cocaine, methadone, opiates, morphine, phencyclidine (PCP), cannabis and tricyclic antidepressants.

Triage: This analytical system allows screening for 11 parameters: methadone, opiates, cocaine, cannabis, amphetamine, methamphetamine, PCP, benzodiazepines, barbiturates, tricyclic antidepressants and acetaminophen. Triage is validated with chromatography analysis in the Netherlands, with high sensitivity and specificity in patient samples [14].

The reason for consultation was divided into three broad categories: suicidality (including suicidal thoughts, behavior or attempts); psychiatric signs, symptoms or behavior (e.g., paranoid ideas or behavior, bizarre behavior, hallucinatory experiences or disorganized behavior) and other.

Demographic data, including sex, age, past psychiatric history, reason for psychiatric consultation, diagnosis, acute treatment and expected drug use, were systematically

Table 1
Demographic data of the two consecutive cohorts (N=120)

		Interview only (n=64)		Interview+UTS (n=56)		Both studies (n=120)	
Gender	Male	28	43.8%	17	30.4%	45	37.5%
	Female	36	56.3%	39	69.6%	75	62.5%
Age	(Mean±S.D.)	37.2±13.5		37.7±17.7		37.5±15.5	
Ethnicity	Caucasian	20	31.3%	25	45.5%	45	37.8%
	2nd-generation immigrant	15	23.4%	14	25.5%	29	24.4%
	1st-generation immigrant	29	45.3%	16	29.1%	45	37.8%
Reason for consultation	Suicide attempt	45	70.3%	39	69.6%	84	70.0%
	Psychosis	9	14.1%	7	12.5%	16	13.3%
	Other	10	15.6%	9	16.1%	19	15.8%