Is drug wipe test relevant to salivary psychotropic drugs detection?

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The detection of psychotropic drugs in blood or urine samples is useful for the proof of the use or abuse of these products. The blood or urine samples are often difficult to obtain, if a voluntary consent is necessary. Saliva samples are easier to obtain when asked to drug addicts, injured patients in car crashes. A rapid, simple and specific method of detection of abused drugs in saliva samples will be necessary in the future for a large scale detection.

In this purpose, we used BOEHRINGER-MANNHEIM’s Drug Wipe Test (D.W.T.) for salivary psychotropic drugs detection. The aim of the present study is to apply to saliva analysis, an existing method designed for detection of psychotropic drugs on stained surfaces. BOEHRINGER-MANNHEIM company has made available to us 3 sets of 20 Drug Wipe Tests for opiates, cocaine and cannabinoids respectively; these unitary tests are based on a coloured reaction developed after chromatographic and immunologic analysis. We have used them on saliva samples from drug addicts already detected as positive by urine analysis. Saliva samples were also analysed following our standard screening method (Fluorescence Polarization Immuno Assay - FPIA-ABBOTT Laboratory).

By using 2 drops of saliva with the Drug Wipe Tests, we investigated salivary psychotropic drugs in 49 patients.

LIMITS OF DETECTION AND SPECIFICITIES

Cannabinoids
The specifications given by BOEHRINGER-MANNHEIM for the Drug Wipe Test state that a positive test result is obtained by the direct application of delta 9 tetrahydrocannabinol (5 ng), cannabinol (5 ng) or cannabidiol (25 ng). 11-nor-delta 9-tetrahydrocannabinol (THC)
carboxylic acid, 11-nor-delta 8-tetrahydrocannabinol carboxylic acid, 11-hydroxy-delta 9-
tetrahydrocannabinol and delta 8-tetrahydrocannabinol are detected with similar sensitivities. The Drug Wipe Test may detect delta 9-THC in saliva concentrations higher than 10 ng/ml.

The FPIA test is designed for detection of delta 9-THC carboxylic acid concentrations higher than 10 ng/ml. In the FPIA tests, the antibody has a low affinity against delta 9 THC; the antibody detects the carboxylic acid metabolite.

**Narcotics**

A positive test result is obtained by the direct application of heroin-hydrochloride (5 ng). The following substances are detected with similar sensitivity: morphine, morphine-3-glucuronide, codeine, dihydrocodeine, ethylmorphine, hydromorphone, hydrocodone, thebaine. Other morphine derivatives such as oxymorphone, oxycodone, normorphine and norcodeine also exhibit positive reactions, however, in considerably higher quantities. At present, crossreactions with other substances that do not exhibit the morphine backbone have not been observed.

In FPIA test, the limit of sensitivity (25 ng/ml) for detection of morphine is low but the crossreactions between different morphine derivatives are variable for different opiates.

**Cocaine**

A positive test result is obtained by the direct application of cocaine-hydrochloride (2.5 ng). The following substances are detected with similar sensitivity: cocaine (free base), benzoylecgonine.

The FPIA test may detect low concentrations (30 ng/ml) of benzoylecgonine. This test cannot detect cocaine in saliva nor in urine with a good sensitivity.
RESULTS

Cannabinoids
20 Drug Wipe Tests (D.W.T.) were used for cannabinoid detection. 11 were positive. Among 20 DWT, 6 were in disagreement: 4 of 6 may be explained by the differences in sensitivity between the two methods.
If THC is present in saliva, this may be due to oral contamination when cannabis is smoked. The presence of THC in saliva (short half life of THC in saliva) may be correlated with pharmacological effects of cannabis while delta 9-THC carboxylic acid may be positive in urine several days after the intoxication.

Narcotics
18 Drug Wipe Tests were used for morphine derivatives detection. 12 were positive. Among 18 D.W.T., 4 were in disagreement: 1 of 4 was explained by the difference between sensitivities of the two methods. Morphine and morphine derivatives may be detected by D.W.T. in saliva. Buprenorphine, unfortunately, is not detected by these immunochemical methods. In literature, heroin and a few hours later, 6 monoacetylmorphine and morphine, may be detected in saliva after intravenous injection or smoked heroin. Their presence is well correlated with their behavioural effects. The specificity of these tests needs to be confirmed by more specific methods like Gas Chromatography/Mass Spectrometry.

Cocaine
18 Drug Wipe Tests were used for cocaine and metabolite detection. 6 were positive. 1 of 6 was in disagreement (negative detection in FPIA): in this case, there was also cocaine in the patient’s urine.

D.W.T. may detect cocaine in saliva while FPIA test is used for the detection of benzoylecgonine and not of cocaine.

Literature confirms that there is a secretion of cocaine in saliva. The decreasing concentrations in saliva are: cocaine > ecgonine methyl ester = benzoylecgonine > norcocaine > anhydroecgonine. When cocaine is smoked, the concentrations of cocaine in
saliva are higher than cocaine concentrations in blood, because of oral contamination. In D.W.T «cocaine», there are no crossreactions between cocaine and opiates or cannabinoids.

A good agreement has been reached between the two immunochemical methods. This exploratory assessment of the use of Drug Wipe Tests for drug screening in saliva looks very promising in terms of sensitivity and practicability. Still the specificity of this method remains to be demonstrated by the confirmation of such results against an unquestionable method such as mass spectrometry.