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MDMA: EXTERNAL ASSESSMENT RESULTS FROM IMMUNOLOGICAL TESTS ONLY DETECTING AMPHETAMINES AND/OR METHAMPHETAMINE

INTRODUCTION

The detection of Methylenedioxy-N-methylamphetamine (MDMA, "Ecstasy") by immunological tests raises many questions about crossed reaction between this molecule and Amphetamines (AMP) and Methamphetamine (mAMP). The analysis positivity depends on the tests detection limit. The aim of this study was to determine the positivity of a MDMA sample on immunological tests only detecting AMP and/or mAMP.

We wanted to highlight the interpretation "error" of results participants. Indeed, participants did not know that only MDMA was present in the sample. They expected either AMP and/or MAMP. Therefore they reported their immunological tests results as Amphetamines and/or Methamphetamine whereas these substances were absent in the sample.

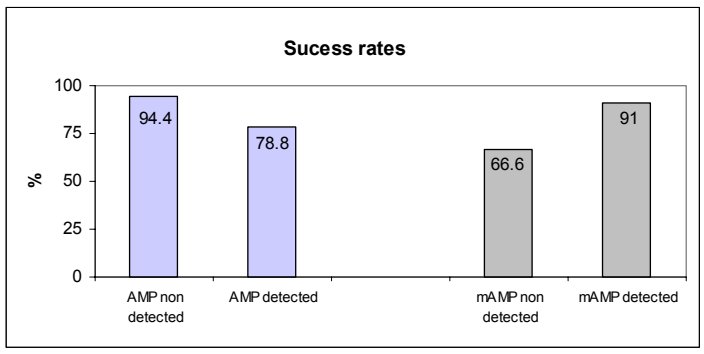
METHODS AND PARTICIPANTS :

A sample MDMA positiv and AMP negativ and mAMP negativ was distributed to more than 100 participants. Results could be expressed in AMP and/or mAMP.

DISCUSSION :

The success rate was as follows in percent of correct reported results:
for AMP detecting tests: 94,4 % of “non detected” results and 78,8 % of “detected” results (8 various fast tests and 9 various automated systems),
for mAMP detecting tests : 66,6 % of “non detected” results and 91 % of “detected” results (6 various fast tests and 4 various automated systems).

SUCESS RATES



AMP reported results with different immunological tests (R = rapid, A = automated system) for a MDMA containing sample, indicative value of 3 300 ug/l , but without either AMP nor mAMP.

Immunological screening tests : **Amphetamines AMP**	Type	Furnisher	Total	Non detected	Detected	Not reported	Cut-off	Cross reactivity with MDMA since (ug/l) MDMA
			Answers					
ToxSee Multidrug	R	BioRad	5	**5**	-	-	1 000	**100 000**
Triage 8	R	Biosite	27	-	**26**	1	1 000	**2 000**
Intex Drogentest	R	Intex	6	**4**	1	1	1 000	**100 000**
DrugScreen	R	Megro	1	1	-	-	1 000	**No information**
RapiTest Multidrug et AMP	R	Morwell	6	**5**	-	1	1 000	**100 000**
OnTrak TesTstik	R	Roche	2	**1**	1	-	1 000	**100 000**
OnTrak TesTcup	R	Roche	1	**1**	-	-	1 000	**100 000**
Syva RapidTest d.a.u. AMP	R	Dade Behring	12	**4**	6	2	1 000	**>100 000**
Syva Emit II Plus on Dimension	A	Dade Behring	2	**1**	1	-	300	**5 193,**
							500	**9 150,**
							1 000	**34 274**
Syva Emit II Plus on other than Dimension	A	Dade Behring	3	**1**	2	-	300	**5 193,**
							500	**9 150,**
							1 000	**34 274**
Syva Emit d.a.u. AMP/MET	A	Dade Behring	1	-	**1**	-	1 000	**3 000**
Axsym AMP/MET II	A	Abbott	7	1	**4**	2	1 000	**3 000**
Abuscreen OnLine	A	Roche	4	-	**4**	-	500	**1 400**
			9	**9**	-	-	1 000	**697 000**
Abuscreen OnLine HS AMP/MDMA sur Hitachi	A	Roche	2	-	**2**	-	300	**320**
Integra applic AMP	A	Roche	3	**3**	-	-	1 000	**248 000**
Integra applic AMP MDMA sensible	A	Roche	4	-	**4**	-	500	**820**
Total			95	36	52	7		
%			**100%**	**38%**	**54%**	**8%**		
Total of correct results as expected				34	41			
% correct results as expected		**% success rate**		**94,4%**	**78,8%**			

mAMP reported results with different immunological tests (R = rapid, A = automated system) for a MDMA containing sample, indicative value of 3 300 ug/l , but without either AMP nor mAMP.

Immunological screening tests : **Methamphetamines mAMP**	Type	Provider	Total	Non detected	Detected	Not reported	Cut-off	Cross reactivity with MDMA since (ug/l) MDMA
			Answers					
ToxSee Multidrug	R	BioRad	5	1	**4**	-	1 000	**2 500**
Triage TOX	R	Biosite	3	-	**1**	2	1 000	**1 500**
Syva RapidTest d.a.u. mAMP	R	Dade Behring	11	-	**9**	2	1 000	**2 000**
Intex Drogentest	R	Intex	2	-	**1**	1	1 000	**2 000**
RapiTest Multidrug	R	Morwell	4	**1**	2	1	1 000	**5 000**
OnTrak TesTstik	R	Roche	1	-	**1**	-	500	**1 000**
Axsym AMP/MET II	A	Abbott	4	-	**2**	2	1 000	**3 000**
Abuscreen OnLine	A	Roche	1	-	**1**	-	500	**1 400**
	A		1	**1**	-	-	1 000	**697 000**
Integra applic AMP MDMA sensible	A	Roche	2	-	**1**	1	500	**820**
Total			34	3	22	9		
%			**100%**	**9%**	**65%**	**26%**		
Total of correct results as expected				2	20			
% correct results as expected		**% success rate**		**66,6%**	**91%**			

Immunological screening tests : Methamphétamines **mAMP**	Type	Furnisher	Total	Non detected	Detected	Not reported	Cut-off in mAMP
HPLC	A	BioRad	2	**2**	-	-	300 [13]

Measurement principles of used methods
(R = rapid, A = automated system)

Method	Type	Principle
ToxSee	R	Single step immunological detection
Triage	R	Fluorescence immunodetection
Intex	R	Single step immunological detection
DrugScreen	R	Single step immunological detection
RapiTest	R	Single step immunological detection
Ontrak TesTstik	R	Inhibition of microparticles capture
Ontrak TesTcup	R	Inhibition of microparticles capture
Syva RapidTest d.a.u. AMP	R	Single step immunochromatographical test
Syva Emit II Plus	A	Enzymatic immunodetection in homogeneous phase
Syva Emit d.a.u. AMP/MET	A	Enzymatic Immunodétection in homogeneous phase
Axsym AMP/MET II	A	Fluorescence polarization immunoassay (FPIA)
Abuscreen OnLine	A	Kinetic interaction of microparticles in solution (KIMS)
Abuscreen OnLine HS AMP/MDMA	A	Kinetic interaction of microparticles in solution (KIMS)
Aplication AMP	A	Kinetic interaction of microparticles in solution (KIMS)
Aplication AMP MDMA sensible	A	Kinetic interaction of microparticles in solution (KIMS)

INTERPRETATION :

According to both cut-off and cross reactivity peculiar to each reagent used, results were correct when AMP and mAMP were reported as "detected" or "not detected".
If the sample results are "non detected" as AMP and mAMP, they do not ensure the absence of MDMA because of the detection limit of the tests.
If they are "detected", they do not ensure that it acts exclusively for AMP or mAMP

Probable causes for "false" reported results with various immunological tests (R = rapid, A = automated system) for a MDMA containing sample, indicative value of 3 300 ug/l, but without either AMP nor mAMP

AMP reported results as “ false ” :

Immunological test	Type	“ FALSE ”	Probable causes of error
Intex	R	detected	Misreading between the control line and the AMP line
Ontrak TesTstick	R	detected	mAMP test used instead of AMP test
Syva RapidTest d.a.u.	R	detected	mAMP test used instead of AMP test
Syva EMIT II Plus	A	detected	mAMP test used instead of AMP test
			Syva EMIT d.a.u. test used instead of Syva EMIT II Plus test
Axsym AMP/mAMP IIA	A	non detected	Expired reagents, procedures or storage conditions not respected

"False" results were more reported with the rapid tests (9) than with the automated system (4).

mAMP reported results as “ false ” :

Immunological test	Type	“ FALSE ”	Probable causes of error
TOX/See	R	non detected	AMP test used instead of mAMP test
RapiTest Multidrug	R	detected	Misreading between the control line and the mAMP line

“ false ” results were reported with the rapid tests (3). None with the automated system (0).

CONCLUSION :

It is extremely important to know the cut-off value (threshold of positivity) of the test used at the laboratory as well as the possible cross reactivities. Consequently, training of people carrying out analytical tests is critical. Moreover, a performance evaluation is more specific if compared to cut-off rather than compared to reagent.

Any immunological test result has to be considered as “preliminary” until a chromatographic confirmation has been performed.

In front of the increasing diversity of available tests on the market, external assessment surveys proposed in Switzerland offer an excellent opportunity for this education.

References

[1] Giroud C, Augsburger M, Sadeghipour F, Varesio E, Veuthey JL, Rivier L. [Ecstasy--the status in French-speaking Switzerland. Composition of seized drugs, analysis of biological specimens and short review of its pharmacological action and toxicity], Schweiz Rundsch Med Prax. 1997 Mar 25;86(13):510-23.

[2] Verstraete A, Van haute I. Spécificité des immunoessais pour la détection des amphétamines. Toxicorama 1997; 9: 65 - 71

[3] Giroud C et Mangin P, Drug assay and interpretation of results Forensic medicine and Pathological Aspects, Greenwich medical media 2003 40 :609-621

[4] George S. Position of immunological techniques in screening in clinical toxicology Clin Chem Lab Med. 2004;42(11):1288-1309

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