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ชุดตรวจยาบ้าในปัสสาวะ : ชุดตรวจรวดเร็วเทียบกับน้ำยาแอ็บบอต

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บทคัดย่อ

เปรียบเทียบชุดตรวจยาบ้าในปัสสาวะแบบตรวจเร็วที่สามารถอ่านผลโดยไม่ต้องใช้เครื่องวิเคราะห์กับการตรวจด้วยน้ำยาแอ็บบอต พบว่าชุดตรวจยาบ้าแบบเร็วซึ่งใช้หลักการอิมมูโนวิทยา 5 ชนิดที่มีจำหน่ายในประเทศไทยและชนิดที่ใช้หลักการเทียบสีให้ผลเชิงคุณภาพคือบวกหรือลบ ชุดตรวจเหล่านี้มีความจำเพาะกับเมทแอมเฟตามีน ขณะที่น้ำยาแอ็บบอตต้องตรวจด้วยเครื่องซึ่งให้ผลเป็นตัวเลขปริมาณของยาบ้า โดยมีความจำเพาะกับแอมเฟตามีนและยาอีชนิด MDA ปัสสาวะที่มีเมทแอมเฟตามีนและแอมเฟตามีนปนกันจะให้ผลการตรวจมากกว่าปริมาณยาบ้าทั้งสองชนิดที่เติมเข้าไปรวมกัน ความไวในการตรวจวิเคราะห์ของชุดตรวจแบบเร็วที่ใช้หลักการอิมมูโนวิทยาทั้ง 5 ชนิดเกินกว่า 1,000 นาโนกรัมต่อมิลลิลิตร ความไวของชุดตรวจเร็วแบบเทียบสีมีค่าเท่ากับ 3,000 นาโนกรัมต่อมิลลิลิตร น้ำยาแอ็บบอตสามารถวัดปริมาณต่ำสุดที่ 300 นาโนกรัมต่อมิลลิลิตร การให้ผลบวกกับสารอื่นที่ไม่ใช่ยาบ้า พบว่าชุดตรวจแบบเร็วที่ใช้หลักการอิมมูโนวิทยาทั้ง 5 ชนิด และน้ำยาแอ็บบอตเป็นไปได้น้อย มีเพียงยาอีชนิด MDMA และยาลดความอ้วนชนิด Fenfluramine เท่านั้นที่สามารถให้ผลบวกกับชุดตรวจแบบเร็วบางยี่ห้อ ชุดตรวจแบบเทียบสีสามารถให้ผลบวกกับอนุพันธ์ของยาบ้าทุกชนิดที่มีความเข้มข้นสูง ราคาชุดตรวจแบบเร็วชนิดที่ใช้หลักการอิมมูโนวิทยาที่ศึกษาในงานวิจัยนี้อยู่ในช่วง 32-90 บาทต่อการทดสอบ ชุดตรวจเร็วแบบเทียบสีราคา 15 บาทต่อการทดสอบ น้ำยาแอ็บบอตมีราคา 130 บาทต่อการทดสอบ ชุดตรวจแบบเร็วเหมาะกับการตรวจจับผู้ใช้ยาเพราะทำได้เร็วและสามารถตรวจได้ในทุกสถานที่ น้ำยาแอ็บบอตให้ผลการตรวจวิเคราะห์เป็นตัวเลขจึงเหมาะกับการติดตามผลการรักษาผู้ติดยา และใช้ในการวินิจฉัยภาวะได้ยาเกินขนาด

คำสำคัญ: เมทแอมเฟตามีน, ชุดตรวจวินิจฉัยแบบเร็ว, การวิเคราะห์ทางอิมมูโน, การวิเคราะห์โดยการเทียบสี, การเปรียบเทียบวิธีวิเคราะห์

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Reagent Kits for Urine Methamphetamine: Rapid Test Kits *v.s.* Abbott A/M II Reagent

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Abstract

To compare rapid urine methamphetamine test kits available in Thailand with Abbott A/M II reagent which analyzed by TDx analyzer. Five rapid immunoassay test kits and the colorimetric test kit gave only qualitative results, i.e., positive or negative. They showed more specific to methamphetamine than to amphetamine. Less cross-reactivity were found with the immunoassay kits. Only some kits showed cross-reactivity with MDMA and fenfluramine. However, for the colorimetric kits, all amphetamine analogues showed cross-reactivity at high concentrations. Abbott A/M II reagent gave quantitative results with specificity to amphetamine and MDA. Sensitivities of all 5 immunological test kits were found to be over 1,000 ng/mL of methamphetamine. Sensitivity of the colorimetric test kit was at 3,000 ng/mL and the sensitivity of Abbott A/M II reagent was at 300 mg/mL. The cost/test of the studied immunological rapid test kits were offered between 32 to 90 bahts. It was around 130 bahts for Abbott A/M II reagent and around 15 bahts for the colorimetric test kit. Since the rapid test kits can be easily handled and do not require an analyzer, they can be used as an on site drug-screening test. The quantitative results of Abbott make this reagent suitable for following up the drug abstaining and for identifying drug overdose.

Key words: methamphetamine, rapid diagnostic test, immunological test, colorimetric test, method comparison

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Original Article

Introduction

Amphetamine and methamphetamine are potent sympathomimetic amines. Amphetamine was firstly used as a medication [1]. However, in 1981, the U.S. Drug Enforcement Administration (DEA) found that methamphetamine, not amphetamine, was a popular stimulant abused in the U.S. Possibly because methamphetamine is easily synthesized in clandestine laboratories [2]. In Thailand, methamphetamine or "Ya-Ba" has been widely abused [3-4] and the abusers have created many critical socioeconomic problems. To prevent the problems, law enforcement officers need a rapid and reliable methamphetamine test, whose results can be used for arresting abusers before they make a problem.

Commercially available reagent kits for urine methamphetamine/amphetamine in Thailand are imported from the U.S. They are based on immunoassay method and are available in strip or cassette form or in liquid reagent. All strip/cassette kits rely on competition for binding antibody between drugs coated on a membrane and drugs, which may be present in the urine being tested. In general, when a drug is present in the urine, it competes with membrane-bound drugs for the limited antibodies present as dye-antibody conjugates. When a sufficient amount of drug is present, it will prevent the binding of dye-antibody conjugate to the membrane-bound drug. Therefore, a positive urine sample will not generate a color band in the test region while the presence of a color band in the test region indicates a negative result. The result can be read between 3 and 10 min after the urine is added to the strip/cassette. Abbott amphetamine/methamphetamine II assay utilizes fluorescence polarization immunoassay (FPIA) technology. Briefly, d-amphetamine calibrators at concentrations of 0, 150, 300, 1000, 3000, and 8000 ng/mL are used to make a standard curve and, therefore, the results are reported quantitatively.

Because all immunoassay kits are quite expensive, the division of narcotics analysis, department of health, Thailand, had developed a colorimetric test kit for methamphetamine screening. The principle of this kit is that in the present of methamphetamine, the violet color of the complex of methamphetamine-tetrabromophenophthalein ethyl ester (TBPE) is developed in dichloromethane layer [5-6].

Not only is the cost per test an imortant factor for choosing a drug testing, but there are also other factors must be considered. As reported, the major problems with screening for amphetamine/ methamphetamine are specificity, sensitivity, and cross-reactivity [7-11]. In adition, turnaround time and the need for analyzer are also factors must be concerned.

The objective of this study is to compare the specificity, sensitivity, and cost of the Thai colorimetric kit and the immunoassay test strips/cassettes commercially available in Thailand with the Abbott liquid immuassay kit. The study was also conducted to verify the the accuracy of Abbott reagent

and determined if, and to what extent, amphetamine analogues, over-the-counter medications, hemoglobin, and bile/bilirubin cross-react with all studied assays.

Materials and Methods

Methanolic solutions of 1 mg/mL free base of these drugs; d-amphetamine, d,l-amphetamine, d-methamphetamine, d,l-methamphetamine, 3,4-methylenedioxy-amphetamine (MDA), 3,4-methylenedioxy methamphetamine (MDMA), 3,4-methylenedioxyethylamphetamine (MDEA), and ethylamphetamine were purchased from Radian Corporation (Austin, TX.). Their stock standards were prepared by diluting to 100,000 ng/mL with methanol and were kept in the freezer. Ephedrine, fenfluramine, phentermine, caffeine, ascorbic acid, acetaminophen, and aspirin were purchased from Sigma Co. (St. Louis, MO). The stock standards of these drugs, in the concentration of 500,000 ng/mL, were prepared by weighting each drug and dissolving in methanol. Drug free urine was collected from a healthy volunteer. Working standard solution was prepared by spiking free urine with a certain stock standard. Hemoglobin was prepared by adding hemolysed blood into drug free urine. Likewise, bile/bilirubin was prepared by adding icteric serum into drug free urine.

ACON methamphetamine test strip (ACON Laboratories, Inc., CA) was sponsored by Bangkok Inter Products Co., Ltd. Instant View methamphetamine cassette (Alfa Scientific Designs, Inc., CA) was sponsored by Firmer Co., Ltd. SureStep drug methamphetamine cassette (Applied Biotech, Inc., CA) was sponsored by Sky Lab Co., Ltd. DrugSight methamphetamine strip (AmGenix International Inc., CA) was sponsored by Clinical Diagnostics Co. Ltd. Teco methamphetamine card test and dipstick (Teco Diagnostics, CA.) were sponsored by Affinitech Co., Ltd. Colorimetric test kit was purchased from the government pharmaceutical organization (Rangsit, Pathumthanee). All kits were conducted as recommended by their manufacturers. Briefly, the end of the strip was placed into the sample until the urine was seen to move up through the test area. The strip was then placed on the flat table and color bands was developed in the test and the control areas within 3-8 min. A control band appeared in all tests unless the test had failed. The presence of an additional color band in the test area indicated a negative result whilst the absence of this band indicated that methamphetamine was present in the urine at a concentration above the cut-off value, 1,000 ng/mL. The cassette contained a sample well into which two or three drops of urine were added; results were indicated as for strip tests. For colorimetric kit, 1 mL of urine was added into a vial containing 100 mg of sodium borate. After mixed well, 5 drops of 1% TPBE in dichlomethane was added. After shaked well, in the presence of drug, the violet color was developed in the upper layer.

Abbott amphetamine/methamphetamine II reagent, calibrators, and controls were manufactured by Abbott laboratories (Illinois, USA) and were purchased from Abbott Laboratories Co. Ltd., Thailand. The Abbott TDx analyzer was operated in accordance with the Abbott operator manual. The TDx was calibrated at the beginning of the study using the d-amphetamine calibrators and the curve generated was stable over the period of the study.

Results

From table 1, all rapid immunoassay kits showed specificity to methamphetamine. Acon and Instant View expressed the isomeric specificity, i.e. they were more specific to d-isomer than to d,l-isomer of methamphetamine. MDMA showed cross-reactivity at the concentration of 3,000 ng/mL with DrugSight kit. At the concentration of 10,000 ng/mL, MDMA gave positive results with the other immunoassay kits. Acon and Instant View showed cross-reactivity with fenfluramine at the concentration of 50,000 ng/mL. Likewise, the colorimetric assay was more specific to methamphetamine than to amphetamine. However, the colorimetric kit showed cross-reactivity to all studied amphetamine analogues at the concentration of 10,000 ng/mL. Acetaminophen, ascorbic acid, aspirin, caffeine, bilirubin, and hemoglobin did not cause a positive result with all studied reagent kits. All studied kit failed to give a positive result with methamphetamine at the concentration of 1,000 ng/mL, which is the cut-off value recommended by the US NIDA[12].

Table 2 shows quantitative results determined by Abbott A/M II reagent on TDx analyzer. The added amounts of certain compounds were compared with the analytical results. It was found that Abbott A/M II reagent was more specific to both d-amphetamine and d,l-amphetamine than to methamphetamine. Only MDA could give significant cross-reactivity. Because of its quantitative results, the accuracy was also evaluated when amphetamine was present along with methamphetamine in a urine sample. As shown in table 2, although methamphetamine alone gave less signals than its actual added amounts, in the present of amphetamine, the detected amounts were higher than the summation of added amounts of amphetamine and methamphetamine.

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Table 1. The Results from Reagent Strips/Cassette and Colorimetric Test Kits

Compound	*Acon*	*DrugSight*	*Instant-View*	*SureStep*	*Teco*	*Color*
d-methamphetamine						
1,000 ng/mL	Int	Neg	Int	Neg	Int	Neg
1,500 ng/mL	Pos	Neg	Pos	Int	Pos	Neg
3,000 ng/mL	Pos	Pos	Pos	Pos	Pos	Pos
d,l-methamphetamine						
1,000 ng/mL	Neg	Neg	Int	Neg	Int	Neg
1,500 ng/mL	Int	Neg	Int	Neg	Pos	Neg
3,000 ng/mL	Int	Pos	Pos	Pos	Pos	Pos
d-amphetamine						
5,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
10,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
d,l-amphetamine						
5,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
10,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
MDA						
5,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
10,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
MDMA						
1,000 ng/mL	Neg	Neg	Neg	Neg	Int	Neg
3,000 ng/mL	Neg	Pos	Int	Int	Int	Pos
5,000 ng/mL	Neg	Pos	Int	Int	Pos	Pos
10,000 ng/mL	Pos	Pos	Pos	Pos	Pos	Pos
MDEA						
1,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
3,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
10,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
Ethylamphetamine						
1,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
3,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
10,000 ng/mL	Int	Int	Int	Int	Neg	Pos

Note: Pos = Positive, Neg = Negative, Int = Intermediate

Table 1. The Results from Reagent Strips/Cassette and Colorimetric Test Kits (Continued)

Compound	*Acon*	*DrugSight*	*Instant-View*	*SureStep*	*Teco*	*Color*
Fenfluramine						
1,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
3,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
50,000 ng/mL	Pos	Int	Pos	Int	Neg	Pos
100,000 mg/mL	Pos	Int	Pos	Int	Neg	Pos
Phentermine						
5,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
10,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
100,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
Ephedrine						
5,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
10,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
100,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Pos
Caffeine 100,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
Acetaminophen 100,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
Aspirin 100,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
Ascorbic acid 100,000 ng/mL	Neg	Neg	Neg	Neg	Neg	Neg
Bilirubin 9.00 mg/dL	Neg	Neg	Neg	Neg	Neg	Neg
Hemoblobin 12.5 g/L	Neg	Neg	Neg	Neg	Neg	Neg

Note: Pos = Positive, Neg = Negative, Int = Intermediate

Table 2. The Results from Abbott TDx Analyzer with Abbott A/M II Reagent

Compound	*Detected Conc (ng/mL)*
d-Methamphetamine	
500 ng/mL	474
1000 ng/mL	862
3000 ng/mL	2175
5000 ng/mL	2839
10000 ng/mL	4466
d,l-Methamphetamine	
1000 ng/mL	635
3000 ng/mL	1806
5000 ng/mL	2266
10000 ng/mL	4123
d-Amphetamine	
500 ng/mL	575
1000 ng/mL	1154
3000 ng/mL	3380
5000 ng/mL	6400
10000 ng/mL	>8000
d,l-Amphetamine	
1000 ng/mL	937
3000 ng/mL	4120
5000 ng/mL	>8000
d-Amphetamine, 200 ng/mL and	
d-Methamphetamine 500 ng/mL	1464
d-Methamphetamine 1000 ng/mL	1758
d-Methamphetamine 2000 ng/mL	2553
d-Methamphetamine 3000 ng/mL	4155
d-Amphetamine, 500 ng/mL and	
d-Methamphetamine 500 ng/mL	1865
d-Methamphetamine 1000 ng/mL	3061
d-Methamphetamine 2000 ng/mL	3949
d-Methamphetamine 3000 ng/mL	6239

Compound	*Detected Conc (ng/mL)*
MDA	
1000 ng/mL	1461
3000 ng/mL	6173
5000 ng/mL	>8000
MDMA	
1000 ng/mL	625
3000 ng/mL	2396
5000 ng/mL	3572
MDEA	
1000 ng/mL	314
3000 ng/mL	624
5000 ng/mL	879
Ethylamphetamine	
1000 ng/mL	317
3000 ng/mL	656
5000 ng/mL	834
Phentermine	
1000 ng/mL	61
3000 ng/mL	156
5000 ng/mL	270
Fenfluramine	
1000 ng/mL	340
3000 ng/mL	691
5000 ng/mL	1031
Acetaminophen 100000 ng/mL	3
Ascorbic acid 100000 ng/mL	0
Aspirin 100000 ng/mL	5
Caffeine 100000 ng/mL	4
Bilirubin 9 mg/dL	57
Hemoglobin 12.5 g/L	2

When consider the turn-around time, all immunoassay strips/cassettes and colorimetric test need about 10 min to finish each test. The total detection times per cycle of these kits are based on number of samples analyzed, which averagely equal to number of samples run each cycle multiplied by an individual detection time. Since Abbott reagent has to run on the instrument, the total detection time must be at least 30 min; about 10-20 min for warming up the instrument, 5-10 min for running standards and controls, and 5-10 min for running tests. However, when the analytical system is ready, the result of each sample can be reported within 5-10 min. Thus, the total detection time will not rely on the number of samples run each cycle. It is the fact that by using automated analyzer, the more samples run each cycle, the less detection time per sample is.

Cost per test is also a considering factor when choosing a test kit. The offered prices of each studied kits were as followed.

DrugSight	100	Strips	3,200	Baths
Acon	50	Strips	2,650	Baths
Instant-View	25	Cassettes	1,000	Baths
Sure Step	25	Cassettes	2,250	Baths
Teco	40	Cassettes	1,512	Baths
Teco	50	Strips	1,250	Baths
Colorimetric	100	Kits	1,500	Baths
Abbott A/M II	100	Kits	12,626	Baths

For Abbott A/M II reagents, cost per test must include the costs of running 6 levels of standards and 3 levels of controls. The strips and cassettes do not need controls because they have a control area on the same strip/cassette that the sample is added and because they can give only qualitative results.

Discussion

Although all amphetamine/methamphetamine reagents are marketed for both amphetamine and methamphetamine tests, they are not specific to these two drugs in the same manner. All 5 reagent strips/cassettes and the colorimetric assay showed more specific to methamphetamine than to amphetamine. In contrast, Abbott A/M II reagent was more specific to amphetamine than to methamphetamine. In these circumstances, the use of these rapid test kits, which are the strips/cassettes and the colorimetric assay, would be very helpful in early detection. Since amphetamine, which is a major

metabolite of methamphetamine, was detected in urine 4 hr after the oral ingestion of methamphetamine[13], the negative result from these test kits only means that the individual is not currently using methamphetamine. It does not exclude the possibility that the individual has used methamphetamine at some earlier date. Abbott A/M II reagent is not useful for detecting methamphetamine alone. But in the presence of amphetamine, the enhancement effect that has previously been reported[14], i.e., the analytical results of amphetamine are higher than the summation of added amphetamine and methamphetamine concentrations in the same samples, was also found in this study. Therefore, urine collected after methamphetamine has been used for a few hours will be possible to give a positive result with Abbott A/M II reagent. Undoubtedly, urine collected from long-term methamphetamine abusers will give positive results with the Abbott A/M II reagent.

Making antibodies that will bind only amphetamine and methamphetamine is probably an unachievable goal[15]. According to the previously reported, the Abbott A/M II reagent showed cross-reactivity to MDA and showed reduced cross-reactivity for compounds that have a substitution on the amine nitrogen, such as MDMA, and MDEA[14, 16-17]. Whereas, the reagent strip/cassette kits showed significant cross-reactivity only to MDMA. For both strip/cassette immunoassay and Abbott A/M II kits, no falsely positive results were found from ephedrine, a cold relief medicine as well as from phentermine and ethylamphetamine, which are the anti-obesity drugs. Cross-reactivity of over-the-counter medications to these reagents is quite low and very few positives would be expected to result from even fairly heavy use. A close reactant relative to molecular structure can give an insight into the steric and chemical characteristics important in the recognition and binding of a hapten by antibody. For example, uncharged alpha methyl group of phentermine reduces cross-reactivity by steric hindrance. Whereas the charged beta-hydroxy group on ephedrine reduces binding by repulsive electrostatic forces as well as steric effects[18]. Compared to immunoassay, the colorimetric assay showed less specific or higher cross-reactivity to other phenethylamines or amphetamine analogues. The compounds that are not amphetamine analogues and commonly found in urine, i.e., ascorbic acid or vitamin C, acetaminophen, aspirin, caffeine, hemoglobin, and bile did not interfere with all strip/cassette kits, Abbott A/M II, and the colorimetric kit. It is very important for methamphetamine/amphetamine screening tests to show negligible cross-reactivity to other drugs, because abusers do not always intake only one kind of drug[19].

Knowledge and application of cross-reactivity data of the assay system can make the task of interpretation of analytical results easier. On one hand, the availability of reagents with higher specificity has the significant advantage of decreasing the number of positive results from common phenethylamines. On the other hand, it has the advantage of increased cross reactivity to some of the more common illicit

analogues, thereby allowing the identification of analogues without loss of the ability for the primary analytes. This allows those interested in screening for these compounds to do so rapidly and easily.

The sensitivity of the colorimetric assay is as high as 3,000 ng/mL. This may compensate for its high cross-reactivity to reduce numbers of falsely positive results. All studied immunoassay strips/ cassettes showed their detection limit above 1,000 ng/mL of methamphetamine. The most sensitive method in this study is the Abbott A/M II reagent, which can detect at the concentration of amphetamine as low as 300 ng/mL.

As shown above, the Abbott A/M II reagent showed good specificity and good sensitivity and it is the only one in this study that can give quantitative results. However, it is compromised by its high cost and the need for instrument. The cost per test of Abbott A/M II reagent must include the cost for 6 levels of standards and for 3 levels of controls when it is run first time. In the next time, standards do not need to be run, however, at least one control should be run along with the test sample in order to check the analytical system.

The cost per test of the strip/cassette kits and of the colorimetric kit are cheaper than that of Abbott A/M II reagent. And they are easily to carry and can be conducted on-site testing. There is no need for an instrument. The results can be visually interpreted within 10 min. A limitation of strip/cassette tests is that they only give a result as positive or negative: nothing can be concluded about the amount of drug present in the urine. This means that the result cannot be interpreted in relation to earlier tests for the same individual, which is in contrast to Abbott immunoassay.

In this study, it was found that there was variability in reading the test strip/cassette between observers as well as for one observer over a period of time. In the case of tests showing faint test bands, so-called "intermediate" in this study, it may be difficult to judge if this indicates the presence of a drug. To avoid falsely reporting, only specimens producing distinct bands can be interpreted as being positive, particularly when no confirmation test available. When the results were read after the manufacturer's recommended time, some results turned from positive to intermediate or even to negative. From the observation, it was found that truly positive result from d-methamphetamine would not be changed over the period of time. Only positive results from the analogues could be changed if they were not read within the manufacturer's recommended time.

Laboratories should consider the pros and cons of the various screening assays available when choosing a test. The choice should be based on the objective performance of the tests for a given drug and in accordance with the purpose of the drug-relating program. Reagent strip/cassette or colorimetric kit may be useful for screening drug at the scene. They are cheaper and give results faster than Abbott A/M II

reagent. However, due to their qualitative results, they cannot be used for monitoring drug abstaining and for identifying drug overdose. In case that an abuser has taken methamphetamine for a long period of time before his/her urine is collected, it is possible that the strip/cassette kit may give a negative result while Abbott A/M II reagent gives a positive result. Since the former one is more specific to methamphetamine, which is metabolized to amphetamine.

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