Ain Shams Journal of Forensic Medicine and Clinical Toxicology
June 2012, 19: 119-127

Pholcodine Containing Cough Medications as a Defense in the Court

Abdel Aziz A. Ghanem, Sahar Abd El- Aziz El-Dakroory, Rania Hamed Abdel Rahman, and Osama A. Shabka[1]

[1] Department of Forensic Medicine and Clinical Toxicology, Faculty of Medicine, Mansoura University, Mansoura, Egypt

Abstract Urine drug screens (UDSs) beyond the health care and criminal justice systems have increased throughout the past decade. A proper knowledge of medications that cross-react with UDSs are essential for accurate interpretation of the results. This study aims to evaluate one of the cough medications which may interfere with drug abuse testing and to highlight its plausibility as a defense in the court against dependence. Urine samples were collected from 30 patients presented to Mansoura Toxicology Unit with disturbed conscious level. Thorough history taking, routine laboratory investigations and toxicological analysis of urine for drugs of abuse by enzyme multiplied immunoassay (EMIT) and thin layer chromatography (TLC) were done. EMIT assay revealed that opiates, cannabinoids, benzodiazepines and barbiturates were positive in 100%, 76.7%, 36.6% and 20% of samples respectively. Confirmatory analysis demonstrated positive TLC of morphine in 96.7%, codeine in 43.3%, pholcodine and ephedrine in 53.3% of samples. The opiate positive results in persons taking pholcodine cough syrup proved the plausibility of this drug as a defense in the court in cases with legal and clinical forensic issues. However, each case must be considered on its own merits bearing in mind the need for caution when interpreting the analytical data especially when suspecting the use of pholcodine containing cough mixtures. It is advisable to search for pholcodine and ephedrine to exclude the possibility of taking antitussives containing these compounds. Further studies should be performed to assess the urgent need to schedule these medications. Meanwhile, these drugs should not be sold without a prescription and a warning against positive opiate assay must be written in their pamphlet.

Keywords Pholcodine, forensic drug testing, false positive opiate

Introduction

Drug testing beyond the health care and criminal justice systems has increased throughout the past decade. Common areas include the workplace (e.g., pre-employment and random testing), the military, athletics, legal and criminal situations (e.g., rehabilitation testing of ex-convicts and post-accident testing), and health care (e.g., treatment, compliance monitoring, cause of death). Misinterpretation of drug tests can have serious consequences, such as unjust termination from a job, risk of prison sentence, inappropriate exclusion from a sporting event and possibly inappropriate medical treatment in emergencies (Moeller et al., 2008).

Forensic drug testing is a key component of drug court programs because it provides objective information to the judge, other justice system officials, treatment personnel, and caseworkers regarding a participant's progress in treatment. The value and usefulness of drug testing regime are dependent on the scientific integrity of the analytical process and the accurate assessment of the raw data. The interpretation of the results requires balancing a number of factors, including elements directly related to the test, the physical characteristics of the individual being tested, the nature and duration of drug usage (Jerome and James, 2000).

Urine drug screens have been the most common method for analysis because of ease of sampling. The simplicity of use and access to rapid results have increased the demand for using immunoassays; however, these assays are non-specific and in most cases test for the "class" of drugs such as opiates, benzodiazepines,

and amphetamines. False positive tests can lead to serious medical, social or legal consequences if results are not confirmed by a secondary test such as chromatographic analysis (Moeller et al., 2008; Kapur, 2012).

There are a number of legal narcotic drugs which may cross-react with immunoassays leading to false positive results for opiates. Codeine, hydrocodone (cough syrups) and oxycodone HCl are the most common narcotic analgesics that, unfortunately, can generate positive immunoassays due to their structural similarities. Thus, the forensic medical practitioner may encounter potential problems in discriminating therapeutic intake of these medications versus recreational use (Neerman, 2006).

Another common cough medication is pholcodine, which is a centrally-acting antitussive because of its ability to suppress the cough reflex by depressing the medullary cough center and reducing the discharge of nerve impulses to the muscles that cause coughing. It seems to have a lower abuse potential than that exhibited by codeine (Mason, 2002; Bolser, 2006).

As pholcodine is a common component of cough mixtures, its prolonged excretion could represent a hazard in interpreting the results obtained from drug analyses of urine samples (Kovács et al., 2006). So, the aim of this study is to evaluate a pholcodine containing antitussive preparation which may interfere with drug abuse testing and to highlight its plausibility as a defense in the court.

Patients and Methods

I) Patients

Inclusion criteria

- Patients complained of disturbed conscious level and presented to Mansoura Emergency Hospital, Toxicology Unit in the period between January 2010 and January 2011.
- History of ingestion of antitussive medication "pholcodine containing syrup".
- Positive preliminary drug screen by Enzyme Multiplied Immunoassay Testing (EMIT).

Exclusion criteria

- Patients who had disturbed consciousness due to non-toxicological causes e.g. head trauma, abnormal liver or kidney function tests and impaired blood glucose level.

II) Methods

All patients included in this work were subjected to the following:

(1) Written informed consents were taken from all patients or their guardians to perform the study.

(2) History taking and clinical assessment

- Thorough history taking was done to determine the sociodemographic data as regards age, sex, residence, marital status, educational level and occupation.
- Complete medical examination was conducted by senior clinical staff in Mansoura Toxicology Unit.

(3) Urine sampling

Forty milliliters of urine were collected from each patient at the time of admission and prior to administration of any medication.

(4) Toxicological analysis of urine samples

A- Preliminary test (Emit® d.a.u. TM : drug of abuse in urine):

EMIT was done immediately for qualitative detection of opiates, cannabis, benzodiazepine and barbiturate in human urine by using Syva, Solaris S/N 1076 Version 3.00L.

B- Thin Layer Chromatographic (TLC) confirmation

- **Extraction**
  - Opiate extraction was done according to Meadway et al. (1998).
  - Benzodiazepines, barbiturates and cannabis extraction was done according to (Flanagan et al., 1995; George and Braithwaite, 1995).
  - Extracts of urine samples were stored at – 18 ºC until performance of thin layer chromatography (TLC).
- **Standards**
  - Delta-9-tetra-hydrocannabinol (Δ9THC), cannabinol and cannabidiol mixture, phenobarbital "Vienna International Toxicology Center", diazepam "La Roche Comp.", codeine "Macferlane, England", morphine, ephedrine, pholcodine, lyophilized urine "Vienna International Toxicology Center".
  - The lyophylized urine "one vial dissolved in 200 ml pure water" was spiked with morphine, codeine, ephedrine and pholcodine standards in concentration of 1 µg/ml.
- **Solvents**
  1. Ethyl acetate: methanol: concentrated ammonia (85: 10: 5) solvent was used to develop plates of opiates and barbiturates.
  2. Toluene for cannabinoids.

3. Toluene: glacial acetic acid (97: 3) for benzodiazepines.

• Spraying reagents

1. Acidified iodoplatinate reagent was used to detect opiate metabolites which appeared as purple brownish spots.
2. Zwikker's reagent "40 ml copper sulphate 10% was mixed with 10 ml of pyridine and add water to produce 100 ml" to visualize pink purplish spots of barbiturates.
3. Four spraying reagents were used in the following sequence to detect benzodiazepines (benzophenones): the plate was 1st sprayed lightly with H2SO4 (18 N), then freshly prepared 1% sodium nitrite, followed by ammonium sulphamate. Finally, benzo reagent (1% naphthyl-ethylene diamine in 80% acetone) was sprayed to localize benzodiazepines pink or purple spots.
4. Freshly prepared 0.1% solution of fast blue BB salt in water and methanol (1: 3) was sprayed for detection of cannabinoids spots (violet red for cannabidiol, pink for Δ9THC and purple for cannabinol).

(III) Statistical analysis

All data were run on an IBM compatible personal computer and analyzed by using the Statistical Package for Social Scientists (SPSS) version 10.00 for windows (SPSS Inc., Chicago, IL, USA). All data were qualitative so they were presented as number and percentage.

Results

This work was conducted on thirty patients with the inclusion criteria previously mentioned presented to the Toxicology Unit during the study period.

Table (1) showed the demographic characteristics of the studied patients.

Table (2) demonstrated the results of both EMIT assay and thin layer chromatographic (TLC) analysis of the studied urine samples.

Table (3) illustrated the frequency and percentage of EMIT and TLC analytical data. Confirmatory results of opiate positive samples revealed that both morphine and codeine were positive in thirteen patients.

Thin layer chromatograms for positive urine samples extracts for opiates, cannabinoids, benzodiazepines and phenobarbitone were demonstrated respectively in figures (1, 2, 3 and 4).

Table (1): Sociodemographic characteristics of the studied patients (n=30).

Characteristics	Number	Percentage (%)
Sex:		
Males	28	93.3
Females	2	6.7
Age (years)		
18- < 23	14	46.7
23- < 28	10	33.3
28- < 33	4	13.3
≥ 33	2	6.7
Residence		
Urban	25	83.3
Rural	5	16.7
Marital status		
Single	25	83.3
Married	5	16.7
Educational level		
Illiterate	11	36.6
Secondary school	14	46.7
High education	5	16.7
Occupation		
Unemployed	23	76.7
Governorate clerks	3	10
Private work	4	13.3

Table (2): Analytical results of urine samples of the studied patients: EMIT and TLC.

No	EMIT assay				TLC for opiates and ephedrine				TLC of cannabinoids, benzo-diazepines & phenobarbitone		
	Opiate	Cannab	benzo	barbit	Morph	Cod	pholc	ephed	Cannab	Benzo	Phenobarb
1	+ve	+ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve	-ve
2	+ve	+ve	-ve	-ve	+ve	+ve	-ve	-ve	+ve	-ve	-ve
3	+ve	+ve	-ve	-ve	+ve	-ve	-ve	-ve	+ve	-ve	-ve
4	+ve	+ve	-ve	-ve	-ve	+ve	-ve	-ve	+ve	-ve	-ve
5	+ve	+ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve	+ve	-ve
6	+ve	+ve	+ve	-ve	+ve	-ve	+ve	+ve	+ve	+ve	-ve
7	+ve	+ve	-ve	-ve	+ve	+ve	-ve	-ve	+ve	-ve	-ve
8	+ve	+ve	-ve	-ve	+ve	+ve	-ve	-ve	+ve	-ve	-ve
9	+ve	+ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve	-ve
10	+ve	+ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve	-ve
11	+ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve	+ve	-ve	+ve
12	+ve	+ve	+ve	+ve	+ve	-ve	+ve	+ve	+ve	+ve	+ve
13	+ve	-ve	+ve	-ve	+ve	-ve	+ve	+ve	-ve	+ve	-ve
14	+ve	-ve	+ve	-ve	+ve	-ve	+ve	+ve	-ve	+ve	-ve
15	+ve	+ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve	-ve
16	+ve	+ve	-ve	-ve	+ve	+ve	-ve	-ve	+ve	-ve	-ve
17	+ve	+ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve	-ve
18	+ve	+ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve	+ve	-ve
19	+ve	+ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve	+ve	-ve
20	+ve	+ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve	-ve
21	+ve	+ve	-ve	-ve	+ve	+ve	-ve	-ve	+ve	-ve	-ve
22	+ve	+ve	-ve	-ve	+ve	+ve	-ve	-ve	+ve	-ve	-ve
23	+ve	-ve	-ve	-ve	+ve	-ve	+ve	+ve	-ve	-ve	-ve
24	+ve	-ve	+ve	-ve	+ve	+ve	-ve	-ve	-ve	+ve	-ve
25	+ve	-ve	+ve	+ve	+ve	+ve	-ve	-ve	-ve	+ve	+ve
26	+ve	-ve	+ve	+ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve
27	+ve	+ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve	+ve	-ve
28	+ve	+ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve	-ve
29	+ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve	+ve	-ve	+ve
30	+ve	-ve	-ve	+ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve

Table (3): Frequencies and percentages of positive urine samples in the studied patients (n= 30).

EMIT assay					TLC of opiates and ephedrine					TLC of cannabinoids, benzodiazepine (benzophenone) & phenobarbitone		
	Opiate	Cannab.	Benzo.	Barbit.		Morph	Cod	pholc	ephed	Cannab	Benzo	Phenobarb
Total	30	23	11	6	Total	29	13	16	16	23	11	6
%	100	76.7	36.6	20	%	96.7	43.3	53.3	53.3	76.7	36.6	20

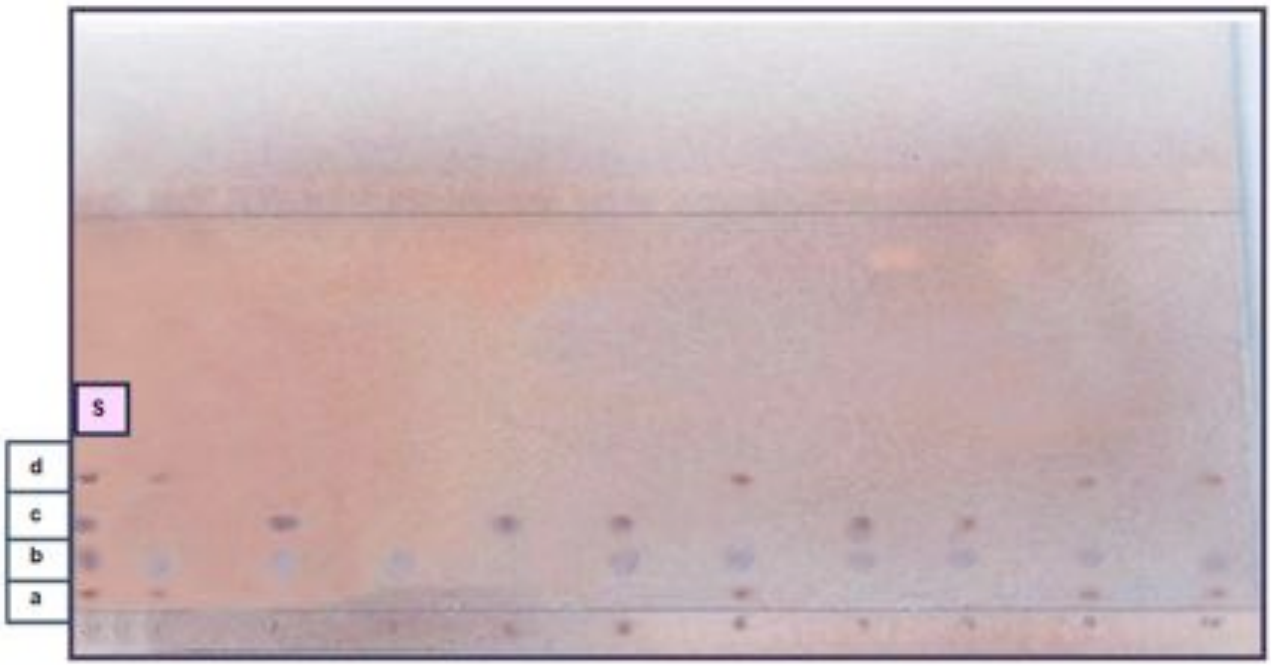

Figure (1): Thin layer chromatogram of opiate and ephedrine standards and positive urine samples extracts. (S) refers to standards; (a) refers to ephedrine standard; (b) refers to morphine standard; (c) refers to codeine standard, (d) refers to pholcodine standard.

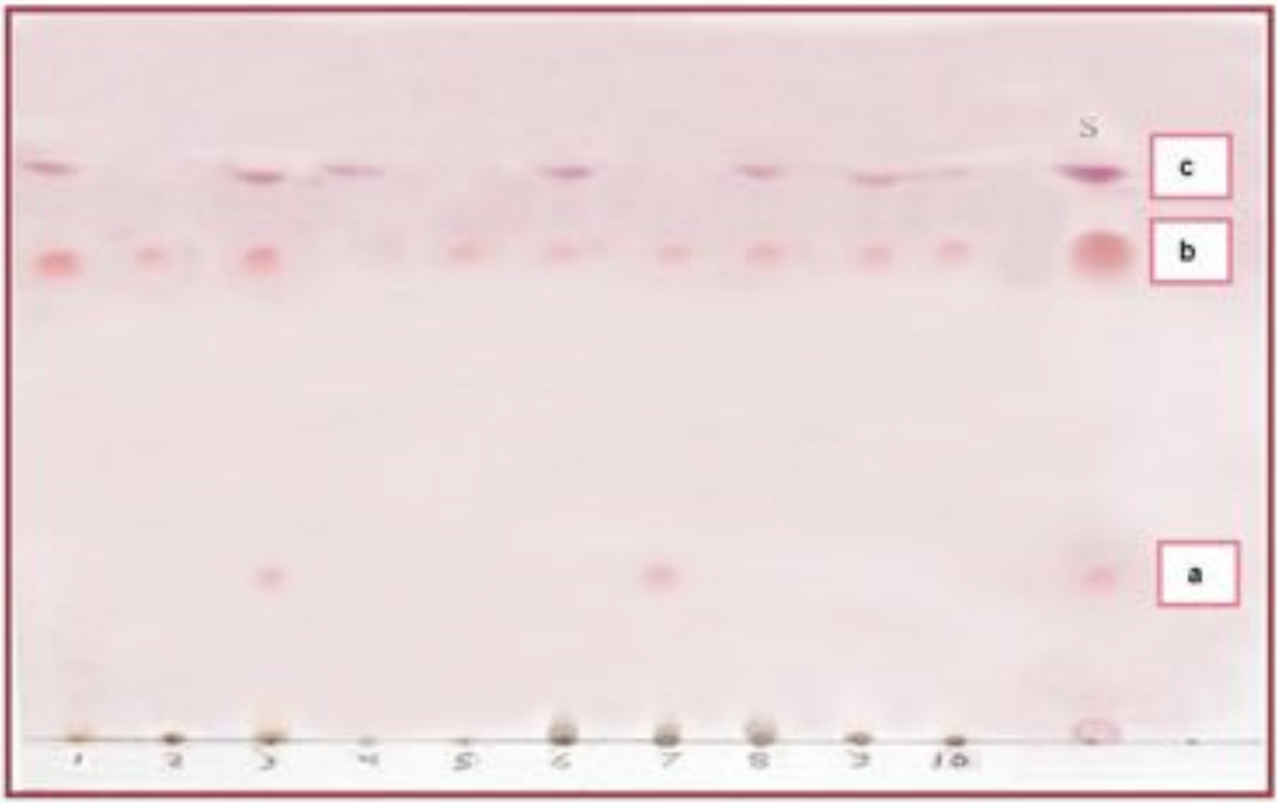

Figure (2): Thin layer chromatogram of cannabinoids standards and urine samples extracts positive for cannabinoids. (S) refers to cannabinoids standards; (a) refers to cannabidiol standard; (b) refers to delta 9 tetra-hydrocannabinol (Δ9THC) standard; (c) refers to cannabinol standard.

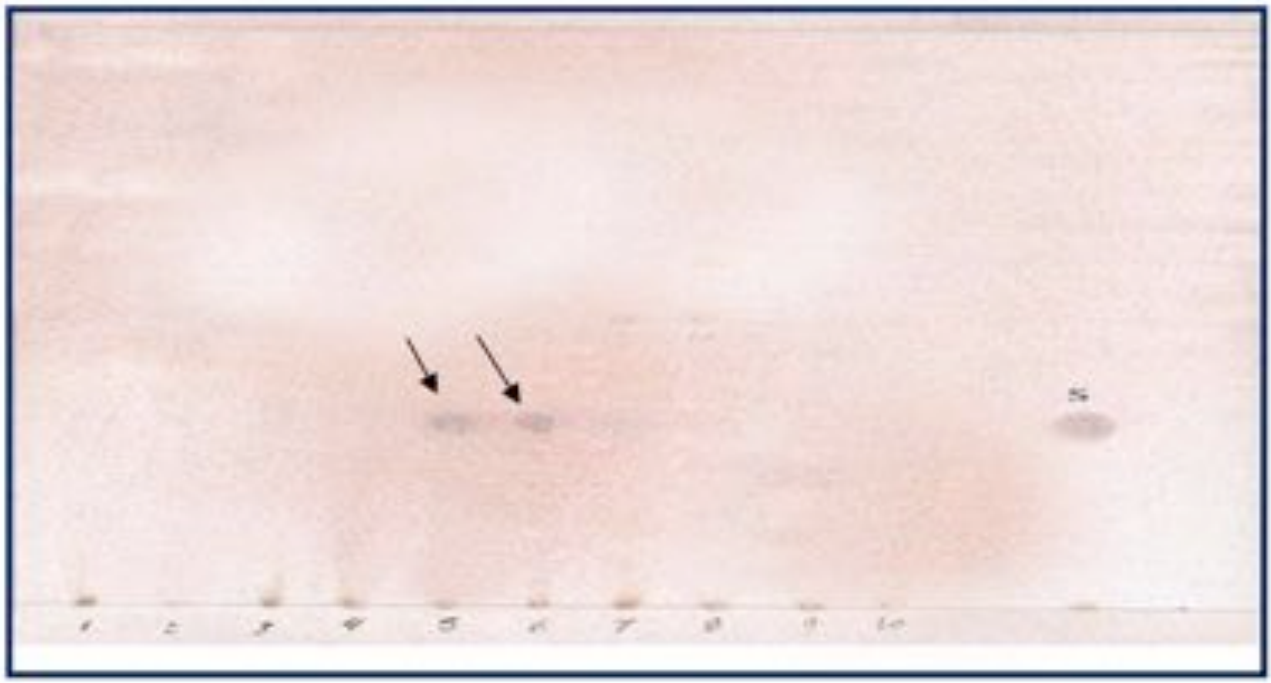

Figure (3): Thin layer chromatogram of diazepam standard and urine samples extracts positive for diazepam. (S) refers to diazepam standard.

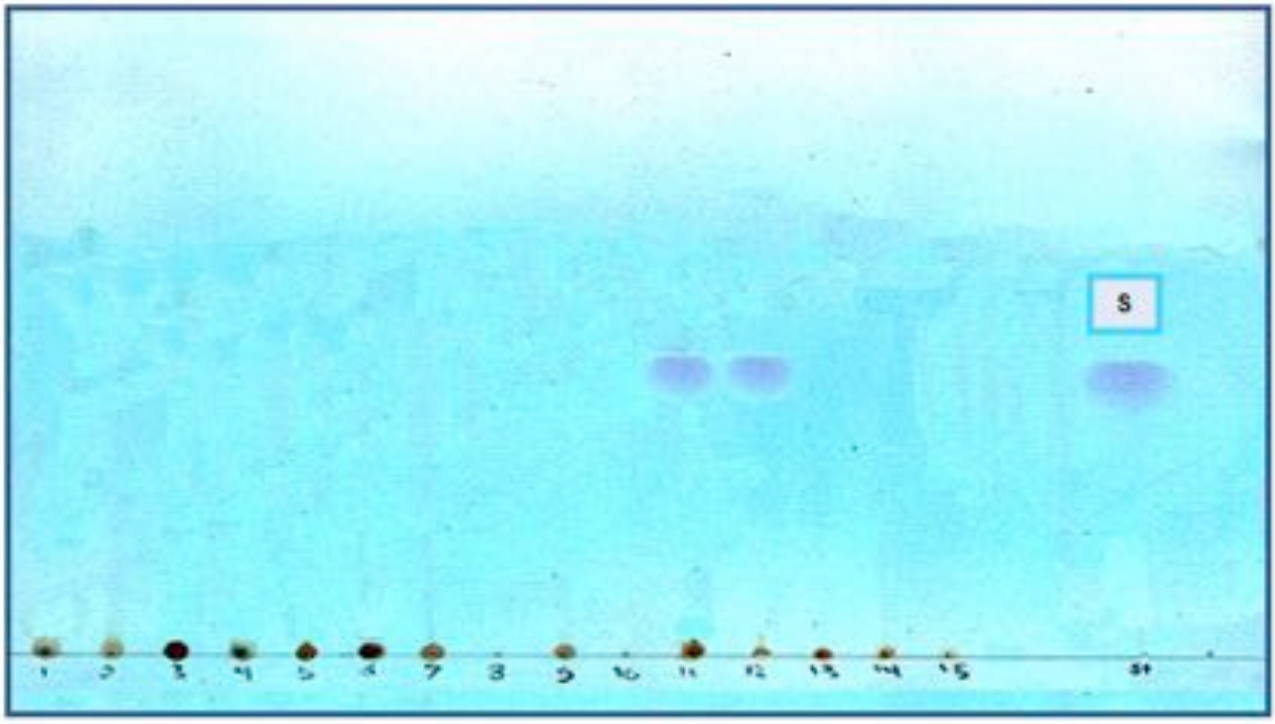

Figure (4): Thin layer chromatogram of phenobarbitone standard and urine samples extracts positive for phenobarbitone (samples 11 and 12). (S) refers to phenobarbitone standard.

Discussion

Workplace and forensic drug abuse testing is usually performed for medico-legal purposes. Only those samples that are positive by both screening and confirmatory methods should be reported as positive since the consequences to individuals convicted of abusing prohibited drugs can be grave including loss of employment, child custody, driving privileges, right to compete in international sports and ultimately freedom with mandatory confinement. In view of these penalties, laboratories charged with providing evidence must maximize testing accuracy (Huestis and Smith, 2006).

This study aims to assess an antitussive drug containing pholcodine that may interfere with the results of drug screen analysis leading to undesirable legal proceedings. Urine samples were taken from thirty patients with disturbed conscious level presented to Mansoura Toxicology Unit and giving history of

ingestion of antitussive medication containing pholcodine.

Most of the studied patients were males (93.3%) with the majority (80%) aged 18-28 years old. Single patients from urban areas constituted 83.3%. About 47% of patients had 2ry school education and 76.7% were unemployed.

EMIT assay revealed that opiates, cannabinoids, benzodiazepines and barbiturates were positive in 100%, 76.7%, 36.6% and 20% of the patients' urine samples respectively. TLC analysis confirmed the EMIT results concerning cannabinoids, benzodiazepines and barbiturates. The disturbed conscious level in the studied patients is attributed to the intake of these drugs. It is not clear if the disturbed consciousness is due to intake of large or even therapeutic dose of pholcodine containing mixture or due to other medications (e.g., benzodiazepines or barbiturates).

Confirmatory TLC analysis proved that morphine and codeine were positive in 96.7% and 43.3% of patients respectively. On the other hand, pholcodine and ephedrine were found in 53.3%. Sixteen patients were positive for three drugs; morphine, pholcodine and ephedrine. There was a claim of using a certain type of antitussive medication among these patients. The analytical data could be explained by the fact reported by Rokia (2006) who mentioned that the alleged drug contains mainly pholcodine and ephedrine.

Kovács et al. (2006) stated that pholcodine (3-O-morpholinoethylmorphine), a semisynthetic morphine derivative, is available over the counter in many countries since it is an antitussive agent with no analgesic or addictive properties. It cross-reacts with opiate immunoassays due to its morphine-like structure. Hence, very selective and sensitive analytical methods are needed to determine the presence of pholcodine and its metabolites in human samples and to avoid medicolegal misinterpretations.

Moreover, morphine and unknown impurities were claimed to be detected in all analyzed pholcodine samples (Oliver et al., 2002). These impurities, in addition to the possible formation of morphine during the hydrolysis step of sample preparation serve to complicate the interpretation of confirmatory results of opiate analyses. So, the only way to avoid misinterpretation of morphine positive results is to look for the presence of pholcodine in these specimens.

In the present study, positive opiate immunoassays were detected whether after single or multiple doses of pholcodine administration. Meadway et al. (2002) reported that the large side chain in pholcodine prolongs its metabolic clearance (mean elimination half-life: 50 hours) which means that 'opiate positive' immunoassay screening results may be detected for up to 10 days following a single oral therapeutic dose or longer if multiple doses are administered. Maximal morphine concentration is obtained after about 7 days while lower concentrations were found up to 19 days after the final dose of multiple pholcodine administration.

Similarly, Baselt (2011) stated that the most important urinary metabolite of pholcodine is conjugated morphine, which may be detectable for days or weeks after the last dose. It is produced in level above the cutoff threshold (300 ng/ml) by both EMIT and TLC. This could trigger a false positive result for opiates in a urine drug testing program (Dasgupta, 2010).

On the other hand, the present work showed that chromatographic confirmation of opiate positive samples proved the presence of morphine and codeine in thirteen subjects. This could be explained by the availability of opioid based cough mixtures and their safe use among the public. These drugs contain some ingredients that are attractive for their psychoactive effect (Moira et al., 2006). Chronic use of over-the-counter cold and cough medicines make drug abusers often use them as a substitute for morphine and heroin, attributing the morphine in the urine test to therapeutic prescription medication (Dasgupta, 2010; Shek, 2012).

The prevalence of morphine positive results in the present work could be explained by the fact that codeine as well as pholcodine are metabolized in humans to morphine; however, the reverse pathway leading to the production of codeine from morphine does not occur. Both morphine and codeine are generally found in biological fluids after heroin use or codeine ingestion. Since heroin is diacetylmorphine and morphine is a heroin metabolite, positive result for morphine in urine can indicate prior use of heroin (Frederick, 2006).

In addition, codeine is a by-product of illicit heroin. Another acetylated derivate i.e. acetylcodeine is a manufacturing impurity (1–15%) of illicit heroin synthesis and is metabolized into codeine and subsequently, into morphine. Hence, both codeine and acetylcodeine were interesting markers that can be qualitatively measured to detect illicit heroin use (Christian et al., 2001).

Unfortunately, the interpretation of positive morphine results can be a difficult task because of the presence of opiate alkaloids in medicines and foods. For example, morphine and codeine are present in many preparations for the treatment of pain and cough. Ingestion of these products leads to excretion of codeine and morphine in urine (Christian et al., 2001). Both codeine and heroin are metabolized into morphine. Therefore, detection of morphine in urine can result from intake of heroin, morphine, codeine, or poppy seeds (Frederick, 2006; Smith, 2009). So, morphine and codeine must be assessed simultaneously for accurate interpretation of the results (Lötsch et al., 2009; Wong and Tse, 2009).

It seemed that the interpretation of toxicological findings is critical for the thorough investigation of the use and abuse of psychoactive substances. A positive analytical result could lead to criminal proceedings and a punitive outcome for the defendant whose sample was analyzed (Stefanidou et al., 2010). The present findings demonstrated that pholcodine containing medications could be attributed to therapeutic intake and might be used in medico-legal and forensic drug testing issues as a defense against

drug abuse. Persons who use these drugs may be labeled morphine abusers as their urine has trace amount of morphine as a metabolite of pholcodine-containing medicines. Also, drug abusers may claim the use of this medication as a legally prescribed therapy to escape from the charge and criminal penalty.

Conclusion

A great care should be taken when interpreting the screening tests for opiates in patients treated with some over the counter preparations as it is a very challenging process. Inclusion of codeine and pholcodine in confirmatory tests facilitates determination of which opiate drug was administered and also minimizes false results. The forensic medical practitioner should determine whether the positive test result could be related to abuse or from proper use of a prescription drug. The forensic interpretation of the analytical results should be accurate and justifiable to make a proper decision in the court.

It is recommended to review the medical history of the patients and to perform HPLC/MS or GC/MS/MS so as to validate the immunoassay screening data and to specify the type of the drug used. It is also worthy to search for ephedrine and pholcodine in all samples positive for morphine which is a common metabolite of pholcodine. Differentiation between abuse and medical prescription necessitates estimation of blood level of morphine to exclude possibility of ingestion of cough syrup containing pholcodine. Further studies are urgent to assess the need for scheduling these medications. In the meantime, these drugs should not be sold without a prescription and a warning against positive opiate assay must be written in their pamphlet.

References

Baselt R C (2011): Disposition of Toxic Drugs and Chemicals in Man, Biomedical Publications, Seal Beach, USA, Foster City, CA, 9th ed., P.P. 1258-1260.

Bolser D C (2006): Current and future centrally acting antitussives. Respir. Physiol. Neurobiol., 152(3): 349–355.

Christian S, Miguel M, Annie M et al., (2001): Detection of acetylcodeine in urine as an indicator of illicit heroin use: method validation and results of a pilot study. Clinical Chemistry, 47(2):301–307.

Dasgupta A (2010): Analytical True Positives in Workplace Drugs Testings due to Use of Prescription and OTC Medications. In: Beating Drug Tests and Defending Positive Results, Springer Science, Business Media, L.L.C., Ch. 10, P.P. 131-141.

Flanagan R J, Braithwaite R A, Brown S S, Widdop, B and de Wolff F A (1995): Benzodiazepines. In: Basic Analytical Toxicology. WHO, Geneva in collaboration with the United Nations Environment Programme and the International Labour Organization. PP. 77-82.

Frederick WF (2006): Forensic Toxicology, Ch.66, p.p.617-621.

George S and Braithwaite R (1995): A preliminary evaluation of five rapid detection kits for on site drugs of abuse screening. Addiction, 90:227-232.

Huestis MA and Smith ML (2006): Modern analytical technologies for the detection of drug abuse and doping. Drug Discovery Today: Technologies, Analytical Chemistry, vol. 3: 49-57.

Jerome JR and James WJ (2000): Drug Testing in a Drug Court Environment: Common issues to address. U.S. Department of Justice, Office of Justice Programs, Drug Courts Program Office. P.P.1-27.

Kapur (2012): False positive drugs of abuse immunoassays. Clinical Biochemistry, 45: 603–604.

Kovács Z, Hosztafi S and Noszál B (2006): Site-specific acid-base properties of pholcodine and related compounds. Anal. Bioanal. Chem., 386:6: 1709-1716.

Lötsch J, Rohrbacher M, Schmidt H et al., (2009): Can extremely low or high morphine formation from codeine be predicted prior to therapy initiation? Pain, 144: 119-124.

Mason P (2002): Over-the-counter treatment of coughs and colds. The Pharmaceutical Journal, 269:612-614.

Meadway C, George S and Braithwaite SR (1998): Opiate concentrations following the ingestion of poppy seed products – evidence for `the poppy seed defense. Forens. Sci. Int., 96 (1): 29-38.

Meadway C, George S and Braithwaite SR (2002): Interpretation of GC-MS opiate results in the presence of pholcodine. Forens. Sci. Int., 127: 131–135.

Moeller K E, Lee KC and Kissack JC (2008): Urine drug screening: Practical guide for clinician. Mayo Clin. Proc., 83 (1): 66-76.

Moira GS, Gary KH and Eric K (2006): Cough mixtures: not always for cough. Australian Family Physician, 33(5):327-331.

Neerman MF (2006): Drugs of abuse: analyses and ingested agents that can induce interference or cross-reactivity. Lab. Medicine, 37 (6):358-361.

Oliver M, Graham G and David G (2002): Impurity profiling of pholcodine by liquid chromatography electrospray ionization mass spectrometry (LC-ESI-MS). J. Pharm. Pharmacol.,54 (1): 87–98.

Rokia MA (2006): HPLC chromatographic methods for simultaneous determination of pholcodine and ephedrine HCl with other active ingredients in antitussive-antihistamine oral liquid formulations. Nature Product Sciences, 12(1):55-61.

Shek DTL (2012): Personal construction of cough medicine among young substance abusers in Hong Kong. Sci. World J., ID 754362, 1-14.

Smith H S (2009): Opioid metabolism. Mayo Clin. Proc., 84(7):613-624.

Stefanidou M, Athanaselis S, Spiliopoulou C et al., (2010): Biomarkers of opiate use. International Journal of Clinical Practice, 64 (12): 1712–1718.

Wong RC and Tse HY (2009): Quantitative, False Positive and False Negative Issues for Lateral Flow Immunoassays as Exemplified by Onsite Drug Screens. In: Lateral Flow Immunoassay. Wong, R.C. and Tse, H.Y. (eds.), Humana Press, New York, NY, Ch. 10, P.P. 185-203.

الملخص العربي

أدوية السعال المحتوية على الفولكودين كوسيلة للدفاع في المحكمة

عبد العزيز أبو الفتوح غانم و سحر عبد العزيز الدكرورى و رانيا حامد عبد الرحمن و أسامة علي شبكة[1]

كثر الكشف عن الأدوية و المخدرات في البول في العقد الماضي ليس فقط في نطاق الرعاية الصحية ولكن ليشمل أيضا بعض نظم العدالة الجنائية. والمعرفة الصحيحة للأدوية التي تتفاعل مع هذه الاختبارات أصبحت ضرورية للتفسير الدقيق للنتائج. وتهدف هذه الدراسة إلى تقييم دواء للسعال يحتوي على " pholcodine"والذي قد يتداخل مع تحليل تعاطي المخدرات؛ وتقييم احتمال استخدام مثل تلك الأدوية كوسيلة للدفاع ضد التعاطي والإدمان في المحكمة.

وقد تم جمع عينات البول من 30 مريض جاؤوا إلى وحدة السموم، بمستشفى الطوارئ الجامعي بالمنصورة. وتم أخذ التاريخ المرضى للحالات وعمل تحليل أولى للكشف عن تعاطي المخدرات في البول بواسطة إنزيم المناعة (EMIT) ثم تأكيد النتائج بواسطة التحليل الكروماتوجرافي ذو الطبقة الرقيقة (TLC). وقد تبين وجود مخلفات أيض الأفيون والحشيش والبنزوديازيبين والباربيتورات في 100٪، 76.7٪، 36.6٪ و 20٪ من المرضى على التوالي. وكشف التحليل التأكيدي إيجابية المورفين في 96.7٪، الفولكودين في 43.3٪ و الكودايين والإيفيدرين في 53.3٪.

وبناء على ذلك فنتائج الأفيون الإيجابية في هؤلاء الأشخاص الذين يتناولون أدوية السعال التي تحتوي على الفولكودين يمكن أن تستخدم كوسيلة للدفاع في المحكمة ضد تعاطي المخدرات. ولذلك يجب النظر في كل حالة على حده وفقا لحيثياتها، مع الأخذ في الاعتبار ضرورة توخي الحذر عند تفسير النتائج، مع استعراض شامل للتاريخ الطبي للمريض خاصة في الممارسات الطبية الشرعية وغيرها، وفي الحالات التي يشتبه فيها استخدام الأدوية التي يمكن أن تتداخل مع الاختبارات المعملية للمخدرات مع ضرورة عمل تحاليل تأكيدية لاتخاذ القرار الصحيح. ويتصح أيضا بالكشف عن الفولكودين و الإيفيدرين لاستبعاد احتمال تناول أدوية السعال التي تحتوي على هذه المركبات كما يجب إجراء المزيد من الدراسات العاجلة لتقييم مدى الحاجة لجدولة المركبات المحتوية على الفولكودين. في غضون ذلك، يجب كتابة تحذير في المنشور الدوائي بإيجابية تحاليل الأفيون عند تناول تلك العقاقير كما ينبغي ألا تباع تلك الأدوية إلا بموجب روشتة طبية.

[1] قسم الطب الشرعي والسموم كلية الطب جامعة المنصورة