

CASE REPORTS

URINE TOXICOLOGY SCREEN: WHAT CHALLENGES?

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ABSTRACT

The urine toxicology screen is a test widely used in clinical practice, but it may be subject to false positive or negative results. With regard to opioid screen, one of the causes of false positives is the ingestion of poppy seeds. The authors describe the case of an adolescent who performed a urine toxicology screen in the context of a first seizure episode, which revealed the presence of morphine. After a detailed anamnesis, the teenager reported having consumed crackers with poppy seeds the night before. The opium poppy is widely used in the food industry, mainly through its seeds. This clinical case alerts us to the possibility of false positives in toxic screening tests after ingesting poppy seeds. This situation can be a problem as it can have medical-legal implications. For this reason, the cut-off value of 300 ng/ml used by most laboratories in many countries has been frequently discussed.

Introduction

The urine toxicology screen is a complementary diagnostic test that is easily accessible in clinical practice. Its apparent simplicity, with a "negative" or "positive" result in the detection of a given substance, does not always have a linear interpretation. In fact, a correct assessment of this analysis must take into account the clinical context, the type of test and its specificity, the degree of suspicion of use or exposure to a particular toxic, as well as the probability of obtaining false positives or false negatives.¹ Despite its limitations, there are some situations in which urine toxicology screen becomes helpful in the diagnostic process, namely in episodes of seizures, cardiovascular events, psychiatric manifestations or medical-legal investigations.² Regarding the detection of opioids, the universally defined cut-off of 300 ng/ml for screening these substances has been questioned for a long time.³ An example of the possibility of false positives is the ingestion of poppy seeds, whose detection of morphine can persist in the urine for 48 hours⁴, reaching its maximum peak 2-4h after consumption.⁵

Case Report

Fifteen years old female adolescent, with a personal history of headaches with migraine characteristics, without other relevant personal or familiar history, was brought to the Emergency Department for altered state of consciousness. That morning she was found by her parents, in bed, with tremors of the lower limbs, noisy breathing, clenched teeth, drooling and staring. In this sequence, she fell from bed, resulting in trauma to the left supraorbital region. The episode was self-limited, lasting for about seven to eight minutes and she had amnesia for the event. She

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denied sphincter incontinence, morning myoclonus, sleep deprivation or toxic consumption. Upon admission to the Emergency Department, she was conscious, oriented, cooperative and hemodynamically stable. A brief neurological examination was performed, without changes. On examination, a hematoma with excoriation in the left supraorbital region was seen. A first generalized tonic-clonic seizure was hypothesized, and cranioencephalic computerized axial tomography and electroencephalogram were performed, which did not reveal alterations. From analytical research, we highlight the detection of morphine in urine toxicology screen. After a detailed anamnesis, the teenager reported having consumed crackers with poppy seeds the night before. Five months after the first crisis, she had a new episode when she woke up, with noisy breathing, hypertonia of the head and neck, hypotonia of the remaining segments, with tongue biting, but without abnormal movements, regaining consciousness after 15 minutes. She was medicated with levetiracetam and had no new crisis. Keeps follow-up in Neuropediatrics consultation.

Discussion

The opium poppy, or *Papaver somniferum* L., in addition to its uses for the production of pharmaceuticals and illegal drugs, is widely used in the food industry for the manufacture of cakes, biscuits, pasta, mainly through the use of its seeds.⁶ Several studies have shown that the amount of alkaloids present in poppy seeds can vary greatly, and the way in which the harvest is carried out, as well as the method of confection, are the main determinants.⁶ For example, washing seeds with hot water can reduce the amount of morphine by 70%.⁶ The possibility of false positives in toxic screening tests after the consumption of foods containing poppy seeds is a reality, so in certain countries such as the United States of America it was determined that in laboratory tests carried out in the context of occupational safety and health, the cut-off would be increased to 2000 ng/ml and not the 300 ng/ml used

by most laboratories.^{5,7} In light of current knowledge, there is no defined value for the amount of poppy seeds ingested that would exclude false positives⁵, because the amount of alkaloids present in them depends on several factors, like the method of preparation of the food, but also the origin and plant harvest.⁶ This clinical case alerts us to the possible existence of false positives in urine toxicology screen. These results can be a problem when we refer to situations with medical-legal implications, so the clinician must have specialized knowledge about these tests for an adequate and accurate interpretation. Increasingly tight control over the methods of manufacturing and cooking food containing poppy seeds will be necessary in order to regulate their alkaloid content. Future studies may constitute a starting point for changing the cut-off defined in several countries for research on opioids in urine, especially when referring to occupational health or medico-legal contexts.

Compliance with ethical standards

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References

1. Hadland SE, Levy S. Objective Testing. *Child Adolesc Psychiatr Clin N Am.* 2016;25(3):549-565. doi:10.1016/j.chc.2016.02.005
2. Levy S, Siqueira LM, Ammerman SD, et al. Testing for drugs of abuse in children and adolescents. *Pediatrics.* 2014;133(6). doi:10.1542/peds.2014-0865.
3. Neves J. Análise toxicológica de opióides em contexto forense. Published 2016. Accessed May 10, 2022. https://bdigital.ufp.pt/bitstream/10284/5811/1/PPG_25546.pdf
4. Trafkowski J, Madea B, Musshoff F. The significance of putative urinary markers of illicit heroin use after consumption of poppy seed products. *Ther Drug Monit.* 2006;28(4):552-558. doi:10.1097/00007691-200608000-00011.
5. Samano KL, Clouette RE, Rowland BJ, et al. Concentrations of morphine and codeine in paired oral fluid and urine specimens following ingestion of a poppy seed roll and raw poppy seeds. *J Anal Toxicol.* 2015;39(8):655-661. doi:10.1093/jat/bkv081.
6. Lachenmeier DW, Sproll C, Musshoff F. Poppy seed foods and opiate drug testing-where are we today? *Ther Drug Monit.* 2010;32(1):11-18. doi:10.1097/FTD.0b013e3181c0eee0.
7. Bush DM. The U.S. Mandatory Guidelines for Federal Workplace Drug Testing Programs: Current status and future considerations. *Forensic Sci Int.* 2008;174(2-3):111-119. doi:10.1016/j.forsciint.2007.03.008.