



CANNABINOID POISONING IN CHILDREN: IMPORTANCE OF MULTIDRUG TESTING

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ABSTRACT

Introduction: Cannabis sativa is one of the most commonly used recreational drugs, contains over 500 different clinical compounds and over 60 known cannabinoids. Drug abuse tests are widely used as hospital screening tests for poisoning diagnoses. Objective: This study aims to understand the types of drug abuse tests used in cases of acute cannabinoid poisoning, especially in children.

Methodology: This was a literature review, having as source of research the databases UpToDate, NCBI Pubmed, Online Library (SCIELO) and Toxicology Manuals. As inclusion criteria were used publications from 2000 to 2019, in Portuguese, English and Spanish, related to the keywords.

Discussion: Acute cannabis poisoning is a clinical diagnosis, however, diagnosis in children may be difficult, so drug screening in the urine may be helpful to confirm the diagnosis.

Conclusion: These tests are easy to perform and cheap, having good specificity through their chemical structure, directing the immunoassay to the toxic agent.

Keywords: cannabis sativa, accidents, toxic agent.

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INTRODUCTION

Cannabis sativa is one of the most commonly used recreational drugs, containing over 500 different clinical compounds and over 60 known cannabinoids. Of these, delta-9 tetrahydrocannabinol (THC) is responsible for most intoxication symptoms⁷. According to the World Health Organization⁶, 147 million people, or 2.5% of the world's population, use *cannabis* (marijuana), as of 2018 nine states have allowed the sale and possession of recreational marijuana, making it the most illicit substance widely cultivated, trafficked and abused in the world. Both decriminalization and legalized recreational use have been associated with increased unintentional pediatric ingestion through ingested (sweet food) and vaporized (passive inhalation) forms representing a risk of intoxication⁵.

Drug abuse tests are immunochromatographic tests using single or multi-drug reagent strips. The basic test screen shows five drug classes: amphetamine, cocaine, marijuana, opioids, phencyclidine (PCP) or benzodiazepines. Tests included on other basic screens may vary by medical facility, region, and country-specific³. Although many drugs used are undetected, such as newly developed, plant-derived or synthesized amphetamines (synthetic cannabinoids), they are widely used as hospital screening tests for diagnoses in cases of poisoning.

OBJECTIVE

Given the social and clinical aspects, understanding of drug abuse testing is of paramount importance especially in cases of acute cannabinoid poisoning in children.

METHODOLOGY

This is a bibliographical, descriptive and qualitative review, which had as source of research the databases UpToDate, NCBI Pubmed, Online Library (SCIELO) and Toxicology Manuals. As search descriptors the following terms were used: intoxication, drugs of abuse, recreational use, *cannabis sativa*, and

the inclusion criteria of the articles were those published from 2000 to 2019, in Portuguese, English and Spanish, related to keywords.

DISCUSSION

Studies point out that as cannabis legalization has been authorized, intoxication cases have increased, making it an important factor for knowledge of cannabinoid drug testing. According to Wag⁷, when concentrated hashish resin became more available in France, a corresponding increase in the number and severity of annual hospitalizations occurred among infants and young children as well as after legalizing recreational marijuana use in Colorado, annual calls Regional Center for Pediatric Marijuana Control increased 34% on average to 6 cases per 100,000 population, which was almost double the rate for the rest of the United States.

Epidemiological data describe exposure to oral ingestion, either by the use of highly concentrated food or incentive or passionate inhalation. Noroya and collaborators⁵ report a picture of poisoning by an 8-year-old girl after eating a chocolate cake containing cannabis flowers ("buds") made by a 22-year-old brother. Hospitalization is seen more in children than in adults, with toxic doses being poorly defined, depending on the degree of signs and symptoms. Heizer JW et al² define an estimated dose requiring hospitalization 7.13 mg / kg, but 3.2 mg / kg THC led to minimal medical observation and intervention.

Clinical determination is a crucial point for the confirmation of the toxic agent and for the possible therapeutic approaches. Cannabinoid poisoning in children has acute neurological symptoms marked by drowsiness, lethargy, hyperactivity, irritability, agitation, confusion, mydriasis, nausea and vomiting, sympathomimetic effects (tachycardia and hypertension). Bradycardia \ hypotension and seizures may occur, being less seen. Overdoses (large intakes of concentrates) may occur with apnea or depressed breathing. Slurred speech,

red eyes, inattention, and concentration are all clear signs of cannabinoid poisoning²⁻⁵⁻⁷

Regardless of age, acute *cannabis* poisoning is a clinical diagnosis. However, diagnosis in the pediatric population can be difficult because a history of exposure is often lacking and the symptoms of marijuana exposure are nonspecific. Thus, drug screening in urine may be useful to confirm the diagnosis because any positive result in children identifies acute exposure⁷. Proper interpretation of results should take into consideration the type of test to be performed, the level of suspicion for drug use or exposure (ie, pretest probability), the purpose of obtaining the test, and the likelihood of false positive and false negative results³

Immunoassays are typically the initial screening test used to detect the presence of drugs of abuse or metabolite. Usually providing a result within minutes of sample application, being able to detect low concentrations of a substance with a high degree of specificity, are technically easy to perform and relatively inexpensive². The major marijuana metabolite (11-Nor-9-carboxy-delta-9-tetrahydrocannabinol, THCCOOH) can be found in a child's urine to confirm exposure. This metabolite can be detected for more than seven days after acute exposure and offers preliminary results. The specificity of the test helps exponentially in the diagnosis, because the chemical structure is unique and the immunoassays are directed to THC metabolites, making rare false positive results and very recurrent use in hospitals⁴.

Confirmation techniques allow unambiguous identification of the substance, such as mass spectrometer-coupled gas chromatography (GC / MS), or mass spectrometer-coupled liquid chromatography (LC / MS) that allows additional identification, however, test results confirmatory findings do not return quickly enough to affect clinical care³.

A second test can also be used, point-of-care (POC) tests using urine or saliva perform poorly than manufacturers, particularly for marijuana / cannabinoid detection, in the case of the

departmental POC test. In emergencies or clinical testing, errors in technique and interpretation are more likely, thus requiring specific training for collection and interpretation¹. In both tests they do not detect synthetic cannabinoids and the presence of the drug or metabolite does not necessarily indicate active intoxication, as the drugs can be detected at levels that do not cause clinical effects.

FINAL CONSIDERATIONS

Thus, we can conclude that drug abuse tests used to detect the active metabolite of *cannabis sativa* is an important tool for rapid detection of toxic agents, especially in children, who have more severe clinical manifestations. These tests are easy to perform and cheap, having good specificity through their chemical structure, directing the immunoassay to the toxic agent and confirming the signs and symptoms present. However, with the increase in synthetic drugs, this test may not direct the sample to a possible substance other than natural cannabinoids, making the diagnosis fully clinical.

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