1,4 Butanediol (BD) intoxication: report of the first case in Brazil

Intoxicação aguda por 1,4 Butanodiol (BD): relato do primeiro caso brasileiro

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ABSTRACT

The authors present the case of a patient in coma in an emergency room, with special hemodynamic, respiratory and neurological characteristics due to acute intoxication with 1,4 butanediol; the article includes a literature review.

Keywords: Street drugs; Neurotoxic syndromes

INTRODUCTION

Within the drug abuse category, there are those called “club drugs” or “date rape drugs”\textsuperscript{(1-2)}, that is, drugs used especially for alleged physical-sexual stimulus at parties and “raves”, and also for sedation with posterior amnesia when used mixed with any fluid in order to make sexual assault easier\textsuperscript{(1,3)}. Their use has been reported in adolescents, adults and elderly, and the category includes the well-known “Ecstasy” (MDMA) and some benzodiazepines\textsuperscript{(1)}. Until the 1990s, gamma hydroxybutyrate (GHB) was one of the most popular drugs in the United States, and was also used by those who practice sports and fitness gym users to attain better physical status. It was even sold as a food supplement, until forbidden by the American federal government\textsuperscript{(1)}.

At that point, a precursor of GHB was discovered, 1,4-butanediol (BD), and its ingestion results in the same basic physical and psychological changes. We report the case of a patient who used BD, and presented with typical complications of an overdose. It is also the first Brazilian case reported to the pertinent institutions.

CASE REPORT

A 22 year-old male patient, college student, who practiced martial arts and went to body building exercise centers, arrived home from school after a quick trip to the gym. His parents felt he was a little more euphoric than usual, and soon he began to behave very differently, such as getting food directly from the refrigerator and eating it without warming it first, something that had never happened before. A while later he began to complain to his parents of general malaise, presented vomiting and a light confusional state, when he was taken to the First Care of the Einstein Alphaville Advanced Unit.

The patient arrived walking, conscious, along with his parents, but quickly began losing his level of conscience; his blood pressure – always reported as normal – reached 160X95 mmHg, his heart rate began to fall from 80 beats per minute to 60, and he was immediately put under strict observation, with nasal oxygen and a venous access. With the exception of the blood pressure and heart rate, the clinical examination was unaltered, not even ketonic or alcohol halitus. Equally normal were the neurological examination and ophthalmoscopy, except for decreased level of conscience.
The level of conscience ranged between 6 and 3 on the Glasgow scale, making ventilatory assistance and atropine necessary. The ECG was normal and sinusual, except for low heart rate. Complete blood count, sodium, potassium, urea and creatinine were within normal parameters. Brain CT scan with no contrast enhancement was normal. The presumptive diagnosis was metabolic disorder or exogenous intoxication.

The relatives informed no significant past history and did not know about drug use by the patient. However, one of the patient’s relatives called colleagues from the same gym, who declared that the young man without been offered a solution with BD diluted in a lict “energetic drink”, with the alleged objective of improving muscular performance. The patient was informed that it was a natural substance and Wihant contraindications, since the patient had always stated being against using illicit drugs. However, he was going to take part in a sports competition and this, in theory, could improve his performance in terms of physical preparation. It was discovered that about 10 ml of BD had been diluted in a glass of “Red Bull”. Approximately 30 minutes after arriving at the emergency room, he recovered consciousness entirely, with cognitive functions preserved, but became sleepy again after a few minutes. Basic respiratory and heart care were maintained, in addition to increased intravenous solution volume. After about twelve hours the patient had completely recovered to his normal state.

DISCUSSION

BD is converted into GHB in the liver by the same enzymes that metabolize alcohol\(^{(1,4)}\). Its action is not immediate: the conversion described only takes place after passing through an alcohol-dehydrogenase. The literature describes that it has the same toxic actions of alcohol intoxication and as of propylene glycol\(^{(7)}\). However, its use is not absolutely safe, and if associated with alcohol it leads to more significant and potential effects. BD use is also reported not to cause the exact same effects of GHB, and the most common symptoms are nausea, vomiting, dizziness, behavioral changes, sleepiness, coma, and gastric and kidney disorders\(^{(1,4-6)}\). The probable action of BD in the central nervous system may be its effects, similar to GHB, on the GABAergic system\(^{(7)}\). The utilization of BD leads to the feeling of hangover, which does not occur with GHB, and although its utilization up to now has been occasional, there is evidence that its chronic use may lead to psychological and physical dependence\(^{(5)}\). Its use with “doping” purposes has also been examined\(^{(6)}\). BD use began to grow in the mid 1990s in the United States, after the already mentioned prohibition of GHB. It is important to point out that BD is a licit substance, utilized in the chemicals industry to manufacture polyurethanes, Spandex, as a solvent in other products and even as an excipient of legal drugs and there are even occupational recommendations for those who work with it. As an example, in 1996, 500 thousand tons of BD was used worldwide by the industry\(^{(5)}\). With this information on its regular industrial use, which restricts severely its purchase according to the rules of each country, it began to be sold through the Internet, with fantasy names, disguised as supposedly innocuous soft drinks or vitamin supplements and “fat burners”. A search on the Internet allowed finding several sites that conceal BD selling, with electronic payment and confidential home delivery. The following fantasy names were found up to now: Cherryl fX Bombs, Lemmon fX Dropps, Orange fX, Rush, Thunder Néctar, InnerG, Amino Flex, Rejuv+Nite, Liquid Gold, Thunder, Serenity, X-12, N-force, Fantasy, Georgia Home Boy, BVM, Revivarant, Firewater, Jolt and Enliven. It is unnecessary to repeat that the examples above are transient, because as soon as one of these brands is identified, it disappears from the market and gets a new name. As it is an industrial solvent, its utilization as drug abuse leads to central nervous system depression and, depending on the dose utilized, it can be lethal, and some fatal cases were reported\(^{(4-5)}\).

Serum dosing of BD is not usually available even in the best world centers. There is a study in the literature in which the authors used gas chromatography to determine the presence of BD in patients with clinical suspicion, having identified nine cases, two of which lethal\(^{(4)}\). The cases had dosages of 5.4 to 20 g in peripheral blood; the others ranged between 1 and 14 g. There is a case report with seizures\(^{(8)}\), in addition to a curious report case in which the concomitant use of ethanol delayed the classical effects of the ingestion of BD\(^{(9)}\). When the use is suspected, or confirmed as in the present case, strict surveillance measures, intravenous hydration (because it is completely eliminated through the kidneys within 28 hours\(^{(1,4)}\), ventilatory and hemodynamic care, and if necessary atropinization completely revert the acute overdose.

CONCLUSIONS

BD is a new drug even in the international scenario, and the first intoxication case in Brazil, reported in the present paper, could only be identified thanks to information supplied by the patient’s relatives. The case was reported to the Municipal Intoxication Center of Sao Paulo, to the Intoxication Center of the Hospital das Clínicas da FMUSP – CEATOX, and to the Brazilian Reference Center for Drug Intoxications (CEBRID) of
the Universidade Federal de Sao Paulo – UNIFESP. The institutions had data from the literature, but had no knowledge of any actual case in our country. The report is especially valid to draw the attention of emergency professionals, intensive care professionals, neurologists, toxicologists and other professionals that work in emergency services and that may face similar cases, given the utilization may be lethal. Although treatment is relatively simple, there is no laboratory method available to confirm ingestion of BD.

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