

Acute mercury poisoning from occult ritual use

Radu Ciprian Țincu¹, Cristian Cobilinschi², Zoie Ghiorghiu¹, Radu Alexandru Macovei^{1,3}

¹ Anaesthesia and Intensive Care – Toxicology Unit Department, Clinical Emergency Hospital, Bucharest, Romania

² Anaesthesia and Intensive Care Unit Department, Clinical Emergency Hospital, Bucharest, Romania

³ Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

Abstract

Mercury exposure is a serious environmental issue that concerns people worldwide. Industrial emissions containing mercury, some pharmaceutical and cosmetic products represent exposure sources. In Romania, as in many other countries, a supplementary cause for mercury exposure is represented by various occult rituals where liquids containing mercury are supposed to be ingested. We present the case of a 28 year old female who was admitted to the hospital for oral paresthesia, nausea, vertigo and sialorrhoea, after ingesting 100 ml diluted liquid mercury during an occult ritual. After the gastrointestinal decontamination, including gastric lavage, activated charcoal and cathartics, the outcome was favourable and 48 hours after admission the patient was discharged. This case report emphasizes the importance of an early digestive decontamination in mercury poisoning and the danger of mercury ingestion during various occult rituals.

Keywords: mercury poisoning, occult rituals, early decontamination

Received: 28 January 2016 / Accepted: 14 March 2016

Rom J Anaesth Int Care 2016; 23: 73-76

Introduction

Mercury exposure is a serious environmental issue that concerns people around the world [1, 2]. Some pharmaceutical and cosmetic products, in addition to some old medical instruments represent supplementary exposure sources. A significant exposure to organic mercury (methyl mercury) comes from eating fish [2, 3].

All of the three existing forms of mercury (elemental mercury, inorganic mercury salts and organic forms, primarily methyl mercury) have proved to be toxic, having different target-organs [2, 4, 5].

Elemental mercury or metallic mercury (Hg⁰) is a dense silvery metal, liquid at room temperature. Because of its high vapour pressure it volatiles rapidly

and is capable to reach a balance with the atmosphere of a closed space. Inhalation is the major exposure route. Up to 80% of elemental mercury is rapidly absorbed through the lungs, but absorption of liquid form from the gastro-intestinal tract is < 1%, and negligible through the skin [4]. Although rarely reported, clinical signs of Hg⁰ ingestion are similar with those found in inorganic mercury (mercury salts) exposure [5].

Elemental mercury can be found as a source of exposure in laboratory instruments (thermometers, barometers), dental amalgam, incandescent lights and Hg-based substances used in ritualistic practices. The occult rituals represent an important source for exposure and poisoning with elemental mercury. People from Latin-American and Caribbean communities frequently use mercury as the main element in occult activities such as worshipping Saints (Santeria), invoking health and luck (Espiritismo) or Voodoo religious practices [6, 7]. Santeria followers believe that mercury's supernatural powers are determined by its liquid nature, having the ability to protect people against evil [8]. Moreover, in other traditional cultures, mercury has been used to treat digestive problems (empacho) [9].

Address for correspondence: Dr. Cristian Cobilinschi
Spitalul Clinic de Urgență București
Str. Floreasca nr. 8
014461 București, România
E-mail: cob_rodion@yahoo.com

In Romania, occult practices involving elemental mercury imply mostly drinking liquids with mercury in order to protect marriage or to have good luck and money. Traditional Romanian witchcraft which implies putting mercury in hidden places of the house is used to curse one's enemies. Although in Romania there are no places to buy mercury or other products for occult rituals, this type of practice using mercury is highly popular. As proof, in our department, which is the National Poisoning Centre, approximately 200 cases are admitted per year.

Here we describe a patient who was admitted for gastrointestinal complaints after ingestion of liquid mercury during an occult ritual.

Case report

After obtaining the patient's consent, we present the case of a 28 years old female transferred to the ICU – Toxicology Department of the Clinical Emergency Hospital Bucharest, from a county unit, after ingesting about 100 ml of liquid mercury mixed with water, while she was participating in an occult ritual. Immediately after ingestion the patient presented oral paresthesia and nausea. Five hours after ingestion she went to the county hospital, with vertigo and sialorrhoea. At the recommendation of the Poisoning Centre from the Clinical Emergency Hospital Bucharest, an abdominal X-ray was performed and gastric lavage was rapidly initiated. The first abdominal radiograph revealed multiple high intensity opacities (metal) into the jejunum (Figure 1).



Fig. 1. Plain x-ray showing high intensity opacities (metal) in the jejunum

Three hours later the patient was transferred to the ICU-Toxicology Department of the Clinical Emergency Hospital. On admission the patient presented anxiety, dizziness, pale skin, nausea and mouth paresthesia. On examination the patient had no fever,

no shortness of breath. She was tachycardic (HR = 115 bpm), with a blood pressure of 124/85 mmHg and good peripheral perfusion. Electrocardiography showed no abnormality, except tachycardia. The abdomen was soft but with diffuse tenderness. Diuresis was present with normochromic urine. Preliminary laboratory results showed normal full blood count (Hb 142 g/L, Hct 37%, Plt 300000/ μ L, Leuc 8000/ μ L), no electrolyte imbalance (plasma sodium 140 mmol/L potassium 4.7 mmol/L) or kidney injury (urea 30 mg/dL, creatinine 0.7 mg/dL). Blood and urine mercury concentrations were determined on admission in our department, at approximately 8 hours after ingestion. The results were under the toxicity threshold, 0.56 μ g/L in the blood and 0.38 μ g/L in urine. Blood and urine mercury measurements after 24 and 48 hours revealed similar mercury concentrations.

Fluid replacement was initiated in combination with gastric protection, antiemetic and diuretic therapy. Vitamin supplementation and antioxidant therapy was also added. We performed continuous digestive decontamination by administering 25 mg mannitol p.o., 20 g lactulose and Ricinus communis oil 15 mg.

Twelve hours after ingestion the abdominal X-ray showed that the opacities had progressed distally into the sigmoid colon and rectal ampulla. Superior digestive endoscopy was performed, with no particular findings. Taking into account that all blood and urine mercury values were under the toxicity threshold, no chelator treatment was administered. 48 hours after admission the patient was discharged in good condition. One month reevaluation indicated normal general status, blood and urine mercury concentrations were normal as well as the abdominal radiograph.

Discussion

Occult rituals which involve elemental mercury represent a frequent cause of mercury poisoning in our country. In the Latin-American and Caribbean communities, where occult rituals with mercury are very popular, the exposure usually involves mercury vapour inhalation from burning candles or after spreading it inside houses or cars [10]. In Romania it is thought that mercury's supernatural powers occur only after it is drunk. The availability of mercury in trade is very restricted in the European Union, unlike the United States or South America. The most important mercury sources in the United States are represented by scientific laboratories, old abandoned factories or specialized local stores in Hispanic neighbourhoods, called *botanicas*, *herbaristerias* or *yerbarias* [9]. In our country, a major source of mercury for these occult rituals is represented by the

mercury black market, which is well organized in East-European countries. Another toxic source might come from old mercury thermometers that are nowadays banned.

Because the elemental mercury is poorly absorbed in the gastrointestinal tract, no significant toxicological effects are observed after ingestion. Acute poisoning usually occurs by mercury vapour inhalation, causing respiratory and neurological symptoms. Hg° ingestion can produce worse damage, if gastrointestinal lesions are associated [5, 11]. Whatever the exposure route is, nephrotoxicity can appear, given the route of elimination [1].

Our patient presented some of the poisoning classical signs, and detection of mercury in blood and urine confirmed the probability of a mercury poisoning. The low plasmatic and urinary mercury levels could be explained by the delayed mercury measurement (8 hours after ingestion), and the prompt initiation of gastrointestinal decontamination. However, given the reduced gastrointestinal Hg° absorption, a severe toxic effect is debatable. Reports have shown that elemental mercury has been ingested in large quantities without obvious toxic manifestations [2]. An increased gastrointestinal permeability and absorption probably did not occur in our case. The 28 years old patient had no previous gastrointestinal disorders, and the gastric endoscopy performed 12 h after ingestion revealed a normal mucosa. However, an immediate local irritation after ingestion cannot be excluded. A wide variety of micro-environments and individual physiological differences may influence the individual absorptive capacity and explain the poor correlation between blood and urine levels and clinical symptoms [12]. Some of the complaints such as anxiety, dizziness, nausea, could be influenced by the patient's psycho-emotional status. As the patient did not offer any explanation the possibility of a concomitant mercury vapour inhalation or an accidental pollution of the ingested solution with mercuric salts cannot be excluded. Gastrointestinal symptoms similar to those after mercuric chloride ingestion, mouth paresthesia, nausea and sialorrhoea were reported in our patient.

Mercury poisoning treatment consists primarily of exposure cessation and of the reduction of mercury concentrations in critical organs or injured sites [11]. Early gastrointestinal decontamination is recommended in spite of Hg° 's low absorption rate, whilst serial abdominal X-rays are performed as part of the follow-up of the patients [1]. Gastric lavage should be performed within the first 6 hours, controlling lavage efficacy through serial abdominal X-rays. Although controversial, activated charcoal should be used, because unlike heavy metals, mercury binds charcoal tightly [1, 13]. After Hg° ingestion a superior digestive endo-

scopy can be performed in order to find any digestive lesions, which may increase mercury absorption [5].

A chelator treatment including Penicillamine, Dimercaprol (BAL) or its water-soluble analogues was avoided in this patient, as it can be associated with severe adverse effects [1]. Moreover, it has been suggested that some agents can mobilize mercury in other tissues such as the nervous tissue, aggravating encephalopathy [5]. In our case the efficient gastrointestinal decontamination avoided the chelating agent administration.

Conclusions

Mercury exposure can cause important lesions in almost every organ of the body. This case report emphasizes the importance of early digestive decontamination in cases of mercury poisoning. Although oral exposure is not the main pathway of mercury exposure, early recognition and intervention may prevent long-term digestive or renal complications. Moreover, the prevention of mercury absorption makes chelating agents administration no longer necessary, so that severe secondary effects of this therapy can be thereby avoided. Although it may be hard to believe, nowadays, occult rituals are extremely popular and despite all legal measures related to the mercury trade, its availability is very high, so that the number of patients intoxicated with elemental mercury is still growing.

Conflict of interest

Nothing to declare

References

1. Rafati-Rahimzadeh M, Rafati-Rahimzadeh M, Kazemi S, Moghadamnia AA. Current approaches of the management of mercury poisoning: need of the hour. *Daru* 2014; 22: 46
2. Ozuah PO. Mercury poisoning. *Curr Probl Pediatr* 2000; 30: 91-99
3. Zahir F, Rizwi SJ, Haq SK, Khan RH. Low dose mercury toxicity and human health. *Environ Toxicol Pharmacol* 2005; 20: 351-360
4. Gochfeld M. Cases of mercury exposure, bioavailability, and absorption. *Ecotoxicol Environ Safety* 2003; 56: 174-179
5. Bensefa-Colas L, Andujar P, Descatha A. Intoxication par le mercure. *Rev Med Interne* 2011; 32: 416-424
6. Wendroff AP. Magico-religious mercury exposure. *Environ Health Perspect* 1997; 105: 266
7. Johnson C. Elemental mercury use in religious and ethnic practices in Latin American and Caribbean communities in New York City. *Popul Environ* 1999; 20: 443-453
8. Riley DM, Newby CA, Leal-Almeraz TO, Thomas VM. Assessing elemental mercury vapor exposure from cultural and religious practices. *Environ Health Perspect* 2001; 109: 779-784
9. Masur LC. A review of the use of mercury in historic and current ritualistic and spiritual practices. *Altern Med Rev* 2011; 16: 314-320

10. Ozuah PO. Folk use of elemental mercury: a potential hazard for children? *J Natl Med Assoc* 2001; 93: 320-322
11. Park JD, Zheng W. Human exposure and health effects of inorganic and elemental mercury. *J Prev Med Public Health* 2012; 45: 344-352
12. Florentine MJ, Sanfilippo DJ 2nd. Elemental mercury poisoning. *Clin Pharm* 1991; 10: 213-221
13. Beasley DMG, Schep LJ, Slaughter RJ, Temple WA, Michel JM. Full recovery from a potentially lethal dose of mercuric chloride. *J Med Toxicol* 2014; 10: 40-44

Intoxicația acută cu mercur în cadrul ritualurilor oculte

Rezumat

Expunerea la mercur reprezintă o problemă de mediu actuală, care îngrijorează populația din întreaga lume. Emisiile industriale, care conțin mercur, anumite tipuri de produse farmaceutice sau cosmetice sunt

surse de expunere pentru intoxicația cu mercur. În România, precum și în multe alte țări, o cauză suplimentară a intoxicației cu mercur este reprezentată de numeroase ritualuri oculte, în cadrul cărora este practică ingestia de lichide ce conțin mercur.

Prezentăm cazul unei paciente de 28 de ani, transferată în departamentul nostru pentru parestezii bucale, vertij și sialoree, apărute după ingestia a 100 ml de mercur în timpul unui ritual ocult. După decontaminarea gastrointestinală, care a inclus lavaj gastric, administrarea de cărbune activat și laxative, statusul clinic a fost favorabil, astfel încât la 48 de ore de la internare pacienta a fost externată.

Această prezentare de caz subliniază importanța decontaminării digestive precoce în cazul intoxicației cu mercur și riscurile ingestiei de mercur în cadrul diverselor rituale oculte.

Cuvinte cheie: intoxicație cu mercur, ritualuri oculte, decontaminare precoce