



Case report

Acute mercury vapor poisoning in a 3-month-old infant: A case report

Zhenyan Gao^a, Xiaolan Ying^a, Jin Yan^a, Ju Wang^a, Shizhong Cai^b, Chonghuai Yan^{a,*}^a Ministry of Education-Shanghai Key Laboratory of Children's Environmental Health, Xinhua Hospital, Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China^b Children's Hospital of Soochow University, Suzhou, China

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ABSTRACT

Background: We investigated the clinical characteristics of a 3-month-old infant with acute mercury vapor poisoning. Clinical symptoms of acute mercury poisoning in infants include acute onset, rapid progression, severe illness with respiratory symptoms that may result in pneumothoraces and aspiration pneumonias.

Case presentation: A 3-month-old girl presented with pneumothoraces and respiratory failure to the hospital. Two days before hospitalization, the girl had stayed in a room containing mercury vapor for several hours. She was hospitalized for acute mercury poisoning. We used sodium dimercaptosulphonate (DMPS) for treatment.

Conclusion: Pulmonary disease was mainly induced by the inhalation of mercury vapor. The disease was characterized by acute respiratory distress, pneumothorax and acute chemical pneumonitis. It responded to chelation therapy with the agent DMPS.

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1. Introduction

Mercury (Hg) is a volatile silver-colored liquid at room temperature when, if heated, evaporates quickly becoming highly toxic if inhaled. There are 3 main forms of Hg that differ with respect to their toxicokinetics regarding absorption, distribution, and accumulation in the body. Metallic (elemental) Hg is lipophilic and is stored in fatty tissues. By inappropriately handling or cleaning up of spilled Hg, individuals often can be exposed to elemental Hg and which in turn can be ingested, inhaled or taken subcutaneously [1], or intravenously [2–3]. Hg in inorganic compounds vary in water solubility. In general, organic Hg, especially methylmercury, is the most dangerous form of Hg to human health. Consumption of contaminated fish is the most common source of organic mercury poisoning [4]; other sources include medical equipment such as thermometers and blood pressure measuring instruments. The most harmful form of Hg poisoning is by inhalation of Hg vapor [5]. It can lead to pneumonitis, respiratory distress syndrome, and even death [6].

Children are exposed to Hg through primary and secondary pollution, such as through air, water, food, and soil. Most of the emitted Hg is in the form of gaseous elemental Hg that can be inhaled. At-home occupational activity is a common reported source of exposure to Hg vapor [7,8], but there is so little in the literature on this age group among infants. Infants with acute Hg poisoning develop dyspnea, cough, severe pneumothoraces and respiratory failure. After exposure to Hg vapor, the history of Hg vapor exposure is often not considered initially which can easily lead to misdiagnosis and delay in initiating

appropriate treatment. We now report the case of a 3-month-old infant who developed acute Hg poisoning and eventually developed pneumothorax and respiratory failure. It highlights the need to include consideration of Hg exposure in patients with unexplained severe respiratory symptoms [9].

2. Case presentation

2.1. General information

The patient was a 3-month-old girl who had been remained in a room containing Hg vapor for several hours, 2 days before she was hospitalized.

2.2. The clinical manifestations

Two days prior to admission, she had a sudden onset of cough which was paroxysmal and rough sounding, accompanied by purplish lips, groaning, slight shaking of limbs, and depressed appearance. She remained conscious, did not develop fever, vomiting or diarrhea. She was taken to the children's hospital of Jiangxi province, China, where she was noted to be dyspneic. The computed tomography (CT) of the chest showed the following: inflammation in both lungs, bilateral pneumothoraces, pneumomediastinum, and a small heart shadow. After oxygen therapy and anti-infection treatment, the local doctor considered the baby to be in a critical condition and she was transferred to Xinhua Hospital in Shanghai, China, for further evaluation and treatment. A detailed medical history was obtained from the parents. They reported that the infant had stayed in a room for several hours with her grandmother where she engaged in gold smelting using Hg. The

* Corresponding author.

E-mail address: yanch@shkeylab-ceh.org (C. Yan).

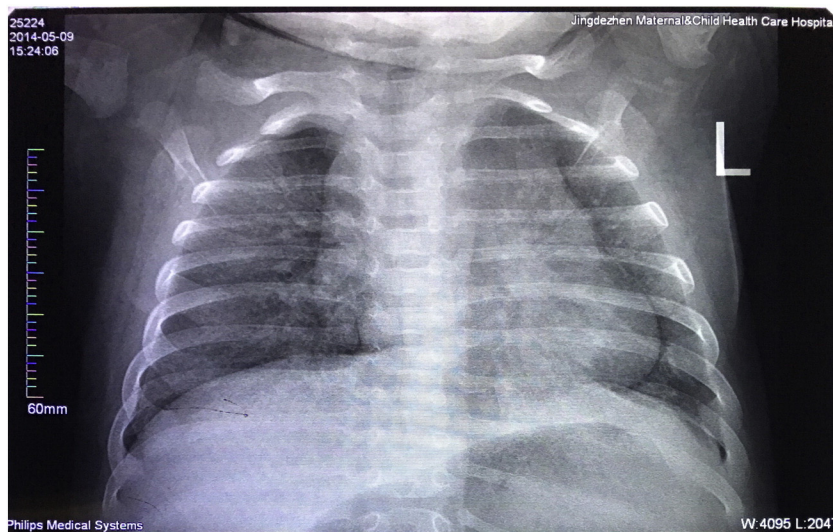


Fig. 1. A. Chest X-ray before the treatment. B. After chelated treatment.

distance between the baby and the work field was 6 m with no protective barriers. Her grandmother also developed respiratory difficulties that night.

On physical examination in Xinhua Hospital, the infant's body temperature was 36.4 °C, with a heart rate of 100 bpm, respiratory rate of 35 times/min, blood pressure of 96/60 mmHg, depressed affect, and perioral cyanosis. Pulmonary examination found decreased air flow bilaterally, without other inspiratory signs. There were no other significant clinical findings. At presentation the infant appeared to have pneumonia based on exam and CT findings; routine blood tests showed that the white blood cell count was increased and declined after antibiotic treatment. Blood gas analyses were consistent with respiratory failure on the first day. After respiratory support treatment was provided, the infant's lung function improved (Table 1).

2.3. Laboratory tests

Blood, urine, stool, blood gas analysis, liver and kidney function tests, chest X-ray, Hg concentrations in blood, hair and urine were examined. Results are given in Tables 2–4. At Xinhua Hospital Hg concentrations were obtained from the infant and her family and the results are summarized in Table 2. The data showed that the infant's grandmother

had high Hg concentrations in her hair, blood and urine. The infant's Hg concentrations were: hair 5257 µg/kg and blood 36.32 µg/l.

2.4. Treatment

Based on the results, the infant was diagnosed with severe pneumonia (changes in stroma), respiratory failure (type II), pneumothorax, and Hg poisoning. Blood oxygen, ECG monitoring, CPAP ventilation, anti-infection treatment, nutrition support, and other comprehensive treatments were provided to improve the respiratory function. Because of the uncertain etiology, no treatment of Hg poisoning was given for the infant when hospitalized. Results of the Hg concentrations indicated Hg poisoning and the decision to chelate was made. Chelation therapy using sodium 2,3-dimercapto-1-propanesulfonic acid (DMPS) was employed. Two courses of treatment were provided with results shown in Tables 3 and 4.

3. Discussion

Elemental Hg is widely used in industrial production processes with resulting pollution of the working environment of adults. Hg smelting and artisanal gold smelting is the children's main pathways of exposure

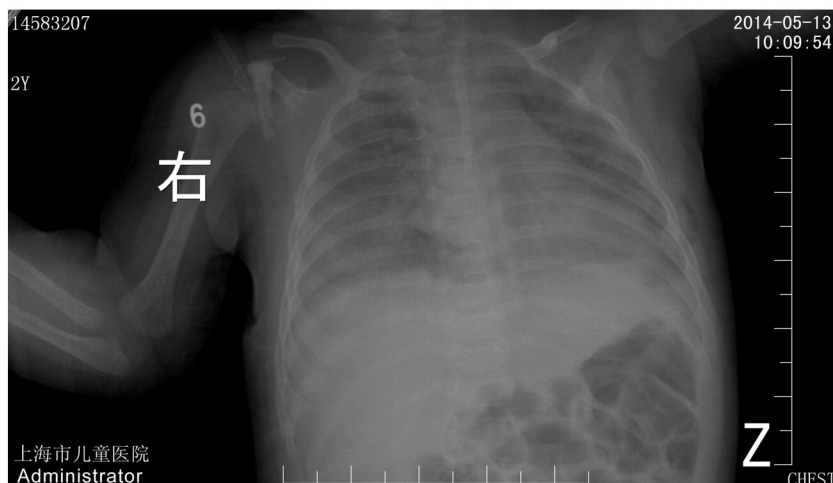


Fig. 2. Chest X-ray After chelated treatment.

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