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Case Report

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Exposure to Mercury Through Gold Extraction: Various Toxicity Signs and Symptoms

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CASE REPORT

A 48-year-old man said that his "skin is starting to peel off" when he called the poison control hotline. He said that about 100 milliliters of elemental mercury, which is used to extract gold, leaked when a container fell off a shelf ten days earlier. He searched the silvery substance for any recoverable gold particles because it was believed that there was still a significant amount of gold in the mercury. When finished, he swept the remaining material beneath a rug and vacuumed out the mercury. Noting that it was a chilly January day, he turned on the heat and pointed out that the room lacked exhaust ventilation. He spent the following week in bed (in this same room) because he thought he might be getting influenza-like sickness (ILI).

The patient was told to report the spill to the county hazardous materials agency and was directed to the local emergency department (ED). His vital signs at the emergency department were within normal ranges. He was observed to have modest erythema and a desquamating rash on both his upper and lower extremities (Figures 1 and 2). He reported that his fingers and lower extremities were numb. A complete blood count and metabolic panel were among the laboratory tests that came back within normal ranges. The results of the chest x-ray and ECG were normal. One week later, the results of a spot urine mercury test and a whole blood mercury test were returned with values of 144 mcg/g creatinine (reference range: non-exposed adult <4 mcg/g creatinine) and 262 mcg/L (reference range: <10 mcg/L), respectively. Four weeks following the initial incident, the patient was referred to the Occupational and Environmental Clinic and seen there. The incident was reported to his county public health office. He mentioned recent psychological changes, such as despair and a diminished interest in social engagement, but denied having any tremor. He said that although his rash had gone away, he still had sensory neuropathy and was experiencing worsening disorientation, numbness in his arms and legs, cold sensitivity, and balance issues. His professional and leisure pursuits, such as dancing, playing an instrument, and woodworking, were restricted by these neurological problems. He mentioned that he had moved away from the mercury spill site. The results of a 24-hour urine collection showed 44 mcg/L of mercury (reference range: <20 mcg/L), and a repeat whole blood mercury level came back at 13 mcg/L. The patient was offered formal neurologic testing, but he was unable to finish it since he did not have health insurance. He didn't follow up after his clinic visit. A possible mercury leak at the household was reported to the county department of public health, but they were unable to get in touch with the patient and the house was not inspected.

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Signs of mercury toxicity

Figure 1: Left arm.

Figure 2: Left arm, closeup.

DISCUSSION

Because amalgamation effectively catches gold and doesn't require more expensive machinery or procedures, small-scale gold mining still occurs. The mercury can be extracted from the gold amalgam by heating it after it has been collected. Frequently, the mercury fumes are not properly handled and released into the environment, where they can be harmful if ingested by humans.One Heat was not used by our patient to metabolize the mercury. He had a big spill that wasn't cleaned up correctly. At room temperature, mercury will volatilize into the air, and vacuuming will help it disperse. Because he swept the leftover mercury beneath a rug, lacked ventilation to the outside, and spent a significant amount of time there, he was further exposed to the mercury vapors.

Inhaling elemental mercury has been shown to have neurotoxic consequences. Mercury is said to be toxic through a reaction with sulfhydryl groups on cellular membrane proteins, which inhibits cellular enzymes.2. Mercury can affect all organ systems since sulfhydryl groups are common. It has been reported that elemental mercury inhalation causes neurotoxicity that affects the central nervous system (CNS), leading to movement problems and neuropsychiatric disturbances. It has been hypothesized that the neurological system is especially vulnerable to mercury because it lacks important detoxifying processes (such as glutathione storage or reduction-oxidation activity). Seldom have peripheral neurological consequences been documented after acute symptoms of the central nervous system. Both sensory and motor neuropathy are included in these accounts.

There are other descriptions of dermal effects, such as a mercury exanthem with symmetrical, diffuse erythematous maculopapular eruptions that start in the proximal extremities and flexural areas a few days after exposure.3. This can imitate an infectious disease and be accompanied by fever, malaise, and thirst. At around 14 days, the situation improves with widespread desquamation, especially on the hands and feet. The diagnosis is made by combining typical features with increased blood or urine excretion levels of mercury and a history of known or suspected exposure. It is evident that our patient was exposed to mercury vapors. In order to assess the residence and document air levels, the county department of public health was sadly unable to get in touch. He had a desquamating rash and lower extremity numbness when he first arrived. At the four-week follow-up, the rash had resolved. Depression, anhedonia, impaired balance, lightheadedness, sensory neuropathy, cold sensitivity, and numbness in his limbs and legs were among his symptoms. Ten days following the original mercury spill, whole blood mercury and urine excretion levels were increased, and they were elevated for four weeks. Every symptom that is in line with a mercury toxicity diagnosis.

Artisanal gold mining has become more popular both domestically and abroad as a result of the rise in the price of gold. Exposure to mercury poses a significant risk.4. Exposure to elemental mercury can be harmful to the neurological and skin systems, among other organ systems. Clinical signs and symptoms can differ. Those who work with jewels or gold recovery need to be more suspicious. Patients who handle seemingly harmless things run a higher risk. Since suspected cases could lead to additional exposures, public health authorities should be informed when they occur.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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