Case report

Acute Mercury Poisoning: A Case Report

ABSTRACT

Lack of public awareness of the health risks related to mercury exposure can lead to careless handling of mercury-containing items, eventually causing morbidity and even death. We present one such case where avoidable mercury exposure was fatal to an infant and caused poisoning in the mother. ~~Public education on poisoning and the potential hazards of mercury are of vital importance for community health.~~ A 36-year-old woman presented to the ~~ED~~ emergency department with a three-day history of abdominal pain, diarrhea, and fever. One week ~~ago~~previously, her daughter had brought mercury in the liquid form from ~~the~~ her school. ~~She had put it on the~~ and placed it in on the heating stove. One day later, her 14-month-old infant sister ~~baby got~~ developed fever and died before admission to the hospital. At the time of presentation, the woman's ~~Her~~ blood pressure was 134/87 mmHg; temperature, 40.2°C; heart rate, 105 bpm ~~and regular~~; respirat~~ion~~ory rate, 18 bpm; and O_2 saturation, 96%. ~~Nothing was~~

Comment [A1]: The current title does not offer sufficient information to generate interest. I would advise you to be more specific.

For example, if the reason this paper is interesting is the treatment method, you could revise the title as "*N*-Acetyl Cysteine Administration as an Effective Empirical Treatment for Acute Mercury Poisoning: A Case Report."

Comment [A2]: Since an abstract should set the context for the case report, I have added these sentences based on the first sentence of the original abstract and on what I understand to be the focus of your main text. Please check if you agree with this addition.

Comment [A3]: Since this sounds more like the conclusion (take-home message), I have moved this to the end of the abstract.

Comment [A4]: The original sentence implied that you were referring to the infant's signs; hence, I have made this revision.

~~remarkable on~~ The results of an examination and routine laboratory tests were unremarkable. ~~As~~ Because ~~serine~~ serum or urinary mercury levels could not be tested in the city, symptomatic chelation treatment with *N*-acetyl cysteine (NAC) was instituted ~~with regard to~~ on the basis of presumptive diagnosis and the woman's recent medical history of mercury exposure. ~~At~~ On the 7th day of admission, she was discharged without any sequelae or complaints. ~~At the discharge day blood was drawn and sent~~ On the day of her discharge, her ~~for~~ mercury levels ~~which turned out~~ was determined to be 30 µg/dL (~~normal~~ reference range: 0—10 µg/dL). For preventive community health, it is critical to implement measures for public education on poisoning and, specifically, the potential hazardous effects of mercury since it is a component of several household items.

BACKGROUND

Mercury poisoning can occur because of occupational hazards or suicide attempts, and acute and chronic mercury exposure is a potential threat to community health. Mercury is silver-colored and exists in the liquid state at room temperature. ~~Mercury~~ It is available in inorganic and

Comment [A5]: Are you referring to a physical examination? Please specify.

Comment [A6]: "Serine" is an amino acid. From the context, I believe you intended to say *serum* instead and have accordingly made that change.

Comment [A7]: I'm afraid this part is slightly unclear in context. Did you instead mean that there was no facility in the hospital or surrounding area that was equipped to determine serum or urinary mercury levels? Please elaborate.

Comment [A8]: Please specify if this was the blood or serum level.

Comment [A9]: I have revised this sentence to make it sound more like a directive, which is what a conclusion of such case reports should ideally be.

Comment [A10]: I have added this content to justify your focus on mercury poisoning. Please check if this is what you had in mind.

Comment [A11]: In its current form, your background sets no context for the importance of your case report. Based on my understanding of your case, I suggest that you add these sentences to the start of the background:

"Insufficient public awareness of health hazards due to mercury exposure is a major concern because mercury is present in several items that are used regularly. Such ignorance can lead to negligent handling of these items, eventually causing morbidity and even death."

Comment [A12]: It may be relevant to comment on what the most common causes of mercury poisoning are and provide a reference.

organic forms. A~~A~~ll its compounds ~~of mercury~~ are toxic but differ in their routes of absorption~~,~~ and clinical ~~findings~~effects~~,~~; ~~and responses to therapy~~therapeutic approaches for treating toxicity caused by them also differ. Methylmercury, ~~the~~ a soluble form of mercury, is neurotoxic. Elemental ~~(organic)~~ mercury is especially hazardous for children since it is in the liquid form and can easily be found around [1]. ~~Acute and chronic mercury exposure represents a potential threat to community health. Mercury poisoning can occur as a result of occupational hazard or suicide attempt.~~

The clinical effects of mercury poisoning depend on the form and the route of entry ~~to the organism~~. Neurologic, gastrointestinal, and renal systems ~~are~~ may be predominantly affected depending on the route of exposure.

This article presents the case of a 36-year-old ~~case~~ woman admitted to the emergency department (ED) with nausea, vomiting, and diarrhea caused by accidental inhalation of and skin exposure ~~of~~ to metallic mercury.

CASE PRESENTATION

Comment [A13]: Please check if these changes convey your intended meaning. The compounds themselves cannot have *findings*, so I have used "effects" instead. Also they cannot have responses to therapy, so I have assumed you are talking about therapeutic approaches differing according to the type of compound.

Comment [A14]: This information does not seem very relevant since you don't mention methylmercury again. Please consider removing this sentence.

Comment [A15]: The original phrase appeared contradictory. Elemental mercury is mercury in uncombined form, whereas organic mercury would refer to an organic compound of mercury. Since you've referred to the liquid form, I assume you're referring to the elemental uncombined form.

Comment [A16]: This phrase implies that mercury in its liquid state naturally occurs in a home environment, which is not true. Did you instead mean that liquid mercury is found in common household items like fluorescent light bulbs and thermometers?

Comment [A17]: This discussion of the form and route of entry will be important only if you intended to focus on these aspects in your paper, which does not seem to be the case. Please review if you want to omit this.

Comment [A18]: Before you state what your case is about, please explain why this report should be of interest to your readers. What was novel or different about this case of mercury poisoning? Was it the manifestation, the novelty of treatment, the fact that this is a stark example of risks of unawareness/negligence?

Comment [A19]: Many journals require authors to mention that they acquired written informed consent from the patient whose case report is submitted for publication. Please mention if this was done.

A 36-year-old woman presented to the ED with a three-day history of abdominal pain, diarrhea, and fever. One week ~~ago~~previously, her daughter had brought mercury in the liquid form from the school without permission from her teacher. She had played with the mercury~~,~~ and then ~~put~~ placed it on the heating stove and watched its vaporization~~. Meanwhile,~~ while her mother breast-fed her 14-month ~~-~~old ~~sister~~infant. ~~24 hours~~ One day after this event, ~~her baby~~ the infant ~~got~~ developed fever and died before admission to the hospital, without any specific diagnosis. The autopsy report ~~disclosed a suspected~~ suggested mercury poisoning, which might have led to cardiorespiratory collapse ~~resulting in~~ and, eventually, death ~~of the infant~~.

At the time of presentation, ~~On examination, her~~ the woman's blood pressure was 134/87 mmHg; temperature, 40.2°C; heart rate, 105 bpm ~~and regular~~; respirat~~ion~~ory rate, 18 bpm; and O_2 saturation, 96% ~~with~~ as determined by pulse oximetry at room temperature. Her fever ~~relieved~~ resolved after administration of 1 g ~~r~~ paracetamol, while arterial ~~oxygen~~ O_2 saturation rose to 98% with supplemental oxygen.

~~Nothing was remarkable in her~~ The results of head-and-neck, respiratory, cardiovascular, ~~or~~ and abdominal examinations were unremarkable. A ~~N~~neurological examination ~~did not reveal~~

Comment [A20]: Would it be relevant to mention the age of the daughter?

Comment [A21]: Please specify which exact findings suggested mercury poisoning.

Comment [A22]: Please mention the dosage and administration route.

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showed absence of ~~any~~ tremors, paresthesia, ataxia, spasticity, or hearing and vision loss. No ~~N~~neuropsychiatric abnormalities were ~~not identified~~detected.

The results of the ~~C~~complete blood count~~,~~ and urinalysis were normal, and the levels of sodium, potassium, blood urea nitrogen (BUN), creatinine, aspartate aminotransferase (AST), alanine aminotransferase (ALT), and bilirubin levels were within the ~~normal~~ reference ranges as well. Chest ~~X-ray~~radiography and cranial computed tomography revealed no ~~findings~~ signs of disease.

~~As~~ Because ~~serine~~ serum or urinary mercury levels could not be tested in the city, symptomatic chelation treatment with *N*-acetyl cysteine (NAC) was instituted ~~with regard to~~ on the basis of presumptive diagnosis and the woman's recent history of mercury exposure. ~~At~~ On the 7th day of admission, she was discharged without any sequelae or complaints. ~~In~~ On the same day, ~~blood was drawn and sent for~~ her mercury level~~s~~ ~~which turned out~~ was determined to be 30 μg/dL (hospital laboratory's ~~normal~~ reference range: 0–~~–~~10 μg/dL ~~in accord with the hospital laboratory reference~~). Her symptoms guided the treatment and her laboratory results took three days to be officially reported.

Comment [A23]: Please refer to comment A7.

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Comment [A24]: At which point was this history acquired? After the autopsy of the infant suggested mercury poisoning? Or did the patient herself relate the incident of her other daughter handling mercury? Was the patient's general medical history acquired? Please specify this.

Comment [A25]: Please remember to specify if this is the blood or serum level.

Comment [A26]: This sentence is slightly unclear. You have already mentioned earlier that she was given symptomatic treatment. Did you mean that she was asked to continue the same medication after discharge?

Further, in the previous sentence, you say that on the day of the discharge, the blood sample was taken and her mercury level determined. So the statement that her results took three days to be reported sounds contradictory.

Please clarify so that that I can suggest a suitable revision.

A week after the discharge, the patient revisited the ED ~~due to~~ because of recurrent abdominal pain. The results of a ~~P~~physical examination and laboratory test~~s results~~ were unremarkable, and she was discharged after a 24-hour observation. A ~~F~~follow-up was scheduled for one week later. In the follow-up visit, the patient was asymptomatic and ~~without any~~ no clinical ~~finding~~signs were noted. Therefore, NAC treatment was ~~terminated~~ discontinued after 14 ~~treatment~~ days from the time of her first discharge. The other children did not exhibit any manifestations of the disease.

CONCLUSION

Children are ~~always~~ often attracted ~~to~~ by elemental mercury ~~with~~ because of its ~~bright~~ shiny gray appearance [2]. ~~The compound has a short half-life in the blood due to rapid distribution into body compartments. Half-life in the body is only two months.~~ Almost all of the absorbed amount is excreted via urination [3]. Mercury is used for the manufactur~~inge~~ of industrial chemicals, paints, explosives, batteries, thermometers, sphygmomanometers, electronic instruments, etc. ~~Different m~~Mercury compounds are used as antiseptic and diuretic agents in medicine [1]. It is also an ingredient in the drug ~~T~~thiomersal, which is used to prevent contamination of vaccines.

Comment [A27]: The time period was not very clear in the original sentence. Please check if the revision captures what you meant. If not, please return with a clarification and I will be happy to offer an alternative.

Comment [A28]: You have mentioned only one child other than the infant who died. If you are referring to this child, please replace this phrase with "other child."

If the woman had more children, please mention so early on in the case report so that this sentence does not confuse readers.

Comment [A29]: Since you are not referring to any particular disease but just toxicity, I suggest that you replace this phrase with "signs of mercury poisoning."

Comment [A30]: Please explain why this is significant. You could add something like "Therefore, it is very important to educate the public about keeping mercury-containing items away from children's reach."

Comment [A31]: This information is not very relevant here. If you plan to discuss later in the text which clinical tests (urine vs. blood tests) are more reliable, you can add this sentence there.

All of these articles are accessible to both children and adults in their environments, and exposure can lead to acute or chronic poisoning.

Mercury has a short half-life (two months) in the blood since it is distributed rapidly among body compartments. Acute inhalations of mercury vapors can cause pneumonia, adult respiratory distress syndrome, progressive pulmonary fibrosis, and death. Also Further, elemental (metallic) mercury can readily pass into systemic circulation via alveoli present in mercury vapor or directly through the skin. It is also known to pass directly from nursing mothers to infants via breast milk [4]. Predominance of gastrointestinal symptoms and historical findings suggest intoxication with elemental mercury in the present case.

All kinds of Various neurological findings manifestations can be seen occur in chronic mercury exposure. Some effects of high-dose mercury inhalation are shown on in Table 1 [4,5]. A recently published recommendation guideline stresses that ""if the elemental mercury was recently heated (e.g., from stove top, oven, furnace) in an enclosed area, all people within the exposure area should be evaluated at a healthcare facility due to the high risk of toxicity (Grade C)"" [1].

Comment [A32]: Since this case is about acute exposure, this information is unnecessary. Please consider removing it.

Comment [A33]: How will this information be relevant to your case? Please elaborate.

Comment [A34]: I have not made any changes to this portion since it is a direct quote from a referenced paper.
Further, mentioning this guideline is appropriate only if this was followed in your case or if you have anything further to add to this guideline. Please check if you want to add information relevant to these points.

Comment [A35]: I suggest moving this paragraph to just before the conclusion because it currently distracts the reader from your discussion of the case.

~~Findings in history played a critical role in the diagnosis in the present case~~In the present case, ~~.~~ ~~I~~inquiry for additional acid, alkali, arsenic, phosphorus, or iron ingestion did not yield any suspicious finding. Further, no clinical tests for blood or urinary mercury levels could be performed to confirm mercury poisoning. Death of a previously healthy baby in 24 hours prompts consideration of necrotizing bronchitis, pneumonia, or respiratory distress syndrome [7]. In our case, since the patient reported recent exposure to mercury, the inhalation of mercury by the infant was thought to be the main cause of death. Therefore, in the case of the woman, although no clinical confirmation was available, the ~~H~~history of ~~exposure to~~ mercury exposure, gastrointestinal symptoms, and suspicious death of the breast~~–~~fed ~~baby~~ infant led us to the presumptive diagnosis of acute mercury poisoning~~.~~ and to the decision to administer NAC. It can be postulated that ~~in the present case~~ neurotoxicity in the woman was prevented by the NAC treatment ~~which~~ that was instituted empirically ~~based on clinical symptoms and history although blood and urine mercury levels were not determined at the time of admission~~.

~~Death of the previously healthy baby in 24 hours prompts consideration of necrotizing bronchitis, pneumonia or respiratory distress syndrome [7]. Inhalation of mercury by the baby can be thought to be the main reason of death.~~

Comment [A36]: I'm not altogether sure what you mean by "inquiry for…" Did you question the patient if she had ingested any of the items mentioned? Or were tests performed to determine these levels? Please elaborate.

Comment [A37]: This statement should ideally be followed by a comment on whether any of these causes were identified in the infant.

Comment [A38]: You have not cited reference [6] anywhere in the text. Please correct this discrepancy.

~~Initial treatment is keeping the patient away from the environment and toxic agents.~~ NAC is used for chelation of mercury, ~~due to lack~~ in the absence of other treatment options. ~~Basically it~~NAC binds mercury ~~by~~ through its cysteine groups [1]. ~~The~~ Other mercury-chelating drugs commonly ~~with~~ used worldwide ~~application~~ are dimercaprol or British anti-Lewisite (BAL), dimercaprosuccinic acid (DMSA), and 2,3-~~D~~dimercapropropane-1-sul~~phf~~onate (DMPS) ~~British Anti-Lewisite (BAL)~~ (2.5 mg/kg) ~~is also commonly used in the treatment~~ [1, 8].

The immediate precautionary measure when mercury poisoning is suspected is to isolate the patient from the contaminated environment and the toxic agent.

This case report emphasizes the importance of public education on poisoning and specifically, the potential hazardous effects of mercury for preventive community health.

Comment [A39]: If these drugs can also be used empirically, please elaborate why you chose NAC. Else it is not clear how this information is relevant to your case.

Comment [A40]: Please follow this statement by adding whether the patient and her family members were isolated and whether this may have prevented severe manifestations in both the mother and her other child. Else this information is not important.

Comment [A41]: The conclusion ends rather abruptly. It does not justify the uniqueness of your case. While you mention the importance of public awareness, you do not provide any novel directions for either awareness measures or clinical practice.

Your paper has much interesting content, but it currently suffers from a lack of clear direction. Why should a journal consider this case interesting? What new ideas can your case report provide?

Please review your case report critically and see what further insights you can add. Case reports are accepted by most journals only if they convince them of their uniqueness and importance in the field.

REFERENCES

1. Caravati ~~E.M.,~~EM, Erdman ~~A.R., Christinson~~AR, Christianson G~~.~~, Nelson ~~L.S.,~~LS, Woolf ~~A.D.,~~AD, Booze ~~L.L.,~~LL, Cobaugh ~~D.J., Chy ka P.A.,~~DJ, Chyka PA, Scharman ~~E.J.,~~EJ, Manoguerra ~~A.S.,~~AS, Troutman ~~W.G.:~~WG: **American Association of Poison**

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2. ~~Nakyama~~Nakayama H, Shono M, Hada S: **Mercury exanthem.** *J Am Acad Dermatol* 1984, **13:**848-52.

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6. ~~L.R.~~ Goldman~~, M.W.~~ LR, Shannon~~. 2001~~ MW: **American Academy of Pediatrics: Committee on Environmental Health. Technical Report: Mercury in the Environment: Implications for Pediatricians**~~Pediatrics~~**.** *Pediatrics* 2001, **108:**197-205.

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