

Subcutaneous Mercury Injection for Self-Harm: Early Intervention and Successful Outcome

Muzamil Noor Malik¹, Kanattage Kelum Perera², Ambreen Qadir³

^{1,2}Department of Emergency Medicine, Scunthorpe General Hospital NLAG NHS Foundation Trust, Scunthorpe and ³Diana Princess of Wales Hospital, NLAG NHS Foundation Trust, United Kingdom.

Corresponding Author:

Dr Muzamil Noor Malik
Email: drmmnoor@gmail.com

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (creativecommons.org/licenses/by/3.0).

Received : August 25, 2024
Accepted : November 1, 2024
Published : January 15, 2025

Abstract

Background: Mercury toxicity is rare but can have severe local and systemic effects depending on the route of exposure. While mercury inhalation poses significant systemic risks, subcutaneous deposition primarily leads to localized effects, with delayed systemic absorption possible. **Case Report:** A 49-year-old male with a history of diabetes and mental health disorders presented with pain in his left forearm after injecting approximately 30 ml of mercury subcutaneously using an insulin syringe. Prompt imaging revealed mercury deposits in the forearm without systemic toxicity. The patient underwent two surgical washouts for mercury removal and received wound care. No complications were noted, and his condition improved during the hospital stay. **Conclusion:** Subcutaneous mercury injection carries a lower risk of systemic toxicity but requires early surgical removal to prevent local and systemic complications.

Keywords: Bipolar Disorder, Diabetes, Hyperglycemia, Imaging, Mercury Poisoning.

Introduction

Mercury toxicity is rare but serious, with potential systemic and local effects [1]. Subcutaneous injection of elemental mercury is an uncommon self-harm method, often associated with psychiatric disorders. Elemental mercury's low solubility limits immediate systemic toxicity, but direct injection can lead to localized deposits, tissue damage, and delayed absorption. X-rays may exhibit multiple metallic opacities at the injection site and embolization [2].

This case highlights the successful management of a self-inflicted mercury injection through imaging, surgical washouts, and supportive care. Multidisciplinary approach minimized complications and ensured a favourable outcome. Through this case, we aim to raise awareness about an unusual manifestation of mercury exposure and its management.

Case Report

A 49-year-old male presented to the Accident and Emergency (A&E) Department at 11 AM, complaining of pain in his left forearm. He admitted to injecting approximately 30 ml of mercury the previous evening at around 9 PM. The mercury, sourced from a garden thermometer, was intended for intravenous injection as an act of self-harm, but he failed to locate a vein and instead injected it subcutaneously into his left forearm using an insulin syringe. This act was driven by suicidal ideation. Following the injection, he went to bed and awoke the next morning with pain at the injection site, prompting his visit to the emergency department. The patient had a history of diabetes and mental health disorders, including bipolar disorder and borderline personality disorder.

On examination, his airway was clear, bilaterally good air entry was observed with no

added sounds, and heart sounds (S1+S2) were normal. Abdominal examination revealed no distension or tenderness, and his Glasgow Coma Scale (GCS) score was 15/15. Neurological assessment showed no focal deficits, and there were no visible puncture marks, redness, or swelling on the left forearm. Initial investigations revealed hyperglycemia (BM: 40 mmol/L), mild hyponatremia (sodium: 130 mmol/L), and slightly elevated lactate levels (3.4 mmol/L). Other laboratory findings, including complete blood count (CBC), renal function tests, liver function tests, and inflammatory markers, were largely within normal limits apart from a marginally elevated C-reactive protein (CRP: 38 mg/L).

Toxicology guidelines from TOXBASE were consulted, and the case was discussed with the National Poison Information Services. They recommended measuring mercury levels and obtaining X-rays of the forearm, chest, and abdomen. Mercury levels were found to be within normal limits. However, X-rays of the left forearm revealed mercury deposits [Fig.1,2], while chest and abdominal X-rays were unremarkable. The patient's elevated blood glucose levels were attributed to missed insulin doses over the preceding days. He was managed with intravenous fluids and insulin to control hyperglycemia. Plastic surgeons were consulted for surgical intervention, and two washout procedures were performed to remove the mercury from the forearm. During his hospital stay, the patient received care for his diabetes and wound management. A mental health consultation was arranged to address his underlying psychiatric conditions.

The patient responded well to treatment and was discharged in stable condition. Follow-up care, including mental health support, was scheduled to ensure ongoing recovery and prevent recurrence.

Discussion

The toxic effects of mercury depend significantly on the route of exposure. Inhalation of mercury vapor is particularly hazardous, leading to



Fig.1,2: X-ray left arm showing mercury deposits.

systemic toxicity with neurological, pulmonary, and gastrointestinal manifestations, which can escalate to respiratory failure and death. In contrast, subcutaneous deposition of mercury poses a lower risk of systemic poisoning due to limited absorption but can cause localized tissue damage and, in rare cases, systemic complications [3].

Once absorbed, metallic mercury oxidizes to mercurous (Hg^+) and mercuric (Hg^{2+}) forms, which are distributed throughout visceral organs such as the kidneys, spleen, and liver [4]. While systemic mercury toxicity is rare following subcutaneous exposure, two reported deaths in the literature from renal failure and pulmonary empyema highlight the potential risks if not managed promptly [5].

This case demonstrates the importance of early surgical intervention in preventing complications. Prompt washout and removal of mercury deposits from subcutaneous tissue minimized local damage and prevented systemic effects in this patient. The absence of complications

emphasizes the value of multidisciplinary care, including toxicology, surgical, and psychiatric support, in managing such presentations.

Conclusion

Subcutaneous mercury injection poses less immediate risk than vapor inhalation but can cause complications if untreated. Prompt washout and surgical removal, as demonstrated in this case, effectively prevent adverse outcomes.

Contributors: MNM: main author, patient management; KKP: manuscript editing, patient management; AQ: patient consent, images, and patient follow-up. MNM will act as a study guarantor. All authors approved the final version of this manuscript and are responsible for all aspects of this study.

Funding: None; *Competing interests:* None stated.

Consent: Consent was obtained from the patient for publishing the case report and any accompanying images.

References

1. Ellabban MG, Ali R, Hart NB. Subcutaneous metallic mercury injection of the hand. *British Journal of Plastic Surgery*. 2003;56.
2. Bluhm RE, Bobbitt RG, Welch LW, Wood AJ, Bonfiglio JF, Sarzen C, *et al.* Elemental mercury vapour toxicity, treatment, and prognosis after acute, intensive exposure in chloralkali plant workers. Parts I and II. *Hum Exp Toxicol*. 1992;11:201-210.
3. Ruha AM, Tanen DA, Suchard JR, Curry SC. Combined ingestion and subcutaneous injection of elemental mercury. *J Emerg Med*. 2001;20:39-42.
4. Krohn IT, Solof A, Mobini J, Wagner DK. Subcutaneous injection of metallic mercury. *JAMA*. 1980;243:548-549.
5. Isik S, Gu"ler M, O "ztu"rk S, Selmanpakog "lu N. Subcutaneous metallic mercury injection: Early, massive excision. *Ann Plast Surg*. 1997;38:645-648.