



# A Trial of Therapeutic Plasma Exchange in Intramuscular Ricin Poisoning

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## Introduction

- Ricin poisoning is an exceedingly rare clinical scenario encountered in the field of toxicology.
- Potential routes of exposure consist of injection, inhalation, or ingestion.
- The ricin toxin's mechanism of action involves inhibition of protein synthesis, and to our knowledge, there has been only one prior confirmed lethal case of intramuscular poisoning.

## Case Presentation

- 37-year-old man presents with dyspnea, chest tightness, chills, myalgias, fatigue and back pain.
- Arrived to the ED 24 hours after injecting his left antecubital area with 4 cc of supernatant fluid composed of mashed castor beans, acetone, and water.
- Vitals in the ED demonstrated a temperature of 99.7 °F, blood pressure of 127/51 mmHg, pulse of 100/min, respiratory rate of 20/min, and SpO2 97% on RA.
- Physical Exam: Awake, alert, and oriented in mild distress. small circle of erythema was noted on his left arm just proximal to antecubital fossa without necrosis. The remainder of the exam was benign.

## Workup and Management

- **Day 1:** CBC demonstrated a WBC count of 10.2 and platelets at 161. Urine drug screen was positive for methadone and amphetamines. CMP demonstrated creatinine of 0.60, ALT of 98, and AST of 156. CK elevated at 1198. Troponin WNL. CXR normal.
- **Day 2:** Transaminitis worsened and plasma exchange (PLEX) was initiated with albumin 1:1, blood flow at 120 mL/min, PLEX rate of 2500mL/h, and a volume of exchange of 3.5 liters.
- **Day 4:** Developed acute hypoxic respiratory failure with CXR demonstrating bilateral pulmonary vascular congestion and bilateral pleural effusion. Empiric vancomycin and piperacillin-tazobactam initiated.
- **Day 5:** Required endotracheal intubation with negative infectious workup.
- **Day 6-9:** Developed acute renal failure with progression to multi-organ system dysfunction (MOSD).
- **Day 10:** Family declined to pursue further treatment. Patient extubated and transferred to hospice where he died on day 11.

## Discussion

- There is a paucity of published reports on attempted or completed suicide by ricin injection. To our knowledge, there have been only three documented incidents of sublethal poisoning and one lethal poisoning after intramuscular ricin injection.
- Renal failure has been observed in ricin poisoning, however there is a lack of documented evidence on appropriate management.
- We report a trial of PLEX in an individual who subcutaneously injected castor bean extract.

## Clinical Significance

- This case represents the first documented example of PLEX used for intramuscular ricin poisoning. PLEX was indicated due to previous documentation of successful treatment of oral ricin poisoning in children. Our case demonstrates a reduction in hepatic serum biomarkers, suggesting PLEX may be effective upon early initiation. We believe our report provides valuable insight in the management of acute ricin poisoning and highlights the need for further investigation.

## Clinical Signs and Symptoms:

- >Nausea
- >Vomiting
- >Shortness of Breath
- >Pulmonary Edema
- >Cutaneous Necrosis
- >Visceral Necrosis
- >Multi-organ failure
- >Sepsis

