

HEMOADSORPTION IN SODIUM FLUOROACETATE POISONING: CASE REPORTS

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BACKGROUND

Self-inflicted pesticide poisoning remains a significant public-health challenge, accounting for one-third of all suicide deaths worldwide. In Colombia, by 2024 the incidence of self-poisoning with pesticides had risen to 43.9 per 100 000 population, with pesticides implicated in 41.1 % of all fatalities. Sodium fluoroacetate—also known as monofluoroacetate or Compound 1080—was patented as a rodenticide in the late 1930s. It was later withdrawn from the market in most jurisdictions owing to its high lethality and the absence of an effective specific antidote. The Colombian Guide for the Management of Toxicological Emergencies currently recommends early infusion of 30 % ethanol. Nevertheless, continuous venovenous hemodiafiltration (CVVHDF) combined with hemoadsorption may provide therapeutic benefit in the most severe cases.

CASES DESCRIPTION

Case 1. A 28-year-old woman with no relevant medical or psychiatric history presented to the emergency department one hour after intentional ingestion of approximately 100 mL of sodium fluoroacetate. On arrival, she was in poor general condition with refractory arterial hypotension requiring a continuous norepinephrine infusion.

Case 2. A 49-year-old woman with no significant medical or psychiatric history presented to the emergency department 10 minutes after self-administering approximately 15 mL of sodium fluoroacetate ("Sicario"). On arrival, she was critically ill, with pinpoint pupils, cyanosis, diaphoresis, and acute respiratory failure, necessitating emergency orotracheal intubation.

Initial therapy: Gastric lavage with activated charcoal and administration of 29 % ethanol were performed in both cases, but no clinical improvement was noted.

Extracorporeal therapy: CVVHDF with an ST150 filter was initiated and maintained for 72 hours, together with two 6-hour sessions of hemoadsorption using a cartridge HA230 (Figure 1)

Therapeutic response: By 24 hours, vasopressor requirements decreased, hemodynamic parameters stabilized, and acid–base balance improved (Table 1).

Case 1 complication: Treated ventilator-associated pneumonia due to methicillin-resistant *Staphylococcus aureus*

Case 2 complication: Treated aspiration pneumonia

Case 1 resolution: By the fifth day of intensive care, the patient was successfully weaned from invasive mechanical ventilation and was subsequently discharged with outpatient psychiatric follow-up.

Case 2 resolution: By the tenth day of intensive care, the patient was successfully weaned from invasive mechanical ventilation and was subsequently discharged with outpatient psychiatric follow-up.

CONCLUSION

Sodium fluoroacetate poisoning remains a formidable clinical challenge, characterized by rapid multisystem involvement and high rates of morbidity and mortality. The early initiation of continuous venovenous hemodiafiltration combined with hemoadsorption facilitated prompt toxin removal and provided effective extracorporeal organ support, culminating in favorable outcomes in these two cases. These therapies were well tolerated, with no adverse events observed, and, while definitive conclusions cannot be drawn, they may have contributed to the patients' recovery. Further research is necessary.

Table 1.

Variable	Admission		Day 1		Day 2		Day 3	
	Case 1	case 2	Case 1	case 2	Case 1	case 2	Case 1	case 2
Leukocytes (10 ⁹ cells/μL)	7200	14,4	13200	**	13900	16,6	10800	30,1
Hemoglobin (g/dL)	12	16,5	12,5	**	11,7	13,7	11,6	13
Platelets (10 ⁹ cells/μL)	289000	407	309000	**	207000	225	132000	119
Creatinine (mg/dL)	0,77	0,71	0,75	0,99	0,51	0,52	0,35	0,41
Blood urea nitrogen (mg/dL)	11	34	6	34	4	6	**	4
C-reactive protein (mg/dL)	0,15	0,37	0,49	**	2846	1,131	2886	4,7
Aspartate aminotransferase (U/L)	19	18	27	**	77	**	90	18
Alanine aminotransferase (U/L)	12	16	12	**	24	**	29	13
pH	7,38	7,2	7,31	7,36	7,38	7,3	7,45	7,46
PCO ₂ (mm Hg)	31,3	57,5	41	31,4	35	42,6	35	35
Bicarbonate (m mol/L)	19,8	22	20,1	17,4	21	20,6	24	25
Base excess (mmol/L)	-68	-7	-58	-68	-44	-56	0,7	1,4
Lactate (mm d/L)	31,3	1,92	3,81	2,79	4,2	3,03	2,36	2,8
Mean norepinephrine dose (μg/kg/h)	7,15	0,2	4,3	0,14	0,86	0,14	2,2	**

Figure 1.



DISCUSSION

Sodium fluoroacetate is a colorless, odorless, water-soluble, highly toxic monofluorocarboxylate for which no specific antidote exists. In Colombia, illicit formulations marketed as "El Sicario" continue to circulate despite regulatory restrictions. Its high lethality results from disruption of the Krebs cycle and consequent citrate accumulation in tissues and blood. Symptom onset occurs within 0.5–3 hours, and the clinical spectrum ranges from nausea, vomiting, and abdominal pain to seizures, cardiogenic shock, pulmonary and cerebral edema, fatal arrhythmias, and death. Management is primarily supportive; early adjunctive infusions of ethanol and acetate have demonstrated only limited efficacy. Due to its low molecular weight, moderate protein binding, small volume of distribution, and water solubility, extracorporeal removal techniques—such as intermittent hemodialysis, continuous renal replacement therapy, and hemoadsorption—warrant consideration. In our two reported cases, CVVHDF combined with hemoadsorption was employed to enhance toxin clearance and provide multiorgan support.