

Lessons from practice

Hyperkalaemic cardiac arrest due to cream of tartar ingestion

Clinical record

A 70-year-old woman presented to the emergency department with symptomatic hyperkalaemia after excessive ingestion of potassium bitartrate to relieve constipation.

The patient's medical history included chronic constipation and schizophrenia without active psychosis, confirmed on collateral history. The reason for potassium bitartrate ingestion was self-treatment with cream of tartar as a home remedy for constipation. The patient did not have chronic kidney disease.

The amount of cream of tartar ingested was 166 g, combined with water and ingested as a slurry. Six hours after ingestion, she developed symptoms of malaise, lower limb weakness, abdominal pain and a feeling of impending doom. On ambulance attendance, vital signs were within normal limits and the electrocardiogram (ECG) was normal. On the way to the hospital, the patient developed ventricular tachycardia, followed by widening of QRS intervals, and peaking of T-waves before developing a sine wave pattern with cardiac arrest on arrival to emergency.

The patient underwent 19 minutes of cardiopulmonary resuscitation (CPR), including four defibrillator shocks of 200 J for ventricular fibrillation (Box 1) and pulseless ventricular tachycardia before return of spontaneous circulation (RoSC) of a broad complex tachycardia with palpable pulse (Box 2).

Initial venous blood gas (VBG) testing showed a potassium concentration of 9.6 mmol/L (reference interval: 3.4–4.8 mmol/L). Advice was sought from the Victorian Poisons Information Centre.

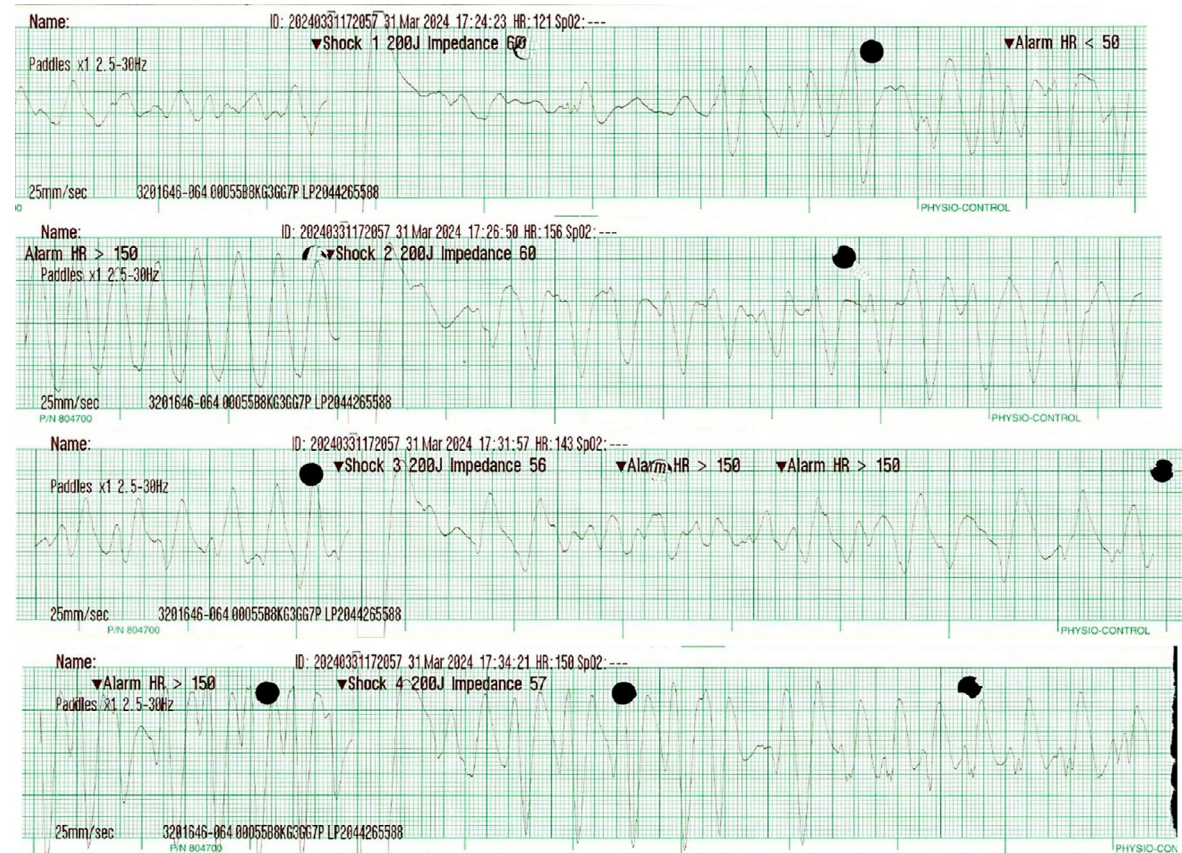
The hyperkalaemia was treated with:

- four doses of calcium gluconate (2.2 mmol each);
- two doses of sodium bicarbonate (4.2 g each); and
- two doses of actrapid (10 units each).

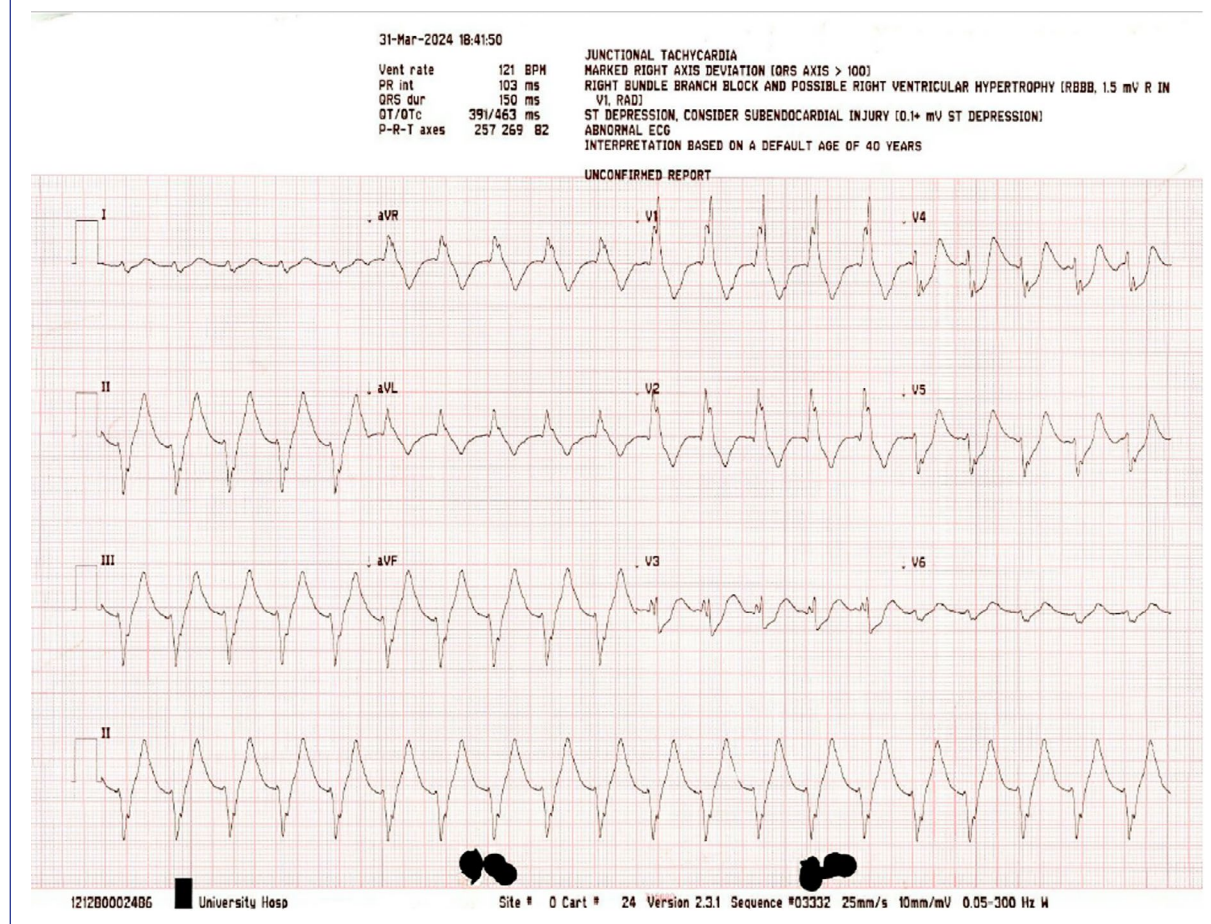
This led to a reduction of potassium levels to 6.6 mmol/L.

Two hours later and on arrival to the intensive care unit, a second cardiac arrest occurred due to recurrence of hyperkalaemia (potassium concentration of 7.2 mmol/L). CPR was performed for 11 minutes, including two defibrillator shocks of

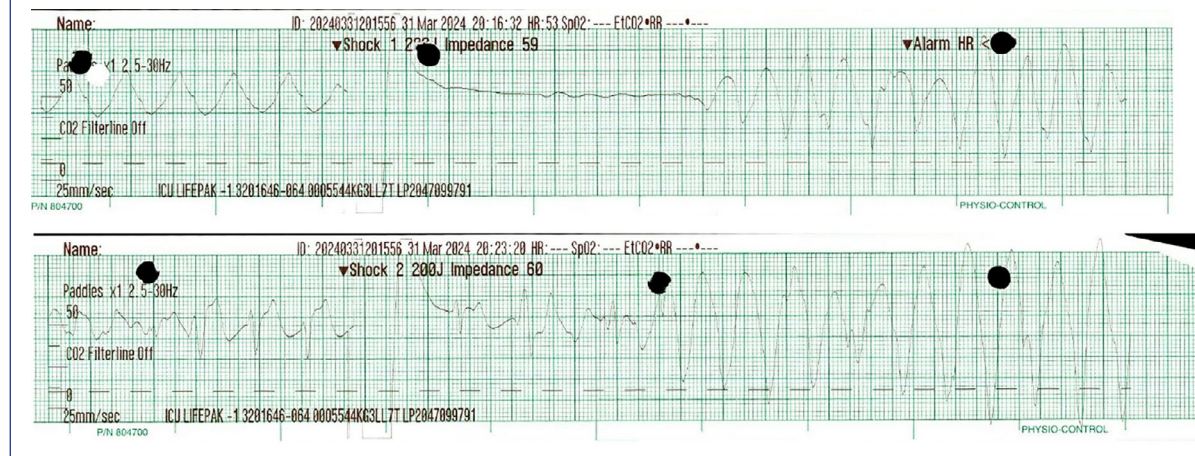
1 Cardiac rhythms from first cardiac arrest

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2 Electrocardiogram after the first return of spontaneous circulation



3 Cardiac rhythms from second cardiac arrest



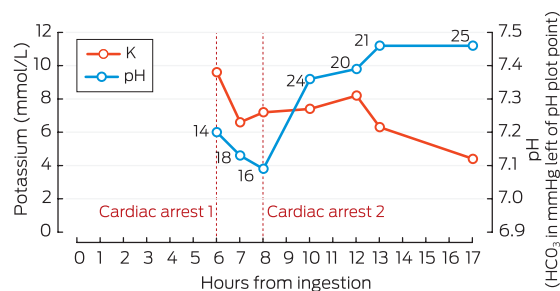
200J, resulting in RoSC (Box 3). Further treatment was given:

- calcium gluconate (2.2 mmol);
- 3 doses of sodium bicarbonate (4.2 g each); and
- atropid (10 units).

Despite the above treatment, the patient had persistent hyperkalaemia (potassium concentration of

7.2 mmol/L), which was further treated with atropid (10 units), sodium polystyrene sulfonate (30 g), and 18 hours of continuous veno-venous haemodiafiltration. Within 4 hours of starting this third round of treatment, the patient started to recover, before achieving successful resolution. The patient was extubated with good recovery of original cognition and discharged after a period of rehabilitation. Trends of potassium concentration and pH are presented on Box 4.

4 Trends of potassium concentration and pH level per hour from time of ingestion



Reference interval for potassium (K): 3.4–4.8 mmol/L; reference interval for pH: 7.35–7.45. Values of bicarbonate (HCO_3^- in mmol/L) labelled to the left of the pH plot points. ♦

Discussion

Cream of tartar, also known as potassium bitartrate, is a widely available household product, primarily used in baking as a leavening agent.¹ It also has stool softening properties when combined with sodium bicarbonate in a polyethylene glycol suppository.²

Cream of tartar has high potassium content and, when ingested in large quantities, has resulted in case reports of life-threatening hyperkalaemia. Two cases were reported by Rusyniak and colleagues, with six tablespoons resulting in symptomatic hyperkalaemia with concerning ECG changes that were successfully treated.¹ Both cases were healthy young men who intended to “clean themselves out”.

The amount of potassium ingested by our patient was 27.4 g (700.5 mmol), based on the approximation that 100 g of potassium bitartrate contains 16.5 g (422 mmol) of potassium, as per Food Standards Australia New Zealand (FSANZ).³ This is equivalent to 15.56 mmol/kg, as the patient’s weight was 45 kg. The National Health and Medical Research Council recommends a daily potassium intake of 2.8–3.8 g per day for adults. Our patient exceeded this recommendation by 7–10 times.⁴ Using the above approximations, an individual ingestion of potassium bitartrate should not exceed 23 g.

Despite administering much of the standard treatment for hyperkalaemia, the patient experienced a rebound episode of hyperkalaemia leading to a second cardiac arrest, likely from previously mobilised intracellular potassium being re-transported extracellularly.

Additional treatments for stabilisation of potassium levels may have included:

- nebulised salbutamol;
- intravenous furosemide to enhance renal elimination;
- earlier administration of sodium polystyrene sulfonate, although noting a large amount required; and

- sustained low-efficiency dialysis or intermittent haemodialysis as a more effective alternative for extracorporeal elimination.

Whole bowel irrigation was considered, but thought to be of limited value given the form of ingestion was a slurry, which would have enabled rapid absorption compared with pills.⁵

This case is the third reported occurrence of hyperkalaemia secondary to ingestion of excessive potassium bitartrate in 11 years. It is possible that the public perceive this common pantry product as a safe alternative to pharmaceutical treatments, not realising that the high potassium content can be potentially fatal.

Our patient did not disclose the source of influence for her ingestion, although collateral history described an unidentified YouTube video. Given the possibility of online misinformation and availability of potassium bitartrate, the incorporation of warning labels should be considered to inform the public of this danger. The Food Standards Australia New Zealand has been contacted regarding the above.

Lessons from practice

- Potassium bitartrate (cream of tartar) is a common household item that presents an under-recognised danger and can cause hyperkalaemic cardiac arrest.
- Early recognition and rapid treatment can prevent mortality.
- Understanding of the anticipated course of potassium bitartrate ingestions will benefit clinicians to initiate urgent patient transfer.
- Warning labels should be incorporated in packaging to avoid recurrence.

Patient consent: The patient provided written consent for publication.

Competing interests: No relevant disclosures.

Provenance: Not commissioned; externally peer reviewed. ■

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- 1 Rusyniak DE, Durant PJ, Mowry JB, et al. Life-threatening hyperkalemia from cream of tartar ingestion. *J Med Toxicol* 2013; 9: 79–81.
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- 5 Whitaker RJ, Maguire JE. Slow-release potassium overdose: clinical features and the role of whole-bowel lavage in management. *Emerg Med Australas* 2001; 12: 218–225. ■