Introduction

- Tetrodotoxin (TTX) is a non-protein quinazoline sodium channel blocking agent. It is amongst the most toxic non-protein derived substances found in nature. In man, an oral dose as small as 10µg/kg may be fatal (1).
- Humans may be affected by consumption of fish or shellfish containing the toxin (2) with pufferfish a common source. In Japan, pufferfish (dugu) is considered a delicacy, but considerable skill is needed for safe preparation.
- This report describes a patient who developed TTX toxicity after reportedly injecting herself with a mixture containing tetrodotoxin.

Case report

History

- A 20 year old female with a history of depression presented to the Emergency Department with paraesthesiae of the mouth and tongue and shortness of breath.
- The patient reported that she injected a mixture of 15µg of ouabain, unknown concentrations of TTX and ryanodine and distilled water into her anterior abdominal wall.
- This mixture was drawn into a 10ml syringe and the patient had reportedly injected 0.1 - 0.2 ml.

Clinical assessment

- Clinical features at presentation included
  - Normal pupil size, but presence of bilateral nystagmus.
  - Bradycardia (fluctuating between 29-48bpm).
  - Hypotension (108/48mmHg).
- Investigations revealed
  - Hyperkalaemia (6.68mmol/L)
  - Raised lactate (4.0mmol/L).
  - Digoxin concentration < 0.2µg/L.
  - Prolonged PR interval (280ms) and widespread ST depression on the ECG.

Management

- Surgical excision of the injection site.
- Treatment with IV fluids, 0.5mg atropine IV and 10mls of 10% calcium chloride IV.
- Monitoring in ICU for 48 hours post operatively.

Outcome

- The patient was clinically discharged on the third day of presentation with no sequelae.

Discussion and conclusions

- TTX causes action potential blockade by inhibiting sodium conductance and neuronal transmission in the central and peripheral nervous systems. TTX also depresses the respiratory and vasomotor centres of the medulla oblongata (3).
- The clinical picture of TTX poisoning is variable. Mild toxicity is associated with sensory and mild gastrointestinal features. Moderate toxicity is marked by distal and facial muscle weakness and ataxia. Patients with severe toxicity may develop flaccid paralysis, respiratory failure and fixed dilated pupils. Life threatening toxicity is associated with cardiovascular events, respiratory failure and coma (2).
- There is no specific antidote available, so treatment is symptomatic and supportive (1).
- The features displayed by this patient are consistent with TTX toxicity, although this case is complicated in that the patient had injected herself with a mixture containing other cardiotoxic substances such as ouabain.