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Case Report

Hypothermia and near-drowning associated with life-threatening injuries: A remarkable recovery: A case report

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ABSTRACT

A young male suffered multiple severe injuries after a fall and near-drowning. On presentation to the emergency department (ED), he was in a critical and unstable condition and his chances of survival were deemed very low. This case illustrates the management of the hypothermic multi-trauma patient and the remarkable recovery made possible by a high standard of care.

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Clinical record

A 46-year-old male was transferred to the ED of a level one trauma centre after a fall from height (approximately 10 m) into water. He was found in the water off a rocky coastline having suffered multiple injuries from the fall, near-drowning and hypothermia.

The patient was retrieved after 30 min in the water. Initial observations showed haemodynamic instability with a variable systolic BP (80–120) and HR (30–120), temperature of 27.6 °C and unrecordable oxygen saturations. Initially, pupils were equal but sluggish and he was moving all limbs, then he deteriorated to a Glasgow Coma Scale (GCS) of 5. At the scene, he was intubated, a right-sided needle thoracostomy was performed due to suspicion of pneumothorax and fluid and adrenaline were administered. The patient was then evacuated via helicopter.

In the ED, two hours after the injury, the patient remained unstable. BP was 80/40, HR 80 in atrial fibrillation and temperature 28 °C. He had obvious bilateral lower limb fractures.

Initial investigations showed pH 7.06, lactate 7.5, haemoglobin 138 and evidence of coagulopathy (INR of 2.33, which increased to 5.78 and undetectable fibrinogen). Chest X-ray demonstrated a right-sided

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pneumothorax and diffuse opacification throughout both lung fields consistent with aspiration/near-drowning (Fig. 1). There were no obvious pelvic injuries on X-ray.

Initial management was according to the Emergency Management of Severe Trauma (EMST) guidelines. This included maintaining a secure airway, spinal precautions, insertion of a right-sided intercostal catheter, ongoing mechanical ventilation, fluid resuscitation and inotropes as well as rapid rewarming (warm IV fluids, Bair Hugger and bladder irrigation). In the ED, he received 6 l of warm crystalloid and two units of packed red blood cells.

Despite initial management, the patient remained haemodynamically unstable, unresponsive despite weaning sedation and hypothermic at 29 °C. Surprisingly, oxygenation was adequate on mechanical ventilation with an FiO₂ of 80%.

A trauma CT was performed and the primary survey repeated revealing multiple injuries but no cause for hypotension. Repeat haemoglobin was 103. Transthoracic echo showed poor global contractility.

At this stage, the use of extracorporeal membrane oxygenation (ECMO) for rewarming and cardiac support was considered and plans made for cannulation. A transoesophageal echocardiogram was performed revealing an underfilled right ventricle, so further fluids were administered and a vasopressin infusion was added. He was transferred to the ICU for ongoing care.

Fortunately, the patient eventually responded to warm fluid resuscitation, inotropes and other rewarming techniques before ECMO was required. His responsiveness improved and he was able to obey commands with all four limbs.

A full assessment was now possible with multiple injuries noted (Table 1). The injury severity score (ISS) was 50.

The patient then proceeded to definitive surgical management of his multiple injuries over the proceeding days (Table 2).

The recovery process was slow and hindered by a number of complications. The left ankle wound required multiple washouts and debridements, VAC dressings, long-term IV antibiotics and eventually a free flap. This was secondary to infection with *Vibrio* species.

After ORIF of a right tibial plateau fracture (11th July), the patient developed respiratory distress and was found to have large bilateral pulmonary emboli (Image 5) and a right calf DVT. He had been receiving 5000 units of heparin twice daily up until the day of the surgery. He was readmitted to the ICU, an inferior vena cava (IVC) filter was inserted and therapeutic anticoagulation commenced (heparin infusion and warfarin).

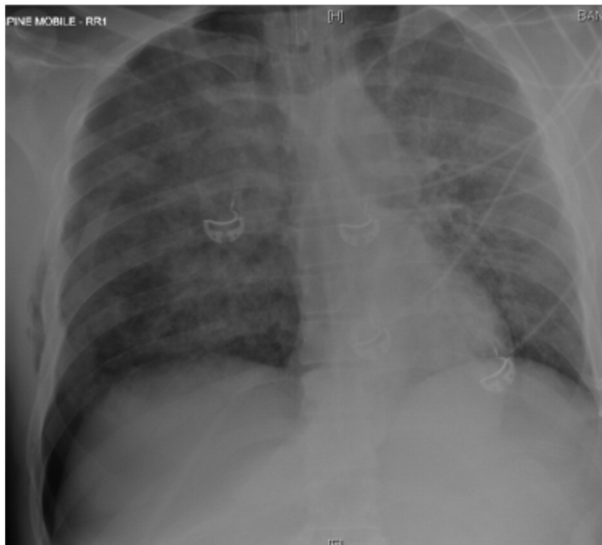


Fig. 1. Chest X-ray on admission.

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