

# MANAGEMENT OF DROWNING

**DROWNING:**

- Respiratory impairment from submersion or immersion in a liquid.
- Avoid terms: Near drowning, Wet Drowning, Dry Drowning and Secondary Drowning.

**POTENTIAL CAUSES:**

- Trauma / fall
- Seizure
- Arrhythmia (including prolonged QT)
- Non-Accidental Injury
- Ethanol / drug intoxication
- Attempted suicide

**INITIAL INVESTIGATIONS:**

- Arterial blood gas
- FBC, coagulation, renal & liver function tests, electrolytes, creatinine kinase (CK)
- Chest XR; consider CT head & neck
- 12 lead ECG

**INITIAL TREATMENT:**

***If in cardiac arrest proceed with resuscitation as per **APLS guidelines*****

**AIRWAY & BREATHING:**

- If spontaneously breathing administer oxygen by face mask oxygen target SpO<sub>2</sub> 93-97%.
- Consider early intubation and ventilation, using cuffed ET tube.
- No evidence for the use of surfactant/steroids.
- Consider antibiotics (not indicated routinely).

**CIRCULATION:**

- Cardiovascular assessment, including CRT and BP.
- Obtain adequate access IV/IO.
- Maintain age appropriate BP with the fluid boluses and early consideration of inotropes.
- Will need to maintain higher mean arterial blood pressure if concerns regarding cerebral injury.

**DISABILITY:**

- Neuroprotection: -30° head up
  - pCO<sub>2</sub>: 4-5 kPa
  - blood sugar 4 - 10 mmol/l
  - paO<sub>2</sub> >8 kPa / SpO<sub>2</sub> >93%
- Hypertonic (3%) saline if signs of raised ICP
- C-spine protection until cleared
- Check temperature, avoid hyperthermia

***Early discussion with the KIDS Team***

**HYPOTHERMIA: Hypothermic heart may be unresponsive to cardiac drugs and defibrillation.**

➤ Resuscitation drugs and Defibrillation:

- Core temperature < 30 °C: With-hold drugs. Maximum 3 shocks, if shockable rhythm persist despite 3 shocks, withhold further shocks until the temperature is greater than 30°C.
- 31 to 35 °C: Double duration between drugs, shock as needed.
- Greater than 35 °C: Normal cycle of drugs and shocks.

➤ Active warming:

- Warm rapidly up to 32 °C then aim to rewarm at 0.25°C per hour up to 35°C.
- Warm fluids, radiant heaters/warming blankets, warm ventilator gases.
- More invasive measures may be required which should be discussed with KIDS.

**INDICATORS OF POOR OUTCOME:**

- Age < 3 years.
- Immersion time >10 mins.
- Time to basic life support >10 mins.
- Time to first respiratory effort >40 mins (Indicator of good prognosis if <3 mins).
- Persistent GCS of < 5
- Requirement for CPR
- Initial pH <7.00.