

## The drowned child

### General features:

- There is no such thing as “near drowning” anymore
- Definition is respiratory impairment due to submersion

### THE DIVING REFLEX

- Bradycardia
- Apnoea
- Due to apnoea, hypoxia and acidosis
- Due to hypoxia and acidosis, there will be tachycardia
- There will also be hypertension
- Eventually, breakthrough breathing will occur
- When inhaled water touches the glottis, immediate laryngospasm occurs
- After the laryngospasm subsides, you just inhale all this water
- Pulmonary oedema ensues
- Severe hypoxia then causes bradycardia and then asystole

THERE MAY ALSO BE SPINAL INJURY AND HYPOTHERMIA.

You won't have too much of an electrolyte derangement from swallowing pond water

### Primary Survey

- Risk of aspiration from swallowed water = intubate immediately
  - Decompress the stomach
  - Chest x ray changes will occur later, don't wait for them
- Patients should be lifted out of the water **HORIZONTALLY** and not vertically. Vertical recovery may cause cardiovascular collapse due to loss of venous-blood-returning pressure from the surrounding water. Apparently acts as a huge TED stocking.
- **Look for hypothermia:** shocks may be ineffective below 30 degrees
  - **Rewarm internally if below 30 (externally if above 30)**
  - Temperature should rise by 1 degree per hr to reduce chance of hemodynamic instability

### ACTIVE INTERNAL REWARMING:

- 39 degree IV fluids
- 42 degree ventilator humidifier
- Gastric, bladder, peritoneal lavage with warm fluids
- Consider extracorporeal blood rewarming

**If the initial rhythm was VF, it's better to keep them cool – at 32-34 degrees**

## Emergency treatment

- Brain ischaemia precedes cardiac ischaemia
- Organisms that affect them are *Pseudomonas* and *Aspergillus*; cefotaxime should be started
- ICP will rise because of hypoxic brain injury
- Normoglycaemia is important

## Prognostic indicators

- Duration of hypoxic-ischaemic injury
- Adequacy of initial resuscitation

### SIGNS OF GOOD RECOVERY:

- Time to respiratory effort < 3 minutes
- Temperature less than 33 on arrival

### SIGNS OF DOOM:

- Immersion time > 8minutes
- Time to respiratory effort > 40 minutes
- Persisting coma
- Persisting acidosis ~ pH 7.0
- Persisting hypoxia below 60mmHg

- It doesn't matter, fresh water or salty

## Outcomes

- 70% survive with basic life support
- 40% survive without basic life support
- Of the survivors,
  - 70% will make a complete recovery
  - 25% will have a mild neuro deficit
  - 5% will be in a persisting vegetative state