Don't Forget The Bubbles

DROWNING

Learners Guide

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PRE-READING/WATCHING

Please read / watch some of these resources before the session:

https://litfl.com/drowning/

APLS – drowning/ALS

https://dontforgetthebubbles.com/drowning/

https://emergencymedicinecases.com/pediatric-drowning-hypothermia/

https://patient.info/doctor/drowning-and-near-drowning

https://www.evelinalondon.nhs.uk/resources/our-services/hospital/south-thames-retrieval-service/drowning-mar-2018.pdf

https://www.rch.org.au/clinicalguide/guideline_index/Drowning/

IAEM Clinical guideline: Management of drowning in children

CASE 1

A family presents to the Emergency Department with their 5 year old.
The parents were inside when they witnessed their 5 year old child struggle in the swimming pool and disappear under the water. They quickly got her out, with a submersion time of less than 1 minute. She had one rescue breath, with no CPR before coughing water at her parents.

She is happy and playing in the waiting room, her only concern is that her throat is sore.

1. How should you manage this case?
2. Where could you direct the parents for further water safety advice?
3. Does this need a social care referral?

CASE 2

A 10 year old is brought in by ambulance. They were playing in the marshes and fell into a pond. Luckily they were pulled out quickly by their friends and a passing dog walker started CPR quickly. After a single round of CPR they achieved ROSC. On your assessment the patient is drowsy but responsive, they have a temperature of 30°C and other observations are normal.

1. What are the important first steps in management?

2. Does this patient need antibiotics?

ADVANCED CASE 1

You are in the paediatric emergency department. A parent runs in with their 6 month old baby who is cyanosed. She says they slipped in the bath 10 minutes ago and have'nt started breathing yet.

1. What should you do?
2. What elements should you focus on in the history?

The child is intubated at 10 minutes. At 40 minutes since submersion a gas shows a pH of 6.9 and a pO_2 of 7.5 .

What needs to be considered at this point?

ADVANCED CASE 2

You are covering resus in winter. You receive a pre-alert for an out of hospital cardiac arrest. A 5 year old child was lost for 30 minutes and has been found in a pond. They are currently receiving CPR. They are 10 minutes away.

1. What are things you should prepare in anticipation of this child arriving?
2. What are the important considerations in resuscitating in hypothermia?
3. What are examples of active rewarming?

MCQS

Question 1.

When resuscitating a drowned child who is hypothermic you should:

A: Not deliver shocks below 30°C

B: Actively rewarm if temperature 32°C

C: Double the dose interval of drugs below 30°C

D: Deliver 3 shocks below 30°C then wait until warmer to shock

E: Double the drug interval between 30-35°C

Question 2.

Poor prognostic factors include:

A: Drowning in sea water compared to freshwater

B: Drowning in water <10°C

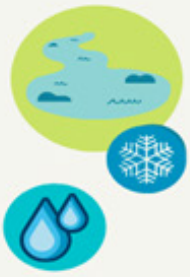
C: Initial recovery from water and BLS within 5 minutes

D: Respiratory effort after five rescue breaths

E: GCS of <5 at 40 minutes post start of resuscitation

KEY TAKE-HOME POINTS

DROWNING & HYPOTHERMIA



70% of children survive drowning when basic life support is provided at the scene

40% of children survive drowning *without* basic life support is provided at the scene

GOOD EARLY INITIAL RESUSCITATION GREATLY IMPROVES OUTCOME

Drowning is the third leading cause of death worldwide, and the highest drowning rates are among young children.

In the UK drowning is the third highest cause of accidental death in children with 31 deaths in 2018 attributed to drowning representing approximately 12% of sudden unexpected, unexplained deaths in children (National Water Safety Forum, 2018) .

Key Principles of Management:

OXYGEN
Maintain adequate oxygenation

PREVENT ASPIRATION
Aspiration of gastric contents is a major complication

STABILISE BODY TEMPERATURE
Drowning is often associated with hypothermia

Hypothermia

- Remove wet clothes and dry the patient, use warming blankets and warmed fluids.
- Arrhythmias are often refractory below 30°C. Limit to 3 shocks and do not give drugs. Use active core rewarming measures
- Between 30-35°C double the dose interval for drugs
- Resuscitation should be continued until core temperature at least above 32°C, or is not increasing despite active measures

Drowning

- "Drowning" is the respiratory impairment from being in or under liquid
- Hypoxia is the key process leading to cardiac arrest
- always consider c-spine immobilisation
- immersion time, time to first respiratory effort and core temperature are associated with outcome
- no evidence for empirical antibiotics
- no difference in management based on type of water submerged in.

Key take home points

1. The old adage "you're not dead until you're warm and dead" is true – though once you hit 32°C careful consideration should be taken about whether it is appropriate to continue.

2. Good EARLY initial resuscitation greatly improves outcome – this is why there are CPR posters at every swimming pool/beach.

3. No antibiotics needed.

4. There is no difference between salt and freshwater

REFERENCES

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2. WHO, 2020. [Online]
Available at: https://www.who.int/news-room/fact-sheets/detail/drowning
[Accessed 03 March 2020].

3. Layon AJ, Modell JH. Drowning: Update 2009. Anesthesiology. 2009 Jun;110(6):1390-1401. DOI: 10.1097/aln.0b013e3181a4c3b8.

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