SIMulatED RDH Emergency Department - Author: RD/MDS

# Scenario Run Sheet: Paediatric drowning

## Learning Objectives

**Target Group:** Paediatric and ED Registrars, ED Nurses

**General:** Interdisciplinary communication/allocation of roles/teamwork/leadership

**Scenario Specific:**

Management of drowning: correction of hypoxaemia/neuroprotection/correction of hypothermia/supportive care

Intubation in a small child: age-specific ALS manoeuvres; calculations/Browselow tape for age-appropriate doses and equipment/use of intubation checklist

Transition of care from SJA to resus room for CAT 1 patient

## Scenario Overview

**Brief Summary:**

6yo child presents post submersion in family pool. Bystander performs CRP and achieves ROSC; unresponsive on arrival of SJA and supported with BVM ventilation en route. Ongoing coma and hypoxaemia requires establishment of a definitive airway + for prevention of secondary brain injury. Maternal distress is significant and requires dedicated staff member.

|  |  |  |  |
| --- | --- | --- | --- |
| Intro Time | Scenario Time | Debrief Time | Soundbite |
| 3 mins | 20-25min | 20 mins | 10 mins |

## Observers’ Engagement Task

What preparations would you make while waiting for the patient to arrive?

## Equipment Checklist

|  |  |
| --- | --- |
| **Mannikin:** | Paed mannequin. Estimated weight: 20kg |
| **Monitoring:** | iSimulate |
| **Docs and Forms** | EDNA, Green sheet, Intubation checklist |
| **Equipment** | Paeds mannequin  - ISimulate  - IVFluids/canulation/IO  - Browselow trolley  -CMAC  -Oxylog  -SJA trolley  -NGT and bag |
| **Consumables** | Normal Saline  Dextrose Saline |
| **Medications** | Adrenaline, metaraminol, salbutamol nebules, sux/ketamine/fentanyl/morphine/midazolam |

|  |  |
| --- | --- |
| **Sim Prompts** | CXR, 12 Lead, VBGs, |

## Participants

**Staff:** ED RN’s x3 ED Registrars x3 Paeds reg x1

**Instructor Roles:** Facilitator in room Sim switchboard/Consultants

**Confederates:** Mother SJA paramedics

**\*MDS check SJA confederate availability**

## Additional Information/Medical History

**Demographics**

6yo boy lives with parents and 2 older siblings

**PMH** Mild autism with behavioural issues, SVD at term, no meds, allergic to wheat, UTDWI, Well lately

**HPC (Mother):**

“He doesn’t know how to swim! I put him to bed at 8pm. We were watching TV and I remember hearing a splash but didn’t think anything of it. During the ad break I went to the garden to check it out. I found him floatingface down in the pool, not moving. I pulled him out and he was blue, he wasn’t moving or breathing. I ran to the fence and screamed for Jenny next door who’s a nurse. She came straight away and performed CPR (for about a minute) and he started breathing again. He vomited all this water but he still hasn’t woken up. I should have gone as soon as I heard the splash!”

**SJA Handover: (while patient transferred from SJA to Resus trolley**

I: 6yo boy “Denver”

M: Near drowning in family pool: Found unresponsive floating face down by mother around 45 minutes ago. She found him about 5 minutes after hearing a splash in the vicinity of the pool

I: She reported blue child with no respiratory effort. Called for next-door neighbour who’s a nurse; commenced CPR within 2 minutes of being retrieved from the pool. She obtained ROSC after about 1 minute.

S: We were on scene around 30 minutes ago: GCS 5 (E1 V1 M3 abnormal flexion), occasional spontaneous respirations around 6/minute, femoral pulse weak but present around 70/minute with cool peripheries, pupils 5mm and sluggish,

T: Commenced assisted BVM ventilation with OPA around 30/min with 100% O2, inline manual spinal precautions during BVM as unwitnessed submersion. Unable to achieve IV access. HR improved to 90/min with bagging, spont RR only 6/minute, BP 50/palp, Temp 35.2

A: No known allergies

M: No regular mediations

B: Mild Autism

C: Mother is distraught, father staying home with 2 older siblings

## Proposed Scenario Progression

**STEM: It is 1am. The Nurse TL tells you SJA is 3 minutes away with a 6yo boy who was found unresponsive in the pool. Bystander CPR was performed, child had ROSC on arrival at scene after 1 minute CPR. Currently: GCS 5, occasional spontaneous respirations; Sinus rhythm with PR 90. SaO2 92% with assised ventilation by BVM, Currently no IV access.**

Team have 3 mins preparation time: Roles/Equipment/Calculations/Drugs/Consumables

* Notifies on call ED consultant; calls for help from anaesthetic team
* Handover from SJA with simultaneous primary survey + dedicated support/interview of mother
* Considers need for cervical spine precautions (assume low risk)
* Identifies coma, inadequate ventilation and circulation
* Checks BSL and temperature: identifies hypothermia for passive rewarming (Blanket)
* Identifies severe metabolic and respiratory acidosis on VBG
* Performs airway/ventilatory manoeuvres (OPA, assisted BVM at rate of 30-40 given acidosis)
* Unable to establish IV access initially, intra-osseous line successfully inserted and delivers fluid bolus 10-20ml/kg/pressors to optimise intubating conditions. Later achieves peripheral IV line
* Completes intubating checklist
* Explanation and reassurance to mother whose distress threatens to hamper resuscitation efforts, including providing timed chaperoned absence from the resus room
* Performs intubation +/- MILS and post intubation checks including NGT, CXR and IDC
* Commences 2/3 maintenance fluids given ischaemic brain and lung injuries
* Prepares for disposition to ICU via CT head

## Scenario Preparation/Baseline Parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Stage 1** | Progression Trigger | **Stage 2** | Progression Trigger | **Stage 3** |
| **RR** | 6 | 30 intubated |  |
| **SpO2** | 85 RA | 92% 100% O2 |  |
| **HR/Rhythm** | 90 reg | 110 |  |
| **BP** | 50/30 | 85/50 |  |
| **T** | 35.5 | 36.5 |  |
| **Other** | BSL 6.8 |  |  |
|  | Cap refill 5 secs | Cap refill 3 secs |  |

## Debriefing/Guided Reflection Overview

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| --- | --- |
| **Opening Gambit** | **Anticipated themes:**  Preparation tasks  Assumption of spinal injury in submersion  Prognostic factors in submersion  Rx post submersion:  Prevention of secondary brain injury  Respiratory Complications and Ventilatory strategies  Ideal body temperature post submersion/rewarming  Use of prophylactic AB and steroids in ARDS  Parental presence in resuscitations/max strategies |
| **Exploration with key players** |  |
| **Engaging the general group** |  |
| **Sharing facilitator’s thoughts** |  |
| **Any other questions or issues to discuss?** | SJA: paeds LMA’S just arrived – may see more |
| **Summary** |  |

## The Soundbite

**Drowning:** process of experiencing respiratory impairment after submersion/immersion in liquid

-Drowning is the SECOND leading cause of ACCIDENTAL death of children and young adults in Australia

-Highest incidence in unsupervised toddler

-Most events occur in swimming pools or bodies of water near child’s home

Pathology: HYPOXAEMIA (breath holding/laryngospasm/aspiration/coma/apnoea/cardiac arrest)

Aspiration - surfactant depletion – atelectasis – bronchospasm: impaired gas exchange

Pulmonary oedema - reduced lung compliance, diffusion imp. Us only 3-4ml/kg aspirated

Hypoxaemia, hypercapnia, acidosis and hypotension contribute to secondary brain injury.

Hypothermia in cold climates.

Rare: electrolyte imbalance, haemolysis, secondary pneumonia.

Trauma (diving/watersports: possible cx injury (1/200 drowned persons )

Other considerations: channelopathy, envenomation, ACS in older, exposure, seizure, toxicology

Prognostic factors:no single indicator has stand-alone predictive value

Immersion time > 10 mins

Core temp < 30

Absence of bystander resus

Arrives to ED with CPR in progress or coma

Arrival serum pH < 7.0

Initial approach:

ALS if cardiorespiratory arrest (1 in 200 persons resuced by lifesavers)

Rapid assessment of ABCDE’s while administering 100% O2; early NIV if required

Cervical spine precautions if Hx unknown or if mechanism suggests possibility of injury

Intubate and ventilate if inadequate respiration or persisting coma; increase minute ventilation

CXR if significant event or signs of respiratory complication

Prevention of secondary brain injury: optimise ABC, restrict maintenance fluids to 2/3-3/4, sedation, normoglycaemia and normothermia (active to 34, passive over 34)

Post intubation gastric tube

Temperature control post immersion

Rewarm actively to 34 degrees then passive

Other therapies

Bronchodilators (no evidence steroids); no evidence for prophylactic ABs

Rx ARDS/NCPO: TV 6ml/kg; PEEP, PCV etc, FiOs for sao2> 90%

References: Tintinalli p1280, LITFL, RCH clinical practice guidelines

General Feedback Prompts/Examples:

Opening Gambit:

* What did you feel were your specific challenges there?
* Let’s talk.
* Can you describe to me what was happening to the patient during that scenario?
* Can you describe to me what was going on?
* What was important to you in choosing to manage that situation?
* Can you tell me what your plan was and to what extent that went according to plan?
* That seemed to me to go smoothly, what was your impression?
* That looked pretty tough. Shall we see if we can work out together what was going on there so that you can find a way to avoid that situation in the future?

Exploration with key players

* Questions to deepen thinking
* Questions to widen conversation
* Introduce new concepts; challenge perceptions; listen and build
* So what you’re saying is…
* Can you expand on…
* Can you explain what you meant by…
* When you said…
* I noticed that you…

Engaging the general group

* Let’s check with the rest of the group how they reacted to you saying that.
* Did you [scenario participants/observers] feel the same?
* What did you [scenario participants/observers] want from [scenario participant] at that point?
* What ideas or suggestions has anyone else got for how to deal with that situation?

Sharing facilitator’s thoughts

* Use advocacy with inquiry to share your observations and explore their perception
* What does the protocol say on…..
* What do you think was happening ….?
* How do you think … would respond to…. ?
* What about next time…..?
* Do you think there’s anything to be gained from…?

Any other questions or issues to discuss?

Summary