

APLS: Cardiac Scenario 7

History {initial candidate briefing}

A 12-year-old male is admitted to the emergency department with a fractured femur after playing football.

He has no other injuries and is previously well.

To provide analgesia an initial dose of 1 microg/kg of I.V fentanyl is given, and a femoral nerve block is administered, using ropivacaine.

Shortly after performing the block the treating doctor is called urgently away. The child then has a brief grand mal convulsion and becomes apnoeic and pulseless. The nurse pushes the emergency bell and commences CPR. You are in ED and respond to the alarm.

Estimated weight 40 kg.

Initial impression {provide information as candidate assesses child and applies monitoring}

Apnoeic and pulseless. Nurse performing CPR.

Clinical Course {to be given to candidate as they progress}

The child is in pulseless ventricular tachycardia (VT) which then changes to VF after the 1st shock. Following a 2nd shock at 4 J/kg, adrenaline and subsequent 2 minutes CPR, ROSC occurs with sinus rhythm 120/min and a palpable pulse. The child starts breathing and moving.

INSTRUCTORS INFORMATION

Key Treatment Points



| | | |
|-------------------------------|---|--|
| Airway & Breathing | Establish airway patency | |
| | BVM ventilation with 100% O ₂ | |
| | Consider LMA/intubation or arrange for intubation | |
| Circulation | Pulseless VT & VF protocol | |
| General Therapy | Uninterrupted BLS | |
| Specific therapy | Lipid rescue, Intralipid 20%, 1.5 mls/kg and infusion. Ideally mentioned but not required for ROSC in the simulation | |

Diagnosis: Pulseless ventricular tachycardia, VF, Ropivacaine (LA) toxicity

Learning objectives

At the end of this session participants should be able to:

- Apply the structured approach to management and diagnosis during cardiac arrest
- Perform BLS/ALS effectively and safely
- Recall and apply the VF/VT ALS algorithm in their own practice
- Recall and apply the 4 Hs/Ts in their own practice

Potential Issues to be Discussed

- VF/VT protocols
- Management of local anaesthetic induced cardiac arrest, importance of effective ventilation/oxygenation (hypoxia/hypercarbia exacerbate LA toxicity)
- Primary learning objectives are emphasis on VF/VT protocols
- Role of Lipid Rescue. If time for discussion
 - See algorithms below
 - Endorsed by ANZCA, AAGBI
 - <https://anaesthetists.org/Home/Resources-publications/Guidelines/Management-of-severe-local-anaesthetic-toxicity>

Extra equipment

- Laminated cognitive aid, Management of severe local anaesthetic toxicity (abridged for use by candidates)
- Intralipid 20% 500 mls (Laminated card)

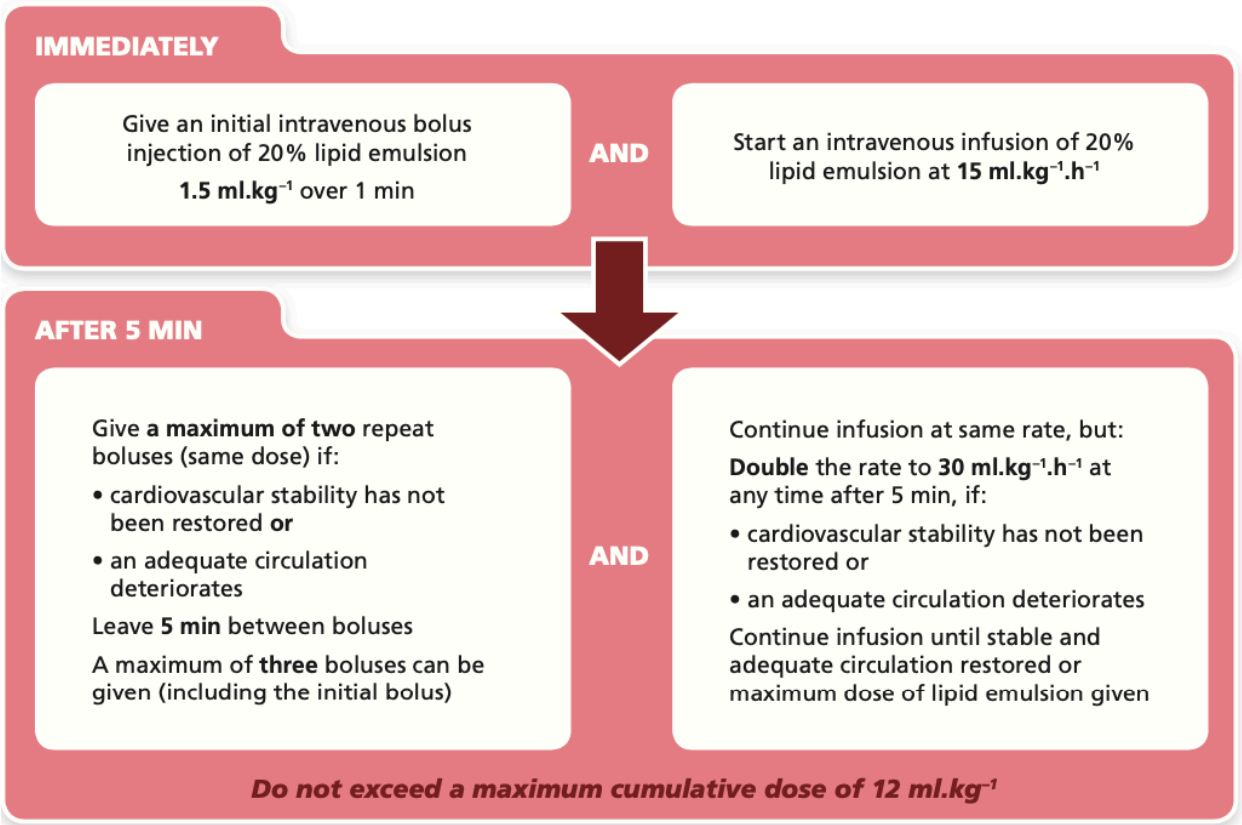
AAGBI Safety Guideline

Management of Severe Local Anaesthetic Toxicity



Abridged for simulation
 LA Toxicity Cognitive Aid

| | | |
|--|---|---|
| <h3>2</h3> <h4>Immediate management</h4> | <ul style="list-style-type: none"> • Stop injecting the LA • Call for help • Maintain the airway and, if necessary, secure it with a tracheal tube • Give 100% oxygen and ensure adequate lung ventilation (hyperventilation may help by increasing plasma pH in the presence of metabolic acidosis) • Confirm or establish intravenous access • Control seizures: give a benzodiazepine, thiopental or propofol in small incremental doses • Assess cardiovascular status throughout • Consider drawing blood for analysis, but do not delay definitive treatment to do this | |
| <h3>3</h3> <h4>Treatment</h4> | <p>IN CIRCULATORY ARREST</p> <ul style="list-style-type: none"> • Start cardiopulmonary resuscitation (CPR) using standard protocols • Manage arrhythmias using the same protocols, recognising that arrhythmias may be very refractory to treatment • Consider the use of cardiopulmonary bypass if available <p>GIVE INTRAVENOUS LIPID EMULSION (following the regimen overleaf)</p> <ul style="list-style-type: none"> • Continue CPR throughout treatment with lipid emulsion • Recovery from LA-induced cardiac arrest may take >1 h | <p>WITHOUT CIRCULATORY ARREST</p> <p>Use conventional therapies to treat:</p> <ul style="list-style-type: none"> • hypotension, • bradycardia, • tachyarrhythmia <p>CONSIDER INTRAVENOUS LIPID EMULSION (following the regimen overleaf)</p> <ul style="list-style-type: none"> • Propofol is not a suitable substitute for lipid emulsion • Lidocaine should not be used as an anti-arrhythmic therapy |



AAGBI Safety Guideline

Management of Severe Local Anaesthetic Toxicity



| | | |
|-------------------------------------|--|---|
| <h3>1 Recognition</h3> | <p>Signs of severe toxicity:</p> <ul style="list-style-type: none"> • Sudden alteration in mental status, severe agitation or loss of consciousness, with or without tonic-clonic convulsions • Cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur • Local anaesthetic (LA) toxicity may occur some time after an initial injection | |
| <h3>2 Immediate management</h3> | <ul style="list-style-type: none"> • Stop injecting the LA • Call for help • Maintain the airway and, if necessary, secure it with a tracheal tube • Give 100% oxygen and ensure adequate lung ventilation (hyperventilation may help by increasing plasma pH in the presence of metabolic acidosis) • Confirm or establish intravenous access • Control seizures: give a benzodiazepine, thiopental or propofol in small incremental doses • Assess cardiovascular status throughout • Consider drawing blood for analysis, but do not delay definitive treatment to do this | |
| <h3>3 Treatment</h3> | <p>IN CIRCULATORY ARREST</p> <ul style="list-style-type: none"> • Start cardiopulmonary resuscitation (CPR) using standard protocols • Manage arrhythmias using the same protocols, recognising that arrhythmias may be very refractory to treatment • Consider the use of cardiopulmonary bypass if available <p>GIVE INTRAVENOUS LIPID EMULSION (following the regimen overleaf)</p> <ul style="list-style-type: none"> • Continue CPR throughout treatment with lipid emulsion • Recovery from LA-induced cardiac arrest may take >1 h • Propofol is not a suitable substitute for lipid emulsion • Lidocaine should not be used as an anti-arrhythmic therapy | <p>WITHOUT CIRCULATORY ARREST Use conventional therapies to treat:</p> <ul style="list-style-type: none"> • hypotension, • bradycardia, • tachyarrhythmia <p>CONSIDER INTRAVENOUS LIPID EMULSION (following the regimen overleaf)</p> <ul style="list-style-type: none"> • Propofol is not a suitable substitute for lipid emulsion • Lidocaine should not be used as an anti-arrhythmic therapy |
| <h3>4 Follow-up</h3> | <ul style="list-style-type: none"> • Arrange safe transfer to a clinical area with appropriate equipment and suitable staff until sustained recovery is achieved • Exclude pancreatitis by regular clinical review, including daily amylase or lipase assays for two days • Report cases as follows: <ul style="list-style-type: none"> in the United Kingdom to the National Patient Safety Agency (via www.npsa.nhs.uk) in the Republic of Ireland to the Irish Medicines Board (via www.imb.ie) <p>If Lipid has been given, please also report its use to the international registry at www.lipidregistry.org. Details may also be posted at www.lipidrescue.org</p> | |

Your nearest bag of Lipid Emulsion is kept

APLS: Cardiac Scenario 8

History {initial candidate briefing prior to arrival of child}

You are called urgently to the resuscitation area in the Emergency department where a 6 year old has been brought in collapsed.
History of pyrexia and lethargy throughout the day.
Estimated weight 20 kg

Initial impression {provide information as candidate assesses child and applies monitoring}

Child is grey and floppy
As child is exposed a purpuric rash is evident on the limbs and trunk

Clinical Course {to be given to candidate as they progress}

The monitor shows a sinus rhythm, but the child is unresponsive, apnoeic and pulseless.
The child remains in PEA until oxygenation is established, the 2nd dose of adrenaline given and fluid therapy is underway.

INSTRUCTORS INFORMATION

Key Treatment Points



| | | |
|-------------------------------|---|--|
| Airway & Breathing | Establish airway patency | |
| | BVM ventilation with 100% O ₂ | |
| | Consider LMA/intubation or arrange for intubation | |
| Circulation | PEA protocol | |
| | IV/IO access | |
| | Fluid bolus | |
| General Therapy | Uninterrupted BLS | |

Diagnosis: Cardio-respiratory arrest – PEA. Circulatory collapse secondary to septic shock

Learning objectives

At the end of this session participants should be able to:

- Apply the structured approach to management and diagnosis during cardiac arrest
- Perform BLS/ALS effectively and safely
- Recall and apply the ALS PEA algorithm in their own practice
- Recall and apply the 4 Hs/Ts in their own practice

Potential Issues to be Discussed

- PEA protocol, 4 Hs/Ts
- Septic shock management
- https://www.rch.org.au/clinicalguide/guideline_index/SEPSIS