COMMON CRISES IN PAEDIATRIC ANAESTHESIA

LOCAL ANAESTHETIC TOXICITY

1. **RECOGNITION**

Signs of severe toxicity:

- 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 sometime after an initial injection

2. IMMEDIATE MANAGEMENT

- Stop injecting LA.
- Call for help
  Maintain and/or secure airway.
- 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 (1st choice) or thiopental in small incremental doses. AVOID Propofol in presence of haemodynamic instability
- Assess cardiovascular status throughout
- Consider drawing blood for analysis, but do not delay definitive treatment

TREATMENT

In the presence of Circulatory Arrest,

- Start CPR. Manage arrhythmias using ACLS protocol, (arrhythmias may be very refractory to treatment)
  For ventricular arrhythmias, amiodarone is preferred; avoid tAVOID vasopressin, beta blockers, Ca channel blockers, lignocaine or procainamide.
- Consider the use of cardiopulmonary bypass if available

Lipofundin N 20% (Kept in OT pharmacy store)

Give an initial intravenous bolus injection of **Lipofundin 20% 1.5ml/kg over 1 min AND start an infusion at 15 ml/kg/hour**.

After 5 minutes, if cardiovascular stability has not been restored:

Consider **a maximum of two** repeat boluses (1.5ml/kg)
A maximum of **three** boluses can be given (including the initial bolus) Leave 5 minutes between each bolus.

- **Double** the rate to **30 ml/kg/h** and continue infusion until stable and adequate circulation restored or **maximum dose of 12 ml/kg of lipid emulsion** given
- 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
- Lignocaine should not be used as an antiarrhythmic therapy

3. FOLLOW-UP

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.

AAGBI Safety Guideline

Management of Severe Local Anaesthetic Toxicity

1 Recognition

Signs of severe toxicity:

- 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

2 Immediate management

- 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

3 Treatment

IN CIRCULATORY ARREST

- 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

GIVE INTRAVENOUS LIPID EMULSION
(following the regimen overleaf)

- 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

WITHOUT CIRCULATORY ARREST
Use conventional therapies to treat:

- hypotension,
- bradycardia,
- tachyarrhythmia

CONSIDER INTRAVENOUS LIPID EMULSION
(following the regimen overleaf)

- Propofol is not a suitable substitute for lipid emulsion
- Lidocaine should not be used as an anti-arrhythmic therapy

4 Follow-up

- 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:
  - 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**)

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**

Your nearest bag of Lipid Emulsion is kept.....

IMMEDIATELY

Give an initial intravenous bolus injection of 20% lipid emulsion **1.5 ml.kg^{-1}** over 1 min

AND

Start an intravenous infusion of 20% lipid emulsion at **15 ml.kg^{-1}.h^{-1}**

AFTER 5 MIN

Give **a maximum of two** repeat boluses (same dose) if:

- cardiovascular stability has not been restored **or**
- an adequate circulation deteriorates

Leave **5 min** between boluses

A maximum of **three** boluses can be given (including the initial bolus)

AND

Continue infusion at same rate, but:

Double the rate to **30 ml.kg^{-1}.h^{-1}** at any time after 5 min, if:

- cardiovascular stability has not been restored or
- an adequate circulation deteriorates

Continue infusion until stable and adequate circulation restored or maximum dose of lipid emulsion given

Do not exceed a maximum cumulative dose of 12 ml.kg^{-1}

An approximate dose regimen for a 70-kg patient would be as follows:

IMMEDIATELY

Give an initial intravenous bolus injection of 20% lipid emulsion 100 ml over 1 min

AND

Start an intravenous infusion of 20% lipid emulsion at 1000 ml.h^{-1}

AFTER 5 MIN

Give a **maximum of two** repeat boluses of 100 ml

AND

Continue infusion at same rate but **double** rate to 2000 ml.h^{-1} if indicated at any time

Do not exceed a maximum cumulative dose of 840 ml

This AAGBI Safety Guideline was produced by a Working Party that comprised:
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This Safety Guideline is endorsed by the Australian and New Zealand College of Anaesthetists (ANZCA).

References:

1. AAGBI Safety Guideline: Management of Severe Local Anaesthetic Toxicity 2010.
2. Neal et al. ASRA Practice Advisory on Local Anesthetic Systemic Toxicity Regional Anesthesia and Pain Medicine & Volume 35, Number 2, March-April 2010