Clinical Guideline
Local Anaesthetic Toxicity (severe)

Policy developed by: SA Maternal, Neonatal & Gynaecology Community of Practice
Approved SA Health Safety & Quality Strategic Governance Committee on:
01 March 2017
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Summary
The purpose of the Local Anaesthetic Toxicity (severe) Perinatal Practice Guideline is to give clinicians information on the signs of severe local anaesthetic toxicity and subsequent management and follow up care.

Keywords
local anaesthetic toxicity, clinical guideline, perinatal practice guideline, maternal collapse, severe, lipid emulsion, intralipid

Policy history
Is this a new policy? N
Does this policy amend or update an existing policy? Y v3.0
Does this policy replace an existing policy? N
If so, which policies? Severe Local Anaesthetic Toxicity

Applies to
All Health Networks
CALHN, SALHN, NALHN, CHSALHN, WCHN, SAAS

Staff impact
All Clinical, Medical, Midwifery, Nursing, Allied Health, Emergency, Mental Health, Pathology, Pharmacy, Students, Volunteers, SAAS

PDS reference
CG253

Version control and change history

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Note:
This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary.
- Advising consumers of their choice and ensuring informed consent is obtained.
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements.

Explanation of the Aboriginal artwork:
The Aboriginal artwork used symbolises the connection to country and the circle shape shows the strong relationships amongst families and the Aboriginal culture. The horse shoe shape design shown in front of the generic statement symbolises a woman and those enclosing a smaller horse shoe shape depicts a pregnant woman. The smaller horse shoe shape in this instance represents the unborn child. The artwork shown before the specific statements within the document symbolises a footprint and demonstrates the need to move forward together in unison.

Australian Aboriginal Culture is the oldest living culture in the world yet Aboriginal people continue to experience the poorest health outcomes when compared to non-Aboriginal Australians. In South Australia, Aboriginal women are 2-5 times more likely to die in childbirth and their babies are 2-3 times more likely to be of low birth weight. The accumulative effects of stress, low socio economic status, exposure to violence, historical trauma, culturally unsafe and discriminatory health services and health systems are all major contributors to the disparities in Aboriginal maternal and birthing outcomes. Despite these unacceptable statistics the birth of an Aboriginal baby is a celebration of life and an important cultural event bringing family together in celebration, obligation and responsibility. The diversity between Aboriginal cultures, language and practices differ greatly and so it is imperative that perinatal services prepare to respectively manage Aboriginal protocol and provide a culturally positive health care experience for Aboriginal people to ensure the best maternal, neonatal and child health outcomes.

Purpose and Scope of PPG
The purpose of this guideline is to give clinicians information on the signs of severe local anaesthetic toxicity and subsequent management and follow up care.
Flowchart: Regimen for intravenous lipid emulsion

Immediately

Give an initial intravenous bolus injection of 20% lipid emulsion
1.5 mL/kg over 1 minute

And

Start an intravenous infusion of 20% lipid emulsion at
15 mL/kg/hour

After 5 minutes

Give a maximum of 2 repeat boluses (same dose) if:
- Cardiovascular stability has not been restored
- An adequate circulation deteriorates

Leave 5 minutes between boluses

A maximum of 3 boluses can be given (including the initial bolus)

And

Continue infusion at same rate, but:

Double the rate to 30 mL/kg/hour at any time after
5 minutes if:
- Cardiovascular stability has not been restored
- 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

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 minute

And

Start an intravenous infusion of 20% lipid emulsion
at 1000 mL/hour

After 5 minutes

Give a maximum of 2 repeat boluses of 100 mL

And

Continue infusion at same rate, but double rate to
2000 mL/hour if indicated at any time

Do not exceed a maximum cumulative dose of 840 mL

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Summary of Practice Recommendations
Follow Basic Life Support (BLS) and Advanced Life Support (ALS) algorithms
As recovery from local anaesthetic-induced cardiac arrest may take >1 hour, continue resuscitation efforts for this time
Give intravenous 20% lipid emulsion

Abbreviations

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<td>&gt;</td>
<td>greater than</td>
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<td>IV</td>
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Definition

| Local anaesthetic toxicity | A potentially fatal complication of regional anaesthesia. It can also occur in other situations with local anaesthetic injections |

Signs of severe toxicity
Local anaesthetic toxicity may occur some time after the initial injection
**Central nervous system:** sudden alteration in mental status, severe agitation or sudden loss of consciousness with or without tonic-clonic convulsions
**Cardiovascular system:** cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur
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Immediate management

Stop injecting the local anaesthetic
Follow Basic Life Support algorithm as per Maternal Collapse PPG (see A-Z listing at www.sahealth.sa.gov.au/perinatal)
Seek immediate help following local hospital / health facility procedures for Emergency Response Team
If not already present, page / contact senior anaesthetist and request additional anaesthetic assistance
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 pH in the presence of metabolic acidosis)
Confirm or establish intravenous access
Control seizures:
  • First line –Midazolam IV 0.1–0.2 mg / kg as a slow bolus
  • If seizures do not terminate, give:
    o Thiopentone IV 125-250 mg in incremental doses of 25 mg over 10 minutes
    OR
    o Propofol IV 1-1.5 mg / kg

Please note: Care must be taken that someone with airway skills is available if thiopentone or propofol are given in the event of respiratory depression.

Assess cardiovascular status throughout
Consider drawing blood for analysis but do not delay definitive treatment to do this

Management in cardiac arrest

Manage arrhythmias, recognising that the arrhythmias may be very refractory to treatment
Consider the use of cardiopulmonary bypass if available

GIVE INTRAVENOUS 20% LIPID EMULSION (follow the regimen above)
Continue CPR throughout treatment with lipid emulsion
Recovery from local anaesthetic-induced cardiac arrest may take >1 hour
Propofol is not a suitable substitute for lipid emulsion
Lidocaine (lignocaine) should not be used as an anti-arrhythmic therapy
Consider immediate delivery via perimortem caesarean section in pregnant women beyond 24 weeks gestation
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Management without cardiac arrest

Use conventional therapies to treat
  > Hypotension
  > Bradycardia
  > Tachyarrhythmia

STRONGLY CONSIDER INTRAVENOUS LIPID EMULSION (It is difficult to predict which patients will progress to cardiovascular collapse and lipid emulsion can prevent this deterioration. It is a low risk intervention with potentially significant benefit)

Follow-up

Arrange safe transfer to a clinical area with appropriate equipment and suitable staff until sustained recovery is achieved

Pancreatitis is a potential complication of intravenous lipid emulsion, although assays for amylase and lipase are unreliable. Clinical diagnosis and consideration of radiological diagnosis is required

Notify hospital management in accordance with local Clinical Governance guidelines and complete a Safety Learning System (SLS) notification

Documentation and debriefing as per Maternal Collapse PPG (see A-Z listing at www.sahealth.sa.gov.au/perinatal)
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References

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Acknowledgements
This guideline has been adopted from the Association of Great Britain and Ireland Guidelines for the Management of Severe Local Anaesthetic Toxicity\(^1\) and is endorsed by the Australian and New Zealand College of Anaesthetists

The South Australian Perinatal Practice Guidelines gratefully acknowledge the contribution of clinicians and other stakeholders who participated throughout the guideline development process particularly:

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