Intravenous Lidocaine (Lignocaine) Use for Perioperative Analgesia Clinical Guideline

V1.0

May 2018
Summary of Intravenous Lidocaine (Lignocaine) Use for Perioperative Analgesia

For prescription by Anaesthetists/Intensivists only

Quick reference guide:

**Indication:**
The best evidence of benefit is for use in *intra-abdominal surgery* (both laparoscopic and open)

**Contraindications:**
- Local Anaesthetic administration by other route
- Hepatic impairment
- Allergy

**Cautions:**
- Arrhythmia/Conduction defects
- Cardiac failure
- Bradycardia
- Epilepsy/Seizures
- Pregnancy
- Severe renal failure

**Loading dose:**
1.5 mg/kg (Max. 120mg = 12ml)
1% Lidocaine neat, slow bolus
At induction or perioperatively
PREScribe periop LIDOcaine protocol on EPMA

**Maintenance Dosing (after 15 mins):**
2 mg/kg/h (Max. 180mg/h = 9ml/h)
2% Lidocaine neat, via syringe driver
In theatre and continued in recovery

[Example regime in 70 kg patient: 105mg (10.5ml 1%) + 140mg/h (7ml/h 2%)]

**Intraoperative monitoring as per AAGBI standards**

**Monitoring in recovery:**
- Continuous ECG monitoring
- BP, HR, RR, SpO2 as per RCHT ‘Analgesic Assessment Chart’
- Monitor cannula site carefully
- Document as per RCHT ‘Analgesic Assessment Chart’

**Discontinuation:**
- After 12 hours
- Or earlier if transferred to ward
- IMMEDIATELY if concerns of adverse reaction

**If any concerns over side effects or toxicity, contact patient’s anaesthetist urgently, or the SAT on bleep 3513 if out of hours.**

NB: This protocol is for analgesic use of Lidocaine, not treatment of arrhythmia.
1. **Aim/Purpose of this Guideline**

1.1. Degree and character of postoperative pain is difficult to predict.

1.2. Various treatments are available and used in common practice, each of which have their own profile of side effects and risks. A multimodal approach to postoperative analgesia is used to balance these against the benefits each drug offers.

1.3. Lidocaine is a commonly used local anaesthetic agent, which has beneficial effects on postoperative pain when used intravenously.

1.4. Lidocaine can be safely used as an adjunct to typical analgesic agents to improve postoperative pain relief.

1.5. This document is to guide anesthetists in its safe use in the perioperative period.

2. **The Guidance**

2.1. **Background:**

2.1.1. Lidocaine is an amide local anaesthetic agent which is routinely used for peripheral and regional anaesthesia. It also has class 1b anti-arrhythmic action.

2.1.2. Its mechanism of action involves sodium channel blockade, preventing neuronal action potential generation and propagation.

2.1.3. Its intravenous use has been well established in the management of both acute and chronic pain, however its specific mechanism of action in these particular circumstances remains unclear.

2.1.4. Other beneficial effects of perioperative Lidocaine include: reduced incidence of ileus, reduced PONV, reduced opioid requirements.

- 2.1.4.1. Intraoperative IV Lidocaine has also been reported to have a MAC sparing effect.

- 2.1.4.2. IV Lidocaine has been reported to blunt airway reflexes and therefore has been employed to aid intubation, and to prevent coughing on extubation.

2.2. **Indications:**

2.2.1. The best evidence for beneficial effects from IV Lidocaine is in patients undergoing laparoscopic or open abdominal procedures.

2.2.2. Benefit has been reported in other specialties, but evidence of such is low grade and sparse.

2.2.3. This is an accepted, evidence supported, safe, but off-license, use of Lidocaine and clinicians should advise patients accordingly.
2.3. **Contraindications:**

2.3.1. IV Lidocaine should NOT be used in conjunction with other administration of moderate to large volumes of local anaesthetic. This includes epidural, regional, or peripheral nerve blocks (especially those with indwelling nerve catheters).

2.3.1.1. IV Lidocaine may be considered with caution in conjunction with spinal anaesthesia / analgesia.

2.3.2. IV Lidocaine should not be used in those with hepatic impairment due to its hepatic clearance.

2.3.3. Documented allergy.

2.4. **Cautions:**

2.4.1. Those with disturbed cardiac conduction; first three months after myocardial infarction; conditions of reduced cardiac output (left ventricular output less than 35 per cent of normal); bradycardia with heart rate below 50; Adam-Stokes syndrome; Wolff-Parkinson-White syndrome.

2.4.2. Epilepsy, or other increased tendency to convulsions; myasthenia gravis.

2.4.3. Severe renal impairment (eGFR <30ml/min/1.73m²).

2.4.4. Pregnancy.

2.5. **Initial dosing:**

2.5.1. An initial loading dose of 1.5mg/kg (max. 120mg) of 1% Lidocaine should be given as a slow bolus over approximately 2 minutes.

2.5.2. This can be given at induction or perioperatively.

2.5.3. If this is given as rescue analgesia in recovery, this should be administered by the anaesthetist. **Caution:** It should be considered that such patients may have already received a local anaesthetic block. Doses should be moderated accordingly.

2.6. **Maintenance dosing:**

2.6.1. A continuous infusion of 2mg/kg/h up to a maximum of 180mg/h (i.e. 9ml/h). Start 15 mins after bolus dose.

2.6.2. This may be down titrated if required.

2.7. **Prescribing and administration:**

2.7.1. **Prescribe the perioperative Lidocaine protocol on EPMA and chart the bolus dose***
2.7.2. Lidocaine should be prescribed as ‘2% Lidocaine neat’ on the ‘fluids and infusions’ paper chart, with the postoperative infusion rate in ml/h (NOT mg/h) clearly written.

2.7.3. 50 ml (of 2% Lidocaine) containing 1000mg should be drawn up.

2.7.4. This should be administered via a syringe driver only, with an anti-reflux valve. The rate should be recorded on the analgesia chart. 2% Lidocaine can be given via peripheral venous access.

2.7.5. Lidocaine infusions for postoperative analgesia should only be given in theatre, theatre recovery, or critical care.

2.7.6. Dose regimens of IV Lidocaine differ if using perioperatively to treat pain, or to treat arrhythmias. This must be carefully distinguished when prescribing.

2.8. Monitoring:

2.8.1. ECG monitoring should be continuous while any patient remains on a Lidocaine infusion.

2.8.2. Intraoperative monitoring should continue as per AAGBI standards.

2.8.3. Minimum frequency of postoperative BP, HR, RR and SpO₂ monitoring should be every 15 minutes for the first hour and then half hourly for two hours. Then hourly thereafter. This is in keeping with RCHT ‘Analgesia Assessment Chart’.

2.8.3.1. Standard frequency of monitoring in recovery, or monitoring frequency as per NEWS score should continue if this is more frequent.

2.8.4. Patients on a Lidocaine infusion should be nursed at a minimum ratio of 1:2.

2.8.5. The cannula site should be checked at least as frequently as the observations, but as often as possible.

2.8.6. Document observations, infusion rate and any signs of LA toxicity on the RCHT ‘Analgesia assessment chart’. This is available via the intranet (copy in Appendix 4).

2.9. Identification of local anaesthetic toxicity:

2.9.1. Early or mild symptoms may include:
- perioral tingling
- metallic taste
- tinnitus
- agitation
- dizziness
2.9.2. Moderate symptoms may include:
- slurred speech or blurred vision
- bradycardia
- AV blocks
- hypotension
- paraesthesia
- confusion

2.9.3. Late or severe symptoms may include:
- Seizure
- Coma
- ventricular arrhythmia
- cardiac arrest.

2.10. Management of local anaesthetic toxicity or other complication.

2.10.1. If any adverse reaction is identified the infusion should be immediately discontinued and the anaesthetist (or on call anaesthetist, bleep 3513) should be contacted as a matter of urgency.

2.10.2. Local anaesthetic toxicity should be managed as per the AAGBI guidelines (see reference card in Appendix 3).

2.10.3. In the event of cardiac arrest: A cardiac arrest call should be made by dialing 2222 and management of the patient should follow advanced life support algorithms.

2.11. Discontinuation:

2.11.1. The infusion should be discontinued after 12 hours, or beforehand if the patient is due to return to the ward before this time.

2.11.2. Patients should never be transferred back to the ward with a Lidocaine infusion running.

2.12. Other uses:

2.12.1. Intravenous Lidocaine has uses in outpatient management of chronic pain and intra-arterial use during fibroid embolization. Use in these settings is not covered by this guideline.

NB. This document is only as guidance for anaesthetists or intensivists prescribing, and the recovery and critical care staff administering, IV Lidocaine – the use of IV Lidocaine by other doctors or departments would not be expected without consultation.
3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>The first 50 patients treated using this protocol will be audited for efficacy and side-effects. Changes to the protocol and further monitoring will depend on analysis of these 50 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Dr K Mitchell</td>
</tr>
<tr>
<td>Tool</td>
<td>Audit Sheet - Attached</td>
</tr>
<tr>
<td>Frequency</td>
<td>Single cohort of 50 patients. Early reports of problems will trigger early intervention</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>The reports above will be presented during scheduled governance sessions. A detailed analysis of the written and anecdotal feedback will be undertaken. This will be included in the minutes of the governance session. The report will be forwarded to theatre leads. This can then be discussed at Theatre Operating Group level at their discretion. All incidents will be reported to Acute Pain Lead and Pain governance lead. Issues will be discussed at Acute Pain Group meetings.</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>See “Reporting Arrangements”</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>The appropriate use of ketamine using this protocol will be inferred from the audit, and from the discussions resulting from their presentation at governance. Conclusions will be presented to relevant practitioners (recovery nurses; anaesthetists) at governance and via email.</td>
</tr>
</tbody>
</table>

4. Equality and Diversity

4.6. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Diversity & Human Rights Policy' or the Equality and Diversity website.

4.7. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 2.
## Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Intravenous Lidocaine (Lignocaine) Use for Perioperative Analgesia Clinical Guideline V1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>1/5/18</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>1/5/18</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>1/5/21</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Keith Mitchell, Consultant Anaesthetist</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252792</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>To provide safe and efficient administration of intravenous lidocaine to provide analgesia in High Dependency Areas in the perioperative period</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>Lidocaine, lignocaine, recovery, rescue, analgesia, intravenous, pain, perioperative</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>New document</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Anaesthetic Dept Governance Meeting 16/1/18 Medication Practice Committee 6/4/18</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Vicky Peverelle, Associate Director</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Ben Whittaker Anaesthetic SpR</td>
</tr>
<tr>
<td>Name and Signature of Divisional/Directorate Governance Lead confirming approval by specialty and divisional management meetings</td>
<td>{Original Copy Signed} Suzanne Atkinson</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>Mark Daly</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and)</td>
<td>Internet &amp; Intranet</td>
</tr>
</tbody>
</table>
Ratification):

Document Library
Folder/Sub Folder: Clinical/Anaesthetics

Links to key external standards
https://www.aagbi.org/sites/default/files/la_toxicity_2010_0.pdf

Related Documents:

Training Need Identified?
No specific training required. Recovery staff will be provided with an explanation and opportunity for discussion

Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 May 18</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Keith Mitchell Consultant Anaesthetist</td>
</tr>
</tbody>
</table>

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This document is to be retained for 10 years from the date of expiry.
This document is only valid on the day of printing

Controlled Document

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy for the Development and Management of Knowledge, Procedural and Web Documents (The Policy on Policies). It should not be altered in any way without the express permission of the author or their Line Manager.
Appendix 2. Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed</th>
<th>Directorate and service area: Theatres &amp; Anaesthetics</th>
<th>Is this a new or existing Policy?</th>
<th>Name of individual completing assessment: Keith Mitchell, Consultant Anaesthetist</th>
<th>Telephone: 01872 252792</th>
</tr>
</thead>
</table>

1. **Policy Aim***

*Who is the strategy / policy / proposal / service function aimed at?*

To guide the safe and appropriate use of intravenous Lidocaine (lignocaine) for perioperative analgesia.

2. **Policy Objectives***

To guide the safe and appropriate use of intravenous Lidocaine (lignocaine) for perioperative analgesia.

3. **Policy – intended Outcomes***

To guide the safe and appropriate use of intravenous Lidocaine (lignocaine) for perioperative analgesia.

4. **How will you measure the outcome?**

Monitoring through audit, departmental feedback, and discussion at governance meetings.

5. **Who is intended to benefit from the policy?**

Patients.

6a **Who did you consult with***

<table>
<thead>
<tr>
<th>Workforce</th>
<th>Patients</th>
<th>Local groups</th>
<th>External organisations</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b). Please identify the groups who have been consulted about this procedure.

- Anaesthetists via group email and governance meetings.
- Pain medicine consultants group.

What was the outcome of the consultation?

Policy agreed

7. **The Impact**

Please complete the following table. **If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.**

Are there concerns that the policy could have differential impact on:

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
</table>
### You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this excludes any policies which have been identified as not requiring consultation. or
- Major this relates to service redesign or development

#### 8. Please indicate if a full equality analysis is recommended.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

#### 9. If you are not recommending a Full Impact assessment please explain why.

---

**Signature of policy developer / lead manager / director**

Keith Mitchell

**Date of completion and submission**

01/05/18
Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead
c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa,
Truro, Cornwall, TR1 3HD

This EIA will not be uploaded to the Trust website without the signature of the Human Rights, Equality & Inclusion Lead.

A summary of the results will be published on the Trust’s web site.

Signed Keith Mitchell
Date 01/05/18
Appendix 3. AAGBI Safety Guideline for the Management of Severe Local Anaesthetic Toxicity.

### AAGBI Safety Guideline

**Management of Severe Local Anaesthetic Toxicity**

<table>
<thead>
<tr>
<th>Recognition</th>
<th>Signs of severe toxicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Sudden alteration in mental status, severe agitation or loss of consciousness, with or without tonic-clonic convulsions</td>
</tr>
<tr>
<td></td>
<td>2. Cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur</td>
</tr>
<tr>
<td></td>
<td>3. Local anaesthetic (LA) toxicity may occur some time after an initial injection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Immediate management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Stop injecting the LA</td>
</tr>
<tr>
<td></td>
<td>2. Call for help</td>
</tr>
<tr>
<td></td>
<td>3. Maintain the airway and, if necessary, secure it with a tracheal tube</td>
</tr>
<tr>
<td></td>
<td>4. Give 100% oxygen and ensure adequate lung ventilation (hyperventilation may help by increasing plasma pH in the presence of metabolic acidosis)</td>
</tr>
<tr>
<td></td>
<td>5. Confirm or establish intravenous access</td>
</tr>
<tr>
<td></td>
<td>6. Control seizures: give a benzodiazepine, thiopental or propofol in small incremental doses</td>
</tr>
<tr>
<td></td>
<td>7. Assess cardiovascular status throughout</td>
</tr>
<tr>
<td></td>
<td>8. Consider drawing blood for analysis, but do not delay definitive treatment to do this</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>IN CIRCULATORY ARREST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Start cardiopulmonary resuscitation (CPR) using standard protocols</td>
</tr>
<tr>
<td></td>
<td>2. Manage arrhythmias using the same protocols, recognising that arrhythmias may be very refractory to treatment</td>
</tr>
<tr>
<td></td>
<td>3. Consider the use of cardiopulmonary bypass if available</td>
</tr>
<tr>
<td></td>
<td>4. Give intravenous lipid emulsion (following the regimen overleaf)</td>
</tr>
<tr>
<td></td>
<td>5. Continue CPR throughout treatment with lipid emulsion</td>
</tr>
<tr>
<td></td>
<td>6. Recovery from LA-induced cardiac arrest may take &gt;1 h</td>
</tr>
<tr>
<td></td>
<td>7. Propofol is not a suitable substitute for lipid emulsion</td>
</tr>
<tr>
<td></td>
<td>8. Lidocaine should not be used as an anti-arrhythmic therapy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>WITHOUT CIRCULATORY ARREST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Use conventional therapies to treat:</td>
</tr>
<tr>
<td></td>
<td>a. hypotension,</td>
</tr>
<tr>
<td></td>
<td>b. bradycardia,</td>
</tr>
<tr>
<td></td>
<td>c. tachyarrhythmia</td>
</tr>
<tr>
<td></td>
<td>2. Consider intravenous lipid emulsion (following the regimen overleaf)</td>
</tr>
<tr>
<td></td>
<td>a. Propofol is not a suitable substitute for lipid emulsion</td>
</tr>
<tr>
<td></td>
<td>b. Lidocaine should not be used as an anti-arrhythmic therapy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Follow-up</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Arrange safe transfer to a clinical area with appropriate equipment and suitable staff until sustained recovery is achieved</td>
</tr>
<tr>
<td></td>
<td>2. Exclude pancreatitis by regular clinical review, including daily amylase or lipase assays for two days</td>
</tr>
<tr>
<td></td>
<td>3. Report cases as follows: in the United Kingdom to the National Patient Safety Agency (via <a href="http://www.npsa.nhs.uk">www.npsa.nhs.uk</a>)</td>
</tr>
<tr>
<td></td>
<td>a. in the Republic of Ireland to the Irish Medicines Board (via <a href="http://www.imb.ie">www.imb.ie</a>)</td>
</tr>
<tr>
<td></td>
<td>b. If Lipid has been given, please also report its use to the international registry at <a href="http://www.lipidregistry.org">www.lipidregistry.org</a>. Details may also be posted at <a href="http://www.lipidrescue.org">www.lipidrescue.org</a></td>
</tr>
</tbody>
</table>

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:
Grant Cave, Will Harrop-Griffiths (Chair), Martyn Harvey, Tim Meek, John Picard, Tim Short and Guy Weinberg.

This Safety Guideline is endorsed by the Australian and New Zealand College of Anaesthetists (ANZCA).
Appendix 4.

INTRAVENOUS LIDOCAINE IN RECOVERY – INTRODUCTION AUDIT

Date

Patient label here

Description of operation:

Did the patient experience any side effects that you think were caused by administration of lidocaine? Please describe symptom, severity and management

Were there issues regarding administering lidocaine? For instance, unavailable drug, unwilling staff, issues regarding prescription?

Was Lidocaine used for uncontrolled pain in recovery?  Y / N

If so, please give your impression of its effectiveness

Made matters worse [ ]
Made no difference [ ]
Improved pain modestly [ ]
Improved pain considerably [ ]
Not applicable – patient comfortable [ ]

Any comments?

Please complete this audit form and place it in the pain folder in the recovery area