Drug Guideline Title: **Lignocaine**

**Summary:** Lignocaine is an anti-arrhythmic and local anaesthetic agent. It may be used for treatment of ventricular arrhythmias.

**Approved by:** ICU Medical Director

**Publication (Issue) Date:** January 2014

**Next Review Date:** January 2017

**Replaces Existing Drug Guideline:** lignocaine

**Previous Review Dates:** 2002, 2004

1. **Introduction contains:**

   **The risk addressed by this policy:**

   - Patient Safety

2. **Policy Statement:**

   - All care provided within Liverpool Hospital will be in accordance with infection control, manual handling and minimisation and management of aggression guidelines.
   - Medications are to be prescribed and signed by a medical officer/authorised nurse practitioner (NP) unless required during an emergency.
   - All drugs administered during an emergency (under the direction of a medical officer/authorised nurse practitioner) are to be documented during the event, then prescribed and signed following the event.
   - Medications are to be given at the time prescribed (as close to the time as is possible when multiple drugs require ‘same time’ administration and, when the nurse is caring for more than one patient, recognition is given to a possible short delay to administration – antibiotics and other lifesaving drugs are to be prioritised) and are to be signed by the administering nurse.
   - Parenteral medication prescriptions and the drug are to be checked with a second registered or endorsed enrolled nurse prior to administration. The “rights of drug
administration" must be followed: right: patient, drug, dose, route, administration, time, reason for the drug, documentation, education and evaluation/outcome.

- Adverse drug reactions are to be documented and reported to a medical officer.
- Medication errors are to be reported using the hospital electronic reporting system: IIMS.
- Guidelines are for adult patients unless otherwise stated.
- Continuous ECG monitoring is necessary during IV administration to avoid potential overdosage and toxicity.

3. Principles / Guidelines

**Actions**¹,²,⁵

- Lignocaine is a Class I membrane stabilising antiarrhythmic, and local anaesthetic. It acts as a sodium channel blocker.
- In the heart, an electrophysiological property of Purkinje fibers decreases diastolic depolarization, and automaticity, causing reduced or unchanged excitability and membrane responsiveness.
- Duration of action potential and ventricular muscle refractory period are also decreased, due to blockade of the sodium channel.
- Refractory period of the AV node may increase, decrease, or remain unchanged. Lignocaine increases the ventricular fibrillation threshold.
- IV lignocaine acts immediately and lasts for 10 to 30 minutes.
- As a local anaesthetic, it stabilises the neuronal membrane and prevents the initiation and transmission of nerve impulses. It is quick acting and last 60 to 90 minutes.

**Indications**¹,²,⁵

- VF/pulseless VT where amiodarone cannot be used.
- Prophylaxis in the setting of recurrent VF or VT
- Local anaesthesia for nerve blocks, and procedures

**N.B:** For VF / pulseless VT consider other drugs such as amiodarone first.

**Contraindications**¹

- Known hypersensitivity to amide local anaesthetics.
- Myasthenia Gravis, severe shock or impaired cardiac conduction
- Uncorrected hypotension in patients with epidural or spinal anaesthesia, coagulation disorders
- Supraventricular arrhythmia, severe degrees of SA, AV or intraventricular block unless patient has an artificial pacemaker.

**Precautions**¹,²

- Resuscitation equipment and drugs should be immediately available in the event of anaphylaxis.
- IV cannula should be inserted before the local anaesthetic is injected due to possibility of hypotension and bradycardia following major blocks.
- Great caution to patients with impaired cardiovascular function as they may be less able to compensate for functional changes associated with prolongation of AV conduction.
- Correct hypokalaemia, hypoxia, and disorders of acid/base balance before commencing treatment as it increases risk of arrhythmia.
- Stop lignocaine, if signs of excessive depression of cardiac conductivity (e.g. prolongation of PR interval or QRS complex). Aggravation of arrhythmias or other severe reactions will occur.
- It is unsafe to use lignocaine as a prophylactic treatment for myocardial infarction as it slows conduction that causes tachycardias via re-entry mechanisms.
Significant Interactions¹

- Propanolol and Metoprolol reduce the metabolism of lignocaine IV, observe for signs of lignocaine toxicity.
- Clearance is reduced when administered with Cimetidine, and Amiodarone. High lignocaine level precipitates seizure and lead to severe sinus bradycardia and a long sinoatrial arrest.
- Suxamethonium lead to excessive neuromuscular blockade, Lignocaine prolongs the duration of suxamethonium, combination must be used with caution.

Adverse Effects¹,²,⁵

- Slurred speech, altered consciousness, muscle twitching, and seizures
- Hypotension, bradycardia, heart block and asystole.
- Somnolences, paraesthesia often precede severe reactions, and should not be ignored.
- Methaemoglobinemia
- Local administration may produce nervousness, dizziness, blurred vision, tremor, drowsiness, nausea and vomiting.

Presentation¹

Lignocaine 1%, 50mg in 5mL ampoule.
Lignocaine 2%, 100mg in 5mL ampoule.
Lignocaine 0.4%, 2g in 500mL 5% glucose pre-mixed infusion.

Administration Guidelines

Bolus Dose¹,²,³,⁴,⁵

- Give 1mg/kg IV lignocaine bolus.
- During resuscitation an additional bolus of 0.5mg/kg may be given after five minutes.
- The total bolus dose should not exceed 3mg/kg.

Infusion¹,⁶,⁷

Use the pre-mixed lignocaine infusion, containing 2g in 500mL 5% glucose. The following reducing dose regimen is given over 24 hours:

\[
\begin{align*}
4\text{mg/min} &= 60\text{mL/hr for 1 hour then} \\
3\text{mg/min} &= 45\text{mL/hr for 4 hours then} \\
2\text{mg/min} &= 30\text{mL/hr for 19 hours}
\end{align*}
\]

The infusion should be stopped as soon as patients heart rhythm is stable or at the earliest signs of toxicity such as:

- Peripheral paraesthesia
- Metallic taste in mouth
- Twitching
- Fitting
- Decreased LOC
- Agitation

Clinical Considerations¹,²,⁵

- Continuous monitoring of ECG is essential during lignocaine infusion for arrhythmias.
- Careful and constant monitoring of cardiovascular and respiratory vital signs and the patient's state of consciousness should be attended. It should be kept in mind that at such times restlessness, anxiety, tinnitus, dizziness, blurred vision, tremors, depression or drowsiness may be early warning signs of CNS toxicity.
- Avoid prolonged contact between lignocaine solution and metal surfaces e.g. cannulae and syringes with metal parts. Ions irritating to vessels may be released.
- It is not recommended to start a lignocaine infusion until return of spontaneous circulation.
4. **Performance Measures**

All incidents are documented using the hospital electronic reporting system: IIMS and managed appropriately by the NUM and staff as directed.

5. **References / Links**


**Author:** CNC (S.Shunker) ; RN (Rizalina del Rosario)

**Reviewers:** ICU Director, ICU – NM, NUM, ICU – CNE, ICU – CNS, Pharmacist.

**Endorsed by:** A Prof. Michael Parr, ICU Director