Lidocaine Infusion - Full Clinical Guideline

Reference no.: CG – PAIN/2015/001

Aim and scope:

To reduce post-operative opiate requirements, improve analgesia, and to improve return to normal bowel function in patients undergoing the following operations:

Lap or open bowel resection (elective only - Not to be used in septic patients)
Cystoprostatectomy
Major Gynae surgery with bowel involvement
Complex spinal surgery
Laparoscopic Upper GI surgery

Instructions for anaesthetist:

- Arcomed syringe driver loaded with 50ml syringe containing lidocaine 1%
- Select lidocaine programme, confirm concentration, and programme patient's weight.

Loading dose at induction: 1.5mg/kg (if appropriate)

- Select loading dose 1.5-2mg/kg to be delivered over 10 minutes
- Please see Appendix 1 for dosing regimens.

Peri-op maintenance dose: 1-2mg/kg/hr

- Select maintenance dose in ml/kg/hr
- A good starting rate **1.5mg/kg/hr** (ie for 80kg man - 120mg/hr = 12ml/hr)
- Run at the same rate for the duration of surgery or until the patient leaves recovery.
- Please see appendix 1 for dosing regimens.

Post op:

Ensure the lidocaine infusion is stopped and discarded on leaving recovery.
Run through a 'PCA' line with anti-reflux and anti-syphon valve.
Ensure there is also an adequate separate iv access point.
The infusion and program must be handed over to the recovery staff by the anaesthetist, and the patient reviewed in recovery by the anaesthetist before being discharged.
The anaesthetist should remain immediately available until the patient has been in recovery for 1 hr, and the minimum stay in recovery should be 1 hr.
The infusion line should be clearly labeled with grey lidocaine stickers along the length of the line.

NB: for patients with BMI>30: use **ideal body weight** for dosage calculations. (see appendix 1)

Please see appendix 3 for drug interactions and adjust your dose accordingly (usual range 0.5-2mg/kg bolus + 0.5-2mg/kg/hr infusion).

Instructions for recovery/ward staff:

If extending post operatively, please follow the following instructions:

- The lidocaine infusion should run at the same rate through an Arcomed pump until the patient leaves recovery
- Do not change the syringe – if the pump runs out, discontinue and discard, unless provided with a new syringe and changed by the anaesthetist.
- Ensure that the infusion line is clearly labelled.
- Do not change the rate, unless adverse symptoms or signs occur.
- If any signs of toxicity occur, stop the infusion and contact the anaesthetist.
- See Appendix 2 for signs of toxicity.
- If unsure for any reason, and unable to get help or advice from an anaesthetist, stop the infusion.

Monitoring of vital signs as per standard recovery protocols is sufficient.

The recovery nurse must verify the medication (type, concentration and dose), and the pump settings with the anaesthetist on arrival of the patient into recovery

Instruct the patient to notify the recovery nurse if experiencing any of the following:

- Twitching/ tremors
- tinnitus
- perioral numbness
- metallic taste
- dizziness
- blurred or double vision
- visual hallucinations

Documentation Controls

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Consultation with:	
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Review Date:	June 2022
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Appendix 1: Dosage regimens:

If patient's BMI is >30, use Ideal Body Weight to dose lidocaine, which can be calculated as follows:
Height (cm) – 100 cm = IBW for women, kg.
Height (cm) – 105 cm = IBW for men, kg.

Lidocaine 1% (via an infusion pump, only for intraoperative use)
Concentration 10mg/ml, doses expressed as ml.
Give specified volume as loading dose then run at specified ml//hr for maintenance.
NB: Suggested starting rate of 1.5mg/kg/hr (highlighted in pink) This can be altered if there are drug interactions or signs of toxicity.

Weight (Kg)	0.5mg/kg	1mg/kg	1.5mg/kg	2mg/kg
50	2.5	5	7.5	10
60	3	6	9	12
70	3.5	7	10.5	14
80	4	8	12	16
90	4.5	9	13.5	18
100	5	10	15	20

Appendix 2: Signs of toxicity:

peri-oral tingling/numbness, metalic taste
restlessness/agitation,
tinnitus, blurred/double vision
twitching/tremors.

These usually indicate mild toxicity and are usually self-limiting following cessation of the infusion for 1-2hrs, and resumption at a lower rate (eg 1mg/kg/hr)

Visual hallucinations
sedation, confusion, respiratory depression,
fitting, loss of consciousness,
hyper or hypotention, bradycardia

These would indicate higher levels of toxicity and would require immediate cessation of infusion, and call for help. The half-life of iv lidocaine is short, and plasma levels drop off very quickly, so it is likely that the above patients will get better spontaneously with supportive measures. However, if fitting, loss of consciousness or cardiac arrest were to occur, immediate life support and infusion of intralipid would be indicted. Please see intralipid guidelines on flo.

Appendix 3: Drug interactions:

Medications that may increase lidocaine levels and toxic side effects include the following:

The following may decrease metabolism of lidocaine and elevate serum levels

Anti-arrhythmics

Amiodarone

Class I anti-arrhythmics (including procainamide, quinidine, mexiletine, phenytoin) exert their therapeutic effect by blocking sodium channels. Additive toxicity with lidocaine may be seen.

Hypotension/CHF.

Lidocaine is metabolized in the liver by the cytochrome P450 enzyme system (CYP450). However, the clearance of lidocaine is more dependent on liver blood flow than actual liver enzyme activity. Drugs affecting hepatic blood flow will have an impact on lidocaine plasma concentration.

Antibiotics

ciprofloxacin, norfloxacin, erythromycin, clarithromycin

Antifungals

fluconazole, itraconazole, ketoconazole

Antidepressants

fluoxetine, fluvoxamine, sertraline, citalopram, paroxetine

Beta-blockers

They reduce hepatic blood flow and can cause an increase in lidocaine plasma levels by 20 to 30%. Patients on beta-blockers may require lower doses of lidocaine when given as a continuous infusion and lidocaine levels should be followed closely.

CYP2D6 inhibitors

By inhibiting CYP2D6, the following drugs may lead to increased serum lidocaine concentrations: SSRIs (fluoxetine, paroxetine, citalopram), bupropion, terbinafine, and quinidine.

CYP3A4 inhibitors

By inhibiting CYP3A4, the following drugs may lead to increased serum lidocaine concentrations: protease inhibitors (ritonavir, indinavir, nelfinavir), macrolide antibiotics (erythromycin, clarithromycin), azole antifungals (fluconazole, ketoconazole, itraconazole), nefazodone, verapamil, and cimetidine

Other

cimetidine, diltiazem, nifedipine, verapamil

Herbal Remedies

The best known herbal product affecting P450 is St-John's Wort although there is no data to document an interaction. St-John's Wort induces P450- 3A4 and could theoretically reduce lidocaine levels.

Other

Pregabalin is a Ca-channel blocker. Consider reducing the dose of pregabalin for patients on Acute Pain Service to avoid potential hypotension. This is, however, an unlikely interaction. Similarly, exercise caution with patients on Calcium-Channel Blocker for the same reason.