IV Lidocaine for Analgesia in Renal Colic

Clinical Bottom Line

Low-dose IV lidocaine could present a valuable option for treatment of pain and nausea associated with renal colic as an adjunct or alternative to opioids as it has relative minimal cost, side effects, and addictive potential. However, the data does not show any difference in lidocaine as a replacement or an adjunct to morphine. Higher quality studies showing a benefit will be needed before we should consider routine use of lidocaine in acute renal colic.

PICO Question

P = Adult ED patients with signs/symptoms of renal colic
I = IV Lidocaine (1.5 mg/kg) with or without IV Morphine (0.1 mg/kg)
C = placebo with or without IV Morphine (0.1mg/kg)
O = Pain, nausea, side effects

Background

Renal colic affects 1.2 million people and accounts for 1% of ED visits, with symptom control presenting one of the biggest challenges in ED management. Classic presentation of acute renal colic is sudden onset of pain radiating from flank to lower extremities and usually accompanied by microscopic hematuria, nausea, and vomiting. Opioid use +/- ketorolac remains standard practice for pain control, but the use of narcotics carries a significant side effect profile that is often dose-dependent.

IV lidocaine has been shown to have clinical benefits in settings such as postoperative pain, neuropathic pain, refractory headache, and post-stroke pain syndrome. Given the side effects of narcotics, as well as the current opioid epidemic, alternatives to narcotics are gaining popularity. In patients presenting to the ED with signs and symptoms of renal colic, IV lidocaine may serve as an additional therapy to limit (or replace) opioid use and to provide faster control of symptoms such as pain and nausea.

Study 1


Validity Rating: Moderate risk of bias
The Basics
RCT; N = 240; patients age 18-65 in one Iranian hospital with signs/symptoms of renal colic. One group (N=120) received IV Lidocaine at 1.5mg/kg (max dose 200mg) and the other group (N=120) received IV Morphine 0.1mg/kg (max dose of 10mg). Pain scores were assessed using 10 point VAS at time intervals of 5, 10, 15, and 30 min after injection. Reglan given to all study participants prior to receiving pain medication. IV fluids were not given as fluid therapy not commonly used in this Iranian hospital for treatment of renal colic.

Exclusion Criteria
Patients with history of renal, hepatic or cardiac disease or with lidocaine or morphine allergy, inability or unwillingness to provide written consent, and pregnant females.

Primary Outcomes
Pain relief (measured at various time intervals on VAS scale) trial considered accomplished when either patient had a pain score of less than 3 for 30 minutes after the last analgesic dose or the 10mL of solution in the syringe (either 200mg lidocaine or 10mg morphine) was used up.

Secondary Outcomes
Article states side effects were tracked and states they were “mild and temporary” but do not list a time frame on when side effects were experienced or how long they monitored for side effects and side effects were listed in Table 3 (perioral numbness, transient dizziness, dysarthria, hypotension, vertigo, nausea, and vomiting).

Follow-up
This article did not discuss whether patients were lost to follow-up or not and why they were lost to follow up if they were.

Results
Groups were slightly different at baseline, lidocaine group had more people presenting with first stone and less with a recurrent stone
90% (108/120) patients responded to lidocaine successfully.
70% (84/120) patients responded properly to morphine.
Number of patients experiencing side effects were reported as similar between groups but data p values not provided, only percentages of patient’s experiencing side effects per group.

Limitations/Biases
It was not discussed how many patients from each group received only their appropriate weight based dosing of medication and how many required additional dosing or what they were given. Study was technically blinded but possible that the person administering the drug would be able to infer the drug being given if they knew patient weight. For example: for 100kg patient, appropriate lidocaine (1.5 mg/kg) dose would be 150mg or 7.5mL of drug from the 10mL syringe. Appropriate morphine
(0.1mg/kg) dose would be 10mg or the entire 10mL from the 10mL syringe. Also, the standard deviations for each group had significant overlap in numerical VAS score means with SD despite being statistically significant. So even if the study was performed appropriately, there does not appear to be a clinically significant difference according to this trial.

**Study 2**

**Validity Rating:** Low to moderate risk of bias

**The Basics**
RCT; N = 110; patients age 18-50 in an Iranian hospital in 2012-2013 with history/findings of renal colic. Intervention group (N=55) received IV morphine (0.1mg/kg) plus IV Lidocaine (1.5mg/kg), and the control group (N=55) received IV Morphine (0.1mg/kg) plus normal saline placebo. Pain scores were assessed using 10 point VAS at time intervals of 5, 10, 30, 60, and 120 minutes.

**Exclusion Criteria**
History of asthma, substance abuse, cardiac disease, kidney/liver failure, pregnancy, >3 prior admissions due to renal colic in a year, use of analgesics <4 hours PTA, clinical instability, allergy to lidocaine/morphine, or diagnosis not confirmed by hematuria, ultrasound, or radiologic imaging.

**Primary Outcomes**
Pain intensity scored by VAS at various time intervals. Secondary outcomes included changes in nausea intensity and side effects.

**Follow-up**
21 patients out of an enrolled 110 were lost to follow-up (intervention N = 47, placebo N = 42)

**Results**
There was no statistically significant difference in primary outcome time to pain-free state between groups (87 minutes for M+L and 100 minutes for M+NS, P = 0.071). There was a trend favoring morphine + lidocaine, but no significant difference was found due to small sample size. There was a statistically significant difference in secondary outcome of time to nausea-free state (27 minutes for M+L and 58 minutes for M + NS, P < 0.001).
Limitations/Biases
The treatments in this study were not compared against or used along with other common adjuncts that are standard for treatment of renal colic in the U.S., such as IV NSAIDs or antiemetics. This study was under-powered with an initial N of 110 and subsequent high rate of loss to follow up (21 patients thought to be primarily due to unconfirmed diagnosis). However, often at the time of treating suspected renal colic, we may not have yet confirmed the diagnosis therefore we felt it may have been useful to include these patients.