CO's CURE Podcast
Lidocaine

Provider: Hello, I'm Dr. Cathy O'Neil, a hospitalist practicing in Denver, and in this episode of the CO's CURE podcast we will talk about low dose lidocaine infusions for the treatment of pain. Our goal is to decrease the use of opioids for pain to combat the opioid epidemic in our communities.

Low dose lidocaine infusions for pain have been used for years by our anesthesia colleagues as part of their "early recovery after surgery" protocols. Studies have shown that patients had reduced analgesic requirements, and pain scores, for up to 36 hours after low-dose lidocaine infusions (Eip, Gupta, & Penning, 2016). One study showed benefit with abdominal, urologic and breast surgeries though no benefit in hip, gynecologic or cardiothoracic surgeries (Dunn & Durieux, 2017).

Incorporating lidocaine into our pain management toolbox allows us to use fewer opioids and avoid their side effects of sedation and constipation in our patients. Lidocaine was also noted to be pro-peristalic (Eip, Gupta, & Penning, 2016), which decreased the incidence of ileus after surgery and would allow patients to eat sooner after their surgery.

In the emergency department, ALTO protocol taught us to use bolus doses of lidocaine for renal colic, abdominal pain and migraine. In those scenarios, lidocaine served as an effective alternative to opioids.

Rachel Duncan is a pharmacist who has used low dose lidocaine for years and can give us more insight.

Cathy: Rachel, thanks for joining me. How does lidocaine work for pain?

Rachael: Lidocaine is thought to block Na channels in neural tissue, leading to analgesia. But the exact mech is unknown.

Cathy: When I mention using lidocaine to treat pain, some of my colleagues audibly gasp. They are very wary of using lidocaine because of its historical use with cardiac resuscitation. Tell us more about this and how can we address this concern about using lidocaine in a different setting?

Rachael: Yes, I can understand their concerns as IV lidocaine has historically been used for cardiac ventricular arrhythmias and has been recommended in cardiac arrest in the ACLS guidelines. However, it's important to note that the dose used for cardiac indications is much higher than what we're recommending for pain. The hospitalist guidelines recommend a continuous infusion dose of 1mg/kg/hr with a max of 120 mg/hr. Most providers may be more familiar with dosing in mg/min for cardiac indications, it's recommended at 2-4 mg/min with levels and clinical effect to guide titration. If you convert the max pain dose of 120 mg/hr into mg/min, it comes out to 2 mg/min, which is on the low end of the cardiac dosing. In addition, we're also only recommending use for 24 hours, with a 72-hour hard stop, to avoid accumulation and minimize cardiac and other toxic effects. The use of the infusion should be reassessed every 24 hours for effectiveness and SEs and discontinued if not found to be helping

or having any issues. If it is effective, it can be continued for up to 72 hours total. At each assessment, keep in mind that you need to have an "exit" plan.

Cathy: Which patients are safe for lidocaine?

Rachael: Patients with significant cardiac disease and already on antiarrhythmic therapies should be avoided. Those with hepatic disease need to be monitored very carefully, lower the dose, or avoided altogether. That is why the guidelines suggest continuous telemetry when using continuous infusions of lidocaine.

Cathy: Hepatic disease as in elevated LFT's or cirrhosis with coagulopathy?

Rachael: Yes, it should absolutely be avoided in patients with significant cirrhosis. In patients with bumped LFTs, I would lower dose, use for a limited amount of time, or avoid. It's important that your frontline staff, i.e. your RNs, understand which patients are at highest risk for toxicity. RNs are going to be the ones to first recognize signs of toxicity and be able to contact the provider.

Cathy: Then there is the concern for toxicity. Will we miss the signs and have the patient go into cardiac arrest before we can administer the antidote?

Rachael: The first signs of toxicity occur when lidocaine levels approach 5ug/ml. Patients may have numbness of tongue, metallic taste, lightheadedness and tinnitus. As lidocaine levels rise, they may have muscle twitching, HTN and bradycardia. Unconsciousness and seizures may occur. If untreated and levels continue to rise, above 10 ug/ml, then coma, respiratory arrest or cardiac arrest can occur.

If the patient is awake and conversant (or wakes easily) then cardiac arrest is unlikely to occur. The point here being, cardiac arrest is really the LAST SE to happen - you will see some of these other very specific SEs first and can stop or reduce the infusion.

If frontline staff have any concern whatsoever that the patient is experiencing toxic SEs, we recommend that they immediately stop the infusion and contact the provider for assessment.

Treatment of lidocaine toxicity is done by giving a lipid rescue to the patient, which is going to sequester the lidocaine, minimizing effects, and provide the heart with fuel to overcome any issues. Your pharmacy department will help frontline staff better understand how lipids are administered and make sure that any areas of the hospital using injectable lidocaine has a lipid rescue kit readily available.

Cathy: Would you recommend using levels to guide therapy?

Rachael: No, I would not. First, they are usually a send out lab that takes days to get back. If you have any concerns, you should just stop the infusion. And since the SEs are so predictable based on level, it's unnecessary.

Cathy: When do the new guidelines recommend using IV lidocaine?

Rachael: The guidelines recommend using the IV continuous lidocaine infusion as second line therapy for extremity pain, specifically for pain involving neuropathy or ischemia, and for renal colic. Since its second line therapy, it should only be used after first line therapy has proven

ineffective, and the first line agents should still be kept as part of the therapeutic plan. Once pain is controlled, IV lidocaine should be the first agent removed from the plan, as it cannot be continued upon discharge. You must have an "exit" plan.

Cathy: The ED ALTO guidelines recommend using a lidocaine 1.5 mg/kg bolus for complaints like renal colic. If I admit a patient that has received the bolus in the ED and found it helpful, am I okay to start the infusion?

Rachael: Absolutely. If the patient does not have any CIs, that is the perfect candidate to start the infusion on for continued control. As the half-life of lidocaine is quite short, by the time the patient is transferred to an inpatient bed it is safe to go ahead and start the infusion. Again, the recommendation is that the patient now be on continuous telemetry, in case any accumulation starts to occur.

Cathy: If I'm hesitant to try IV lidocaine infusion, describe to me a low-risk patient that I might consider for an appropriate candidate?

Rachael: Sure. Let's first describe the patient where I would NOT recommend using lidocaine the first time: elderly, frail patient with significant cardiac history, on amiodarone, with decreased hepatic function. A candidate that I might consider first using it in looks like this: a young, healthy patient with no past medical history presenting with renal colic, admitted for pain control.

Cathy: Thanks for discussing this with me today and I am sure this will help decrease providers reticence to use low dose lidocaine for pain.

Reference:

Lauren K. Dunn, Marcel E. Durieux; Perioperative Use of Intravenous Lidocaine. Anesthesiology 2017;126(4):729-737. doi: https://doi.org/10.1097/ALN.0000000000001527.

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