

Practical Pain Management

Could Systemic Lidocaine be the New Standard of Care for Pain due to Inflammation?

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Don Bivins, MD, directs the inpatient pain management service at Roanoke Memorial Hospital as part of Carilion Clinic and the Virginia Tech Carilion School of Medicine. His board certification includes neurology and hospice and palliative medicine. At the 28th Annual Meeting of the Academy of Integrative Pain Management (AIPM) in San Diego this October, he shared his observations from several years of treating patients with chronic pain, particularly after trauma or surgery, through his former private practice and now emergency care. Dr. Bivins and his pain care team have found surprising benefits to systemic lidocaine use, and he proposes the drug be considered in certain peri-operative situations to prevent and reduce the likelihood of neuropathic pain in the long term.

Lidocaine has traditionally been used in medicine as a local anesthetic to numb the nerve membranes that transmit pain. The drug has been documented to treat pain systemically in post-operative scenarios since the 1960s, but its use remains uncommon in most hospitals across the country, Dr. Bivins told *Practical Pain Management*. Lidocaine use before, during, and after surgery, however, may result in reduced anesthetic and opioid use in patients, based on his experience, for managing both acute and chronic pain.

“I want doctors and hospitals to feel comfortable with the knowledge that systemic lidocaine can be effective in treating a variety of disorders’ associated inflammation and pain in doses that are not cardio-toxic,” he explained.

“So many pain conditions are associated with inflammation, and we could prevent that at onset, in the emergency department, for instance, thereby reducing hospital admissions and further need for opioid use after a procedure.” Dr. Bivins further explained that, in many trauma situations, a pain specialist may not be brought in for 24 to 72 hours afterward, “but if we could see the patient earlier and administer lidocaine, if appropriate, it could benefit the outcome.”

Mini Case Example

Dr. Bivins shared several case examples as part of his AIPM presentation, including:

A 56-year-old male presented to private care practice with onset over 24 hours of severe left flank, buttock, and proximal hamstring sharp pain. He was originally given large doses of fentanyl patch, oxycodone, and gabapentin to reduce pain from a scale rating of 9 out of 10 to a rating of 6 out of 10. Diagnosed as non-diabetic vasculitic lumbosacral polyradiculoplexopathy, the patient was left with chronic neuropathic pain (1-3/10) and numbness in the area of the pain.

At 64 years old, the same patient presented in 1/14 for elective anterior cervical decompression and fusion (ACDF) at two levels (bilateral). He had lost most of his strength in his right triceps and left biceps muscles. He received a 4 mg/kg bolus of IV lidocaine over 30 minutes, 2 hours prior to the ACDF surgery. His surgery lasted 8 hours, and post surgery, the patient required no opiates or lidocaine.

The end outcome for this patient was that, “10 years after his chronic pain presentation, the patient was pain free,” said Dr. Bivins. “He had complete relief of neuropathic pain because he received lidocaine infusion.”

Dr. Bivins shared that in his former private practice, his team administered bolus infusions to patients with chronic pain several times a week or month, depending on each case, to keep their pain at bay. Opiate usage among patients over 3 months of infusions, on average, was reduced by 50 to 60 percent.

He also noted examples of reducing hospital length of stay from 2 to 3 weeks to about 6 days for sickle cell patients through the use of lidocaine.

Proposed Application of Lidocaine

Dr. Bivins’ hospital administers parenteral lidocaine to patients with chronic pain in one of three ways:

- IV bolus only (dosage based on weight) given in NS over 30 minutes;
- Constant infusion, based on mg/min rate (not weight based), adjusted according to blood levels;
- IV bolus (dosage based on weight), administered over 30 minutes followed by constant infusion of mg/min with dose adjusted according to blood levels.

Dosing levels for boluses are always based on weight, he told the AIPM audience. For loading bolus, for instance, his clinic recommends 1 or 2 mg/kg in NS over 30 minutes. For constant infusion, a 1-2 mg/min rate is recommended, with adjustments made based on blood levels obtained 12-14 hours after the initiation of the lidocaine. Dr. Bivins considers blood levels at 2 to 2.5 mcg/mL to be safe, and he recommends avoiding dosages above 4 to 5mg/kg over 30 minutes. “Paying attention to blood levels is key; lidocaine is truly a drug that has to be individualized.”

He also advised that physicians educate their patients about potential adverse effects that may occur during bolus, such as dizziness, numbness, hearing effects, and confusion. These effects typically resolve within 30 to 45 minutes, he explained, adding that slowing the rate of the infusion, should the patient require this, is preferable to stopping the infusion.



Lidocaine formula

How Lidocaine Works Remains Unclear

Dr. Bivins admitted, “It’s not completely clear why” the off-label use of lidocaine to prevent and relieve chronic pain works, but somehow, he said, “its effects can be very long lasting. Something about blocking sodium channels for a certain period of time seems to lead to a complete resolution of neuropathic pain.”

Specifically, lidocaine affects the sodium channel by blocking action potential generation in healthy nerves. The drug also reduces neuronal hyperexcitability and spontaneous firing in injured nerves (whether injured acutely or remotely). With less transmission from the injured nociceptor, fewer pain signals arrive at the central nervous system, according to Dr. Bivins. Furthermore, he told *Practical Pain Management*, “If you can reduce inflammation, then you don’t need anti-inflammatory drugs with all of their side effects, and if it treats pain, then don’t need the pain meds. Doctors can reduce two classes of medicines at the same time.”

Dr. Bivins’ observations in the hospital setting have also included lidocaine’s effectiveness in preventing immediate and long-term resulting chronic pain with acute pancreatitis. “I propose that parenteral lidocaine become part of the standard of care for acute pancreatitis due to its analgesic effect at the sodium channel and its anti-inflammatory properties,” he told the AIPM audience.

When asked by the AIPM audience whether lidocaine does *not* work in certain cases, Dr. Bivins responded “yes.” “There are some patients who do not respond to it for pain relief, such as with migraines, or in traumatic/surgical cases where lidocaine is not administered within 24 hours,” he said.

Next Steps Forward

Looking ahead, Dr. Bivins said he hopes that more researchers will explore why lidocaine may be effective in preventing and managing chronic pain in patients, including those undergoing emergency trauma and surgical procedures. “Lidocaine seems to be most effective with certain musculoskeletal problems, such as a ruptured disk or amputated limb,” he said. “But it also has some promise to benefit chronic unexplained abdominal pain (ie, complex regional pain syndrome), ruptured disk pain, and sickle-cell pain. We need more studies with robust numbers” in order for lidocaine to become a standard of care for preventing and managing certain pain conditions, he added.

Dr. Bivins is providing more consults with hospitals and physicians about prescribing lidocaine to prevent and manage both inflammation and pain. His team is also developing research projects in relation to FDA investigational new drug applications for off-label lidocaine usage.