Does Lidocaine as an Adjuvant to Morphine Improve Pain Relief in Patients Presenting to the ED with Acute Renal Colic?

BACKGROUND:

- Renal colic (RC) affects ~1.2 million people, accounts for 1% of all ED visits annually and has a recurrence rate of 50%
- Urinary tract obstruction caused by kidney stones is the most common cause of RC
- RC is commonly treated with opioid analgesics, which have many side effects that are potentially dangerous as dosage increases; therefore, adding lidocaine as an adjuvant therapy is a strategy that could lead to better pain control with less side effects

OBJECTIVE:

- To evaluate the analgesic effect of adding lidocaine to morphine compared to morphine alone in patients presenting to the ED with RC

METHODS

- **Design:** Single site, double-blind, prospective, double-blind, parallel, controlled-experimental trial
- **Duration:** 7 months, with one-time doses given to each patient
- **Inclusion criteria:** signs/symptoms of RC, age 18-50 years, informed consent, diagnosis of RC made by an emergency medicine specialist based on history and clinical findings and confirmed with positive urine analysis for hematuria or by identifying the pelvi-ureteric stone using ultrasound or radiographic imaging including the kidney, ureters, and bladder
- **Exclusion criteria:** history of asthma, substance abuse, cardiac disease, kidney or liver failure; confirmed or suspected pregnancy; multiple previous ED admissions due to RC (>3 times/year); use of any analgesics or spasmolytics in the previous 4 hours before admission; hemodynamic instability; prior known allergy to lidocaine or morphine; unconfirmed diagnosis when using the methods mentioned in the inclusion criteria
- **Primary outcome measure:** comparison of change in VAS pain intensity score at 5, 10, 30, 60, and 120 minutes after intervention
- **Secondary outcome measures:** comparison of change in VAS nausea intensity score over 5, 10, 30, 60, and 120 minutes after intervention, and comparison of incidence of side effects between groups
- 110 patients (55 in each group) received either:
    - Morphine 0.1 mg/kg + lidocaine 1.5 mg/kg
      OR
    - Morphine 0.1 mg/kg + normal saline 0.9% (placebo)
- The study would have needed 156 patients to have a power of 80%, but only 128 enrolled (110 were randomized)
- Data handling method used was per protocol

RESULTS

- Eighty-nine subjects completed the study (47 in the lidocaine group and 42 in the placebo group)
- **Primary outcome measure:** no statistically significant differences were observed between groups, despite a significant time trend decline in pain intensity in both groups
- **Secondary outcome measures:** Nausea scores were lower in the morphine plus lidocaine group than in the morphine plus placebo group, which was statistically significant (P = 0.038). Adding lidocaine shortened the time to a nausea-free state, which was statistically significant (P = 0.019). The median time to become nausea-free in the morphine plus lidocaine group was 26.6 minutes (95% CI, 14.16-39.03), and was 58.33 minutes in the morphine plus placebo (95% CI, 41.85-74.82) (P = 0.001). No adverse effects were observed in this study.

STRENGTHS

- The gold standard study design was used
- A random 1:1 ratio assignment was used to make the groups equivalent
- The inclusion and exclusion criteria were appropriate to study the population of interest
- Blinding was unlikely

LIMITATIONS

- One-time dosing
- Claimed to use intent-to-treat data handling method, but used per protocol method
- Inadequate sample size, power was not sufficient (risk of type II error)
- No data provided for adverse effects
- Used mean VAS pain/nausea scores to graph the results without providing a table of results

CONCLUSIONS

- Although the study did not find statistical significance in change in VAS pain scores between the two groups, there may be a place in therapy for a subset of patients
- The study drug may be used to relieve pain in patients with kidney stone-induced RC who are intolerant to larger doses of morphine, such as those who are respiratory compromised
- Further studies should be conducted to prove efficacy between smaller doses of morphine plus larger doses of lidocaine versus regular doses of morphine alone
- Research should include data pertaining to longer duration of therapy, adverse effects, and multiple doses

Reference: Firouzian A, Alipour A, Rashidian Dezfouli H, Zamani Kiasari A, Gholipour Baradari A, Emami Zeydi A, Amini Ahidashti H, Montazami M, Hosseininejad SM, Yazdani Kochuei F. Does lidocaine as an adjuvant to morphine improve pain relief in patients presenting to the ED with acute renal colic? A double-blind, randomized controlled trial. Am J Emerg Med. 2016 Mar;34(3):443-8.