Novel Opioid Paradigms: Long-Duration Opioid for Same-Day Outpatient Surgery

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Background: More than 50 million Americans undergo outpatient surgery annually. Many report inadequate postoperative analgesia, and chronic postsurgical pain. Another problem is the reservoir of unused postoperative opioids due to overprescription. Typically, short-duration opioids are used for outpatient surgery. For inpatient surgery a single intraoperative dose of a long-duration opioid (i.e. methadone) produces better analgesia than repeated doses of short-duration opioids. However, the clinical effectiveness of long-duration opioids like methadone in outpatient surgery is not known. This investigation tested the hypothesis that in outpatient surgery intraoperative methadone compared with conventional short-duration opioids reduces postoperative opioid consumption and pain, with similar or diminished side effects.

Methods: Patients undergoing same day discharge surgical procedures (e.g. laparoscopic cholecystectomy) (n=60) were randomized 2:1 to receive either single-dose IV methadone at anesthesia induction (0.1 mg/kg or 0.15 mg/kg, ideal body weight) or short-duration opioid (controls: hydromorphone, fentanyl at practitioners' discretion) in a dose-escalation protocol. Intraoperative and postoperative opioid consumption (until discharge) was recorded and expressed in morphine equivalents. Patient pain intensity (at rest, with coughing, with activity) and sedation were assessed at 15, 30, 45 min, 1, 2, 3, 4 h after admission in the PACU and at discharge. Opioid side effects (Opioid-Related Symptom Distress Scale, ORSDS) and ventilatory depression (respiratory rate, oxygen saturation, re-intubation) were also assessed. After discharge, patients were given home diaries where they recorded daily pain, opioid use, and side effects, until postoperative day 30.

Results: Intraoperative methadone doses (mean ± SD) were 6 ± 1 mg (0.1 mg/kg) and 9 ± 1 mg (0.15 mg/kg). Average intraoperative total nonmethadone short-duration opioid use (morphine equivalents) was 25.5, 1.3 and 0.16 mg respectively (n=21, 18, 21) in control, 0.1mg/kg methadone and 0.15mg/kg methadone groups. Patients receiving a single 0.15 mg/kg methadone dose required significantly less opioid vs controls in the PACU (2 ± 3 vs 8±7 mg) and postoperatively during hospital stay (4 ± 4 vs 9±7 mg). Patients receiving intraoperative methadone (0.15 mg/kg) used less take-home opioids (total 30d IV morphine equivalents were 22± 2 mg after 0.15 mg/kg methadone vs 30 ± 1 mg in controls), and stopped taking opioids earlier. Patients receiving 0.15 mg/kg intraop methadone had lower pain scores on arrival in PACU compared to controls (numerical rating scale 3 ± 1 vs 5 ± 1.2). Pain scores at rest in the 30 day postoperative period were lower in patients receiving 0.15 mg/kg intraop methadone compared to controls (summed numerical rating scores were 10 ± 2 vs 23 ± 3). Sedation and adverse events were similar in patients receiving methadone and short-duration opioids intraoperatively.

Conclusion: A single intraoperative methadone dose (0.15 mg/kg ideal body weight) decreased intraoperative and postoperative opioid requirements and provided better analgesia, with similar side effects compared to patients receiving short-duration opioids intraoperatively.