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Opioid-Free Anesthesia for an Emergency Laparoscopic Cholecystectomy in a Patient Taking Buprenorphine-Naloxone for Opioid Addiction: A Case Report

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Abstract

With the growing public health problem of opioid misuse, addiction, and overdose, the number of patients presenting for surgery and anesthesia who may be opioid-dependent or undergoing medication-assisted treatment for opioid use disorder is increasing. These patients may be appropriate candidates for opioid-free anesthesia. This case report describes a patient being treated with buprenorphine-naloxone for opioid addiction who required an emergency laparoscopic cholecystectomy. She requested that opioids not be used in her treatment plan. The patient's pain was successfully managed with opioid-free anesthesia and she was discharged with no requirement for additional pain medications.

INTRODUCTION

Opioid misuse, addiction, and overdose are growing public health problems. In 2016 alone, 11.5 million persons aged 12 or older in the United States misused prescription pain relievers.[1] According to recent data from the Centers for Disease Control and Prevention, the rate of drug overdose deaths involving synthetic opioids other than methadone (eg, fentanyl, fentanyl analogs, and tramadol) doubled from 2015 to 2016 (from 3.1 to 6.2 per 100,000 persons).[2] As the number of prescriptions written for opioid pain medication rises, so too does the number of patients presenting for surgery and anesthesia who may be opioid-dependent or undergoing medication-assisted treatment for opioid use disorder.
Buprenorphine combined with naloxone (Suboxone) is used to treat opioid dependence in outpatient settings. Buprenorphine is a mu-opioid receptor partial agonist and a kappa-opioid receptor antagonist, and naloxone is an opioid receptor antagonist. By binding to the mu-opioid receptor, buprenorphine mimics the pharmacological effect of an opioid but to a lesser extent, thus preventing opioid withdrawal symptoms.[3] However, the high receptor binding affinity and long half-life of buprenorphine make it difficult to treat acute pain in patients being treated for opioid addiction.[4]
In the present case, a patient who was being treated for opioid addiction required an emergency laparoscopic cholecystectomy. She requested that opioids not be used in her treatment plan. This report describes the successful delivery of opioid-free anesthesia to a patient being treated with buprenorphine-naloxone.

Case Summary

A 29-year-old woman (height, 67"; weight, 61 kg; PS2) presented to the emergency department with acute cholecystitis. She had a history of thyroid cancer that had been treated by thyroidectomy, current tobacco abuse, social alcohol use, and a history of opioid abuse currently being treated with buprenorphine-naloxone (Suboxone; Indivior). Preoperative vital signs included a blood pressure of 116/74, heart rate of 82, respiratory rate of 18, oxygen saturation of 95% on room air, and temperature of 100.6 degrees Fahrenheit. During the anesthesia interview, the patient discussed her concerns both with relapse as a result of receiving opioids for pain and with having uncontrolled pain after surgery because of her buprenorphine-naloxone treatment. Because of the emergent nature of the case, there was no time to involve the buprenorphine-naloxone provider in the discussion or to delay surgery until the buprenorphine-naloxone had worn off. The patient and anesthetist discussed a plan of care including multimodal therapy, reasonable expectations after surgery, and acceptable pain levels. The patient gave verbal consent to publication of the case. No approval was sought from an ethics committee because of the emergent nature of the case; the writing of the report did not change the care the patient received.

The patient was taken to the operating room and general anesthesia was induced with 150 mg propofol, 100 mg lidocaine, 50 mg ketamine, and 100 mcg clonidine. Intubation was facilitated with 50 mg rocuronium, which also provided the necessary muscle relaxation for laparoscopic surgery. During induction, a second Certified Registered Nurse Anesthetist (CRNA) performed bilateral subcostal transversus abdominis plane (TAP) blocks with 30 mL 0.25% bupivacaine and 5 mg preservative-free dexamethasone per side shortly after intubation. The case proceeded uneventfully and lasted 132 minutes during which general anesthesia was maintained with desflurane 4% to 5%. The patient required 50 mg ephedrine in divided doses throughout the case to maintain mean arterial pressure (MAP) > 70. The heart rate varied between 60 and 80 beats/min, respiratory rate was set at 15 breaths/min on the ventilator, and oxygen saturation was 98% to 100%. The temperature was 100.6 degrees Fahrenheit and decreased to 99.0 degrees Fahrenheit by the time the procedure was over. Two additional 10-mg boluses of rocuronium were required for muscle relaxation. The patient received 8 mg dexamethasone before incision and 4 mg ondansetron on emergence for nausea prophylaxis. The patient was also given 1 g acetaminophen (Ofirmev; Mallinckrodt) and 30 mg ketorolac intravenously on emergence for postoperative pain. In addition, 3 mg neostigmine and 0.4 mg glycopyrrolate was given for muscle relaxant reversal.

At the conclusion of the case, the patient was extubated and taken to the post-anesthesia care unit (PACU). On admission to the PACU, she was drowsy but awake and alert and fully oriented to person, place, date, and time with stable vital signs. She had mild pain but at an acceptable level (visual analogue scale <4/10) and did not wish to try and reduce her pain through opioid medications. After a suitable period of recovery, she was discharged with no requirement for additional pain medications.

Discussion

In this case, the anesthetist addressed the patient's anxiety about pain and relapse by providing opioid-free anesthesia. Fear of postsurgical pain and the ubiquitous prescribing of opioids for the treatment of acute pain can be strong triggers for relapse in patients being treated for addiction.[4] Patients should be reassured that a history of addiction will not be a barrier to the adequate treatment of postoperative pain.[5] Patients can also be encouraged to intensify their involvement in a recovery program after surgery to help to prevent stress-mediated relapse.[5]

The availability of buprenorphine and buprenorphine-naloxone has expanded opportunities for outpatient treatment of opioid addiction. However, treatment of these patients in the perioperative setting is challenging. Although consensus on the perioperative management of patients taking buprenorphine is lacking, regional and systemic opioid-sparing treatments should be used whenever possible.[4] Therapeutic options include alternative routes of administration of local anesthetic agents, infusion of ketamine, and regional anesthesia.[6] Nonopioid analgesics can be used initially for postoperative pain with or without continuous regional local anesthesia or selective nerve blocks.[5] In this case, the patient received multimodal therapy including regional anesthesia and nonopioid analgesics for postoperative pain.

The Guidelines for the Management of Postoperative Pain of the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council recommend that clinicians offer multimodal anesthesia to treat postoperative pain in both children and adults.[7] The rationale for multimodal anesthesia is that by administering different analgesic medications that target different mechanisms of action in the nervous system, better pain management can be achieved by blocking receptors both centrally and peripherally. The results of randomized trials have shown that multimodal anesthesia is associated with improved pain relief and decreased opioid consumption.[7]

The multimodal anesthesia plan in this case included ketamine, clonidine, ketorolac, acetaminophen, and regional anesthesia. Nonopioid analgesic agents were given on emergence. Postoperative pain guidelines recommend the consideration of ketamine as a component of multimodal analgesia.[7] When included in a multimodal regimen, clonidine has been shown to be effective for reducing acute postoperative pain and progression to chronic pain.[8] In this case, acetaminophen and ketorolac were given intravenously on emergence. The classes of nonopioid analgesics that can be considered in this population for acute pain include acetaminophen, nonsteroidal anti-inflammatory drugs, *N*-methyl-D-aspartate (NMDA) receptor antagonists, alpha-2 agonists, gabapentinoids, and selective serotonin reuptake inhibitors.[4]

The patient in this case, a woman aged less than 20 years, undergoing general anesthesia, and possibly needing postoperative opioids, had characteristics that placed her at higher risk for postoperative nausea and vomiting (PONV). In addition to reducing postoperative opioid use, multimodal therapies can significantly reduce the incidence of PONV.[8] Patients undergoing bariatric surgery are also at high risk for PONV. In a small prospective, randomized study of patients undergoing elective bariatric surgery, Ziemann-Gimmel et al reported that opioid-free anesthesia with dexmedetomidine significantly reduced the risk of developing PONV.[9]

Opioid-free anesthesia is a relatively new trend in anesthesia administration. As the United States continues to address the opioid epidemic, anesthesiologists will encounter patients who may be appropriate candidates for opioid-free anesthesia. In another case in which opioid-free anesthesia was successfully provided, a female soldier on active duty underwent a cervical ganglionectomy 7 days after ultra-rapid opioid detoxification under general anesthesia.[10] The patient was eager to return to duty and requested that opioid use be avoided. In that case, a balanced anesthetic including dexmedetomidine, ketamine, and a volatile anesthetic was used. In both that case and the present case, the patients wanted to prevent relapse by avoiding opioids during surgery. In both cases, the combination of an NMDA receptor antagonist such as ketamine with an alpha-2 agonist, such as dexmedetomidine or clonidine, seemed to be especially effective for controlling hemodynamics intraoperatively and reducing postoperative pain. The benefits of opioid-free anesthesia are summarized in Table 1.

Table 1. The Benefits of Opioid-Free Anesthesia
• Providing superior postoperative pain control by protecting the patient from surgical and opioid-induced hyperalgesia
• Minimizing respiratory depression in patients with impaired respiratory function, such as patients with chronic obstructive pulmonary disease, sleep apnea, and obesity
• Treating patients with chronic pain conditions, patients receiving chronic opioid therapy, patients with addiction, or patients in recovery and treatment for opioid use disorder (eg, with methadone or buprenorphine-naloxone)
• Minimizing postoperative cognitive dysfunction
• Minimizing other side effects of opioids such as nausea, pruritus, immune suppression, urinary retention, and constipation

The growing opioid crisis has implications for practitioners in the fields of surgery and anesthesia. Substance abuse should be addressed early and frankly by providers, and patients should be reassured that their pain can be effectively controlled and their risk for relapse minimized. Opioid-free anesthesia should be considered as a means of achieving these goals.

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