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Perioperative Pain Management for Patients on Chronic Buprenorphine: A Case Report

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Abstract

Here we present a patient with a Type I Chiari malformation who was receiving buprenorphine for chronic pain who underwent two separate urogynecologic procedures for removal of vaginal mesh with two different pain management regimens. For the first procedure at an outside hospital, the patient's usual dose of buprenorphine (8 mg sublingual every 8 hours) was continued up through her surgery and then a full opioid receptor agonist was used for postoperative pain management. The patient complained that this resulted in very poor pain control for her in the postoperative period. Prior to her second procedure, which was performed at our institution, buprenorphine was switched to a full opioid agonist (oral hydromorphone 4 mg every 4 to 6 hours, maximum 20 mg per day) for 5 days prior to surgery; postoperative pain was managed with full opioid receptor agonists. The patient again reported suboptimal pain control in spite of substantially increased doses of opioids. This case report highlights the difficulty of perioperative pain management for patients on chronic buprenorphine and emphasizes the need for additional investigation.

Introduction

Buprenorphine is a semi-synthetic mu receptor agonist-antagonist and potent kappa receptor antagonist [1,2]. It is an attractive treatment option for opioid addiction and may be useful for the treatment of chronic pain due to its reported good safety profile and low abuse potential [1–5]. With the increasing use of buprenorphine in the general population, anesthesiologists are encountering more patients who pose a unique challenge for perioperative pain management. While, there is no consensus on how to best manage acute surgical pain for patients on chronic buprenorphine, a few publications suggest maintaining patients on their usual dose before major surgery with supplemental opioids as needed [6–8]. An alternative approach is to switch buprenorphine to a full opioid agonist preoperatively [7]. This case report presents a patient who had 2 similar urogynecological procedures 6 months apart for which both pain control regimens were used with limited success. The authors sought and received permission from the IRB of the Hospital of the University of Pennsylvania to publish this case report.

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Case Report

A 37-year-old woman (ASA-PS II, 170 cm, 88 kg) with chronic pelvic pain on buprenorphine (8 mg sublingual every 8 hours), zolpidem (10 mg at bedtime), and lorazepam (1 mg every 6 hours) was scheduled for removal of vaginal mesh and cystoscopy under general anesthesia. Her medical history was significant for hypothyroidism, hepatitis C, and a Type I Chiari malformation. The patient had previously undergone other pelvic procedures at an outside hospital including a vaginal hysterectomy with anterior repair and SPARC sling, followed by a pubovaginal sling, anterior colporrhaphy, vaginal extraperitoneal colpopexy, and insertion of mesh, all in 2006. She developed erosion and pain from the mesh and had multiple trimming procedures in the office and in the operating room. For her most recent vaginal mesh trimming at the outside hospital, the patient was instructed to continue her buprenorphine up to the day of surgery, but reported that this approach resulted in severe pain in the post-operative period. As a result, she requested preoperative consultation for perioperative pain management before undergoing a similar procedure at our institution. The anesthesia pain consultation service recommended that the patient discontinue buprenorphine 5 days before surgery and start oral hydromorphone 4 mg every 4 to 6 hours (maximum 20 mg per day). No contact was made with the patient's buprenorphine prescriber.

Upon arrival the morning of surgery, the patient reported adequate pain control with oral hydromorphone and did not describe any difficulty transitioning from buprenorphine to hydromorphone. Given the patient's history of chronic opioid use, a modified fentanyl challenge as originally described by Davis et al. [9] was started by the anesthesia resident in the pre-operative holding area. With no other premedication, intravenous fentanyl 100 mcg was given with additional 50 mcg increments in 1–2 minute intervals up to 400 mcg. The patient remained alert and conversant and was transported on a stretcher by the resident to the operating room. The fentanyl challenge was continued in the operating room. The patient was still conversational after a total of 1000 mcg of fentanyl. Induction was then accomplished with lidocaine 80 mg IV followed by propofol 200 mg IV and succinylcholine 100 mg IV. Tracheal intubation was performed under direct laryngoscopy with a Mac 3 blade and a 7.0 cuffed endotracheal tube. General anesthesia was maintained with inhaled sevoflurane (0.6–0.7 MAC). An additional fentanyl 100 mcg and ketorolac 30 mg IV was given during the 1-hour procedure.

Upon emergence, the patient complained of unbearable right hip pain after being taken out of stirrups, reporting that her hip felt dislocated. An urgent orthopedics consult was requested, and the patient was re-sedated with small boluses of propofol and fentanyl as fluoroscopy was performed. After no dislocation was confirmed, the patient was transferred to the stretcher and fentanyl was given in 100 mcg boluses every 1–2 minutes on the way to the post-anesthesia care unit (PACU) with continuous SpO2 monitoring. At the time sign-out was given to the nurses in the PACU, the patient had received an additional 1000 mcg IV of fentanyl post-operatively. Although the patient complained of significant pain when asked, she would close her eyes when left unstimulated with a respiratory rate of 14–16 breaths per minute.

In the PACU, the anesthesia pain team was consulted to assist with post-operative pain management, and under the supervision of the PACU anesthesia resident, the patient received additional IV doses of midazolam 2 mg, lorazepam 1 mg, fentanyl 100 mcg, and hydromorphone 8.5 mg over the course of the next two hours. She also had a hydromorphone PCA with a basal rate of 2 mg/hr and a demand dose of 0.6 mg every 10 min. After being transferred to the floor, she continued to rate the pain in her right hip and

pelvis as a 7–8/10 with a self-reported acceptable pain score of 6/10. In addition to IV PCA hydromorphone, her medication regimen included ketorolac 30 mg every 6 hours.

On post-operative day 1, she was transitioned to her pre-operative regimen of oral hydromorphone 4 mg every 3 hours with acceptable pain control. The patient was able to ambulate, void, and tolerate a regular diet and was discharged home later that day with a limited amount of hydromorphone and instructions to follow-up as an outpatient with her buprenorphine prescriber regarding transition back to buprenorphine.

Discussion

Buprenorphine is a semi-synthetic opioid agonist-antagonist used primarily in the treatment of opioid addiction. Its pharmacokinetic and pharmacodynamic properties make it an attractive drug for this purpose. It has high affinity for the mu and kappa receptors and very slow dissociation, giving it an extended duration of action and limiting the opioid “high” that is produced by a pure mu agonist such as methadone. There is a ceiling effect at higher doses, reducing the abuse potential and minimizing respiratory depression. It also attenuates the effect of other opioid agonists, decreasing the euphoria and efficacy of concurrently administered opioids [8].

Since its introduction to the market in the United States, indications for the use of buprenorphine have expanded [10]. The FDA most recently approved a 7-day transdermal patch for management of severe, chronic pain (http://www.medscape.com/viewarticle/724626). We expect that with expanded indications, the number of patients presenting for surgery on buprenorphine therapy will continue to increase. However, the same properties that make buprenorphine advantageous for management of addiction and chronic pain present a challenge to anesthesiologists.

Although there is no consensus in the literature as to how to best manage acute pain in these patients, there are three alternative options when regional anesthesia is contraindicated or not considered as in this case. The first option is to continue the baseline regimen and supplement with additional buprenorphine. Escalating the dose of buprenorphine is an appealing option, particularly when used in the treatment of opioid addiction to avoid re-exposure to opioids. There is concern that the ceiling effect will prevent sufficient analgesia, although 1 case report does describe adequate pain control with supplemental doses of buprenorphine [11].

The second option is to continue the buprenorphine preoperatively; however, if pain control is inadequate with additional buprenorphine, traditional opioids will need to be added. The risk with this strategy is that very large doses will be necessary to counteract the high receptor affinity and the partial antagonist effects of buprenorphine. Sedation and respiratory depression can become significant concerns at those doses, and higher levels of monitoring post-operatively may be required [12].

Lastly, the buprenorphine can be converted to a traditional opioid preoperatively with resumption of buprenorphine following the acute perioperative period. While there is no antagonist effect to overcome, large doses of opioids may still be required as described in this case since, these patients may have significant tolerance [8].

Ideally, a multimodal approach to pain control would be used with adjuncts such as local anesthetic in the wound, regional anesthesia, and NSAIDs. For this patient, there was no incision in which to infiltrate a local anesthetic, and a regional technique was not considered given the theoretical risk of creating or exacerbating symptoms of a Type I Chiari

malformation from a dural puncture. Ketorolac 30 mg IV was given every 6 hours for supplemental pain control.

An evidence based guidelines for the perioperative management for patients on chronic buprenorphine is needed. However, additional research needs to be conducted to determine the best perioperative regimen for acute pain management in this population. Regardless of choice, multimodal analgesia should be used when possible and the anesthesiologist must anticipate the need for large doses of traditional opioids and detailed preoperative discussion with patients is needed.

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