



## A Case Series about Perioperative Management of Buprenorphine

Shuo Qiu\*

Resident physician, Charlottesville, Virginia, United States

### Abstract

Currently, there is no consensus on continuing vs. holding buprenorphine preoperatively. Management of post-operative pain in patients on buprenorphine has been hotly debated, with evidence showing for and against stopping buprenorphine prior to surgery. This case series will examine 6 VA patients who have undergone a variety of surgeries with different levels of expected pain. Patients who undergo minor surgeries with low expected pain can safely continue buprenorphine. None of our patients who underwent minor surgeries and continued buprenorphine reported significant pain, even for a patient 5 who underwent cholecystectomy. Patient 2 endorsed additional pain relief when he increased his buprenorphine from 16 to 32 mg daily to help with his post-operative pain.

Patients who underwent major surgeries such as hip replacements and wrist joint arthroplasty held their buprenorphine and transitioned to full mu opioid prescription before restarting buprenorphine. Only one patient had a positive post-operative urine drug screen for opioids. Patients show resiliency against opioid use even when undergoing surgeries involving stopping their buprenorphine. Many approaches exist to manage pain perioperatively in patients prescribed buprenorphine. Regardless of which approach, patients should be monitored perioperatively for craving and withdrawal from opioids.

**Keywords:** Buprenorphine; Surgery; Opioid treatment; Drug prescription

### Introduction

Currently, there is no consensus on continuing vs. holding buprenorphine preoperatively [1]. Management of post-operative pain in patients on buprenorphine has been hotly debated, with evidence showing for and against stopping buprenorphine prior to surgery [1]. This case series will examine 6 VA patients who have undergone a variety of surgeries with different levels of expected pain. Patients who undergo minor surgeries with low expected pain can safely continue buprenorphine. None of our patients who underwent minor surgeries and continued buprenorphine reported significant pain, even for a patient 5 who underwent cholecystectomy. Patient 2 endorsed additional pain relief when he increased his buprenorphine from 16 to 32 mg daily to help with his post-operative pain [2].

Buprenorphine is an opioid partial agonist used to treat opioid use disorder [3-5]. Due to its high affinity to the mu-opioid receptor, it is able to displace many opioids (eg. hydrocodone) used for post-operative pain [4,5]. Buprenorphine has intrinsic pain relieving properties even when only occupying 10% of  $\mu$  receptors [3]. Progressively greater analgesic property is possible until doses of 24-32 mg where it's occupying >95% of  $\mu$  receptors. Some studies actually report comparable pain level in patients who continue buprenorphine rather than switch to full agonist opioid [6,7].

Currently, there is no consensus on continuing vs holding buprenorphine preoperatively [1-3]. There is also no consensus on management of post-operative pain in patients with opioid use disorder. Patients with opioid use disorder are known to have lower pain threshold, increased sensitivity to pain and comorbid chronic pain disorders<sup>1</sup>. This has prompted many providers to hold buprenorphine perioperatively [3,4,7]. However studies show that pain level in those who take buprenorphine range from comparable with controls to much higher [1,8-11].

Reason for continuing buprenorphine perioperatively is to prevent withdrawal symptoms and relapses of opioid use [1,3,12]. In patients who hold buprenorphine preoperatively, there are two possible points of failure. First point of failure is during the tapering

process preoperatively. Second point of failure is when they restart buprenorphine postoperatively. Many patients who became addicted to illicit opioids (eg. Heroin) started off by taking prescription opioids [1]. Giving them prescription opioids postoperatively exposes them to a past stimulus which may remind them of past highs and increasing likelihood for relapse [1]. This study will examine if patients who held buprenorphine perioperatively relapsed on opioids. Current literature about management of buprenorphine has not focused on relapse rates [8]. This case series looks at patients' characteristics that may contribute to relapse, including psychosocial stability, dosage, comorbid psychiatric diagnoses and medications.

### Method

Patient 1 was a 58-year-old male with a history opioid, cocaine, marijuana, amphetamine, tobacco and alcohol use disorder resulting in 4 residential treatment treatments. He continued to drink 12 beers or 1 pint of vodka daily. He lived alone with a puppy but interacted with his grandchildren regularly. Patient cited religion as an important protective factor. Comorbid psychiatric symptoms were unspecified depressive disorder and borderline personality traits. Co-morbid medical conditions were obstructive sleep apnea, chronic back pain from lumbar intervertebral disc degeneration. Patient also had chronic pain from left wrist basal joint and scaphotrapeziotrapezoidal region arthritis failing conservative treatment and ganglion in first dorsal compartment left wrist. He was to have left wrist basal joint arthroplasty, tendon transfer, and De Quervain's release. He was taking buprenorphine 8mg/naloxone 2mg sublingual, three times a

\*Corresponding author: Shuo Qiu, Resident physician, Charlottesville, Virginia, United States, Tel: +1 5408530900; E-mail: shuo.qiu@va.gov

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day. Buprenorphine dose was lowered by 2mg each week until patient completely came off of it. UDS was negative throughout the tapering process. Patient had withdrawal symptoms of diarrhea 2 days before surgery and was prescribed loperamide. Patient was discharged home on the day of surgery and given oxycodone 15mg every 4 hours as needed for pain with 40 tablets given, diclofenac 1% gel 2 gram, four times a day. Other pertinent medications were duloxetine 60mg in the morning for depression and pain, gabapentin 900mg three times a day, ibuprofen 800mg three times a day as needed, lamotrigine 150mg daily for mood swings and anxiety, trazodone 100mg nightly for insomnia, hydroxyzine 25mg three times a day as needed for anxiety. Surgical pain was stable after stopping oxycodone. Eight days post-op, patient complained of opioid withdrawal consisted of muscle spasms in arms and leg after stopping oxycodone 2 days ago. COWS were 19. Patient was given cyclobenzaprine 5mg twice daily as needed for muscle spasms. Patient was also started on buprenorphine 16 mg per day. UDS was negative for 6 months postoperatively.

Patient 2 was a 46-year-old male with a history of nicotine use disorder, opioid use disorder and persistent depressive disorder, who underwent dental extraction. His pain was well controlled with acetaminophen and ibuprofen unknown dosage. He was not prescribed opioids agonist and continued buprenorphine 16 mg daily. He was not on any psychiatric medications at the time. UDS was negative for 6 months postoperatively. He lived alone and worked as a vehicle mechanic. He had no social support but was trying to connect with family at the time.

Patient 3 was a 55-year-old male with a history of alcohol, amphetamine, nicotine, and cocaine use disorder, OCD, panic disorder without agoraphobia, MDD, PTSD. Pertinent medical history was obstructive sleep apnea and hypothyroidism. Outpatient psychiatric medications were prazosin 6mg nightly for nightmares, clomipramine 100mg twice daily and 50mg nightly for depression, hydroxyzine 50mg twice daily as needed for anxiety. Outpatient pain medications were pregabalin 150mg three times daily, meloxicam 15mg daily, lidocaine patch 5% daily, diclofenac 1%, 2 grams twice daily as needed for arthritic pain, acetaminophen 235mg to 650mg three times daily as needed. Patient was on buprenorphine/naloxone 8-2, 2 films sublingual daily. Patient lived alone but had support from his daughter and girlfriend. Patient was disabled and unemployed.

He underwent a right lower extremity nerve decompression. Buprenorphine was tapered over one month prior to surgery. UDS was negative during tapering process. Exact taper regimen was unknown. Postoperatively, he was prescribed oxycodone 5mg/acetaminophen 325mg every 12 hours, with 60 tablets given. Two weeks later, he received hydrocodone 5 mg/acetaminophen 500mg every 6 hours, with 90 tablets given, morphine 15mg every 8 hours, with 90 tablets given. Ten days later, he was given morphine 15mg every 12 hours as needed with 30 tablets given. Seventeen days later, he received morphine 15mg twice daily for 5 days then daily for 5 days and then stop. No comments were made about his pain level. Buprenorphine was started 4 days later and increased to 16mg daily. He presented to the ED 6 days later with dizziness and fall. UDS was positive for opioids. Patient was stabilized in the ED and discharged. UDS was negative the next day and remained negative for the next 6 months.

Patient 4 was a 65-year-old male with a history of opioid use disorder, chronic knee and hip pain, depression, nicotine use disorder, anxiety, and hepatitis C. He was living at home with wife and was unemployed. He was getting buprenorphine 16mg daily. He stopped buprenorphine 48 hours prior to his left total knee replacement

surgery. UDS was negative for 1 month prior to surgery. Postoperative pain management included ketorolac 15mg every 6 hours as needed, meloxicam 15mg daily, morphine IV 1-2 mg every 1 hour as needed while in the hospital. On discharge, he did complain of 8/10 pain with exertion. He was discharged on postoperative day 3 with oxycodone 5mg every 4 hours as needed for pain level 1-5 and 10 mg for pain level 6-10, with 150 tablets of 5mg tablets given and meloxicam 15mg daily. After finishing oxycodone, he increased buprenorphine to 32 mg daily on his own to help with pain. Buprenorphine dose was gradually decreased to 20mg 3 months later. UDS was negative for the next 6 months.

At age 67, he underwent dental extraction. He continued buprenorphine 20mg film daily without full opioid agonist. Other outpatient medications included acetaminophen 1000mg three times daily as needed. He took no psychiatric medications at the time. UDS was negative for the next 6 months.

Patient 5 was a 56-year-old male with a history of hepatitis C, alcohol use disorder, cirrhosis of liver, cannabis use disorder, and tobacco use disorder. He underwent excision of sebaceous cyst on left neck. He continued buprenorphine 16mg daily without stopping. No opioid pain medication was prescribed. UDS was negative for the next 6 months. He was living alone at the time and worked in maintenance. He was not in a relationship at the time and had no children. About 9 years later, he underwent cholecystectomy. His pain was well controlled with suboxone alone. UDS was negative for the next 6 months. He was not using alcohol at the time but was still smoking unknown quantity of cigarettes. He was married and was retired.

Patient 6 is a 67-year-old male with a history of chronic PTSD, nicotine use disorder, chronic cervicalgia and bilateral hip pain. Patient had psychosocial support from wife, granddaughter. He was working as IT professional. He took amitriptyline 75mg nightly for PTSD and insomnia. He stopped buprenorphine 18mg daily for "several days" before left total hip replacement. UDS was negative preoperatively during the month prior to surgery. Postoperative pain medications included meloxicam 15 daily, methocarbamol 1000mg three times daily as needed, morphine oral 15 mg every 12 hours, morphine IV 1-2mg every 1 hour as needed, oxycodone 5-10 mg oral every 4 hours as needed. Pain level decreased from 7/10 to 4/10 in 2 days.

He subsequently fell out of bed and had left prosthetic hip fracture and underwent left total hip revision. Pain was well controlled with fentanyl PCA 20mcg per 10 min with lock out after 120mcg per hour and ketorolac 7.5 mg every 6 hours. Patient was discharged on meloxicam 15 mg daily for 6 weeks, morphine 15 mg every 12 hours with 10 tablets given, oxycodone 5-10 mg every 4 hours as needed with 90 tablets given, lorazepam 1mg every 8 hours as needed with 84 tablets given. He stopped opioid pain medications a few unknown number of days before resuming buprenorphine. UDS was negative for the next 6 months.

At age 71, he underwent right cataract surgery. He didn't need opioids for pain control and continued buprenorphine 20mg daily. UDS was negative for the next 4 months.

## Discussion

Six patients underwent a variety of surgeries, from elective surgeries with little pain to major surgeries with complications. No patient had positive UDS during buprenorphine tapering process prior to surgery. With the exception of patient 3, none of the patients had positive UDS for opioids for 6 months after surgeries. Patient 6's surgery was recent

so it has only been 4 months since this study was started. Patient 3 was prescribed morphine and oxycodone for 3 months after decompression of lower extremity nerve. He was off of buprenorphine for so long he actually had to be inducted. The positive UDS for opiate along with an ED visit for dizziness and fall likely signify an opioid relapse. It should be emphasized that the patient was placed on full mu opioid agonist for 3 months before he had a probable relapse. Patient 1 and 6 complained of opioid withdrawal but did not relapse on opioids. This shows that patient who stop buprenorphine, become exposed to full mu opioid agonist, and then return back to buprenorphine are able to control their urges so long as they are not off of buprenorphine for long periods of time. Patient 2 reported significant pain post-operatively but instead of obtaining illicit opioids pain medications, doubled on his buprenorphine. All these behaviors show the resiliency in patients on buprenorphine even when undergoing major surgeries involving stopping their buprenorphine.

All of the patients with the exception of patient 5 had excellent social support with either spouse, friends or children. Patient 5 had no social support but still remained sober post-operatively. They all previously held employment with exception of patient 3 who was disabled.

All patients received non-opioid pain medications in addition to opioid pain medications. Whether it helped reduce the amount of opioid use is unknown due to lack of controls. All patients have different psychiatric diagnoses and take different psychiatric medications. Hence no conclusions can be made about their correlations to pain and opioid relapses.

Traditionally, buprenorphine providers are hesitant to continue buprenorphine blocks full mu opioid agonist. Patient 1, 3, 4, 6 all underwent major surgeries and stopped buprenorphine preoperatively. They all received full mu opioid pain medications perioperatively. They had a range of different pain level postoperatively. Patient 5 who underwent cholecystectomy did not report significant pain. About 51% of patients undergoing cholecystectomy or appendectomy did not use any opioids [13]. It should be noted that patient 4 increased his buprenorphine to 32 mg which is the theoretically the highest dose buprenorphine can provide additional pain relief [3]. This shows buprenorphine can adjusted for additional pain relief in patients with opioid use disorder.

This study offers insights into management of buprenorphine perioperatively. If a patient is undergoing a surgery with low levels of pain, he can likely continue buprenorphine perioperatively. For major surgeries, our patients did not have relapses if buprenorphine was started relatively soon after the surgery. However, each patient must be assessed individually. Taking account into number of relapses patient has had when he came off of buprenorphine in the past can help inform a decision. Other factors to consider are patient's subjective pain level and amount of opioids needed when they underwent procedures in the past. If patient has high risk of relapse and low threshold for pain, they can decrease buprenorphine to a lower dose to allow some free opioid receptors binding. How low to decrease buprenorphine without

causing significant withdrawal symptoms is currently unclear. Small retrospective reports show that patients undergoing vaginal delivery and taking 13mg buprenorphine daily required same amount of rescue opioids as controls [9,10]. However, studies show that patients undergoing C-section and taking 15mg daily needed less rescue opioids than controls [9].

Regardless of how buprenorphine is managed, patients should be monitored perioperatively for cravings and withdrawal from opioids. The surgeon should collaborate with the buprenorphine provider and anesthesiologist to manage opioid use disorder and pain in a safe and effective manner [1,3]. This case series sheds new light about level of pain and risks of relapse from stopping buprenorphine perioperatively. However, the study is limited by its small size. Future studies will include larger sample size to allow for quantitative analysis.

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