

Should We Consider the Use of Buprenorphine for Pain Management in Nonsurgical Candidates With End-stage Osteoarthritis? A Case Report

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ABSTRACT

Introduction: Buprenorphine is a partial μ -opioid receptor agonist, an antagonist at the κ -opioid receptor, and a partial agonist at the δ -opioid receptor.

Case Presentation: This case report highlights the successful management of patient with advanced osteoarthritis who was not a surgical candidate, using transdermal buprenorphine, which provided significant improvement in quality of life and functional status.

Discussion: This case report describes the use of buprenorphine as a potentially safer analgesic option and aims to reduce stigma associated with its use in both medical and nonmedical communities.

also available for intravenous (IV) use in hospitalized patients. Typically, subdermal formulations have higher bioavailability, whereas buccal films provide a more rapid onset of action. However, given its continuous medication delivery, many patients benefit from the transdermal patch.

CASE PRESENTATION

We present the case of a 60-year-old man without significant past medical or surgical history who was seen initially for a routine wellness exam for evaluation of chronic bilateral hip pain that had begun to impact

INTRODUCTION

Buprenorphine is a partial μ -opioid receptor agonist (MOR), an antagonist at the κ -opioid receptor, and a partial agonist at the δ -opioid receptor. Buprenorphine has demonstrated safer clinical outcomes when compared with full MOR agonists, especially regarding respiratory depression, even at increasing doses.¹ Prior clinical trials and meta-analyses suggest improved pain control with buprenorphine compared with full-agonist opioids while simultaneously reducing the risk of respiratory depression. In some situations, buprenorphine may be prescribed for outpatient use in 3 common formulations: buccal (daily), transdermal patch (weekly), and subdermal depot injection (monthly). It is

his quality of life and limit his function in his construction job. He reported longstanding intermittent pain for several years but had not sought care previously, and the pain was responsive to as-needed acetaminophen and ibuprofen. He was open to trying physical therapy but was concerned that his pain would be too severe to participate meaningfully. During this visit, he was also agreeable to scheduling his first colonoscopy after previously deferring, motivated by a close friend's diagnosis of colorectal cancer.

Physical therapy did not improve his pain after several sessions, prompting re-evaluation. X-rays of the hips and pelvis were interpreted as "bilateral end-stage osteoarthritis of the hips; consider orthopedic referral." He was agreeable to referral, as he could no longer meet functional demands at work. He was seen by orthopedics within a week. Given the extent of osteoarthritis, elective unilateral hip arthroplasty was scheduled in 2 months with contralateral hip arthroplasty planned within 4 to 6 months. His pain was still manageable with over-the-counter (OTC) acetaminophen and ibuprofen.

Between his initial orthopedic visit and scheduled surgeries, the patient underwent screening colonoscopy, during which he experienced a colonic perforation requiring hemicolectomy with colos-

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tomy formation. He was no longer considered a surgical candidate for hip arthroplasty at that time and planned to delay surgery until several months after colonic anastomosis. Pain from the colonic perforation and osteoarthritis was no longer controlled with OTC medications, and he requested assistance with pain management but remained adamantly opposed to opioid therapy due to personal observations of opioid addiction in several close friends and family members.

Approximately 1 month after the colonic perforation, the patient developed severe, crushing chest pain radiating to the left shoulder. He presented to the emergency department and was found to have elevated troponin levels, a nonischemic-appearing electrocardiogram (ECG), and echocardiography showing global hypokinesis. He was taken emergently to the cardiac catheterization laboratory and subsequently had 2 stents placed in the left anterior descending artery, with a diagnosis of non-ST-elevation myocardial infarction. Three months later, repeat echocardiography demonstrated a reduced ejection fraction of 25%, and he was started on guideline-directed medical therapy.

After his colon surgery, his myocardial infarction, and new ischemic cardiomyopathy, he was no longer deemed a safe candidate for elective hip arthroplasty even 1-year later, despite partial recovery of ejection fraction (40%–45%). He was no longer able to work due to pain, worsening depression, and passive suicidal ideation in the setting of these life events. Duloxetine and gabapentin were added to regimen with some benefit. He required a 4-point walker due to pain-related gait instability. He remained resistant to opioid therapy but felt he was reaching a breaking point.

We introduced buprenorphine, a partial opioid agonist, as a treatment option for chronic pain. He agreed to trial transdermal patches, applied directly over the site of maximal pain, typically his right hip. He started at 5 µg/h, the lowest US Food and Drug Administration (FDA)-approved dose. He reported a slight improvement in pain and quality of life. Over several months, he was titrated up to 20 µg/h (maximum FDA-approved dose), with patches applied weekly. As his function improved, he no longer required a walker. He reported improved quality of life, particularly related to improved mental health, including resolution of suicidal ideations. Although his goals were to return to construction in some capacity, to discontinue pharmacologic analgesia, and to have surgery, he was unable to return to manual labor but transitioned to a lower-impact desk job.

Over several months, the patient was medically optimized while maintaining adequate analgesia with transdermal buprenorphine. He was able to meaningfully participate in physical therapy and cardiac rehabilitation to the point that he underwent bilateral hip arthroplasty. With resolution of his pain, he discontinued buprenorphine postoperatively and returned to a productive lifestyle with improved quality of life.

DISCUSSION

This case illustrated successful management of advanced osteoarthritis using buprenorphine, a partial opioid agonist, and aims to increase awareness of its appropriate use while reducing stigma associated with this medication compared with full agonist opioids (eg, oxycodone, hydromorphone). Although commonly used for opioid use disorder, buprenorphine also has a role in chronic pain, particularly when the pain is not readily reversible. Guidance from the Veterans Health Administration supports its use to facilitate functional improvement rather than focusing solely on pain scores.² Patients with a reversible cause of pain should not be maintained on lifelong therapy of buprenorphine and should be tapered once the underlying condition is addressed.

Before initiating opioid therapy in patients with chronic or longstanding pain, conservative measures—such as scheduled OTC analgesics, physical or occupational therapy, and behavioral health approaches—should be attempted. Many patients achieve relief with lifestyle modifications and do not require pharmaceutical analgesia. Buprenorphine may be considered within a multimodal analgesic approach but should not be first line unless the patient also has concurrent OUD.

Questions remain regarding optimal dose and route of administration. Generally, the lowest effective dose should be used. Route of administration should be chosen to optimize ease of use, safety, and adherence. For example, sublingual films administered multiple times daily may be appropriate for some patients, whereas once-weekly transdermal patch may better align with others' preferences and lifestyles. Before starting any form of analgesia, the patient's functional goals and treatment options should be discussed, as complete pain elimination is not always achievable and typically is not the goal.

Buprenorphine is associated with adverse effects. Postmarketing data most commonly reported nausea, vomiting, opioid-induced constipation (OIC), and skin irritation at the application site. These effects are typically more prominent during therapy initiation and dose titration phases.³ The side effects of nausea and vomiting often subside as the dose reaches a steady state. OIC may be mitigated with increased water intake and water-soluble fiber (eg, psyllium), and oral laxatives, such as polyethylene glycol. In more severe cases, peripherally acting µ-opioid receptor antagonists (eg, methylnaltrexone), may be considered.⁴ The patch does not need to be applied directly over the site of pain, and rotation of application sites can minimize irritation. In this case, a placebo effect cannot be excluded.

It is worth noting that differences in dosing availability exist between the United States and Europe. In the United States, the maximum transdermal dose is 20 µg/h, whereas in Europe, doses may reach 100 µg/h.^{5,6} Limited evidence regarding higher-dose safety raises questions about whether current US dosing limits may restrict analgesic efficacy.

CONCLUSIONS

Buprenorphine is a partial opioid agonist that may be considered for nonoperative management of osteoarthritis. The treatment goal is to provide enough analgesia to optimize function, reduce suffering, and improve quality of life, rather than complete eradication of pain. This case highlights a potential role for buprenorphine in chronic pain management and may help increase clinician comfort with its use. Although commonly prescribed for OUD, buprenorphine has broader applications in patients with chronic pain of various etiologies.

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