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*Case Report*

# The Effectiveness of Buprenorphine Transdermal Patch and Low Dose Sublingual Buprenorphine Induction to Transition to Long-Acting Subcutaneous Buprenorphine Injection in Opioid Use Disorder in Inpatient Setting

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## INTRODUCTION

Buprenorphine, available in various formulations, has demonstrated safety and efficacy in treating opioid use disorder (OUD).[1] All forms of buprenorphine possess a unique pharmacological profile, functioning as a high-affinity partial agonist at μ-opioid receptors.[2] With an extended serum half-life and prolonged duration of action compared to traditional full agonists, it presents an attractive option for OUD treatment, as it induces less tolerance and poses a lower risk of respiratory depression.[1]This combination of factors makes it an appealing option for OUD as it produces less tolerance, and carries a lower risk for respiratory depression.[1] Moreover, buprenorphine can alleviate cravings and binds to the μ-receptor more strongly than other opioids such as fentanyl and heroin, thereby reducing the likelihood of overdose in cases of relapse while on buprenorphine therapy; however, it can precipitate withdrawal symptoms in the presence of an agonist. This risk can be mitigated by initiating treatment with a low dose and closely monitoring withdrawal symptoms using the Clinical Opiate Withdrawal Scale (COWS).[3]

Although FDA-approved only for pain, buprenorphine transdermal patch presents an excellent alternative for the micro induction of buprenorphine.[4] Micro induction is a novel approach that overcomes need for prolonged opioid tapers and reduces risk of precipitated withdrawals. Micro induction can be done both in inpatient and outpatient settings. The buprenorphine transdermal patch, typically initiated in the inpatient setting, helps reduce opioid withdrawal symptoms.[5-7] Its use as a rapid induction technique with transition to long-acting injectable (LAI) buprenorphine is proposed in this case study. The patch's dosage ranges from 5 to 20 micrograms per hour which is relatively low compared to oral and sustained released formulations.[4] Safety should be assured by discussing risks and benefits with patients. Ingesting or chewing the transdermal patch can pose serious risks due to the sudden release of buprenorphine, potentially resulting in a stronger high, and the potential for adverse consequences far outweighs any perceived benefits.[8]

One of the goals of this micro induction technique is sustained adherence to the OUD treatment, which could be accomplished simply by avoiding multiple daily doses of sublingual (SL) buprenorphine.[9] By giving LAI buprenorphine injection following discharge on buprenorphine transdermal patch, the authors aimed to ensure lasting adherence and reduce the likelihood of relapse.[10]

## CASE REPORT

A 21-year-old male with a history of OUD and cannabis use disorder presented to the addiction clinic after initiating SL buprenorphine-naloxone 8-2 mg three times daily during an Emergency Department (ED) visit. He took SL buprenorphine for five days but had to discontinue due to precipitated opioid withdrawals (POW) from using fentanyl. Subsequently, he was reinitiated in the clinic with the standard method, abstaining from opioid use for 24 hours before initiating SL buprenorphine, but experienced POW again with a relapse to fentanyl. Despite multiple ED and office visits, attempts to transition him from fentanyl to buprenorphine were unsuccessful. As a result, the patient was admitted to the hospital for opioid withdrawal and micro induction of buprenorphine, as he declined methadone for OUD and outpatient micro induction of buprenorphine.

The patient reported using fentanyl three hours before admission, and his urine drug screen (UDS) was positive for both fentanyl and THC. Upon admission, a transdermal buprenorphine patch (10mcg/hour) was initiated, and the course of micro induction is detailed in Table 1. Medications to manage withdrawal symptoms were available as needed and administered as indicated in Table 1. The patient completed the micro induction successfully without significant events. He experienced minimal withdrawal symptoms, with his COWS[3] never exceeding 2, and expressed satisfaction with the process. Although he expressed anxiety about receiving the LAI buprenorphine injection, he received it successfully and expressed a commitment to maintaining abstinence from opioids in the future.

## DISCUSSION

Buprenorphine micro induction is an increasingly utilized technique. This case study aimed to highlight the significant role of transdermal buprenorphine and SL low-dose buprenorphine induction in transitioning from high-potency synthetic opioids (HPSO) to LAI buprenorphine injection. This approach involved initiating buprenorphine at a continuous low dose, gradually increasing it until reaching a therapeutic level.[5] This facilitates the prompt initiation of SL buprenorphine at increased doses over several supervised days. Subsequently, LAI buprenorphine can be administered once the patient is opioid-free and stabilized on an oral dose of SL buprenorphine.[7]

Previous studies have utilized low doses (0.2 mg - 0.5 mg) of SL buprenorphine for induction, even though these higher doses and formulations differ notably from transdermal buprenorphine patch.[9,10] Menard et al.[11] described patients successfully being transitioned from methadone to SL buprenorphine using the patch to avoid severe withdrawal symptoms, but these patients were already established on methadone for OUD. Additionally, the efficacy of transdermal buprenorphine in noncancer chronic pain, particularly when transitioning from prescribed opioids in the outpatient setting, is proven,[12] although at very low doses. Kornfeld et al.[12] indicates the patch is efficacious in reduction of withdrawal symptoms in the transition to SL buprenorphine. These efficacies could implicate transdermal

**Table 1. Dose and patient response through the course of admission until outpatient injection.**

| | Transdermal Buprenorphine Patch | BPN, Twice Daily | COWS | Withdrawal Symptoms | Medication, Indication | Vitals |
|---|---|---|---|---|---|---|
| Day 1 | 10 mcg/hr. | 1 mg bid | 1 | Anxiety, fatigue, insomnia, GI upset | Clonidine 0.1 mg PO, anxiety | HR 71<br>RR 16<br>BP 145/72<br>T 36.8 |
| Day 2 | 10 mcg/hr. | 1 mg qid | 2 | Lower back soreness, anxiety | Hydroxyzine 25 mg PO, anxiety<br>Trazodone 50 mg PO, insomnia | HR 48<br>RR 18<br>BP 135/72<br>T 37.2 |
| Day 3 | 10 mcg/hr. | 1 mg eight times a day | 1 | Rhinorrhea, sneezing | Promethazine 12.5 mg PO, nausea | HR 57<br>RR 18<br>BP 125/68<br>T 37.1 |
| Day 4 | 10 mcg/hr. | 8 mg bid | 1 | Anxiety | None | HR 42<br>RR 19<br>BP 107/51<br>T 36.8 |
| Day 5 | 300 mg Buprenorphine extended-release injection, outpatient | | 0 | None | None | HR 92<br>BP 108/95<br>T 36.8<br>RR 18 |

buprenorphine as an appropriate initial agent in the treatment of chronic pain or induction of buprenorphine in multiple settings while reducing the chronic opioid burden on patients.[13,14]

The secondary goals of this method are increased adherence and success of buprenorphine, attributed to its supervised nature. While prior research has shown the effectiveness of outpatient induction compared to supervised methods, it is important to note that not all patients may have access to inpatient care, as seen in this case study.[6,11] This inpatient technique eliminates the need for patients to manage their own induction and abstinence. It could provide a valuable option to patients who are hesitant or anxious to withdraw but willing to do so in a supervised way.

## CONCLUSIONS

The need for new approaches to treat OUD is critical due to the changing and unpredictable supply of non-prescribed opiates. Transdermal buprenorphine, known for its safety, has shown effectiveness in inpatient buprenorphine induction, minimizing withdrawal symptoms. Further research is required to evaluate its efficacy in outpatient settings and different patient populations. Widespread acceptance of transdermal buprenorphine for induction could enhance access for hesitant patients and improve the success rate of buprenorphine induction.

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