

## Pseudoaneurysm Due to Misuse of Buprenorphine

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Received Date: March 15, 2023; Published Date: April 05, 2023

### Abstract

Buprenorphine is sublingually administered for the maintenance therapy of opioid addicts for the past three decades. We report a case of 45 year old male who presented with complaints of bloody discharge from wound over right groin. He was a chronic intravenous drug abuser with multiple substance abuse including buprenorphine. He was on substitution therapy with buprenorphine since 2015. He had injected the sublingual buprenorphine preparation after mixing it with distilled water into the Right femoral artery because of the thrombosis in the veins. Arterial Doppler of the right lower limb showed a large pseudoaneurysm arising from common femoral artery measuring 5.2 x 3.2 millimeter with yin-yang flow with neck approximately measuring 2 millimeter. The patient was started on intravenous antibiotic cefoperazone-sulbactam and right ilio-femoral bypass on the next day. This case report explores the misuse of sublingual buprenorphine maintenance dose which resulted in pseudoaneurysm and chemical arteritis due to the excipients present in the preparation. Motivation of such patients to refrain from such abuse through counseling or replacement of buprenorphine with buprenorphine-naloxone can help in avoiding such misuse

**Keywords:** Pseudoaneurysm; Buprenorphine Misuse; Saphenofemoral Artery; Nitrazepam; Lysergic Acid Diethylamide

### Introduction

Buprenorphine is a partial agonist at the  $\mu$  opioid receptor which is sublingually administered for the maintenance therapy of opioid addicts for the past three decades. We report a case of buprenorphine misuse which resulted in pseudoaneurysm of the right femoral artery.

### Case History

A 45-year-old male presented with complaints of bloody discharge from wound over right groin on 20th April 2022. On eliciting history, it was known that he was a chronic intravenous drug abuser with multiple substance

abuse like marijuana, cocaine, nitrazepam, Lysergic Acid Diethylamide (LSD) and buprenorphine, heroin, 3,4-methylenedioxymethamphetamine in the past and nicotine, alcohol, marijuana and buprenorphine in the present. He was on substitution therapy with buprenorphine since 2015. He had the habit of mixing the sublingual preparation of buprenorphine in distilled water and injecting it intravenously. He had injected the sublingual buprenorphine preparation into the femoral artery because of the thrombosis in the veins. He was Hepatitis C positive and had no other concurrent illness.

On evaluation, arterial doppler of the right lower limb showed a large pseudoaneurysm arising from common femoral artery

(137 centimeter/second [cm/s] Triphasic) measuring 5.2 x 3.2 millimeter with yin-yang flow with neck approximately measuring 2 millimeters. There was no thrombus in it. Monophasic flow was noted in saphenofemoral artery (SFA) 85 cm/s, deep femoral artery 107 cm/s, popliteal artery 51 cm/s, anterior tibial artery 69 cm/s, posterior tibial artery 41 cm/s, peroneal artery 40 cm/s and dorsalis pedis artery 30cm/s. Distal obstructive monophasic flow noted in SFA and beyond it with maintained peak systolic velocities. The total count was 39,700 cells/millimeter cube, differential count was polymorphs 85%, lymphocytes 13%, eosinophils 1%, monocytes 1%, hemoglobin was 7.6 grams/deciliter, Packed Cell Volume was 21.1%, Mean Corpuscular Hemoglobin 32.3 picogram, platelet count was 5.6 lakhs cells/millimeter cube, RBC was 2.34 million/millimeter cube, ESR was 150 millimeters/hour, SGOT was 82 units/liter and SGPT was 68 units/liter. Other parameters like electrolytes, renal function tests were within normal limits.

The patient was started on intravenous antibiotic cefoperazone -sulbactam and right ilio-femoral bypass on the next day. An incision was made on the right groin from supra to infra inguinal area. The left thigh vein was harvested, reversed proximal anastomosed to right external iliac artery and distal to right saphenofemoral artery following which good distal flow was established. The wound was closed after hemostasis. The procedure was uneventful and the patient was started on intravenous antibiotics. Psychiatry consultation was done. The patient improved symptomatically and was discharged after two weeks with cloxacillin 500 milligram(mg) orally twice daily for a week, aspirin 75 mg once daily orally and acenocoumarol 2mg once daily orally.

## Discussion

Buprenorphine is a partial agonist of the opioid receptor used in maintenance therapy of opioid dependence. The partial agonist activity with its ceiling effect at moderate dose producing positive opioid effects, its high affinity to receptor with slow dissociation makes it an ideal and safe drug for treating opioid dependence [1]. Sublingual dose of 8-16 mg per day has shown comparable effect as that of 60 mg of oral methadone which is an opioid agonist used for maintenance [2].

In this case report the patient was a multiple drug abuser and he was on sublingual Buprenorphine maintenance since past 7 years and he started misusing it intravenously for pleasurable effects. Sublingual buprenorphine is readily soluble in water, which enables inadvertent intravenous abuse causing damage to the vein, transmission of blood-borne viruses, abscesses, infections and death [3].

In this patient due to inability to gain vein access he punctured the femoral artery which resulted in pseudoaneurysm. A pseudoaneurysm (false aneurysm) is a hematoma that communicates with an artery through a disruption in the arterial wall [4]. Due to the ease of access, femoral artery is the most common site for pseudoaneurysm and can present with complications like exsanguination, hematoma formation, digital embolism, limb loss, septicemia and even death. The pathophysiological response to intra-arterial injection could be due to any of the excipients viz monohydrated lactose, mannitol, maize starch, povidone excipient K30, citric acid, sodium citrate or magnesium stearate in the sublingual preparation which produced a chemical endarteritis resulting in endothelial injury, platelet activation and associated localized thrombosis [5,6].

Proper diagnosis using duplex ultrasonography and Computed Tomography angiography helps in differentiating it from infected groin abscess [7]. In this patient ultrasonography was done and empirical treatment with antibiotics was started after diagnosis of pseudoaneurysm. Literature shows that ligation of the artery with or without stent-graft and debridement of the wound is the surgical treatment whereas ultrasonography guided thrombin injection to promote thrombosis is the non-surgical alternative [8-10].

In this patient anastomosis was done and the procedure was uneventful. However, in such patients there is increased possibility of similar episodes and hence caution should be exercised by continuous supervision with frequent toxicological testing of blood and urine samples [11]. Alternatively, a combination of buprenorphine /naloxone may be used. Naloxone being a pure opioid antagonist will not deliver the pleasurable effects of opioid thus restricting the misuse of the combination [12].

Buprenorphine misuse should be considered as an adverse drug reaction (ADR). We should take initiative for reporting misuse of drugs. According to World Health Organisation Uppsala Monitoring Centre causality assessment, the causal association in this case is probable. Preventability criteria according to Schumock and Thornton scale are Definitely Preventable. Severity according to Modified Hartwig's Severity Assessment scale showed Level 5 association.

## Conclusion

This case report explores the misuse of sublingual buprenorphine maintenance dose which resulted in pseudoaneurysm and chemical arteritis due to the excipients present in the preparation. Motivation of such patients to refrain from such abuse through counselling or replacement of buprenorphine with buprenorphine-naloxone can help in avoiding such misuse.

Ethical concerns-Informed consent was taken from the patient.

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