

# Ultrasound Guided Femoral Nerve Block In An Obese Patient With A Patellar Tendon Tear And Severe Obstructive Sleep Apnea

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## Abstract

Surgical patients with obstructive sleep apnea (OSA) present several challenges in the perioperative setting. In particular, these patients are extremely sensitive to the respiratory depressant actions of opioid analgesics. Anesthesiologists and surgeons often struggle to find the narrow window of opioid induced analgesia without encountering excessive somnolence and airway obstruction in this patient population. I will report the details of a successful femoral nerve block utilizing ultrasound in a patient with severe obstructive sleep apnea who had sustained a complete tear of his infrapatellar tendon.

## INTRODUCTION

Obstructive sleep apnea (OSA) is estimated to afflict at least 2% of women and 4% of men in our country (1). Due to the increasing number of patients with OSA presenting for surgery a task force consisting of 12 members has recently published guidelines for the perioperative care of these patients (1).

Prior to the publishing of these guidelines our hospital took the proactive approach of developing a Monitored Surgical Care Area (MSCA) that is exclusively devoted to the postoperative care of patients with OSA. Patients with known or suspected OSA that require post operative intravenous or neuraxial opioids are admitted to the MSCA following a stay in our PACU. The MSCA accepts patients who require closer monitoring than provided on traditional surgical floors but do not meet admission criteria for intensive care units. The typical ratio of nurse to patients in our MSCA is 1:3. Specific monitoring modalities include the use of continuous pulse oximetry and respiratory monitors.

## CASE HISTORY

A 50 year old male who weighed 112 kg presented to the emergency department of our facility after sustaining a fall on black ice while shoveling snow. The diagnosis of a complete infrapatellar tear was confirmed by physical examination and a knee x-ray. His x-ray demonstrated a high-riding patella and thickening of soft tissues inferior to the patella. Regrettably, the patient suffered his injury on the

day of his retirement party from the police department after 26 years of dedicated service.

His past medical history was remarkable for obstructive sleep apnea, diabetes mellitus II, and obesity. He was on nocturnal CPAP therapy for his obstructive sleep apnea. Medications included glyburide and metformin, and he denied having any drug allergies. Preoperative CBC, blood sugar, and electrolytes were within normal limits. Physical examination was notable for a large body habitus (BMI = 36.2) with an excessively large neck circumference and a class III mallampati score. Vital signs were all within normal range.

The patient was interviewed, medical records reviewed, and anesthetic options were discussed. An ultrasound guided femoral nerve block using a 21g (100 mm) needle was performed in the preoperative holding area. Given the nature of the patient's injury a quadriceps contraction was not possible and the block was executed in a timely fashion relying solely on ultrasound imaging. A total of 30ml of 0.5% bupivacaine in 1:200,000 epinephrine was injected with frequent aspirations. No paresthesias occurred and the injected local anesthetic enveloped the femoral nerve with a classic "doughnut sign" (2). Sedation for this femoral nerve block consisted of 1.5 mg of IV midazolam and 75 ug of IV fentanyl. Supplemental oxygen was delivered and no desaturations occurred.

Shortly after block performance the patient was transported

to the operative suite and a non-eventful general anesthetic was conducted. Due to the rapid onset of a dense femoral nerve block no intraoperative opioids were necessary. Surgical repair consisted of reattaching the patellar tendon to cancellous bone of the tibia. The tourniquet time was 26 minutes. Fluid totals for the case consisted of 800 ml of lactated ringers with 30 ml of estimated blood loss. At the conclusion of the operation the patient's operative leg was placed in a compressive dressing and stabilized in a leg brace that was locked at zero degrees. Next, he was uneventfully extubated and transported with supplemental oxygen to the PACU. His initial postoperative vital signs were within normal limits and his pain was rated as 0/10. Due to the high quality femoral nerve block no supplemental opioids were required in the PACU and he was able to avoid our Monitored Surgical Care Area (MSCA) and head directly to the orthopedics floor.

## DISCUSSION

This case contributes to the growing body of literature that supports the utility of ultrasound guided peripheral nerve blocks (<sub>3,4,5,6</sub>). This patient had sustained a complete tear of his infrapatellar tendon rendering traditional nerve stimulator techniques of a femoral nerve or lumbar plexus block futile. Other potential analgesic options included a fascia iliaca block or a lumbar neuraxial block. Given the patient's large body habitus both of these options were easily dismissed in favor of an ultrasound guided femoral nerve block.

Unlike traditional nerve stimulator techniques, ultrasound can be performed in a variety of situations where motor responses are not possible or would be hurtful to patients. In particular, ultrasound can also be of assistance in diabetic patients with neuropathy where nerve stimulation produces minimal motor responses (<sub>6</sub>). Additional advantages of ultrasound include being able to visualize nerve complexes, avoiding intraneuronal injections, being able to redirect the needle to strategically deposit local anesthetic in the perineural space (<sub>3,4,5</sub>). Further, in obese patients traditional landmarks are often difficult to define, while ultrasound continues to generate high quality images without being hindered by extra adipose tissue.

Regional anesthesia continues to prove cost effective and has even allowed total hip arthroplasty as an overnight stay procedure (<sub>7</sub>). In the above reported case our patient was able to avoid our MSCA and go directly to the orthopedics floor as he did not require intravenous or neuraxial narcotics. Avoiding the MSCA resulted in substantial cost savings to both the patient and the hospital. High quality portable ultrasound devices have increased the variety of clinical situations in which peripheral nerve blocks can be employed. Ultrasound guided peripheral nerve blocks should be added to the perioperative arsenal of CPAP, mandibular advancement devices, weight loss, continuous pulse oximetry, respiratory monitors, and specialized postoperative units for the management of patients with OSA.

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