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Correspondence

Perioperative management of quadriceps tendon rupture in a patient recovering from COVID-19 pneumonia: A case report

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To the Editor:

The timing of surgery and perioperative management of patients recovering from severe COVID-19 infection remains challenging. For elective surgery, a joint statement from the American Society of Anesthesiologists and Anesthesia Patient Safety Foundation recommends a recovery period of four to twelve weeks depending on the severity of infection and treatment intensity [1]. Quadriceps tendon repair is a surgical procedure that is often considered elective. However, the timing of surgery is critical, with delayed intervention (i.e., more than 3 weeks) being associated with poorer outcomes [2]. We present a case of a patient who ruptured his quadriceps tendon prior to hospital admission for COVID-19 pneumonia and the collaborative effort that ensured his safe and successful perioperative care. The patient provided written permission to share the details of his case. This article complies with the applicable EQUATOR publishing guidelines for case reports (CARE: Consensus-based Clinical Case Reporting; <https://www.equator-network.org/reporting-guidelines/care/>).

A 64-year-old 198 kg (BMI 56 kg/m²) man, with a history significant for hypertension, morbid obesity, and pulmonary embolism on apixaban, was referred to the anesthesiology service for preoperative consultation. He was recently discharged from an intermediate care hospital after spending several days in the intensive care unit for COVID-19 pneumonia. When transferring to the hospital by ambulance, he had a traumatic fall and completely avulsed his quadriceps tendon from the superior pole of the patella. Orthopaedic surgery at our tertiary care referral hospital was consulted, but definitive treatment was delayed due to his critical respiratory status. After a two-week hospitalization during which he received high flow nasal cannula oxygen, remdesivir, tocilizumab, and dexamethasone, he was discharged to a local rehabilitation facility on room air.

His case was discussed during multidisciplinary rounds involving anesthesiology, orthopaedic surgery, and internal medicine. The patient was already one month post-injury, and there was concern that further delay would decrease the likelihood of successful repair and functional

recovery [2]. Therefore, the decision was made to proceed with urgent scheduling.

Regional anesthesia has been recommended for patients with active COVID-19 infection to avoid tracheal intubation and aerosol generation [3] and the potential for pulmonary complications associated with mechanical ventilation. Given the patient's recent COVID-19 pneumonia and other comorbidities, regional anesthesia was deemed the safest anesthetic approach. The surgeon endorsed this plan, including the possibility of aborting the surgery if regional anesthesia was unsuccessful. The patient provided informed consent and agreed to hold his apixaban three days prior to surgery.

On the day of surgery, the patient received a fascia iliaca (FI) continuous nerve block using a technique described previously [4] with 15 ml of mepivacaine 1.5% as the initial bolus (Fig. 1). A catheter was advanced through the needle and secured with adhesive dressings. After placement, the patient reported numbness only on the medial thigh and knee. Therefore, the regional anesthesia team performed a supplemental ultrasound-guided lateral femoral cutaneous nerve block with 10 ml of mepivacaine 1.5% injected around the nerve, caudal to the anterior superior iliac spine.

Anesthesia of the medial, anterior, and lateral aspects of the thigh was confirmed, and the patient was brought to the operating room. Spinal anesthesia was attempted but unsuccessful despite multiple attempts. The operative team and patient collectively decided to proceed with surgery using the peripheral nerve blocks for surgical anesthesia and without a pneumatic tourniquet. The surgery began with a 4 cm vertical incision midline to the superior pole of the patella and extended proximally. Subcutaneous flaps were made medially and laterally, exposing the entirety of the distal quadriceps tendon. A complete tear was evident with minimal retraction of the tendon and preserved muscle bulk confirmed (Fig. 2A). The superior pole of the patella was freed of any soft tissue. Three biocomposite anchors were placed in the superior pole of the patella. Locking sutures were passed through the quadriceps tendon and tied to re-approximate the tendon to the native patellar

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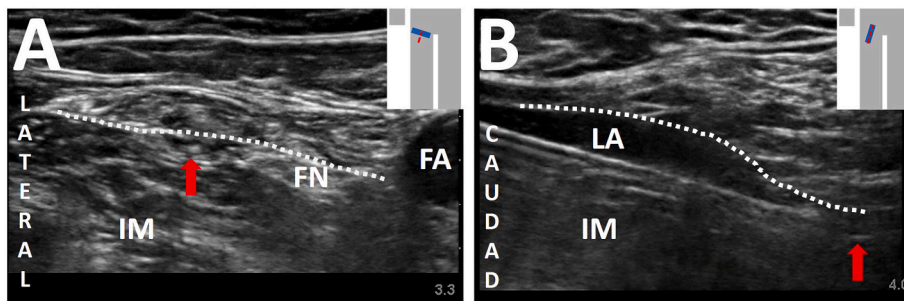


Fig. 1. Sample ultrasound images demonstrating fascia iliaca catheter insertion using the technique described by Mudumbai et al. [4]: A) The placement needle is inserted out-of-plane lateral to the femoral nerve visualized in short-axis until the tip (red arrow) penetrates the fascia iliaca (dotted line), and local anesthetic is injected into the fascia iliaca compartment; B) the ultrasound transducer is then turned 90 degrees to visualize the needle in-plane below the fascia iliaca (dotted line) in long-axis, and the needle tip (red arrow) is advanced cephalad further into the compartment after incrementally injecting local anesthetic. The catheter is then advanced through the tip (arrow) of the placement needle. The inset boxes show the position of the ultrasound transducer

(rectangle) relative to the needle trajectory (dashed line). Abbreviations: FA, femoral artery; FN, femoral nerve; IM, iliacus muscle; LA, local anesthetic.

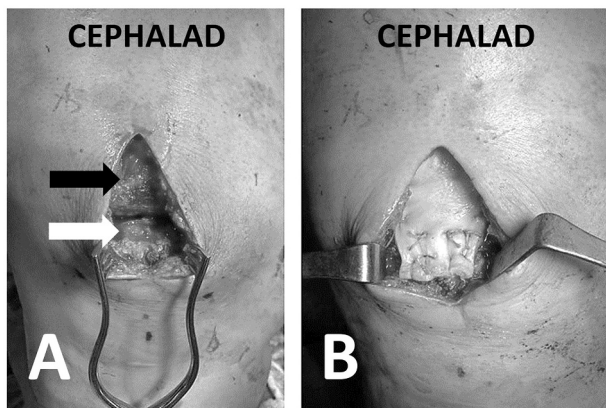


Fig. 2. Repair of the quadriceps tendon rupture: A) Initial surgical exposure showing distal quadriceps tendon stump (black arrow) and superior aspect of the patella (white arrow); B) completed quadriceps tendon repair with acellular dermal matrix allograft secured over the tendon for reinforcement.

footprint. An acellular dermal matrix allograft was secured over the tendon for reinforcement given injury chronicity and body habitus (Fig. 2B). The incision was closed with suture and dressed using an incisional wound vac.

The patient received an intravenous dexmedetomidine infusion for mild sedation and was hemodynamically stable and pain-free during the 2-h 8-min surgery. He was admitted to the ward postoperatively where he received a perineural infusion of 0.2% ropivacaine via the FI catheter which provided excellent pain control. The catheter was removed on postoperative day 1 prior to restarting apixaban. At his surgery follow-up one week later, the repair was intact by ultrasound exam; at 6 weeks postoperatively, he was able to perform a straight leg raise.

Peripheral nerve blocks represent invaluable approaches to anesthesia and opioid-sparing analgesia, and their role in perioperative care has expanded in the COVID-19 era. When neuraxial blocks are difficult even for experienced practitioners and the surgical site is amenable, peripheral techniques may provide the means to avoid general anesthesia, unnecessary airway manipulation, and potential pulmonary injury from mechanical ventilation in this growing population of surgical patients who are recovering from COVID-19 pneumonia.

Disclosures

TLW is a medical advisor for Blumio (San Francisco, CA, USA) and a

consultant for Theranova (San Francisco, CA, USA) and Medable (Palo Alto, CA, USA). None of these companies had any input into the preparation of this report. None of the other authors has any conflicts of interest to declare.

Declaration of Competing Interest

None.

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