

Novel Use of Fenestrated Needle for iPACK Block

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Introduction

The iPACK block was first described in 2012 as a technique to control posterior knee pain in total knee arthroplasty¹, which can be missed when using adductor canal blocks without peri-articular local anesthetic infiltration. Articular branches arise from the tibial and obturator nerves, travel between the popliteal artery and femur to innervate the posterior capsule². By selectively targeting these terminal articular branches while sparing the tibial and common peroneal nerves, the iPACK can block sensation to the posterior knee while not affecting sensorimotor function of the lower leg, thus avoiding foot drop.

Methods

As all patient identifying information has been removed from the case report, it is exempt from IRB approval per University of Utah's policy. Patient was contacted via phone after being discharged from the hospital and verbal consent was obtained to use this case for research and presentation purposes. She was informed that all identifying information would be omitted to protect privacy. We used a M6-15 transducer probe on a GE Venue Go ultrasound machine and a fenestrated needle.

Case Description

72-year-old female presented for a knee manipulation under general anesthesia after having a left total knee arthroplasty (TKA). Post-operatively an adductor canal block was performed, but the patient continued to endorse significant pain in her posterior knee. She needed adequate pain control to participate in physical therapy. The decision was made to also perform an iPACK block to target posterior knee pain.

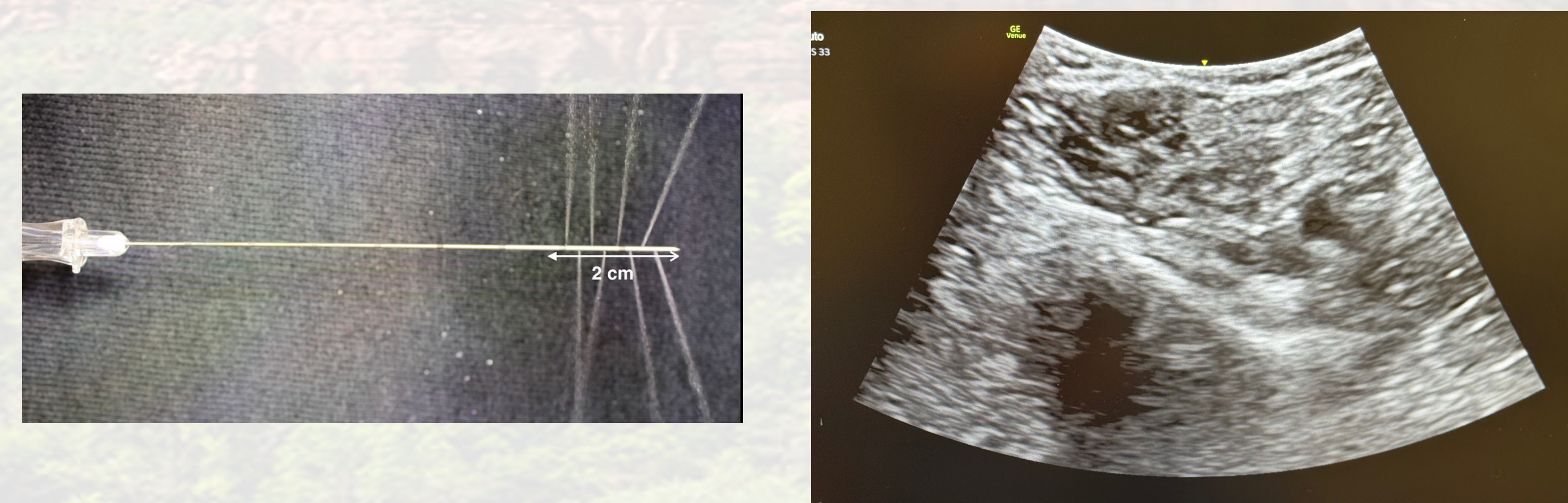
Under ultrasound guidance, a fenestrated needle was inserted into the tissue plane between the popliteal artery and femoral shaft and 15mL of 1/8% bupivacaine with epinephrine was injected. Prior to leaving the post anesthesia care unit, the patient reported significant improvement in her posterior knee pain. The patient was called to follow up a week after discharge. She reported significant pain relief for 24 hours after the block which allowed her to participate in important physical therapy appointments.

Discussion

Meta-analysis shows that in the absence of surgical peri-prosthetic infiltration of local anesthetic, performing the iPACK block in addition to an adductor canal block provides superior pain relief for up to 24 hours and enhanced functional recovery³. Patients undergoing knee manipulations do not receive local anesthetic infiltration by the surgeons. Being able to participate in PT is extremely important for this group. So, performing both adductor canal and iPACK blocks in this population has the potential to improve pain control and overall functional outcomes.

After finding the appropriate US image, the iPACK block is performed using an in-plane approach, inserting the needle between the popliteal artery and femur, until the tip is 2-cm beyond the popliteal artery. Then local anesthetic is injected in divided aliquots as the needle is withdrawn to ensure even distribution throughout the tissue plane. Using a fenestrated needle, we were able to inject local anesthetic in a single dose with even distribution because of the fenestrations. Our patient had equivalent analgesia with this needle, demonstrating an adequate variation in the iPACK technique.

Images



References

1. Sinha S, Abrams J, Sivasenthil S, et al. Use of ultrasound guided popliteal fossa infiltration to control pain after total knee arthroplasty: a prospective, randomized, observer-blinded study (Abstract P 52). Presented at: American Society of Regional Anesthesia (ASRA) Meeting, March 2012; San Diego, CA.
2. Sinha S. How I do it: Infiltration between popliteal artery and capsule of knee (iPACK). American Society of Regional Anesthesia and Pain Medicine. <https://www.asra.com/news-publications/asra-newsletter/newsletter-item/asra-news/2020/05/03/how-i-do-it-infiltration-between-popliteal-artery-and-capsule-of-knee-ipack>. Published May 3, 2020.
3. Hussain N, Brull R, Sheehy B, et al. Does the addition of iPACK to adductor canal block in the presence or absence of periarticular local anesthetic infiltration improve analgesic and functional outcomes following total knee arthroplasty? A systematic review and meta-analysis. *Regional Anesthesia & Pain Medicine* 2021; 46:713-721.