

Comments on 'Relieving Pain after Arthroscopic Knee Surgery: Ultrasound-Guided Femoral Nerve Block or Adductor Canal Block?'

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Dear Editor,

We interestingly read the original article titled 'Relieving Pain after Arthroscopic Knee Surgery: Ultrasound-Guided Femoral Nerve Block or Adductor Canal Block?' by Rahimzadeh et al. (1) published in the 2017 edition of TJAR. The study demonstrated greater efficacy and better satisfaction in terms of the analgesic quality with femoral nerve block (FNB) in the patients. In the study, the authors found that the quadriceps femoris muscle weakness after the injection of 0.125% bupivacaine was comparable for the initial 12 h in both the FNB and adductor canal block (ACB) groups. We have a few comments on the discussion. ACB blocks the saphenous nerve which is a sensory nerve and a branch of the femoral nerve. However, the adductor canal also contains the nerve to vastus medialis (NVM), which is a branch of the posterior division of the femoral nerve. NVM is a motor nerve which is responsible for the motor weakness after ACB (2). The review article by Wan Yi Wong et al defined the location of the adductor canal using ultrasonography in volunteers, and suggested that proximal or mid-thigh ACB could lead to the proximal spread of the local anaesthetic (LA) into the femoral triangle, thus leading to motor blockade (3). Conversely, a distal ACB injection could lead to a distal spread of LA which could block the posterior branch of the obturator nerve and popliteal plexus, which contributes to the intra-articular innervation of the knee. Vastus medialis is an extensor muscle situated in the anterior compartment of the thigh, and is one of the four quadriceps muscles along with vastus lateralis, vastus intermedius and rectus femoris. It is difficult to distinguish NVM from the saphenous nerve on ultrasound during ACB (4). In many cases, the saphenous nerve cannot be

visualised, but knowing its consistent relation to the superficial femoral artery, LA is injected at both 10 o'clock and 2 o'clock positions (4). Two ways of minimising NVM involvement after ACB are as follows: using lesser volume of LA (≤ 10 mL) and performing the block at a lower location (≤ 10 cm above the knee joint) (5). Weakness of the quadriceps muscles affects early mobilisation in patients after knee arthroplasty and arthroscopy, with the occurrence of undesirable events, such as falling while standing. ACB has been more popular than FNB due to its relative sparing of the quadriceps muscle. However, NVM involvement after ACB negates its benefits over FNB in terms of providing analgesia without a motor block. Therefore, we suggest a lower approach and lesser LA volume for ACB to avoid post-operative quadriceps weakness.

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Author's Reply

Re: Comments on 'Relieving Pain after Arthroscopic Knee Surgery: Ultrasound-Guided Femoral Nerve Block or Adductor Canal Block?'

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Dear Editor,



Thank you for your recent inquiry into our study (1). We would like to take this opportunity to reply. In our study (2), we found that the quadriceps femoris muscle weakness after injection of 0.125% bupivacaine was comparable in both groups for the initial 12 hours after both femoral nerve block (FNB) and adductor canal block (ACB). We also found that the FNB provides superior post-operative analgesia compared to ACB. It is known that weakness can occur when performing FNB block due to blockade of motor branches of the femoral nerve (FN).

Nair et al. (1) wonders if perhaps in our study the ACB was placed too proximally in the thigh, which could in theory anesthetize the nerve to the vastus medialis muscle (NVM) and explain quadriceps femoris muscle weakness we observed following ACB. The NVM is a branch of the posterior FN which occurs more proximally in the thigh. They are correct in that if the ACB is performed at a more proximal location such as mid-thigh, it is more likely to block NVM which could lead to quadriceps femoris muscle weakness. However, in our study, as we describe in the *Methods* section, we specify that the ACB is placed in the distal 1/3 of the thigh with minor variation from this position to optimize our sonographic target of the FA and often times visualized saphenous nerve (SN) (2-4).

What we have noted in our practice is that when attempting an ACB in morbidly obese patients with larger diameter thighs, there is a tendency to move more proximally in the thigh to obtain an optimal and more superficial location of the FA just below the sartorius muscle, which could perhaps be in the vicinity of the NVM. However, to protect against

this technical challenge in our study, we specifically excluded patients with BMI >35, and we made every attempt to remain in the distal 1/3 of the thigh, which is distal to the usual takeoff of the NVM. We also agree that it is theoretically possible that if a large volume (20-30 mL) of concentrated LA is used when placing an ACB, proximal blockade of the NVM could occur and anterior thigh muscle weakness could be observed. However, in our study, since we used a low volume (12 mL) of the dilute local anesthetic (LA) bupivacaine 0.125%, it is unlikely that the observed weakness in the ACB group is from motor blockade of the NVM.

As we note in our study, we theorize that because the FNB provides superior analgesia compared to ACB, and pain can inhibit the patient from extending their knee, this is the main reason why we observed muscle weakness in the ACB group.

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