Reply to Dr. Stevens

To the Editor:

We thank Dr. Stevens for his letter that raised the question about the method we used in intravenous regional anesthesia (IVRA; Bier block) in complex regional pain syndrome (CRPS) type I.[1] IVRA was first described in 1908 for anesthesia of the hand and forearm and has been accepted as simple to administer, reliable, and cost-effective. In addition to being an anesthetic procedure for the treatment of fractures and tendon or muscle injuries, it has been used in various clinical conditions, including vascular disturbances, and in pain states such as CRPS.[2]

CRPS is a complex clinical picture characterized mainly by diffuse pain, edema, reduced range of motion, and changes in temperature and skin color that are more prominent at the distal part of the affected extremity. Although the pathophysiology of CRPS remains ill-defined, the use of sequential treatment modalities that decrease pain and restore function is vital for a successful outcome. The use of these medications is largely empiric; however, theoretical mechanisms support their use in chronic pain.[3]

Although the traditional injection site for IVRA is the distal part of the extremity, in CRPS and similar conditions, the technique may be hampered by difficulties associated with cannulating a vein at the distal part of the affected extremity because of edema and pain. Moreover, allodynia and hyperalgesia are encountered very often in CRPS. In a Bier block, the precise mode of action and the site of action of intravenous regional analgesia are still controversial.[2] Raj et al.[4] demonstrated that the anesthetic agent accumulates proximally, irrespective of the injection site, but some other investigators have provided strong evidence that the periphery is the major site of action.[2] Lai et al.[5] suggested that the principal site of action of lidocaine in IVRA mainly depends on concentration rather than on the injection site. Blyth et al.[6] investigated whether proximal injection in the antecubital fossa leads to the lack of beneficial effects of the method and found that both methods were equally effective. In addition, they reported that fewer technical problems were associated with the procedure. As a result, in contrast to Dr. Stevens' suggestion, data are still lacking in regard to the major site of action and the injection site.

In IVRA, the anesthetic solution is used to replace the blood in the vascular area to be anesthetized. The technique is, thus, a volume technique and depends on the vascular volume of the extremities. In a human study with radioactive chromium 51, the upper extremity was found to have an average volume of 170 mL.[7] Although the preferred volume is up to 60 mL in IVRA of the upper extremities, controlled trials are needed to document the differences among different volumes in CRPS, which may diffusely affect an extremity. Leakage through veins is the major problem when such high volumes are used. However, with the necessary measures, such as exsanguination of the extremity as completely as possible, use of wide cuffs, adequate cuff pressure, and slow injections, the method seemed safe in our study. We did not face more serious side effects than those reported in the literature.

Many authors suggest that sympatholytic interventions such as IVRA should be applied in selected patients in whom sympathetically maintained pain has been demonstrated.[8] Our study did not assess whether sympathetic overactivity accompanied our patients' clinical picture. We think that in addition to the technique of the procedure, a study performed in a patient group with sympathetic overactivity would add some important contributions to this subject.

Furthermore, the aim of IVRA is to provide analgesia to facilitate therapy and rehabilitation. In CRPS, treatment should be multifactorial and should be based on physiologic criteria. Viewing a single method as a remedy may lead to mistakes. Treatment paradigms should decrease inappropriate autonomic function, restore appropriate arteriovenous shunting, and identify and correct underlying nociceptive foci.[3]

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Sciatic Nerve Block for Total-Knee Replacement: Is it Really Necessary in All Patients?

To the Editor:

We have read with great interest the study by Pham-Dang et al.[1] about the value of adding a sciatic block to continuous femoral block for analgesia after total-knee replacement (TKR). Although we agree that some patients have severe pain that originates from the sciatic territory and that in such cases, a sciatic nerve block can

be very useful, we advise caution about the routine use of sciatic block in all patients before TKR.

Sciatic nerve injury after TKR is a well-established complication with an overall incidence of 0.2% to 2.4%.[2-4] Some risk factors, such as valgus deformity ≥10°, total tourniquet time ≥120 minutes, preexisting neuropathy, and postoperative bleeding, have been described.[2] Moreover, electromyographic study done before and after TKR shows almost 30% incidence of new neural damage[4] that is undetectable clinically, which thus illustrates the vulnerability of the sciatic nerve in knee surgery. Furthermore, in one study, half of the sciatic-nerve injuries show incomplete recovery after 5 years.[3] However, surgical treatment of nerve palsy after TKR could possibly improve the prognosis of such injuries.[5]

Considering that knee surgery can place significant stress on the sciatic nerve and that blood supply to the nerve can be decreased by additional perioperative factors such as tourniquet use, vasoconstrictor use, and intraneural injection, we believe that significant benefits should outweigh the risks related to sciatic nerve block before TKR. Not only could preoperative sciatic nerve block theoretically increase risk of neural injury but, most importantly, also could delay diagnosis and treatment of that injury. Thus, the question: Do all patients benefit from combined femoral-sciatic nerve block preoperatively in TKR?

In our institution, we use perioperative continuous femoral nerve block to provide analgesia after TKR. We inject 20 mL of 0.75% ropivacaine preoperatively and use a PCA pump to deliver ropivacaine 0.2% with the following program: 3 to 5 mL/h infusion, 5-mL bolus, and 30-minute lockout. Unless contraindicated, the patient systematically receives paracetamol, intravenously, 1 g every 6 hours and ketoprofen, intravenously, 100 mg every 12 hours. Breakthrough pain (VAS > 3) is treated with oral tramadol or intravenous morphine. Patients with severe pain (VAS ≥ 6) in the PACU receive single-shot lateral sciatic nerve block with 20 mL of 0.75% ropivacaine after integrity of the sciatic nerve is ensured. We retrospectively reviewed the last 200 TKR procedures performed in a 15-month period and found the following: 25 patients (12.5%) needed addition of a sciatic nerve block in PACU; the mean consumption of morphine in PACU was 6.9 mg; and mean consumption of tramadol and morphine over the next 48 hours was 108.0 mg and 9.1 mg, respectively. The mean VAS scores at 2, 4, 12, 24, and 48 hours were 2.2, 1.7, 1.6, 1.8, and 1.3, respectively. Patients assessed the quality of their postoperative analgesia as 3.7 out of 4 (1 = totally unsatisfied, 4 = totally satisfied).

In their study, Pham-Dang et al.[1] showed that in the continuous femoral nerve group, the mean VAS (crude value) dropped below 3 between 2 and 6 hours postoperatively and never rose above that level for the rest of the study period, despite relatively low use of rescue morphine. The somewhat higher pain score observed in their continuous femoral block group, as compared with our results, may be explained by the small percentage of patients with severe pain from the sciatic territory, who received sciatic nerve block in PACU at our institution.

Our data show that good quality postoperative analgesia after TKR could be achieved with continuous femoral nerve block and multimodal analgesia, while avoiding sciatic nerve block and its associated risks in more than 85% of patients. Clinicians should consider the risk-to-benefit ratio of routine sciatic nerve block in their analgesia protocol, particularly in patients at higher risk for sciatic nerve injury after TKR, as defined by Horlocker et al.[2] in their retrospective review.

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Continuous Sciatic Nerve Block and Total-Knee Arthroplasty

To the Editor:

We read with interest the article by Pham Dang et al.,[1] who assessed the value of adding a continuous sciatic nerve block to a continuous femoral nerve block after total-knee arthroplasty. They suggested both continuous femoral and sciatic nerve blocks are required to achieve quality analgesia. However, we disagree with their conclusions for the following reasons.

First, although a statistically significant difference in visual analog score at rest (VASr) exsists between the 2 groups, this difference is clinically insignificant. The most significant difference in pain is within the first 12 hours after the operation. After 12 hours, the mean pain score is below 30. Most clinicians would agree that VAS of 30 equates to satisfactory pain control. Thus, a single-shot sciatic with a long-lasting local anesthetic would have provided the analgesia for this time period.

Second, the VASr-time curves that use the crude value seem to reflect differently from their smoothening technique that uses the linear mixed model. Close examination of that crude data would suggest that at 12 hours onward, the average difference is 10 to 15 mm between