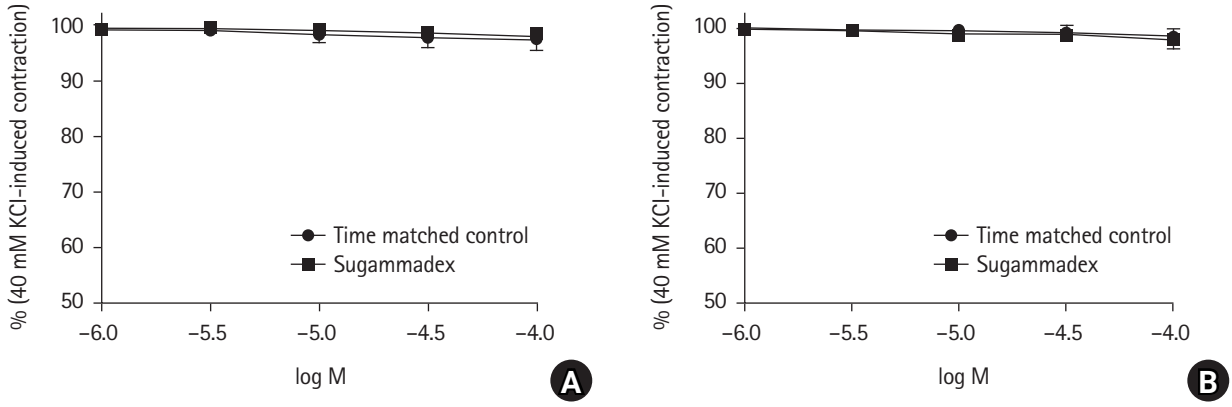

Fig. 1. Effect of sugammadex on KCl-induced contractions in A) isolated human internal mammary artery rings (n = 6*, P = 0.632) and B) isolated human saphenous vein rings (n = 6*, P = 0.958). Data are presented as mean ± SD. *The number of internal mammary artery or saphenous vein rings.

let-activating factors, and various cytokines, that are released from mast cells in hypersensitivity reactions.

In conclusion, sugammadex did not directly affect vascular contractility in isolated human internal mammary artery or saphenous vein rings. Therefore, the observed vasospasm reported in the above cases was not likely a direct effect of sugammadex on vascular tone. Instead, it may be attributed to hypersensitivity reactions or changes in different mediators induced by sugammadex administration.

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Received: January 8, 2024; Revised: February 23, 2024 (1st); March 6, 2024 (2nd); Accepted: March 8, 2024

Funding: None.

Conflicts of Interest: No potential conflict of interest relevant to this article was reported.

Author Contributions: Mert C. Ongun (Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Visualization; Writing – original draft; Writing – review & editing); Bahar Oc (Conceptualization; Data curation; Writing – review & editing); Mehmet Oc (Data curation; Writing – review & editing); Hulagu Bariskaner (Conceptualization; Data curation; Formal analysis; Methodology; Supervision; Writing – original draft; Writing – review & editing)

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Korean J Anesthesiol 2024;77(4):484-485
https://doi.org/10.4097/kja.24017

Response to "Comment on Comparison of the pericapsular nerve group block with the intra-articular and quadratus lumborum blocks in primary total hip arthroplasty: a randomized controlled trial"

We would like to thank Gupta et al. [1] for their interest in and comments on our randomized controlled trial [2].

In our study, body weight was measured for the pericapsular nerve group (PENG) block (75.66 ± 9.7), quadratus lumborum block (QLB) (80.90 ± 12.11) and intra-articular group (81.72 ± 10.97). The dose of bupivacaine administered to the patients included in the study did not exceed the recommended safe dose. We agree that drug pharmacokinetics in geriatric patients may be significantly affected by age-related

organ dysfunction. Therefore, the blocks were administered appropriately by an experienced specialist and monitored closely. Local anesthetic toxicity was not observed in any of the patients followed up during our study.

Studies on the effective volumes and concentrations of postoperative analgesia for PENG blocks and QLBs in patients undergoing total hip arthroplasty are ongoing. Various volume and concentration studies have been reported in the literature; however, neither have been fully clarified. We selected a volume of 20 ml for the PENG blocks, as this is the volume frequently preferred in the literature. However, we were concerned about the volume of the QLB because the affected dermatome area differs according to the volume applied. We chose 30 ml as the most appropriate volume, given the dermatomes affected by the QLB in healthy volunteers and cadavers [3,4]. A volume of 60 ml was selected for the intra-articular group to avoid exceeding the regular dose range reported in the literature. This same dose and volume were used in the study conducted by Bravo et al. [5].

Our patient population spanned a wide range of ages. However, due to insufficient sample size, analyzing variations in sensitivity to local anesthetic agents in each block group according to age could not be conducted as the results would not have been reliable. However, we encourage future research to be conducted to examine these differences.

In our study, 56.2% of the patients underwent total hip replacement surgery with joint degeneration and limitation of movement not caused by hip fractures. Therefore, evaluating intra-articular bupivacaine administration in terms of postoperative chondrolysis was not considered appropriate. Additionally, we agree that ropivacaine is a safe drug, and plasma concentrations confirm its safety even at high doses. However, the only long-acting local anesthetic available was bupivacaine.

As mentioned in the Discussion section, the lack of a control group was a limitation of this study. However, PENG block and QLB applications have been shown to be effective in studies with control groups. Our aim was to compare and evaluate the PENG block and QLB in terms of postoperative analgesia and quality of recovery and compare them with the traditional method of intra-articular local application. Based on the study results, we concluded that PENG block and QLB applications provided effective analgesia postoperatively but did not contribute to recovery.

In our clinic, we prefer the sham procedure as a blinding method to a sham block with high-volume saline. The sham procedure was performed with high precision and care to maintain blindness. The specialist performing the block did not see the patient during randomization or postoperative evaluation. In addition, the patient's front was covered during the sham procedure so that the patient could not see the block application. The postoperative pain assessors, nurses, and patients were blinded to the intervention group, including the data collection process.

The PENG block is a preferred motor-sparing block because only the articular branches of the sensory nerve fibers, femoral nerve, and accessory obturator nerve are involved. However, the mechanism of femoral nerve block with volumes greater than 20 ml may be due to anesthetic spread between the pectineus and psoas, targeting the femoral nerve. Further volume and concentration studies are required to confirm this. We agree with Gupta et al. [1] that correct needle positioning is important for preventing motor weakness when applying a PENG block.

Postoperative pain management and effective rehabilitation in patients with total hip arthroplasty remain important topics. Any efforts to improve outcomes in this patient population are therefore welcome. We would like to thank Gupta et al. [1] for their comments, as they presented several issues that should not be overlooked.

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Received: March 30, 2024; Revised: April 4, 2024; Accepted: April 7, 2024

Funding: None.

Conflicts of Interest: No potential conflict of interest relevant to this article was reported.

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Korean J Anesthesiol 2024;77(4):485-487
https://doi.org/10.4097/kja.24215

Assessment of fluid infusion rate using a pulse oximeter: a pilot study

Dear Editor,

Fluid administration plays a critical role in perioperative patient care, including hydration, electrolyte balance, blood product transfusion, and medication delivery. Accurate monitoring of the fluid infusion rates is essential to ensure optimal patient management. Here, we briefly introduce a pilot study to measure the rate of fluid administration that is a method for calculating the number of drops using a pulse oximeter wrapped around the drip chamber.

A 1,000 ml bag of 0.9% normal saline (HK inno.N) without medication was used. The normal saline bag was suspended at the manufacturer's recommended height of 100 cm. A pulse oximeter (Nellcor™ SpO_2 Adhesive Sensors, Medtronics, Neonatal/Adult < 3 kg or > 40 kg) was wrapped around the drip chamber, and the fluid flow was controlled using an intravenous infusion flow regulator (IIFR) set (Innofuser; SUNGWON MEDICAL Co., Ltd.). The pulse oximeter was monitored by connecting to an IntelliVue MP70 instrument (Philips). Drop rates were measured using a pulse oximeter and recorded at different numerical scales on the IIFR dial (Supplementary Video 1). The expected and measured volumes were calculated and the deviations between the IIFR and pulse oximeter measurements were compared. Three IIFR products of the same type from the same manufacturer were used. Each trial was initiated by opening the tubing roller clamp and the infusion was run for exactly 5 min, at which point the roller clamp was closed. Each fluid volume in the beaker was calculated indirectly by using the relative density (kg/L) of the fluids that had been previously measured by recording the weight of 50 ml at 20°C. All experiments were conducted by a single researcher.

The drop rates measured by the pulse oximeter were consistent for infusion rates above 100 ml/h on the IIFR dial (Table 1). Maximum volume deviations ranged from –2.83 to 3.1 for the IIFR and from –0.4 to 0.2 for the pulse oximeter. The percentage of maximum volume deviation varied from –15.72% to 19.9% for the IIFR and from –3.66% to 0.76% for the pulse oximeter. In all trials, the drop rate measured by the pulse oximeter showed lower deviations than the IIFR.

Manual IIFRs are popular because of their simplicity; however, variations in fluid injection have been reported [1,2]. Although computer-controlled infusion pumps offer precise measurements, their high cost and bulkiness limit their popular use. This pilot study used the light source of a pulse oximeter, and a study have measured the fluid infusion rate using light sources [3]. As far as the authors searched, there were no studies using the pulse oximeter. This study introduces the feasibility of using a pulse oximeter, a device readily available in clinical settings, as an alternative method for measuring infusion rates. The limitations of this study include the use of a specific IIFR product, measurement restrictions to rates above 100 ml/h, and the dependence on specific monitoring and oximeter devices. However, the ability of a pulse oximeter to capture drop rates accurately offers a simple and accessible method for monitoring fluid administration. Thus, this method is advantageous in small clinics or emergency situations that lack electronic infusion devices.

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Received: June 23, 2023; Revised: July 11, 2023 (1st); July 12, 2023 (2nd); Accepted: July 12, 2023

Funding: None.

Conflicts of Interest: No potential conflict of interest relevant to this article was reported.

Author Contributions: Yeiheum Park (Data curation; Investigation; Methodology; Project administration; Writing – original draft); Sungho Moon (Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing – original draft; Writing – review & editing)

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Supplementary Material: Supplementary Video 1. Measurement of drop rate by pulse oximeter.

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Korean J Anesthesiol 2024;77(4):487-488
https://doi.org/10.4097/kja.23489