Correspondence

Letter to the Editor: Using epinephrine in local infiltration analgesia (LIA): focusing on safety reasons

(Re: Chareancholvanich et al., Acta Orthop 2023; 94: 97–101. doi: 10.2340/17453674.2023.8482)

Sir,—we have read with interest the study "Efficacy of epinephrine in local infiltration analgesia on pain relief and opioid consumption following total knee arthroplasty: a randomized controlled trial" by Chareancholvanich et al. (1). We would like to comment on using high doses of local anesthetics and the risks associated with their systemic absorption.

The use of adjuvants such as epinephrine in association with local anesthetics can pursue several effects: enhancing their analgesic effect, increasing the duration of that effect, or decreasing unwanted effects, such as local anesthetic systemic toxicity (LAST). With this objective in mind, the authors evaluate the effect of adding epinephrine to the local infiltration analgesia (LIA) solution, assessing the impact of this addition on pain and morphine consumption during the first 48 hours postoperatively.

The results showed that adding epinephrine at a concentration of 6 µg/mL did not significantly affect the quality or duration of analgesia obtained in the experimental group. The authors, therefore, conclude that using epinephrine may be unnecessary for LIA in cases of primary TKA.

We agree with the authors that the results do not support the use of epinephrine to increase or prolong the analgesic effect of bupivacaine on LIA. However, it seems relevant to indicate that using potent local anesthetics, such as bupivacaine, carries the potential risk of cardiotoxicity. As the authors suggest, it is a risk that is greater when using solutions with racemic bupivacaine, compared with other drugs such as ropivacaine or levobupivacaine, particularly in techniques in which the doses of local anesthetics administered are high, as in LIA or interfascial blocks (transversus abdominis plane blocks and erector spinae plane blocks, among others).

To our knowledge, no study has evaluated bupivacaine absorption used in LIA for TKA. However, studies on ropivacaine report that 400 mg in 200 mL results in a mean peak total ropivacaine concentration of 0.76 (0.023–1.2) µg/mL (2), while LIA solution of 150 mL ropivacaine 0.2% (300 mg) with epinephrine 5 µg/mL results in a median peak concentration of 0.57 µg/mL (0.42–0.83 µg/mL) (3). Although the results are not directly comparable, it suggests that the use of epinephrine could diminish interpatient absorption variation.

To the best of our knowledge, no direct comparison of local anesthetic with or without epinephrine in LIA has been done. Its impact on other forms of administration, for example, in the interfascial blocks, suggests that epinephrine use can significantly decrease the plasma concentration of local anesthetics (4), decreasing the risk of LAST, particularly in elderly and frail patients, such as those frequently scheduled for knee or hip arthroplasties. This has been discussed before by Breivik (5), and the occurrence of LAST has already been reported.

In summary, although epinephrine at concentrations of 2–6 µg/mL does not seem to affect the quality or duration of analgesia of LIA, it seems prudent not to discard its use until more information is available regarding its effect on the systemic absorption of local anesthetics and, eventually, on the risk of developing LAST.

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1. **Chareancholvanich K, Tantithawornwat S, Ruangsomboon P, Narkbunnam R, Chatmaitri S, Pornrattanamaneewong C.** Efficacy of epinephrine in local infiltration analgesia on pain relief and opioid consumption following total knee arthroplasty: a randomized controlled trial. Acta Orthop 2023; 94: 97-101. doi: 10.2340/17453674.2023.8482.
2. **Gromov K, Grassin-Delyle S, Foss N B, Pedersen L M, Nielsen C S, Lamy E, et al.** Population pharmacokinetics of ropivacaine used for local infiltration anaesthesia during primary total unilateral and simultaneous bilateral knee arthroplasty. Brit J Anaesth 2021; 126(4): 872-80. doi: 10.1016/j.bja.2020.11.038.
3. **Miller R J, Cameron A J, Dimech J, Orec R J, Lightfoot N J.** Plasma ropivacaine concentrations following local infiltration analgesia in total knee arthroplasty. Region Anesth Pain Med 2018; 43(4): 347-51. doi: 10.1097/AAP.0000000000000727.
4. **Corvetto M A, Echevarría G C, Fuente N D L, Mosqueira L, Solari S, Altermatt F R.** Comparison of plasma concentrations of levobupivacaine with and without epinephrine for transversus abdominis plane block. Region Anesth Pain Med 2012; 37(6): 633-7. doi: 10.1097/AAP.0b013e31826c330a.
5. **Breivik H.** Local infiltration analgesia (LIA), risk of local anaesthetic systemic toxicity (LAST) and kidney failure from NSAID in elderly patients. Scand J Pain 2016; 13(1): 132-3. doi: 10.1016/j.sjpain.2016.09.004.

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