

Local infiltration anesthesia: does it really work?

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Postoperative pain control after major surgeries such as total hip arthroplasty (THA) is so important because leads to an increased mobilization, decreased opioids consumption and hospital stay, all of which are the major concerns after THA surgery. Perioperative local infiltration anesthesia (LIA) is one of the recent techniques for achieving these purposes (1-3). LIA to the operation site is a simple way and have demonstrated great impacts on abdominal, thoracic, and plastic surgical setting. Actually, it is a widely used analgesic technique in recent years. In this technique, a solution including long-acting local anesthetic combined with opioids, non-steroidal anti-inflammatory drug (NSAID) or steroids are used (3,4). It can be done anytime related to surgery and preemptive usage of this modality is encouraged as well. In one study conducted by Ong *et al.* (5), it was indicated that preemptive LIA improved analgesic consumption and time to first pain relieving request, but it did not result in any decrease in postoperative pain scores. However, it has been shown that patients who received infiltration with local anesthetics experience lower pain scores as well as lower analgesic requirement. The effects of LIA could differ according to the type of surgical procedures, type and dosage of the used local anesthetic, adding adjuvants to local anesthetic, injection only into incision site or the whole wound, flap or joint and the use of intraarticular catheters for postoperative infusion. Shin *et al.* showed that preoperative bilateral superficial cervical plexus block and ropivacaine wound infiltration were more effective for reducing pain scores than ropivacaine wound infiltration alone in patients undergoing robotic thyroidectomy, which shows the efficacy of performing multiple injections for pain control (6).

In 2008, LIA technique is first described by Kerr and

Kohan to improve mobilization after THA and reduce pain and opioids consumption (7). The results of this study revealed that adding ketorolac to the ropivacaine and epinephrine via LIA technique decreased the postoperative pain score and opioids consumption; the addition of epinephrine helps to reduce the toxicity of the local anesthetic by keeping it localized to the area of injection. Hofstad *et al.* in their study have used perioperative LIA with ropivacaine in 116 patients under THA, and found no superiority for LIA regarding analgesic effect after THA compared with multimodal analgesic regimen. They did not report any pain reduction and opioid consumption (1). Interestingly similar controlled study by Dobie MPhil in 2012 on 96 patients showed parallel results. The case group in their study received levobupivacaine with adrenaline. They measured the level of pain and morphine consumption 24 after operation and reported that local anesthesia during THA did not decrease the level of pain, morphine consumption, hospitalization and did not impact on mobilization (8). In harmony with these findings another double-blind controlled trial by Lunn *et al.* in 2011 on 120 patients indicated that infiltration of high volume of ropivacaine did not reduce pain and consumption of oxycodone after THA. Hence, the authors concluded that intraoperative local infiltration analgesia is not effective and they did not recommend it in THA (9). However in contrast to these results three systemic reviews in 2012 by McCarthy *et al.*, in 2014 by Marques *et al.*, and in 2014 by Gupta *et al.* have indicated that the LIA significantly decreased the pain score, analgesic consumption and hospital stay in THA (10-12). On the other hand, several studies have evaluated the efficacy of intraarticular infiltration, both intraoperatively and postoperatively. Badner *et al.* found

that intraarticular injections of bupivacaine and adrenaline at wound closure reduced the postoperative need for opiates in total knee arthroplasty surgery (13). In a study done by Busch *et al.* in 2010 (14), they found that periarticular intraoperative injection with multimodal drugs can reduce postoperative patient-controlled analgesia requirements and pain on activity in patients undergoing THA with no apparent increase in risk. The rate of infection and delayed wound healing in patients with total hip replacement (THR) should be noted. Although if proper aseptic techniques are maintained for insertion and bolus administration the risk of infection can be minimized (11,12,14,15).

It is difficult to interpret these conflicting results in light of the potential relationship between LIA and its impact on pain, opioids consumption and hospital stay. Local anesthetic infiltration can decrease pain levels after THR, with less opioid consumption and a low incidence of vomiting and nausea. This could explain the early mobilization and earlier discharge of patients who received local anesthetic infiltration, irrespective of alternative pain management strategies (3). However, the reason for such a discrepancy might be related to the difference in patient's selection, study design and possibly using different kind of local anesthetics (long- or short-acting local anesthetics) in these studies. For example, ropivacaine has long block duration, a greater margin of safety, and reduced toxic potential compared to bupivacaine. Hofstad *et al.* confirmed the result of previous controlled trial by Lunn *et al.*, but relatively small sample size (in both studies) limit the ability to generalize the results of this study and certainty of its conclusions (9). We recommend to the authors conduct a study with similar methodology and larger sample size to validate findings reported here.

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Footnote

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