



Perineural addition of dexamethasone to 0.5% ropivacaine: a future with less pain in mandibular third molar surgery

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The incessant search for pain control during the operative and, especially, the postoperative periods has been going on for a long time. The use of analgesic and anesthetic substances dates back to ancient Greece. There are reports that Hippocrates (460 BC) used soporific sponges containing analgesic and sedative substances, among other techniques, as a way of mitigating pain from invasive procedures (1). From the point of view of dentistry, the pain generated by surgical dental procedures is a determining factor for the development of dental anxiety, which will directly influence the increase in pain sensation (2). This feedback significantly contributes to a greater difficulty the adherence to dental surgical treatments, constituting a turning point for anesthesiology.

This editorial commentary aims to reflect on the study by Stojanović *et al.* (3), who evaluated ropivacaine combined with dexamethasone as an option to promote greater efficiency in reducing postoperative pain in third molar surgeries. In a randomized, double-blind, clinical trial, the research group investigated the hypothesis that the joint administration of dexamethasone, a steroidal anti-inflammatory, with ropivacaine, a long-acting anesthetic, would provide a significant extension of the duration of anesthesia and the duration of postoperative analgesia, when compared to bupivacaine. The study, very well designed, comprised 3 groups with 15 individuals each. The first group received 0.5% ropivacaine with the addition of 4 mg of dexamethasone, the second received 0.5% ropivacaine

with the addition of 1 mL of sterile 0.9% saline solution, and the third received 0.5% bupivacaine with the addition of 1 mL of sterile 0.9% saline solution.

Ropivacaine is a long-acting amide-type local anesthetic approved by the Food and Drug Administration (FDA) for surgical anesthesia and treatment of acute pain. It has great versatility of use and can be used for extensive nerve blocks to terminal infiltrative blocks. We can mention epidural anesthesia among the procedures that use ropivacaine the most. The mechanism of action of ropivacaine consists of reversible inhibition of sodium ions into nerve fibers, through inhibition of sodium channels, and dose-dependent inhibition of potassium channels. This action prevents the propagation of the nerve stimulus. Its action on nociceptive A, B and C, and AB motor fibers is selective. Because of its lower affinity for lipids, ropivacaine has a low probability of penetrating large myelinated motor fibers. This characteristic makes it stand out in relation to bupivacaine and other local anesthetics, which are generally more lipophilic. Ropivacaine is significantly less cardiotoxic and neurotoxic compared to bupivacaine and it is generally well tolerated (4). The search for an anesthetic that has a prolonged duration in order to delay postoperative pain and that produces low side effects is one of the main objectives of studies on analgesia. Thus, the results presented in the study are quite expressive, especially with regard to the duration of anesthesia and analgesia induced by ropivacaine. These findings justify further studies on this anesthetic base

in dental surgeries.

The use of dexamethasone to decrease pain and other post-surgical side effects such as trismus and edema in third molar removal surgeries has been extensively reported in the literature (5-8). Dexamethasone is a synthetic glucocorticoid with potent anti-inflammatory and immunosuppressive effects (9). The mechanism of action of glucocorticoids and the sites where they act is still unknown. Perineural administration of dexamethasone causes direct inhibition of signal transmission from nociceptive C fibers. In addition, it promotes a decrease in the local effect and induces vasoconstriction, which prolongs the anesthetic effect (10).

Dexamethasone has provided positive effects in minimizing post-surgical adverse effects and reducing pain, edema, and trismus, in surgeries to remove impacted third molars, when compared to placebo (5-8). We can also point out that the possible routes of administration of dexamethasone have also been compared in order to identify which one is more efficient. A clinical trial compared the effect of two routes of dexamethasone administration, local injection and oral use, on pain, edema, and trismus control in third molars surgeries, demonstrating similar efficacy (11). A systematic review on studies that compared the intramuscular and the submucosal routes for the administration of dexamethasone did not find significant differences among the four evaluated studies (12). A recent network meta-analysis evaluated the effectiveness of different routes of administration in reducing the postoperative sequelae of impacted third molar removal and also did not present significant differences among the different ways of using dexamethasone (13).

In this sense, we should draw attention to the technique for the administration of dexamethasone used by Stojanović *et al.* (3). This technique consists of replacing the syringe containing the anesthetic solution with another syringe containing 1 mL of dexamethasone. Importantly, the needle remains positioned at the injection site. This technique requires great skill from the professional as the risk of accidents, such as needle fractures, increases. Since other routes of administration, like the oral route, have provided effective results in the postoperative period of dental surgeries (5-9), it is imperative that more studies be carried out to evaluate ropivacaine and the different routes of administration of dexamethasone.

Expanding the possibilities of anesthetic bases for dental use is an important step towards mitigating the traumatic effects of dental surgeries, as well as minimizing possible complications related to these drugs. As demonstrated

by Stojanović *et al.* (3), ropivacaine is an anesthetic base that has important characteristics that can lead to the dissemination of its use in dental surgeries. Moreover, the use of dexamethasone contributes even more to a post-operative period with few complications, promoting more comfort to the patient. We should also mention the probable decrease in the postoperative use of analgesics, in addition to an improvement in the quality of life of those who need to undergo the removal of impacted third molars.

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