Medicina Universitaria. 2016;xxx(xx):xxx–xxx

MEDICINA UNIVERSITARIA

www.elsevier.es/rmuanl

ORIGINAL ARTICLE

Local anesthesia and sedation vs. spinal anesthesia for knee arthroscopy

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Received 17 February 2016; accepted 8 June 2016

KEYWORDS
Arthroscopy;
Knee;
Local anesthesia;
Spinal anesthesia

Abstract
Objective: To evaluate the efficacy of local anesthesia and diagnostic or therapeutic Arthroscopy procedures and compare them with spinal anesthesia.
Material and methods: We conducted a longitudinal, prospective, non-blind and analyst comparative clinical trial with two groups of 54 patients, aged 18–65 years. In the group assigned to local anesthesia and sedation, fentanyl, midazolam and propofol infusions were administered at the beginning of the surgery, the surgeon infiltrated ports and articular cavities with lidocaine and bupivacaine to provide postoperative analgesia. In the spinal anesthesia group, 7.5 mg of simple bupivacaine was injected into the cerebro-spinal fluid (CSF). Clinical indicators were evaluated and were contrasted using inferential statistics.
Results: There was a significant difference in the following variables: time from the patient's entry to the beginning of the surgery (Local 39.19 min SBA 55. 56 min,), the group treated with SBA showing a statistically greater value ($p < 0.01$), and length of stay in the recovery area (Local 102.33 min SBA 143 min), with the SBA group having the longest time ($p < 0.01$).
Conclusions: Values were observed to be significantly lower in the time from the anesthetic procedure until the beginning of the surgery and the time of discharge from the recovery in the group treated with local anesthesia and sedation technique, with a maximum value of EVA 3. In conclusion, this technique is a good choice for this type of procedure, having a lesser total duration for the procedure and recovery.

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http://dx.doi.org/10.1016/j.rmu.2016.06.004

Please cite this article in press as: Díaz-Osuna V, et al. Local anesthesia and sedation vs. spinal anesthesia for knee arthroscopy. Medicina Universitaria. 2016. http://dx.doi.org/10.1016/j.rmu.2016.06.004

Introduction

Joints are innerved structures which transmit proprioceptive and nociceptive information, the main afferent pathways are A-delta fibers,which conduct nociceptive impulses, and group C nerve fibers which are slow-conduction nervous fibers, slower than group-A fibers. The receptors react to mechanical and surgical stimuli[1]; the synovial membrane is highly vascularized externally; in some places capillaries are deep and innervation scarce. Small diameter nerve fibers have been identified, and implicated mechanoreceptors have been described, important for the transmission of articular pain, with large diameter afferents and fast conduction. These afferent pathways are called silenced nociceptors, the cartilage is not innerved, the capsule has free Ruffini-type nerve endings and ligament innervation is through myelinated fibers, therefore the effect of anesthetics is direct, thus requiring small doses.[2]

The development of less invasive surgical techniques such as arthroscopy, and the improvement of postoperative analgesic control through local anesthetic techniques, have helped patients to reduce their hospital stay, along with the implementation of outpatient surgery and short hospital stay programs, which avoid unnecessary expenses.[3] Intra-articular local anesthesia of the knee is a simple, safe technique well accepted by patients. It is linked to a low morbidity, reducing analgesic intake as well as reducing hospital stay, and thus a reduction in costs. Moreno-Regidor et al.[3] conducted a study with 56 patients using local anesthesia and sedation. Their reports showed that it was necessary to reinforce the pain analgesics in portals or during knee valgus/varus stress maneuvers in 6 patients.

Subarachnoid spinal blocks and epidurals are the most commonly used methods in arthroscopic surgery for the knee. These techniques provide a sensation and motor block for the lower limb. Amongst the advantages of regional or general anesthesia are a greater convenience for the surgeon and greater analgesic levels; on the other hand, the disadvantages are linked fundamentally with risks for the patient and discomfort during recovery,[4] i.e. low-back pain, urinary retention, and post-puncture headaches. These complications are not frequent, however, one must keep in mind the fact that there is a valid alternative: intra-articular local anesthesia.[4]

The use of local anesthesia and sedation compares favorably with other techniques: surgery time is not increased, the recovery time is significantly shortened and there is a high degree of satisfaction among patients using this technique.[5]

The first Biopsy procedures using local anesthetics spread in the late 1960s. Mc Ginty and Matza developed an intra-articular knee anesthesia by adding bupivacaine to the washing fluid[5]; the first report by Williams using local anesthesia for a knee arthroscopy was in 1970, since then its use has increased and has been reported as effective.[6]

Local anesthesia for arthroscopic knee surgery is a well-documented procedure that offers many advantages over other types of anesthesia, there are only minor hemodynamic effects,[7] it requires less surgical and recovery time, it shows good postoperative analgesia, a faster return to work or sports, less time needed for rehabilitation, is inexpensive and the results obtained are similar to other types of anesthesia. However, arthroscopic knee surgery is continuing to be performed more frequently with general or spinal block anesthesia. Previous reports such as that of Williams, et al. on the use of local anesthesia in knee arthroscopies, have emphasized the safety of this method and the low serum level of local anesthetics found during and after the procedure.[8]

A study by Moreno-Regidor[3] concluded that although local anesthesia for the intra-articular knee is not the preferred treatment, it is a simple, safe technique, well accepted by patients, associated with low morbidity and increased time before the patient requests the first analgesic, reducing their consumption, and also reducing hospital stay and therefore lowering costs. That is why it is extremely interesting to contrast the use of spinal anesthesia (the widely-used technique) and local anesthesia, to determine their similarities and differences, in order to give the patient the best option.

Materials and methods

A comparative clinical, longitudinal, prospective and non-blind trial was conducted with 54 patients, randomly chosen, probabilistically simple and divided equally into two groups of 27 patients at the Department of Anesthesiology in the University Hospital ''Dr. José Eleuterio González''. The patients were aged 18–65 years, with anesthetic risk ASA I or II, and scheduled for intra-articular treatment (diagnostic or therapeutic arthroscopy including procedures such as meniscectomy or meniscal repair, joint lavage and osteochondral lesions). The patients agreed to participate willingly (expressing their will by signing the informed consent), and we had the approval of the Institution's Ethics Committee.

We excluded patients allergic to amide-type local anesthetics (lidocaine, bupivacaine and ropivacaine), patients with combined treatments (such as arthroscopic debridement and osteotomy), or the presence of any acute inflammatory condition such as swelling, severe pain, synovitis and/or sepsis.

In the preoperative period, patients were dosed with 50 mg of ranitidine intravenously (IV), metoclopramide 10 mg (IV), midazolam 0.04 mg/kg (IV), and a single dose of crystalloid at 10 mL/kg. After the pre-anesthetic medication, patients were taken to the operating room where they were placed supine, underwent type 1 monitoring (electrocardiography, pulse oximetry and noninvasive blood pressure), were administered oxygen at 4–5 L/min via face mask without a reservoir, and initial vital signs were recorded.

For the patients randomly assigned to local anesthesia and sedation, 100 mcg of fentanyl was also administered and a propofol infusion was started at 1 mg/kg (IV) for pervasiveness, and 0.01–0.05 mg/kg/min (IV) of sodium chloride at 0.9% (200 mg in a 250 mL solution) for maintenance before port infiltration. At the start of the surgical procedure, the surgeon (the teacher assigned for the arthroscopic knee operation) infiltrated the two ports with 6 cc of lidocaine, and subsequently infiltrated the joint cavity with 20 cc of simple lidocaine at 2%. Before starting the surgical procedure, the two ports were infiltrated with 6 mL of bupivacaine

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