ORIGINAL RESEARCH PAPER

Volume - 10 | Issue - 06 | June - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A COMPARATIVE STUDY OF INTRA-ARTICULAR LEVO-BUPIVACAINE WITH CLONIDINE AND ROPIVACAINE WITH CLONIDINE FOR POST-OPERATIVE ANALGESIA IN PATIENTS UNDERGOING KNEE ARTHROSCOPIC SURGERY UNDER SPINAL ANAESTHESIA.

Anaesthesiology

Sukesh Kumar Assistant Professor, Department of Anaesthesiology, PMCH, Patna

Vishal Vaibhaw* Assistant Professor, Department of Anaesthesiology, PMCH, Patna.*Corresponding Author

Rajesh Verma Associate Professor, Department of Anaesthesiology, PMCH, Patna

ABSTRACT

To compare the efficacy intra-articular administration of levobupivacaine and clonidine was compared with ropivacaine and clonidine in knee joint arthroscopic surgery under spinal anesthesia. **METHOD:** 90 patients, aged between 15 to 55 years patients were randomized into two equal groups (n = 45) . Patients in Group A received 10 ml of 0.50% levobupivacaine and 1 mcg/kg clonidine and Group B received 10 ml of 0.75% ropivacaine and 1 mcg/kg of clonidine through intra-articular route at the end of the procedure. In the post-operative period, pain intensity was assessed by VAS (Visual Analogue Scale) Score recorded at 1st, 5th, 8th, 12th, 18th post-operative hours. Duration of analgesia, total rescue analgesic dose in first 18 hours and any side effects were also recorded. **RESULT:** Group A experienced significantly longer duration of effective postoperative analgesia and lesser rescue analgesic compared to group B. No side effects were observed among the groups. **CONCLUSION:** Intra-articular administration of levobupivacaine and clonidine give better post-operative pain relief by increasing duration of analgesia, and decreasing need of rescue analgesic compared to intra-articular ropivacaine and clonidine.

KEYWORDS

Intra-articular administration, levobupivacaine,

Arthroscopy (also called arthroscopic or keyhole surgery) is a minimally invasive surgical procedure on a joint in which an examination and sometimes treatment of damage is performed using an arthroscope, an endoscope that is inserted into the joint through a small incision. Arthroscopic procedures can be performed during ACL reconstruction.

The advantage over traditional open surgery is that the joint does not have to be opened up fully. For knee arthroscopy only two small incisions are made, one for the arthroscope and one for the surgical instruments to be used in the knee cavity. This reduces recovery time and may increase the rate of success due to less trauma to the connective tissue. It has gained popularity due to evidence of faster recovery times with less scarring, because of the smaller incisions.[1] Irrigation fluid (most commonly 'normal' saline) is used to distend the joint and make a surgical space.

The surgical instruments are smaller than traditional instruments. Surgeons view the joint area on a video monitor, and can diagnose and repair torn joint tissue, such as ligaments. It is technically possible to do an arthroscopic examination of almost every joint, but is most commonly used for the knee, shoulder, elbow, wrist, ankle, foot, and hip.

Knee arthroscopy, or arthroscopic knee surgery, is a surgery that uses arthroscopic techniques.

It has, in many cases, replaced the classic open surgery (arthrotomy) that was performed in the past. Arthroscopic knee surgery is one of the most common orthopaedic procedures, performed approximately 2 million times worldwide each year.[2] The procedures are more commonly performed to treat meniscus injury and to perform anterior cruciate ligament reconstruction.[3]

While knee arthroscopy is commonly used for partial meniscectomy (trimming a torn meniscus) on middle aged to older adults with knee pain, the claimed positive results seem to lack scientific evidence.[4] Many studies have shown the outcomes from knee arthroscopic surgery for osteoarthritis and degenerative meniscal tears are no better than the outcomes from placebo (fake) surgery or other treatments (such as exercise therapy).[5][6][7][8][9][10]

During an average knee arthroscopy, a small fiberoptic camera (the arthroscope) is inserted into the joint through a small incision, about 4 mm (1/8 inch) width. More incisions might be performed in order to visually check other parts of the knee and to insert the miniature instruments that are used to perform surgical procedures.

MATERIALS AND METHODS

Ninety patients between 18–75 years of age undergoing arthroscopic knee surgery were included in this prospective, randomized, double-blind study. We excluded patients taking NSAIDs, those with peptic ulcer disease, hemorrhagic diathesis or clotting dysfunction, allergy to local anesthetics and those who were pregnant, lactating or who declined to participate. All patients signed informed consent forms. This study was conducted in the orthopedic operation theater of Patna Medical College and Hospital, Patna, for 6 months. All patients were clinically examined in the preoperative period, when whole procedure was explained. . All patients were clinically examined in the preoperative period, when whole procedure was explained.

Patients in Group A received 10 ml of 0.50% levobupivacaine and 1 mcg/kg clonidine, and Group B received 10 ml of 0.75% ropivacaine and 1 mcg/kg of clonidine. The anesthetic technique was standardized for all patients. Lumbar puncture was done in a sitting position at L3 and L4 intervertebral space in midline approach with 26-gauge spinal needles. 2.5 ml of 0.5% (12.5 mg) hyperbaric bupivacaine was given in the subarachnoid space and then the patient were placed in supine position immediately. After 5 min of subarachnoid injection confi rming the sensory blockade (T10) arthroscopic procedure was allowed to start. At the end of the surgery before the skin closure, study drug was administered through the port site in the intra-articular space by the surgeon. Intraoperative assessment of NIBP, SPO2, Pulse, and Heart Rate were recorded immediately after anesthesia and thereafter at every 3 min interval. The intensity of pain was assessed by VAS score in immediate postoperative period and thereafter at 1 h and 5th, 7th, 12th, and 18th intraoperative postoperative period which was explained to the patients preoperatively. All data were collected by an observer who was unaware of patients' group assignment. Statistical analysis was done and $P < 0.05$ was considered to be significant.

RESULTS

There were no signifi cant differences between the two groups with regard to demographic data such as age, sex, weight, and height [Table 1]. Time for the request of first postoperative rescue analgesia in Group A was shorter compared to Group B ($P < 0.05$) . Total amount of rescue analgesia requirement in first 19 h in the postoperative period was also signifi cantly less in Group A (126.74 ± 33.51) mg compared to Group B (154.10 ± 32.82)mg ($P < 0.05$) . The VAS score was 0 in all the groups at a 1st postoperative hour. Compared with Group A, Group B had higher mean VAS score at 5th, and 12th postoperative hours [Table 1]. Mean blood pressure variation was not significant in between the two groups in the postoperative period [Figure 1]. No incidence of adverse effects such as nausea, vomiting, urinary retention, itching, or sedation was observed in anyone in the study population.

Table 1: Comparison of demographic data between the two study groups

Parameters	Group A Levobupivacaine and Clonidine (n 45)	Group B Ropivacaine and Clonidine(n=45)

Age (Years)	35.21+/- 10.27	36.17+/-9.74
Sex(M/F)	33:14	33:12
Height(cm)	167.50+/-9.70	163.65+/-9.24
Weight(Kg)	68.63+/-8.77	60.97+/-11.6
ASA Physical Status(I/II)	25.19	35.9

Table 2: The comparison of visual analog scale score at 1st, 5th, 8th, 12th, and 18th postoperative hours

Parameter	Levobupivacaine and clonidine Group A	Ropivacaine and Clonidine Group B
VAS Score at 1 h	0 (0-0)	0 (0-0)
VAS Score at 5 h	1(1-2)	1(1-2)
VAS Score at 8 h	2 (1-2)	2 (1-2)
VAS Score at 12 h	3(2-3)	3(2-3)
VAS Score at 18 H	5 (4-5)	5 (4-5)

DISCUSSION

The factors affecting the amount of post-operative pain experienced by patients after arthroscopic knee surgery and the quality of intra-articular analgesia include pre-operative pain levels, mode of anesthesia, surgical technique, duration of surgery and the volume and choice of intra-articular drugs [8]. We avoided potential bias by using spinal anesthesia for all participants, the same volume of intra-articular drugs and the same surgeon and surgical procedure, with the result that there was no significant difference in operation times between the groups.

Levobupivacaine is a long acting local anesthetic agent. The S-enantiomer of bupivacaine is comparatively newer local anesthetic introduced into clinical practice with less cardiac and neural toxicity but similar potency to bupivacaine. Levobupivacaine is generally as eff ective as bupivacaine for management of postoperative pain especially when combined with clonidine, morphine of fentanyl. The tolerability profiles of levobupivacaine and bupivacaine is very similar in clinical trials. No clinically signifi cant ECG abnormalities or serious central nervous system events occur with the dose used.[11] Intra-articular administration of levobupivacaine is safe for postoperative pain relief as stated by diff erent studies.[11] Ropivacaine is a new aminoamide local anesthetic. It is prepared as the pure S-enantiomer and it blocks the peripheral afferents acting on voltage dependent Na channels. It blocks nerve fibers involved in pain transmission to a greater degree than those controlling motor functions .[11] It is less cardiac and neurotoxic than other long acting local anesthetics like bupivacaine. Intra-articular administration of ropivacaine is safe. Samoladas et al. found that intraarticular ropivacaine is eff ective to reduce postoperative pain minimizing the use of systemic analgesia.[11] Clonidine, is an imidazoline derivative with predominantly alpha two adrenergic agonist activities, is being extensively evaluated as an adjuvant to intrathecal local anesthetics and has proven to be a potent analgesic free of opioid related side eff ects. It is known to increase both sensory and motor blockade of local anesthetics without any clinical significant side effects. The overall effect is to decrease sympathetic activity, enhance parasympathetic tone, and reduce circulating catecholamines. Intra-articular clonidine has been used in lower doses (1-2 mcg/kg) to reduce postoperative pain and supplemental analgesic consumption for arthroscopic knee surgery[10] and has been utilized extensively in several ambulatory centers. Clonidine has also been added to local anesthetic drugs IA to reduce postoperative pain following arthroscopic knee surgery.[5] Clonidine prolongs the duration of local anesthetics. The IA administration of clonidine (1-2 mcg/kg) has been shown to decrease postoperative pain because clonidine can enhance peripheral nerve block when added to local anesthetics. Reuben SS showed that clonidine, when administered along with bupivacaine via the IA route, results in a significant improvement in analgesia. There was an increased time to first analgesic request and a decreased need for postoperative analgesics.[11] Hence, we used local anesthetics with clonidine in 1 mcg/kg for intra-articular administration in our study to observe the effectiveness of the drug in lowest possible dose to avoid any side effects if any. In our study, time for the request of first postoperative rescue analgesia in Group A was shorter compared to Group B and the results were clinically, as well as statistically significant ($P < 0.05$). Rosen et al. found that intra-articular ropivacaine had not produced any signifi cant change in VAS score and narcotic usage when compared with placebo.[11] Here, we found that levobupivacaine produced prolonged analgesia than ropivacaine when used by intra-articular route. Total amount of mean rescue analgesia requirement in first 18 h in the postoperative period was significantly less in Group A compared to Group B . It is supported by the study by Das et al. [5] who found that intra-articular levobupivacaine increases the duration of analgesia and decreases the need for rescue analgesic in fi rst postoperative 24 h.[5] Compared with Group A, Group B had higher mean VAS score at 5th, 12th postoperative hours which were also supported by the study of Kazak Bengisun et al. who found that use of levobupivacaine and bupivacaine IA produced lesser rescue analgesic consumption, lower VAS score, shorter hospital stay, and higher patient satisfaction score while compared with placebo[8]which conforms to our study.

CONCLUSION:

Intra-articular levobupivacaine and clonidine increase the duration of analgesia decrease the need for rescue analgesic for the patients undergoing arthroscopic knee surgery under spinal anesthesia. So analgesic efficacy of intra-articular levobupivacaine and clonidine is superior to that of intra-articular ropivacaine and clonidine in reducing pain in day care arthroscopic procedure.

REFERENCES

1. Dye SF, Vaupel GL, Dye CC. Conscious neuros ensory mapping of the internal structures of the human knee without intraarticular anesthesia. Am J Sports Med 2018;26:773-7.
2. Fortier J, Chung F, Su J. Predictive factors of unanticipated admission in ambulatory surgery: A prospective study. Anesthesiology 2016;85:A27.
3. Aasbø V, Raeder JC, Grøgaard B, Røise O. No additional analgesic effect of intra-articular morphine or bupivacaine compared with placebo after elective knee arthroscopy. Acta Anaesthesiol Scand 2016;40:585-8.
4. Marquardt HM, Razis PA. Prepacked take-home analgesia for day case surgery. Br J Nurs 2016;5:1114-8.
5. Das A, Majumdar S, Kundu R, Mitra T, Mukherjee A, Hajra BK, et al. Pain relief in day care arthroscopic knee surgery: A comparison between intra-articular ropivacaine and levobupivacaine: A prospective, double-blinded, randomized controlled study. Saudi J Anaesth 2014;8:368-73.
6. Dahl MR, Dasta JF, Zuelzer W, McSweeney TD. Lidocaine local anesthesia for arthroscopic knee surgery. Anesth Analg 2000;71:670-4.
7. Eriksson E, Häggmark T, Saartok T, Sebik A, Ortengren B. Knee arthroscopy with local anesthesia in ambulatory patients. Methods, results and patient compliance. Orthopedics 2016;9:186-8.
8. Chirwa SS, MacLeod BA, Day B. Intraarticular bupivacaine (Marcaine) after arthroscopic meniscectomy: A randomized double-blind controlled study. Arthroscopy 2019;5:33-5.
9. Gaumann DM, Brunet PC, Jirounek P. Clonidine enhances the effects of lidocaine on C-fi ber action potential. Anesth Analg 2012;74:719-25.
10. Gentili M, Juhel A, Bonnet F. Peripheral analgesic effect of intra-articular clonidine. Pain 2016;64:593-6.
11. Alagol A, Calpur OU, Usar PS. Intra-articular analgesia after arthroscopic knee surgery. Comparison of neostigmine, clonidine, tenoxicam, morphine and bupivacaine. Knee Surgery, Sports Traumatology. Arthroscopy 2020;13:658-63.