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"COMPARISON OF POST OPERATIVE ANALGESIC EFFECT OF INTRA-ARTICULAR BUPIVACAINE AND ROPIVACAINE IN DAY CARE ARTHROSCOPIC KNEE SURGERY."

Anaesthesiology

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ABSTRACT

Purpose: Intra-articular administration of local anesthetic drugs provides analgesia after arthroscopic knee surgery. Study was comparison of the analgesic effect of intraarticular injection of ropivacaine and bupivacaine in patients undergoing arthroscopic surgery. **Type of Study:** Double-blind, randomized prospective clinical study. **Methods:** The study included patients scheduled for knee meniscus repair under arthroscopy divided into 2 groups to receive, intra-articularly, 30 mL of bupivacaine 0.5%(150mg), or ropivacaine 0.75%(225) solutions at the end of surgery. Postoperatively, pain was measured using a visual analog scale (VAS). Paracetamol was given when patients complained of pain. **Results:** VAS scores were higher in the bupivacaine group compared with the ropivacaine group. Duration of postoperative analgesia and paracetamol administration was shorter in the bupivacaine group compared with the ropivacaine group. Paracetamol consumption was significantly lower ($P < .004$) during the first 24 hours in the ropivacaine group (4.00 ± 1.37) than in the bupivacaine groups (6.89 ± 1.711) **Conclusions**: This study documents that intra-articular ropivacaine 0.75% provides better analgesia than bupivacaine 0.5% after knee arthroscopic surgery.

KEYWORDS

Ropivacaine, Bupivacaine, Intra-articular administration, Arthroscopic knee Surgery.

INTRODUCTION

Intra-articular administration of local anesthetic solutions is used to provide analgesia after knee arthroscopy and arthroscopic surgery. Bupivacaine is the local anesthetic agent most commonly administered in this setting. However, after intra-articular bupivacaine administration, the duration of analgesia is limited to A few hours. Increasing the dose of bupivacaine could increase the duration of analgesia but the amount of bupivacaine that can be administered is also limited to 150 mg (approximately 2 mg/kg) because of the risk of systemic toxicity.[2,3] Indeed, clinical symptoms of toxicity have been occasionally reported in patients having received bupivacaine 150 mg or even less.

Ropivacaine has A lower toxicity than bupivacaine and consequently A higher dose of ropivacaine can be administered to patients, especially when performing infiltrations.[4,5] Ropivacaine doses up to 200 mg or even higher have been administered without any toxic symptoms.[4,5]

In addition, ropivacaine induces A local vasoconstriction that may impair plasma absorption and prolong the local anesthetic effect .[6] thus, ropivacaine could be A valuable substitute for bupivacaine for intra-articular administration. We thus compared bupivacaine 0.5% (150 mg) and ropivacaine 0.75% (225 mg) to evaluate if there was any clinical benefit in the intra-articular administration of highly concentrated ropivacaine solutions.

AIMS

The purpose of this clinical investigation is to compare the Postoperative analgesia of bupivacaine (0.5%) 150mg with ropivacaine (0.75%) 225mg given by intraarticular route at the end of arthroscopic knee surgery

OBJECTIVES

Primary objective:
To compare postoperative analgesia between bupivacaine and ropivacaine.

Secondary objective:
To compare the total amount of analgesic need for 24 hours .

METHODOLOGY

Study Type :- A Randomized Prospective Study

Sample Size:
36 Patient will be distributed randomly in following groups, In each patient study drug injected intra articularly at the end of the surgery.

Group B [18 patients]: 30 ml of 0.5% Bupivacaine(150mg).

Group R [18 patients]: 30 ml of 0.75% Ropivacaine(225mg).

Inclusion Criteria:-
1. Physical status :ASA grade I, II
2. Age: 18 to 75 years
3. Sex: Male or Female
4. Elective knee arthroscopic surgeries

Exclusion Criteria:
1. Patient's refusal.
2. ASA grade III OR IV.
3. Emergency surgeries.
4. Conversion from arthroscopy to open surgery.
5. History of allergy to Local anesthetic drugs.

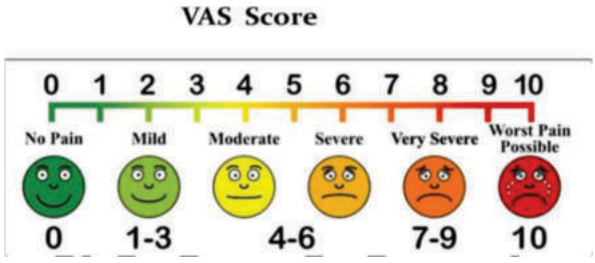
Thirty six patients (healthy patients or patients with mild systemic disease without limitation of daily activity) scheduled for arthroscopy of the knee under general anesthesia, were included in this prospective, randomized clinical study after informed consent .

On the morning of the surgical procedure, patients were allocated randomly into two groups of 18 patients each. General anesthesia used fentanyl, propofol and sevoflurane.

At the end of the procedure, 30 mL of either bupivacaine 0.5% (150 mg) or ropivacaine 0.75% (225 mg) inject intraarticularly were prepared by the anesthetist in charge of the patient and given blindly. The tourniquet was released 5 minutes after the intra-articular injection.

Pain was assessed by patients blinded to the intra-articular injection on a visual analog scale (VAS) graded from 0 (no pain) to 10 (maximum pain).

Measurements were performed 15 minutes after the intra-articular injection and at 2, 6, and 24 hours. When patients complained of pain and had a VAS score higher than 4 , they received 2 g of intravenous propacetamol as a rescue medication



Statistical Analysis:
Statistical analysis done with unpaired T test and chi square test ,Data are expressed as mean ± standard deviation (SD) when appropriate.

RESULTS

Chart-1 Gender Distribution

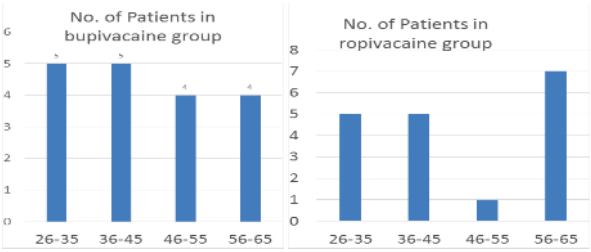


Chart-2 Age Distribution

Thirty six patients were included in the study. They all underwent knee arthroscopic surgery. The two groups were comparable for demographics, fentanyl dose, and duration of the surgical procedure. Anesthesia and surgery lasted less than 45 minutes in all cases. VAS scores were significantly different between the 2 study groups during the first 24 hours. VAS scores were higher in the bupivacaine.

Table -1 VAS Score

VAS SCORE				
	15 MIN	2HR	6HR	24HR
ROPIVACAINE	0.5 ± 0.51	4.22 ± 0.64	3.11± 0.323	4.11± 0.83
BUPIVACAINE	1.33± 0.48	5.56± 0.705	3.83±0.51	4.72± 0.75

The Study documented that a more rapid propacetamol rescue in the bupivacaine group compared with the ropivacaine group. Propacetamol consumption was significantly lower ($P < .004$) during the first 24 hours in the ropivacaine group (4.00 ± 1.37) than in the bupivacaine groups (6.89 ± 1.711). No patient experienced symptoms of local anesthetic toxicity.

DISCUSSION

This study shows that intra-articular ropivacaine reduces pain and delays rescue analgesic administration for 24 hours after knee arthroscopy.

In 1999, **eMoiniche et al**.[1] systematically reviewed 19 studies that compared intra-articular 0.25% to 0.5% bupivacaine with intra-articular saline or no treatment. 9 studies showed significantly lower VAS scores from 1 to 4 hours after arthroscopy whereas 9 did not document any significant difference in VAS scores during this period of time.

In 7 studies, VAS scores were greater than 40 mm . Only 3 of the 10 studies with VAS scores less than 40 mm in the control group showed that intra-articular bupivacaine improved pain relief. Thus, the assessment of the efficacy of intra-articular bupivacaine depends on the immediate postoperative pain scores. low pain scores prevented showing any benefit from intra-articular bupivacaine. Postoperative pain scores may depend on the surgical procedure and on the anesthetic agents used for surgery. Most of the studies included patients scheduled for arthroscopy or meniscus repair that could be considered equally and mildly painful, at least at rest.

In the current study, patients received a higher dose of ropivacaine than bupivacaine, based on a lower toxic effect. In a previous study, **Convery et al**. [7]documented lower verbal rating pain scores with ropivacaine 150 mg compared with bupivacaine 100 mg, but patients were asked to score overall pain during 24 hours. On the other hand, in the same study, pain scores were comparable in patients receiving bupivacaine 100 mg or ropivacaine 100, 150, or 200 mg during the first 4 postoperative hours, and there was no statistical difference in postoperative rescue analgesic consumption in the 4 groups The effect of intra-articular ropivacaine is thus more likely to be limited to the early postoperative period, as documented in the current study. In agreement, **Rautoma et al**.[8] failed to document differences in pain scores at 8 hours in ambulatory patients given intra-articular ropivacaine 100 mg or saline. Conversely, ropivacaine 75 mg was more effective than morphine 2 mg and saline during the first 4 hours following intra-articular administration. [9]

Because it has been suggested that the delay between intra-articular injection and tourniquet release may interfere with analgesic efficacy,[10] we kept the tourniquet inflated for 5 minutes after intra-articular ropivacaine injection. Thus, bupivacaine and ropivacaine plasma concentrations probably remained low.

CONCLUSION

The use of intra-articular 0.75% ropivacaine (225mg) provides an improvement in postoperative analgesia after knee arthroscopy compared with 0.5% bupivacaine (150mg). Moreover, the safety margin of ropivacaine is better than that of bupivacaine. Because of the larger dose given to patients, immediate postoperative pain control is adequate and its duration of analgesia is longer than bupivacaine.

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