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Dr. Sarita Aggarwal
Department of Anesthesia,
Saraswati Ayurved Hospital
and Medical College,
Chandigarh, India

To determine analgesic efficacy of intra-articular morphine in arthroscopic knee surgeries: A clinical study

Dr. Sarita Aggarwal

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Abstract

Background: The present study was conducted to determine analgesic efficacy of intra-articular morphine in arthroscopic knee surgeries.

Materials & Methods: The present study was conducted on 52 adult patients aged between 20- 60 years with American Society of Anesthesiologists physical status grade I or II scheduled for diagnostic or therapeutic knee arthroscopic surgery under subarachnoid block. Patients were divided into 2 groups. Group I received 20 ml of 0.25% bupivacaine intra-articularly with 1mg of morphine and group II received 3 mg of morphine. Post-operative pain was assessed with 10-point VAS, which was recorded after 1, 2, 6, 12 and 24 h after surgery.

Results: Out of 52 patients, males were 32 and females were 20. VAS at 1 hour in group I was 4.5 and in group II was 3.2, at 2 hours was 4 in group I and 2. In group II, at 6 hours was 3.5 in group I and 1 in group II, at 12 was 2.5 in group I and 0 in group II, at 24 hours was 1.2 in group I and 0 in group II. The difference was significant ($P < 0.05$). Side effects in group I was pruritis seen in 2 and 1 in group II, nausea in 3 and 2 in group I and II respectively, urinary retention in 2 and 1 in group I and II respectively. The difference was significantly ($P < 0.05$).

Conclusion: Authors found that morphine is effective in arthroscopic knee surgeries. With 3mg morphine VASs were found to be less.

Keywords: Arthroscopic knee surgery, Morphine, Subarachnoid block

Introduction

Advances in fiberoptic technology and small joint instrumentation have opened up a new world in the area of arthroscopy. However, indications for small joint arthroscopy in the hand remain poorly understood and underutilized^[1]. This is mainly due to a scarcity of papers utilizing this technique in the literature, as well as scarce hands on training in the technical aspects of small joint arthroscopy. Despite the fact that these small joint arthroscopes have been readily available for decades, hand surgeons have been slow to adopt this to include this methodology within their treatment protocols of both traumatic and degenerative conditions involving small joints^[2]

Arthroscopy of the knee joint is a common procedure that is routinely performed on an out-patient basis. Arthroscopic procedures may cause enough pain and swelling, thus delaying rehabilitation and return to work. Several techniques are available to treat pain following arthroscopic knee surgery. Intra-articular (IA) local anaesthetics are frequently used in perioperative pain management^[3] Bupivacaine, a local anaesthetic, is often utilized because of its extended duration of action. Experimental research indicates that locally administered opioid agonists can also produce analgesic effects by binding with peripheral opioid receptors. IA morphine as an additive to bupivacaine is one of the modalities used for post-operative pain relief for arthroscopic knee surgery^[4]. The present study was conducted to determine analgesic efficacy of intra-articular morphine in arthroscopic knee surgeries.

Materials & Methods

The present study was conducted in the department of Anesthesiology. It comprised of 52 adult patients aged between 20- 60 years with American Society of Anesthesiologists physical status grade I or II scheduled for diagnostic or therapeutic knee arthroscopic surgery under subarachnoid block. All were informed regarding the study. Ethical approval was obtained from institute prior to the study.

General information such as name, age, gender etc. was recorded. All patients were given subarachnoid block with 12.5–15 mg of hyperbaric bupivacaine under aseptic precautions for

Corresponding Author:
Dr. Sarita Aggarwal
Department of Anesthesia,
Saraswati Ayurved Hospital
and Medical College,
Chandigarh, India

the surgery. All the surgeries were performed by two senior orthopaedic surgeons. Patients were divided into 2 groups. Group I received 20 ml of 0.25% bupivacaine intra- articularly with 1mg of morphine and group II received 3 mg of morphine. Post- operative pain was assessed with 10- point VAS, which was recorded after 1, 2, 6, 12 and 24 h after surgery. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I: Distribution of patients

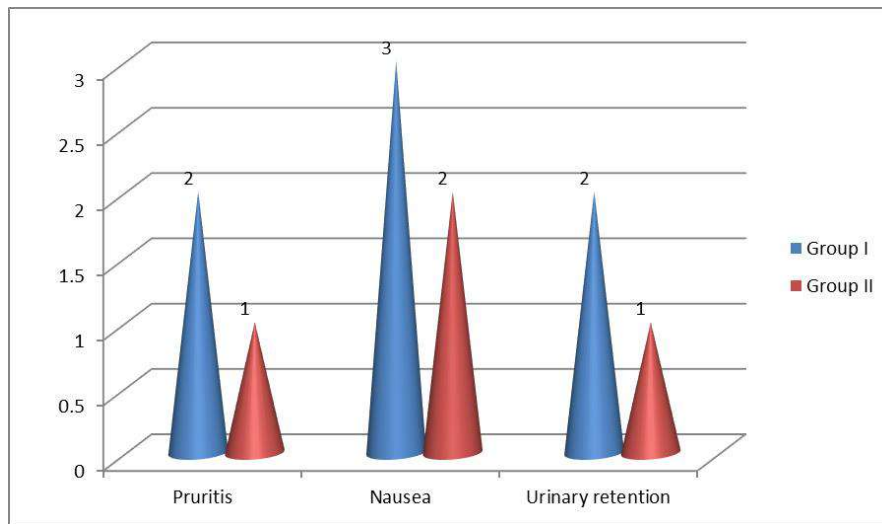
Total- 52		
Groups	Group I (1mg morphine)	Group II (3mg morphine)
Number	32	20

Table I shows that out of 52 patients, males were 32 and females were 20.

Table II: Comparison of VAS in both groups

Time (hours)	Group I	Group II	P value
1	4.5	3.2	0.05
2	4.0	2.0	0.03
6	3.5	1	0.01
12	2.5	0	0.01
24	1.2	0	0.01

Table II shows that VAS at 1 hour in group I was 4.5 and in group II was 3.2, at 2 hours was 4 in group I and 2. In group II, at 6 hours was 3.5 in group I and 1 in group II, at 12 was 2.5 in group I and 0 in group II, at 24 hours was 1.2 in group I and 0 in group II. The difference was significant ($P < 0.05$).



Graph I: Side effects in both groups

Graph I shows that side effects in group I was pruritis seen in 2 and 1 in group II, nausea in 3 and 2 in group I and II respectively, urinary retention in 2 and 1 in group I and II respectively. The difference was significantly ($P < 0.05$).

Discussion

Small joint arthroscopy offers a minimally invasive manner to achieve similar treatment goals and a previously described arthroscopic classification for basal joint osteoarthritis helps direct specific treatment depending on the stage of disease.⁵ Morphine and endogenous opioids (enkephalins, dynorphins, and β -endorphins) stimulate δ -, κ , and μ -opioid receptors. or/and β -endorphins) stimulate sigma, kappa-, and μ -opioid receptors. Activation of all three main receptors has biological effects, which are mediated primarily via central nervous system. After discovery of opioid receptors in peripheral nerve terminals, opioids were administered locally⁶ Antinociceptive and anti-inflammatory effects of morphine have been demonstrated. In chronic arthritis patients, intra-articular morphine injection provides analgesia, which is equivalent to dexamethasone. It is also possible that intraarticular morphine may have some anti-inflammatory actions⁷.

In present study, out of 52 patients, males were 32 and females were 20. We observed that VAS at 1 hour in group I was 4.5 and in group II was 3.2, at 2 hours was 4 in group I

and 2. In group II, at 6 hours was 3.5 in group I and 1 in group II, at 12 was 2.5 in group I and 0 in group II, at 24 hours was 1.2 in group I and 0 in group II. The difference was significant ($P < 0.05$).

Stein *et al.*⁸ were the first to demonstrate a prolonged analgesic effect from the IA administration of morphine in humans in 1991. These receptors are expressed within hours after surgical trauma and are thought to be responsible for afferent sensory input to the central nervous system. Rao *et al.*⁹ conducted a study on sixty adult patients of either sex, aged between 18 and 60 years. All patients underwent surgery under subarachnoid block. After the surgical closure, 20 ml of 0.25% bupivacaine with 1 mg, 3 mg and 5 mg of morphine as additive was injected intra- articularly in Group A, B and C patients, respectively. Post- operative pain assessment was performed with visual analogue scale score in the 1st, 2nd, 6th, 12th and 24th post- operative hour. The common complications were also recorded. There was statistically significant analgesia in Group B and C than Group A in the 1st and 2nd post- operative hour; while at the 24th post- operative hour, Group C had statistically significant analgesia than the other two groups. Time to first rescue analgesia was statistically significantly less and consumption of supplemental analgesia was significantly higher in Group A than the other two groups.

We observed that side effects in group I was pruritis seen in

2 and 1 in group II, nausea in 3 and 2 in group I and II respectively, urinary retention in 2 and 1 in group I and II respectively. Joshi *et al.* [10] conducted randomized, controlled, double-blind study in elective knee arthroplasty patients with morphine (5 mg in 25 ml dilution) in study group and same volume of saline in the control group instilled intra-articularly. Patients in the study group had significantly lower pain scores and required less systemic analgesics than the control group. Plasma profile of morphine and its metabolites showed that they were too low to produce effective analgesia, which suggests that analgesia was mediated by local action within the joint. They also found relation between the times from IA injection to tourniquet release, as longer the time the tourniquet was kept inflated after IA injection, better was the local tissue binding of the drug. The present study was conducted to determine analgesic efficacy of intra-articular morphine in arthroscopic knee surgeries.

Conclusion

Authors found that morphine is effective in arthroscopic knee surgeries. With 3mg morphine VASs were found to be less.

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