

A randomized trial of Intraarticular bupivacaine and bupivacaine with Clonidine for postoperative analgesia after arthroscopic knee surgery

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Abstract

Alpha-2-adrenergic agonists have peripheral analgesic effect; we have assessed the potential analgesic effect of intraarticular clonidine after intraarticular administration in arthroscopic knee surgery. Intraarticular (IA) local anaesthetics are often used for the management and prevention of pain after arthroscopic knee surgery. Clonidine an α_2 agonist prolongs the duration of local anaesthetics. We designed this study to determine whether clonidine added to an IA injection would result in an analgesic benefit. We evaluated 60 patients undergoing arthroscopic knee surgery under spinal anaesthesia. After surgery patients were randomly assigned into two groups. Group B received 20ml of 0.25% bupivacaine IA. Group C received 20ml of 0.25% bupivacaine along with $1\mu\text{g}/\text{kg}$ BW of clonidine. The study revealed a significant difference in analgesia from the IA administration of clonidine. Patients in group C had a significantly decreased need for postoperative analgesia and increased analgesic duration.

Keywords: Intraarticular, Arthroscopy, Clonidine Bupivacaine .postoperative analgesia

1. Introduction

Pain is a symptom that crosses all cultural barriers and encompasses almost all age groups. In handling pain, anesthesiologists have the unique chance to access a largest patient population than any other physician. Postoperative pain may increase length of stay, patient dissatisfaction, and even delay postoperative rehabilitation [3,4].

Knee arthroscopy is a very common orthopaedic procedure and very often performed on an ambulatory basis. In an effort to provide effective, safe and long lasting post arthroscopy analgesia several analgesic agents have been studied.

Lidocaine[1] prilocaine[2] and bupivacaine[3] have all been administered intrarticularly to provide intraoperative local anaesthesia and post operative analgesia. Bupivacaine has often been chosen because of its prolonged duration of action.

Various factors have been recognized as influencing post arthroscopic pain and the effectiveness of IA analgesia. These include preoperative pain scores, duration and type of surgery, use of general or regional anaesthesia, volume of the analgesic agent injected and timing of IA injection. Our study was aimed to evaluate the postoperative analgesic effect of intra articular clonidine along with bupivacaine compared with bupivacaine alone.

2. Methods

Institutional ethical committee approval taken, informed written consent was obtained from the 60 patients scheduled to undergo elective arthroscopic meniscal surgery by a single surgeon. Inclusion criteria included ASA grade I and II patients and age between 20-50 years. Patients on chronic medication relevant drug allergy and contraindication to the use of non-steroidal anti inflammatory drugs were excluded from the study. Patients were randomly allocated into two groups of 30 each. Group B (n = 30) and group C (n=30). All patients in both groups were induced under spinal anaesthesia with bupivacaine heavy 2.5ml under all. aseptic precautions. At the preoperative visit, a 10cm Visual Analog Scale (VAS) with 0 as no pain and 10 worst imaginable pain was explained to each patient. Baseline monitoring of heart rate, ECG, non invasive blood pressure, peripheral pulse and temperature was done. After the surgical procedure, patients were assigned to one of the two treatment groups in a double blind randomized manner.

The patient's knee joint was injected through the arthroscope with the study drug by the surgeon. Group B 20ml of 0.25% bupivacaine and group C 20ml of 0.25 bupivacaine along with $1\mu\text{g}/\text{kg}$ body weight of clonidine.

Pain scores both at rest and with movement were scored by a blinded observer in the post anaesthesia care unit at 2,6,10,14 and 18 hours after injection of study drug. A 10cm linear visual analog scale (VAS) was used for this measurement with 0 = no pain and 10 worst imaginable pain.

Diclofenac sodium 75mg was administered IV as an analgesic supplement if the recorded VAS pain score was ≥ 4 and repeated every 8h if required. The time to the first analgesic requirement and the total diclofenac use during the first 24h after operation were also recorded. Side effects such as bradycardia, hypotension were recorded.

Statistical analysis: Demographic data were analyzed by using analysis of variance and comparison done by student 't' test. A p-value of <0.05 was considered significant.

3. Results

There were no significant difference between two groups with regard to age, weight, gender and duration of surgery. There were also no significant difference in the baseline VAS, HR and MAP in either group.

Postoperative pain scores at rest and during movement were significantly higher in group B than in Group C ($p < 0.05$). Time to first postoperative analgesic requirement was significantly longer in group C (8.87 ± 1.2 hour) than in group B (3.4 ± 1.25 hours) ($P < 0.0001$) 24 hours consumption of diclofenac was significantly different between the two groups. Group B ($p < 0.00014$) and Group C ($p < 0.003$).

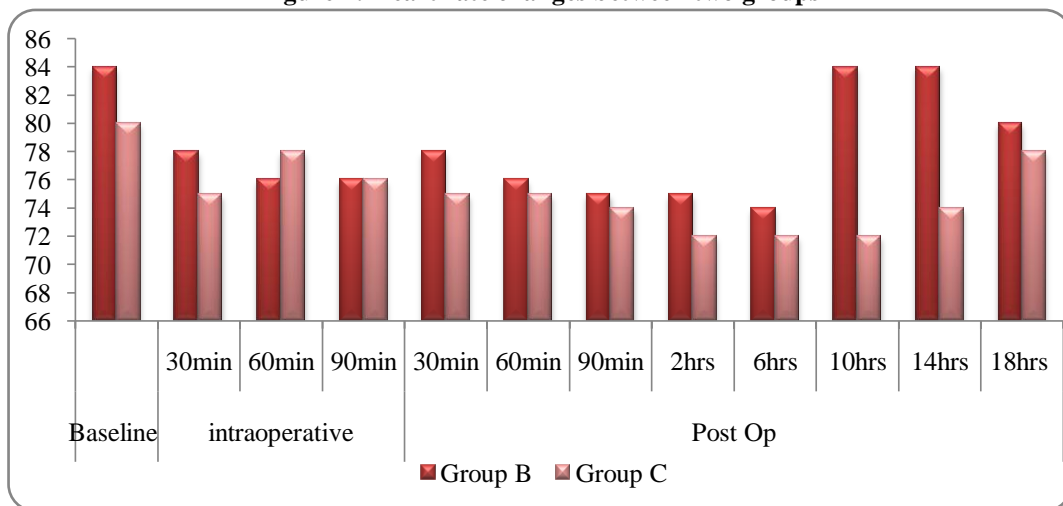
3.1 Demographic Data

Table 1: Demographic Data

	Group C (n= 30)	Group B (n=30)	P value
Mean age (years)	40 \pm 8	44 \pm 9	<0.05
Weight	63 \pm 4	61 \pm 5	<0.05
Sex (M: F)	22/8	20/10	<0.05
Duration of surgery	65 \pm 8	69 \pm 6	< 0.05

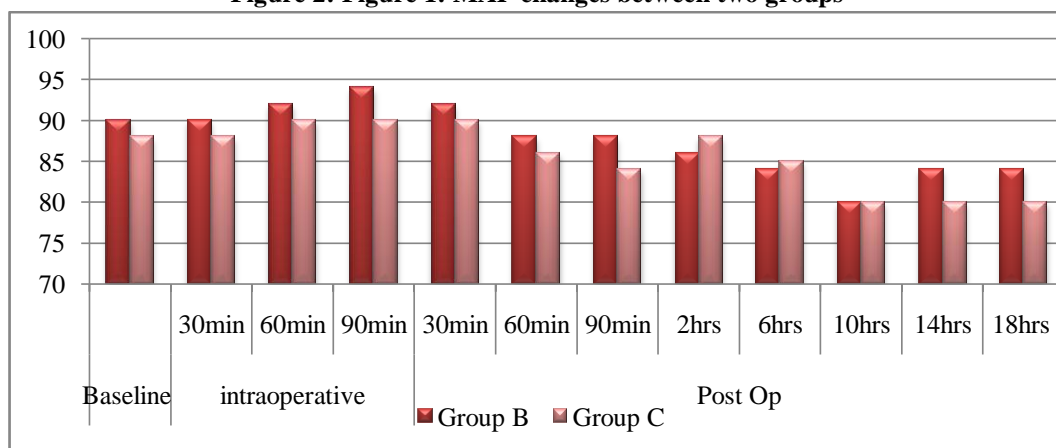
Data are expressed as mean \pm SD, n= 30 in each group

Figure 1: Heart rate changes between two groups



No significant heart rate changes between two groups

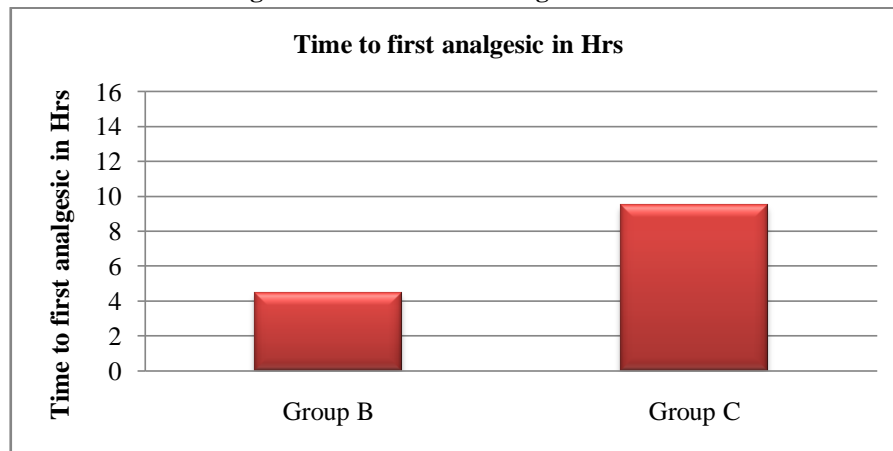
Figure 2: Figure 1: MAP changes between two groups



No significant MAP changes between two groups.

Table 2: Pain and sedation scores

	VAS Scores at rest			VAS score on Movement		
	1hr	2hr	24hr	1hr	2hr	24hr
Group B	2.5±0.7	3.0±0.5	3.9±0.6	4.1±0.9	4.7±0.5	4.8±0.8
Group C	2.3±0.8	2.7±0.6	3.2±0.6	2.8±0.9	3.3±0.9	3.8±0.6

Figure 3: Time to first analgesic in hours

4. Discussion

Fast rehabilitation after arthroscopic knee surgery requires the use of effective methods for postoperative pain control. The IA administration of clonidine has been shown to decrease postoperative pain. It also reduced the need for post operative analgesia and prolonged time to first analgesic request.

A study by Gentile *et al*[6] received 2µg/kg of clonidine which though provided effective postoperative analgesia, caused excessive sedation and hypotension which required a prolonged recovery time in the PACU, Hence we used a smaller dose of (1µg.kg)[7]. Clonidine may act on α2 – adrenergic presynaptic receptors and inhibit the release of nor epinephrine at peripheral afferent nociceptors[8] Clonidine has also been shown to provide local anaesthetic effects which inhibit the conduction of nerve signals through C and A fibres.[9] The analgesic effect of clonidine could be mediated via the modulation of the opioid analgesic pathways.[10] Arthroscopic surgery is associated with a variable amount of post operative pain, but it may be quiet considerable. The pain is caused by an irritation of free nerve endings of the synovial tissues, anterior fat pad, and joint capsule due to surgical excision and resection.

The result of the present study provided some evidence that clonidine exhibits a significant portion of its effect at the periphery rather than through a control mechanism. In conclusion, intra articular clonidine enhanced postoperative analgesia after arthroscopic knee surgery. There was an increased time to first analgesic request and decreased use of postoperative analgesia.

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