



## COMPARISON OF ADDUCTOR CANAL BLOCK AND INTRA ARTICULAR LOCAL ANAESTHETIC INJECTION FOR POST OPERATIVE PAIN RELIEF IN ARTHROSCOPIC KNEE SURGERIES

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**ABSTRACT** **Background:** Adductor canal block and intra articular local anesthetic injections are good methods of post operative pain relief in arthroscopic knee surgeries. **Aims And Objective:** 1) To study whether USG guided adductor canal block is more effective for pain management in operated cases of arthroscopic knee surgeries than intra articular injection of local anesthetic. 2) To study the duration of action of adductor canal block and intra articular injection of local anesthetic for pain relief in post operative cases of arthroscopic knee surgery. **Materials And Methods:** 60 patients of ASA I and II, aged 20-60 years, operated for arthroscopic knee surgeries were randomly allocated to group A (n-30, USG guided adductor canal block using 15 ml 0.5% Bupivacaine) and group S (n-30, intraarticular injection of 15 ml 0.5% Bupivacaine.) Each case was subsequently followed up for onset and total duration of analgesia till 6 hours postoperatively. Efficacy in both groups was assessed by visual analogue scale. **Results And Summary:** There was significant difference in onset of action between both the groups. Patients of Group S had quicker onset of pain relief than group A. The duration of action in group A was more (5.4±1.02 hrs) than group S (2.8±1.40 hrs). Visual analogue score showed significant pain reduction in group S after 15 minutes and although the duration of pain relief was more in group A. **Conclusion:** Adductor canal block and intra articular joint injection both are excellent way of pain relief in post operative cases of arthroscopic knee surgeries. The intra articular injection acts immediately and the action is short lived on the other hand the duration of pain relief is more in adductor canal block at the cost of a slower onset of action.

**KEYWORDS :** Arthroscopy, Adductor canal block, Intra-articular

### INTRODUCTION

Knee joint arthroscopy is a fairly common surgery. Usual indications are ligament tear and meniscal injury. Surgery involves reconstruction of sheared and severed ligaments and repair of meniscal tears. Movement of affected extremity leads without surgery causes pain and laxity of the joint. Post operative pain management is of utmost importance to help faster recovery and discharge. Adductor canal block, intraarticular intra synovial local anaesthetic injections, systemic analgesia using NSAID and opioids are commonly used modalities for postoperative pain relief following arthroscopic knee surgeries<sup>[1,2]</sup>.

Intrasynovial infiltration has the advantage of providing prompt pain relief within 2-5 minutes but the effect is short lived due to dissipation of local anaesthetic from severed synovial cavity. It is easy to administer preoperatively, is safe and has few side effects.<sup>[2,3]</sup> Adductor canal block on the other hand provides a delayed but more sustained analgesia as long as perineural concentration of local anaesthetic in the facial plains prevails. Our aim is to study onset, duration, and efficacy of pain relief with adductor canal block in comparison to intra articular injection of local anaesthetic for postoperative pain relief in arthroscopic knee surgeries and to notify complications.

### MATERIALS AND METHODS:

After taking approval from ethical committee and informed written consent, 60 patients were included in the study. Thorough preoperative examination was done for cases posted for arthroscopic knee surgeries. Detailed history was taken and routine investigations were done. Patients were then randomly allocated to Group A (n-30, USG guided adductor canal block using 15 ml 0.5% Bupivacaine) and Group S (n-30, intra articular infiltration of 15 ml 0.5% Bupivacaine). At the time of taking consent, patients were explained about the study and the four point visual analogue scale and classifying the intensity of pain as none, mild, moderate and severe at timely intervals. Simple randomization table was used for group allocation. Each case was followed up every 15 mins. Pain score was assessed by visual analogue scale at the initial assessment, and at 15, 30, 60, 90, 120, 180, 360 mins interval. Data collecting doctor and patient were blinded to study group. The study was double blinded, saline injections were given to control group instead of 15 ml 0.5% Bupivacaine for adductor canal block and patients in test group received intra articular saline instead of injection 15 ml 0.5% Bupivacaine. Rescue therapy was given if patient had VAS score is >5 in either group during period of observation they

were supplemented with Inj. Paracetamol 1 gm i.v infusion.

### Inclusion Criteria

- 1) Written and informed consent of patient
- 2) ASA risk I and II
- 3) Age of patient (20-60yrs.) of either gender
- 4) cases posted for knee arthroscopy.

### Exclusion Criteria

- 1) Patient's refusal
- 2) Patients with known allergy to drug
- 3) Patients with neurologic deficit or psychological disorder
- 4) Patients with any cardiovascular or renal disorder
- 5) Patients with vascular or neurological problem in affected limb.

### Procedure

#### Equipment Required

20 ml syringes, a 23 G needle, 20 ml vials of 0.5% Bupivacaine and antiseptic for skin, USG machine, 22G 10 cm stimplex needle.<sup>[3]</sup>

### Technique

Intra articular Injection - The scrubbed nurse was asked assisted load 15 ml 0.5% Bupivacaine by sterile technique and give it to the assistant surgeon to inject just before taking out last port from the knee joint before skin closure at conclusion of surgery.

Adductor canal block was given at the conclusion of surgery after taking aseptic and antiseptic precaution (painting and draping of operated limb and the USg probe) the procedure was started. Standing on same side of operated limb, USG probe was positioned in mid thigh region to visualize femur bone and probe was drifted medially to appreciate femoral artery under Sartorius muscle. Stimplex needle was inserted at a point 1-2 cm lateral to arterial pulsation vertically until it was positioned near to the nerve bundle lateral to the artery in the facial plane of adductor canal. The position of needle in the adductor canal was confirmed using hydro-dissection with 2 ml saline. Careful aspiration was done to check for intra vascular location of needle tip. The local anaesthetic 15 ml 0.5% Bupivacaine was slowly injected in the adductor canal.

### Statistical Analysis

Statistical analysis was done using the SPSS SOFTWARE. To calculate the sample size, a power analysis of  $\alpha=0.05$  and  $\alpha=0.90$ ,

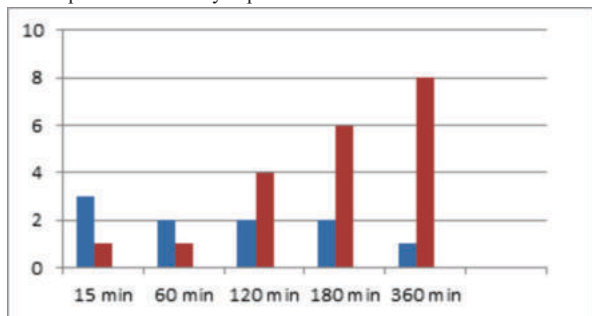
showed that 30 patients per study group were needed. Data are expressed as either mean or standard deviation or numbers and percentages. Continuous covariates were compared using ANOVA. Chi square test performed for the data evaluation with the p- value reported at the 95% confidence interval. p<0.05 was considered statistically significant. Unpaired student t test was used to analyze duration of analgesia and severity of pain.

**OBSERVATION AND RESULTS**

1. Demographic data like age and sex ratio was comparable in both groups.

	AGE+SD	GENDER M:F
A GROUP	38.34+3.64	18:12
S GROUP	39.02+2.06	16:14

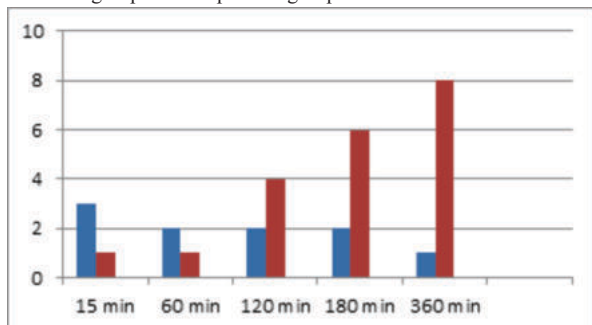
2. Comparison of severity of pain score at different time interval:



Graph 1- Pain At 15 Min

**Pain Relief At 15mins:**

Pain significantly reduced within 15 minutes after block is performed in group S (RED) as compared to Group A (BLUE). The result is statistically significant (p=0.001). The severity of pain was observed to be less in group S as compared to group A.



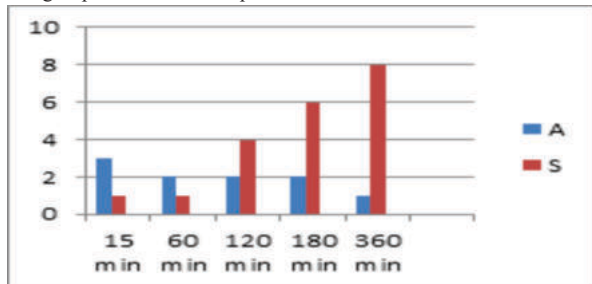
Graph 2- Pain At 360 Min

In Group A at 360 minute, the pain score was significantly less than group S (p=0.001).

3. Comparison of duration of analgesia between two groups: Duration of action in Group A is 5.4±1.02 hrs hours and in Group S is 2.8±1.40 hrs. This difference is statistically significant (p=0.0001).

4. Comparison of severity of pain in two groups  
Onset of pain relief was quicker in Group S. But there was better and more sustained pain relief in Group A patients than Group S.

5. Comparison of number of patients with require rescue analgesia in two groups at different time point of observation.



Graph 3- Requirement Of Rescue Analgesic

6. Complication: There were no major complications.

**DISCUSSION**

Both adductor canal block and intra articular local anesthetic injections are excellent ways to reduce post operative pain in arthroscopic knee surgeries. The onset of analgesia was quicker in group S compared to group A. The duration of pain relief and time to requirement of institution of rescue systemic analgesic was more in group A. In a study done by Muller et al in 2018 on 60 ASA1 cases of arthroscopic ACL repair studying effects of multimodal analgesia for arthroscopic knee surgeries they concluded pain relief and duration of action was more in patients who received adductor canal block. Similar results were observed in a study conducted richar et al in postoperative cases of meniscus repair. The results of our study were in consensus with the study done by Modric et al in post operative cases of traumatic ligament injuries in 100 ASA 1 patients. The longer duration of analgesia with adductor canal block attributed this to delayed clearance of local anaesthetics while it was contained in the fascial planes and more perineural concentration and the quick and prompt relief in intra-articular infiltration is due to direct and to the point action of local anaesthetic at surgical site.

**CONCLUSION**

Adductor canal Block is superior in providing postoperative pain relief in arthroscopic knee surgeries as its effect lasts for longer duration and free of any major complication in comparison with intra articular infiltration of local anesthetic. Routine use of adductor canal block is recommended in post anaesthesia care units solely or as a part of multimodal post operative analgesia in arthroscopic knee surgeries.

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