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## Is Multimodal pain management the new standard of care in total knee replacement?

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### Abstract

**Background:** Measures for pain management after total knee arthroplasty (TKA) are important for early improvement in the quality of life after operation and early postoperative rehabilitation. This study was conducted to evaluate whether multimodal drug therapy with periarticular joint injection is better than conventional combined epidural and spinal in total knee arthroplasty (TKA).

**Methods:** 40 patients undergoing TKA for osteoarthritis were divided into two groups. Group A (20 knees; control group), this group underwent surgery under combined spinal and epidural analgesia. While group B (20 knees) underwent surgery under spinal combined with intra-articular injection of multimodal drug cocktail. All analgesics administered post-operatively were recorded. The evaluation of pain was done using visual analogue scale (VAS).

**Results:** The VAS scores on post-operative days 0, 2, 5 were low in group B compared to group A. The usage of analgesics post operatively was high in group A. The level of pain control was higher in group B than in group A.

**Conclusion:** Intraoperative periarticular injection with multimodal drugs can significantly reduce the requirements for patient-controlled analgesia and improve patient satisfaction, with no apparent risks, following total knee arthroplasty.

**Keywords:** Total knee replacement, pain score, visual analogue scale, knee cocktail, bupivacaine

### Introduction

Pain management plays an essential role in the postoperative period for the patients undergoing Total knee arthroplasty. The problem of acute postoperative pain is widespread with approximately 40% of all surgical patients experiencing moderate-severe acute postoperative pain [1]. Controlling postoperative pain after joint arthroplasty is especially important as it relates to patient satisfaction and outcomes [2]. Perioperative pain management for patients undergoing TKA influences length of stay, rehabilitation progress and functional outcome [3]. Usually patient's pain will be managed either by Spinal anesthesia, femoral block, opioids, continuous epidural pump, intra-articular cocktail, intravenous analgesics and pain patches. The aim of the study is to assess the postoperative pain management using multimodal therapy versus combined spinal and epidural anesthesia.

### Materials and Methods

This was a prospective cohort study done at Sri Ramachandra Medical Centre between August 2017 and August 2018. The study protocol was approved by institutional ethics committee. Inclusion criteria included all patients undergoing total knee replacement with grade 3 and grade 4 primary osteoarthritis knees. Exclusion criteria included those patients undergoing revision surgery or who declined consent, major psychological problems, previous drug dependency, allergies to any of the ingredients of the injection, renal insufficiency, abnormal liver enzymes, a history of stroke or a major neurological deficit, or uncontrolled angina.

We had 40 patients who took part in the study. Exactech Cruciate retaining implant was used in all patients. Pre operatively the patients were divided into two groups chosen by card method. Group A we had 20 patients who underwent surgery under combined spinal and epidural anesthesia and group B had 20 patients who underwent surgery under spinal anesthesia with intraarticular cocktail drug.

The mean age in group A was 59.1 years and group B was 58.7 years. We had nine males and eleven females in group A and eight males and twelve females in group B. We had sixteen patients having grade 3 osteoarthritis and four patients having grade 4 osteoarthritis in group A while group B had eighteen patients having grade 3 and two patients having grade 4 osteoarthritis.

The patients in group A underwent surgery under combined spinal and epidural anesthesia. While group B patients underwent surgery under spinal anesthesia and intra articular knee cocktail containing 30 ml mixture [containing 0.5% bupivacaine (20 ml), ketanov (1 ml), 0.3 mg of epinephrine (0.3 ml), and sterile normal saline (8.7 ml)]. Total knee replacement was performed through standard medial parapatellar approach [4]. Patients in both groups received injection. Paracetamol 1gm thrice a day from day 0 post operative day. Injection Ketanov 30mg was added as SOS for both groups. We prescribed a proton pump inhibitor (omeprazole) to all patients undergoing TKA to prevent a stress ulcer. Joint at rest was assessed preoperatively, and then on postoperative days. Participants rated the severity of their joint pain at rest and the sensory qualities of their joint pain. A visual analog scale (VAS) [5, 6] was used to assess pain at 4 hours after surgery, 0 and on 2<sup>nd</sup>, 5<sup>th</sup> post operative days.

## Results

The mean VAS scores on the day of surgery for group A was 6 and for group B was 4. The mean VAS scores on 2<sup>nd</sup> post operative day for group A was 3 and group B was 2. The mean VAS scores on 5<sup>th</sup> post operative day for group A was 1, for group B was 1. Injection Ketanov 30mg was given for 8 patients in group A and no patients in group B received during the first post operative period.

**Table 1:** Mean Visual Analogue score in two groups

Post op Day	Mean VAS score Group A	Mean VAS score Group B
0	6	4
2	3	2
5	1	1

## Discussion

In Total knee arthroplasty the Postoperative pain is the major concern and the best standard care remains controversial. Intravenous opioids, extra-articular and intra articular injection, epidural analgesia and femoral [7] or sciatic nerve blocks are currently used for postoperative pain management. However each drug has its own side effects. Femoral or sciatic block can diminished muscle control and possible nerve damage while opioids can cause vomiting, dizziness and epidural analgesia causes side effects like urinary retention and spinal headache.

In this study, we compared VAS scores for group B against control group A. From Table 1 We found that periarticular anesthetic cocktail injection controls pain much better than the conventional combined spinal and epidural. The VAS score for pain gradually decreases from 6 in the first postoperative day to 3 at 48 hours after surgery in group A while it was 4 and 2 in group B respectively. All patients were able to walk with a walker the next morning and were discharged to their homes by the fifth day after surgery. Injection Ketanov 30mg was given for 8 patients in group A and no patients in group B received during the first post operative period. The consumption of analgesic drugs during post operative period in both groups showed that Group A

consumed substantially more analgesics than Group B. The analgesic effect of cocktail drug may last up to 48 hours.

Several studies have reported the efficacy and safety of periarticular multimodal drug injections after TKA. No complications related to the infiltration of the local anesthetic were observed, and all plasma concentrations of the local anesthetic were below toxic range [7]. Bupivacaine has a longer effect and less cardiac and central nervous system toxicity [8]. In our cocktail, we used bupivacaine [9, 7, 10] and bupivacaine has been reported as safe and effective for local infiltration [11]. Ketorolac used in this study is reportedly effective for postoperative pain control, 30 milligrams of ketorolac is as effective as 12 mg morphine [12]. No side effects such as gastrointestinal bleeding were observed. This study revealed that intra-articular cocktail analgesic injection reduced the need for morphine and offered a better pain control, without apparent risks following TKA. The findings from this study have limited generalisability because they are specific to the anesthetic and analgesia used in this study. This study shows that periarticular injection with the use of multimodal drugs is an efficient alternative [13] for postoperative analgesia in TKA.

## Conclusion

Intraoperative periarticular injection with multimodal drugs can significantly reduce the requirements for patient-controlled analgesia and improve patient satisfaction, with no apparent risks, following total knee arthroplasty.

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**Conflict of interest:** None declared

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