Original article :

Comparison of epidural analgesia with femoral nerve block for pain management to aid post-opertive rehabilitation following total knee arthroplasty

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Abstract :

Introduction : Epidural analgesia has been used for postoperative pain control after total knee arthroplasty. Its usefulness is being re-evaluated because of poor analgesia and possible adverse effects.

Methods:A retrospective study comparing patients receiving epidural analgesia and femoral nerve block for postoperative pain management.The present study compares the clinical efficacies of epidural analgesia and femoral nerve block after total knee arthroplasty.

Result: No significant differences between the two groups in pain intensity,time interval from postoperative day 1 to day 5 were identified.

Conclusion : Femoral nerve blocks provide comparable analgesic efficacy over epidural analgesia immediate post op,but long term results remain insignificant.

INTRODUCTION:

Pain management in postoperative patients of total knee arthroplasty is challenge for clinicians.Inadequate pain reliefafter total knee arthroplasty may hinder early rehabilitation [1], delay dischargefrom hospital [2], and adversely affect functional outcomes[3]. Systemic opioid analgesia is limited by opioid-relatedside effects such as nausea, vomiting, dizziness, sedation. Epidural analgesia provides betterpain relief than systemic opioids but is associated with morefrequent urinary retention and hypotension after total knee arthroplasty [4].In the last decade, femoral nerve block (FNB) as a part ofmultimodal analgesic regimens has been recommended asthe technique of choice for postoperative pain managementfollowing total knee arthroplasty [5, 6] because femoral nerve block provides comparableanalgesic effect to epidural analgesia but less side effectsthan those associated with epiduralanalgesia [6, 7].

MATERIAL AND METHODS:

50 patients have been selected randomly.The clinical data recorded for analysisincluded gender, age, body weight, height, body massindex (BMI), preoperative comorbidities, American Societyof Anesthesiologist physical status, history of alcohol or drugabuse or chronic opioid use, surgical approach, implantedprosthesis, intra-operative opioids. Only those patients who have operated for unilateral primary total knee arthroplasty were included. The exclusion criteria included age less than 18 years, ASA grade 3 patients, use of opioids for 2 weeks prior to surgery, history of drug abuse or alcohol consumption. These patients are devided into 2 groups randomly, and observed on postoperative days 1 to 5 . At our institution pain management is done by using NSAIDS and

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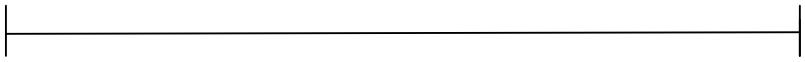
acetaminophen. According to physiotherapy protocol at our institution physiotherapy to postoperative patients of total knee arthroplasty is started on day 3.

Selected patients were shifted to postanaesthetic care unit after total knee arthroplasty then surgeons priscription of NSAIDS and acetaminophen were discontinued on postoperative day1. We administered 2 ml of 0.5% bupivacaine plus 50mg tramadol by epidural route to 25 patients, and remaining 25 patients were managed by giving them femoral block by using 25 ml of 0.5% bupivacaine. All patients were given intravenous ondansetron 8 mg at the end of operation. The intensity of pain was identified as equalto or more than moderate on a verbal severity scale (no pain,mild, moderate, severe, and extreme pain) and by visual analogue scale from no pain to worst possible pain on postoperative days 1 to 5.[8]

Verbal severity scale:

0	No pain
1	Mild pain
2	Moderate pain
3	Severe pain
4	Extreme pain

Visual analogue scale [9]:



No pain Worst possible pain

In the morning of 1st to 5th postoperative days we recorded the pain intensity score of every selected patient by using both visual analogue scale and verbal severity scale. Pain recorded at rest and by doing flexion and extension of knee joint.Postoperative nausea vomiting were controlled by using injection ondensetron 8mg iv. To evaluate the impact of analgesic techniques time interval for decreasing intensity of pain from postoperative day 1 to 5 were recorded.Statistical analysiswas performed using the SPSS softwarepackage.

RESULTS:

50 patients participated in this study, which was conducted. 25 patients were received epidural analgesia and 25 received femoral block.All patients completed the study.

No significant difference in clinical conditions of patients were noted between the epidural analgesia and femoral nerve blockgroup except that more patients in the femoral nerve block group had earlypain relief on postoperative day. There was no significant statistical difference in pain intensity.

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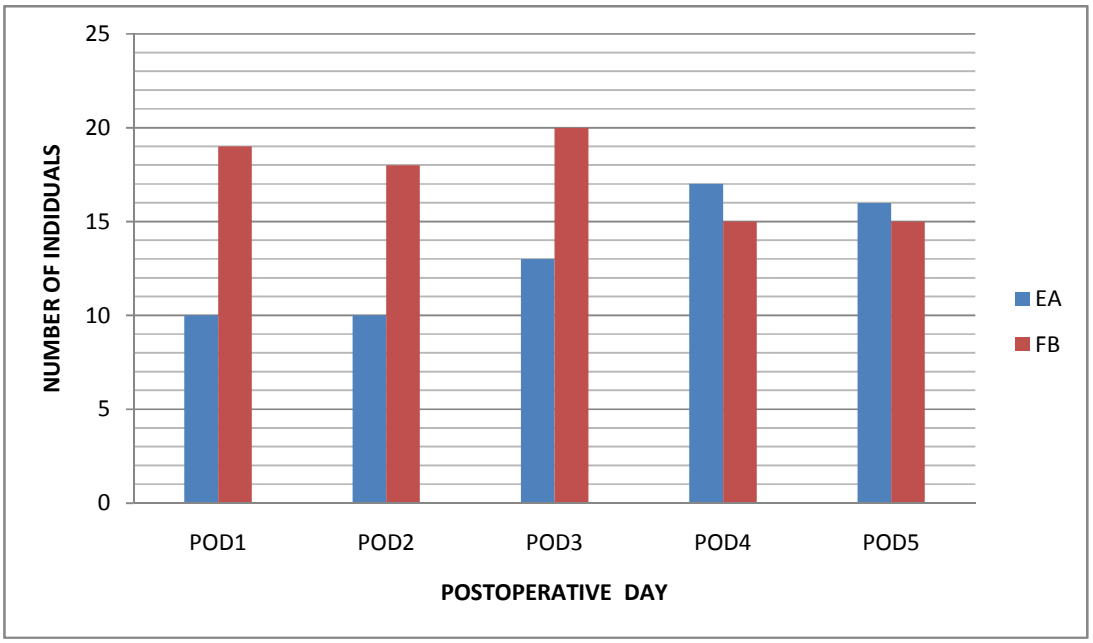
Verbal pain score:

	Epidural analgesia (n-25)	Femoral block (n-25)
Postoperative day1	10	19
Postoperative day2	10	18
Postoperative day3	13	20
Postoperative day4	17	15
Postoperative day5	16	15



POD: Post-operative day

EA: Epidural analgesia

FB: Femoral block

Visual analogue score (VAS) :

	Epidural analgesia(n-25)	Femoral block(n-25)
Postoperative day 1	9	15
Postoperative day 2	10	15
Postoperative day 3	8	17
Postoperative day 4	10	13
Postoperative day 5	12	14

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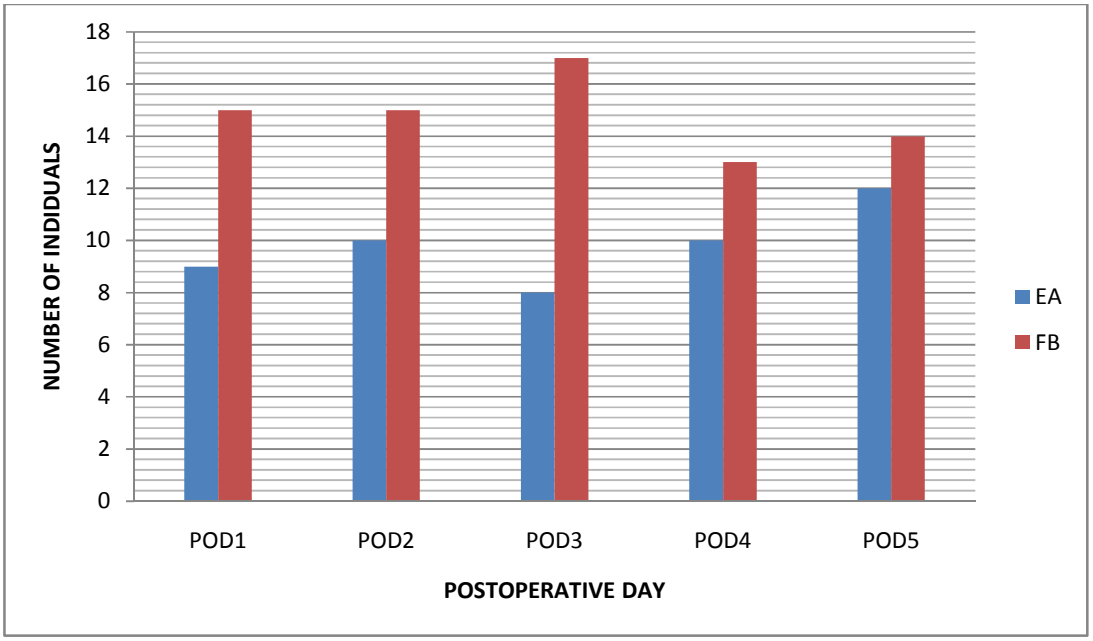

POD: Post-operative day

EA: Epidural analgesia

FB: Femoral block

DISCUSSION:

Our study revealed that after total knee arthroplasty both group displayed similar pain intensity in the first 3 days after operation, there is no significant difference. Our results suggested that femoral block is as effective as epidural analgesia in pain relief after total knee arthroplasty. In this study comparison between two routinely used methods that are effective always for postoperative pain management in total knee arthroplasty has been made.

None of the patients in this study were given analgesics. Pain relief was good but was similar in both the groups during POD1.

During early ambulation and early rehabilitation the ideal analgesic technique should provide adequate pain relief after total knee arthroplasty while preserving muscle strength therefore epidural analgesia is suggested as preferred analgesic technique considering its good analgesic effect in absence of motor blockade. On the other hand when compared with femoral block, found no significant statistical difference in pain score. The high dose of local anaesthetic in large volume in epidural analgesia might contribute to the effective analgesia after total knee arthroplasty in our study.

No local anaesthetic systemic toxicity was noted during our review of medical records. As the rehabilitation protocol in our hospital began after the POD3 time at which the motor blockade from the single shot femoral nerve block with 20ml 0.5% bupivacaine had mostly disappeared. No significant difference was observed in between two groups in the time interval from the end of the operation to the postoperative period of first time walking.

The quality of femoral block depends on the experience of anaesthesiologist that is the reason

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behind the small differences in analgesic efficacy between the two methods.

Analysis of this study revealed that both epidural analgesia and femoral block provide good analgesia after unilateral total knee arthroplasty. Pain after TKA is usually severe and difficult to manage and insufficient pain relief may delay recovery. Historically most effective pain treatment has been epidural analgesia. Femoral block results in low average pain intensity during postoperative period, as it does not cover posterior part of knee which is innervated by sciatic nerve. So it requires supplementary analgesic support. The average degree of pain intensity at rest, but not upon movement was slightly lower in femoral block group. This difference is small and without considerable clinical significance.

CONCLUSION :

Our analysis revealed that high dose of local anaesthetic in epidural analgesia provided significantly similar analgesia as femoral block after total knee arthroplasty and might be associated with early ambulation. In short in this study we could not confirm that there was any clinical superiority in between femoral block and epidural analgesia since the two analgesic techniques have similar quality of pain treatment. However femoral block may be considered as preferred option as it is cheaper and easier to perform in controlling postoperative pain after total knee arthroplasty.

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[8]0–10 Numeric Pain Rating Scale:From McCaffery M, Pasero C. Pain:Clinical Manual, St. Louis, 1999, P. 16. Copyrighted by Mosby, Inc.Reprinted with permission.

[9]Visual Analog Scale and Verbal Pain Intensity Scale: From PainManagement: Theory and Practice, edited by RK Portenoy & RM Tanner,copyright 1996 by Oxford University Press, Inc. Used by permission ofOxford University Press.