

Is early rehabilitation after Total Knee Replacement better with periarticular cocktail of injection or epidural Ropivacaine?

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TKA is routinely done orthopaedic procedure done that aims at improving the quality of patients' life by providing pain relief, functional improvement and deformity correction. This study aims to study the efficacy and safety of a Periarticular analgesic cocktail including ropivacaine injection and epidural ropivacaine for early rehabilitation after a total knee replacement. Methods: Total of 100 patients divided into two groups, one group received epidural ropivacaine and second group given periarticular cocktail containing ropivacaine. Then postoperatively their pain score comparison using VAS score and their functional status is documented knee society score. Results: The mean age for the epidural group is 60.28 years, while for the periarticular cocktail group it's 60.88 years. For female patients, 34 (68%) received epidural analgesia, while 24 (48%) received periarticular cocktail. Among male patients, 16 (32%) had epidural analgesia, and 26 (52%) received periarticular cocktail. For pre-operative pain scores, patients receiving Epidural analgesia had a slightly higher mean score of 7.24 compared to those receiving Periarticular Cocktail, who had a mean score of 7.12. Patients in the Epidural group had a higher mean knee flexion of 83.84 degrees compared to the Periarticular Cocktail group, which had a mean flexion of 79.36 degrees. The Knee Society Scores (KSS) for the post-operative scores; The Epidural group had a mean score of 80.16. The Periarticular Cocktail group had a mean score of 88.40. Conclusion: In conclusion, this study supports the periarticular analgesic cocktail over epidural analgesia for pain management and early rehabilitation following TKR.

Keywords: Total knee arthroplasty, periarticular, ropivacaine, epidural.

INTRODUCTION

Along with the ageing process and the development of medical technologies, total joint arthroplasty has become one of the most common surgical procedures in orthopaedics that can greatly improve the quality of patients' life by providing pain relief, functional improvement and deformity correction^{1,2}. This procedure is often accompanied with a variable degree of unbearable post operative pain³. The uncontrolled postoperative pain can result in a multitude of consequences, including decreased satisfaction of patients, delayed recovery with declined range of motion of the joint, prolonged hospital stay, as well as increased risk of thromboembolism and above all it adds to agony and frustration to the patients^{4,5}. Therefore, aggressive pain control during the early postoperative period is essential and various analgesic techniques can be used for pain management after joint arthroplasty⁶ such as peripheral nerve blockade,

epidural anaesthesia, local infiltration analgesia and narcotics.

Epidural analgesia, while effective at controlling postoperative pain, has undesirable side effects, including nausea, hypotension, Pruritis, somnolence, dizziness, and respiratory depression⁷. Likewise, femoral nerve blockade (FNB) has been associated with poor early postoperative ambulatory ability and the risk of in-hospital falls⁸⁻¹⁰. As a result, alternative methods of analgesia are being sought and there has been increasing support for the inclusion of peri- or intraarticular local anaesthetics in the multimodal pain regimen after TKA. The reported efficacy of periarticular analgesic injections after TKA had been inconsistent and plagued by significant heterogeneity among studies with regard to volume and content of local infiltrations^{11,12}. As an alternative to periarticular administration of analgesics, intraarticular delivery of anaesthetics has gained attention in recent times. The optimal site for analgesic infiltration, whether it is given intra- or peri-articular is still unclear^{13,14}.

Intra-articular (IA) injection of local analgesics is one of the most widely used pain control techniques due to its convenience of operation and practicality^[15]. The local anaesthetic is injected into the IA cavity after the surgical wound or joint capsule closure from where it can spread into the muscles and soft tissues, so as to relieve, postoperative pain¹⁶. Ropivacaine, the common local anaesthetic used during an orthopaedic surgery¹⁷, is characterised by prolonged period of active effectiveness¹⁸. However, few existing studies¹⁹⁻²¹ suggested that IA Ropivacaine could generate a better pain relief effect and requires less narcotic usage than a placebo for joint arthroplasty, while some others²²⁻²⁵ failed to reach any positive results.

This study aims to assess the effectiveness of the periarticular injection of an analgesic cocktail in promoting early functional recovery and to assess the effectiveness of the periarticular injection of an analgesic cocktail of drugs in the reduction of pain during the immediate post operative period, and comparing the outcome to the current treatment regime's currently being used to control pain in our institution – i.e. epidural infusion of ropivacaine.

MATERIAL AND METHODS

After obtaining ethical approval from the institution's ethical committee, Patients presenting with knee osteo-arthritis in Government medical college Patiala and Rajindra hospital OPD was admitted in orthopaedics ward.

Inclusion criteria:

1. Patients undergoing unilateral TKA.
2. Patient fit for undergoing TKA.
3. Patient giving consent for undergoing surgery

Exclusion criteria:

- v1. Bilateral TKR
2. Elderly >80 years
3. Revision TKR
4. History of Arrhythmia/Cardiac complications
5. Those not willing to give consent.

Patients were explained about the study in detail and patient information sheet were given to patients. Informed valid consent was obtained from patients who are willing to participate in study. The proforma for study was filled in the OPD and patient details were obtained. History of diabetes mellitus and rheumatoid arthritis if any was taken. Parameters like walking distance, aids used, preoperative pain score using Numerical pain score (NPS), analgesics used etc will be noted.

Preoperative knee assessment was done using knee society score (KSS). Range of movement was also measured preoperatively. Extensor lag if any also be noted. X-rays were reviewed and the deformity present documented. The patients were then randomized into two groups by block randomization. In one group, the patients received epidural analgesia for 48 hours post operatively. In the other group, the patients received periarticular injection of an anaesthetic cocktail of drugs. Knee society score considers all the existing rating systems and keeps the functional assessment and knee ratings separate. Only three parameters of pain, stability and range of motion are considered for knee assessment. Flexion contracture, extension lag and malalignment are considered as deductions. For a well aligned knee without pain a 100 points score is obtained with 125 degrees motion and negligible instability antero-posteriorly and mediolaterally. Function considers walking distance and stair climbing with deductions for walking aids. A patient who can walk unlimited distance and go up and down the stairs normally is given a maximum functional score of 100.

All clinically diagnosed cases will undergo a total knee replacement in main operation theatre. TKA was done under spinal/epidural anaesthesia as per management plan by anaesthesia staff using a standard medial parapatellar arthrotomy. A tourniquet was used for all patients. A closed suction drain was placed in knee joint before wound closure and removed after 48 hours. The Peri-capsular Cocktail of anaesthetic drugs used for pain control include; 50ml 0.2% Ropivacaine, 10 ml Saline, 0.3 ml Noradrenaline (0.6mg), 40mg Methyl prednisolone acetate, 30 mg Ketorolac. The first 30 ml of the cocktail mixture were injected with 50 cc syringe 23 gauge needle into posterior knee capsule and soft tissue around medial and lateral collateral ligaments before implantation of actual components. The quadriceps muscle (Fig.1), retinacular tissues, pes anserinus, and suprapatellar and infrapatellar fat pat were then be infiltrated with the rest of cocktail while the cement is setting (shown in pictures taken intra operative). The 2nd group will receive analgesia via an epidural catheter. The epidural infusion was given using an infusion pump with 0.2% ropivacaine mixed with 2mcg/cc of Fentanyl given @4-6ml per hour for first 48 hours post operatively. The dosage will be increased if pain is not controlled. The increase in flow rate will be noted. Post operatively data regarding surgical date, side operated, anaesthesia used, components used, patella resurfacing done or not, type of knee whether posterior stabilized or cruciate retaining and the type of post operative analgesia (Epidural or analgesic



Figure 1. — Periarticular injection into quadriceps tendon, vastus medialis and suprapatellar pouch.

RESULTS

In the present study the patients in ≤ 60 age group, 32 patients (64%) received epidural analgesia, while 26 patients (52%) received periarticular cocktail. For the >60 age group, 18 patients (36%) had epidural analgesia, and 24 patients (48%) received periarticular cocktail. The mean age for the epidural group is 60.28 years, while for the periarticular cocktail group it's 60.88 years. For female patients, 34 (68%) received epidural analgesia, while 24 (48%) received periarticular cocktail. Among male patients, 16 (32%) had epidural analgesia, and 26 (52%) received periarticular cocktail.

For Left TKR, 20 patients (40%) received epidural analgesia, while 22 patients (44%) received periarticular cocktail. There were no epidural cases for Left TKT, but 2 case (4%) with periarticular cocktail. For Rt TKR, 30 patients (60%) had epidural analgesia, and 26 patients (52%) received periarticular cocktail.

In the present study regarding Deformity, 2 patient (4%) in the Epidural group and 4 patients (8%) in the Periarticular Cocktail group presented with this complaint. For Difficulty in Walking, 34 patients (68%) in the Epidural group and 30 patients (60%) in the Periarticular Cocktail group reported this issue.

In the present study most of the patients undergoing surgery under Epidural anaesthesia that is 18(36%) didn't use any aid. Also 18(36%) used stick and 14 (28.0%) used walker as an aid to move. Conversely, patients undergoing surgery under Periarticular Cocktail were mostly Walker users 20 (40%), followed by no aid 16 (32%), and least common were Stick users 14 (28%).

For pre-operative pain scores, patients receiving Epidural analgesia had a slightly higher mean score of 7.24 compared to those receiving Periarticular Cocktail, who had mean score of 7.12. However, this difference was not statistically significant (p-value 0.641). Patients in the Epidural group had a higher mean knee flexion of 83.84 degrees compared to the Periarticular Cocktail group, which had a mean flexion of 79.36 degrees. There was a significant difference in pre-operative knee flexion as p-value is 0.020. This suggests that while pre-operative pain levels were similar between the two groups, patients receiving Epidural analgesia had significantly better knee flexion before the operation compared to those receiving Periarticular Cocktail analgesia (Table I).

Patients who received Epidural analgesia reported a higher average pain score on the day of surgery, at day 1, day 2, day 3 and at day 10 compared to those who received Periarticular Cocktail analgesia

cocktail) will be documented. Pain experienced by the patient using the NPS for pain will be assessed postoperatively on a daily basis. The pain score will be determined every 4 hours by the nurses, and the patient will also be reviewed on a frequent basis. The highest NPS score for the day will be noted, and recorded. The pain scores will be noted on day 1-3, and again on day 10 prior to discharge. Dosage of epidural infusion. given in the post operative period was noted as well as any changes in the flow rates were also be documented.

Post operative physiotherapy schedule – All patients were encouraged to perform foot pump exercises in bed and encouraged to do SLR (Straight leg raise) from the day 1 of the surgery – initially with a brace, and subsequently without. Days to do active SLR with the brace in the supine position and lag on supine i.e.: SLR without the brace were documented. On the second day, they were encouraged to sit with the legs out of the bed, and do active quadriceps strengthening. Amount of knee flexion possible and the lag on extension while sitting from the second post operative day will also be documented. Later all will be encouraged to walk with a walker after the drain is removed. A brace for the knee will be used till the patient could do an active SLR. They will be started on active and passive range of movement exercises by sitting at bedside. Number of days taken to walk 50 meters without brace were documented. All patients were discharged when they meet the discharge criteria, which include being able to get in and out of bed independently, independently ambulate with a walker for 100 meters. The distance walked in 6 minutes with a walker were recorded on the 10th post op day. Peri-operative complications if any, also be documented.

Table I. — Comparison of pre-operative pain scores and knee flexion between epidural and periarticular cocktail analgesia.

	Analgesia used	Mean	Std. Deviation	P value
Pre-operative pain score	Epidural	7.24	0.879	0.641
	Periarticular Cocktail	7.12	0.927	
Preop Knee Flexion	Epidural	83.84	6.530	0.020
	Periarticular Cocktail	79.36	6.601	

Table II. — Comparison of numerical pain scores on day of surgery, day 1, day 2, day 3 and day 10 between epidural and periarticular cocktail analgesia.

	Analgesia used	Mean	Std. Deviation	P value
Numerical pain score on day of surgery	Epidural	5.08	0.40	0.000
	Periarticular Cocktail	3.36	0.56	
Numerical pain score on day 1	Epidural	4.75	0.41	0.001
	Periarticular Cocktail	3.0	0.54	
Numerical pain score on day 2	Epidural	4.22	0.39	0.003
	Periarticular Cocktail	2.65	0.47	
Numerical pain score on day 3	Epidural	3.90	0.44	0.007
	Periarticular Cocktail	2.44	0.51	
Numerical pain score on day 10	Epidural	3.41	0.37	0.015
	Periarticular Cocktail	2.08	0.50	

Table III.— Comparison of leg function outcomes by analgesia method

		Analgesia used		Total	P value
		Epidural	Periarticular Cocktail		
Straight Leg Raising with Brace in The Supine Position:	Count	50	50	100	1.00
	Percentage	100.0%	100.0%	100.0%	
Lag On Supine Straight Leg Raising Without the Help of The Brace	Count	8	18	26	0.20
	Percentage	16.0%	36.0%	26.0%	
Lag On Extension in The Sitting Posture	Count	4	16	20	0.07
	Percentage	8.0%	32.0%	20.0%	

who reported a lower pain score. The above p-value shows that the difference between the two methods is statistically significant. These results strongly indicate that Periarticular Cocktail analgesia was more effective in managing post-operative pain compared to Epidural analgesia (Table II).

In the present study all patients in both groups 50(100%) were able to perform straight leg raising with a brace (p-value 1.00, indicating no difference between groups). 8(16%) of Epidural patients and 18(36%) of Periarticular Cocktail patients experienced lag during supine straight leg raising without a brace (p-value

0.20, suggesting the difference is not statistically significant). 2(8%) of Epidural patients and 8(32%) of Periarticular Cocktail patients experienced lag on extension in the sitting posture (p-value 0.07, indicating a trend towards statistical significance but not meeting the conventional threshold of 0.05). Overall, while all patients could perform straight leg raising with a brace, there was a tendency for more patients in the Periarticular Cocktail group to experience lag in leg function without support, although these differences were not statistically significant at the conventional level (Table III).

For the Epidural group, 16 patients (32%) achieved $F_{120} E_{10}$, 30 patients (60%) achieved $F_{120} E_{0-5}$, and 4 patients (8%) achieved $F_{120} E_{5-10}$. In contrast, for the Periarticular Cocktail group, only 2 patient (4%) achieved $F_{120} E_{10}$, 40 patients (80%) achieved $F_{120} E_{0-5}$, and 8 patients (16%) achieved $F_{120} E_{5-10}$. The p-value of 0.032 indicates a statistically significant difference in the distribution of ROM between the two analgesia methods, suggesting that the type of analgesia used may influence the range of movement achieved at discharge. Notably, a higher percentage of patients in the Epidural group achieved the best ROM ($F_{120} E_{5-10}$), while a higher percentage of patients in the Periarticular Cocktail group fell into the $F_{120} E_{0-5}$ category (Table IV).

In the present study patients who received periarticular cocktail analgesia showed better performance across all metrics. They took fewer days on average to walk 50 meters without a brace (3.12 vs. 3.88 days) and to climb 14 steps (40.65 vs. 42.60 days), and they walked a significantly longer distance in six minutes on day 10 (482.00 vs. 340.00 meters). The p-values (0.001, 0.048, and 0.000 respectively) indicate that these differences are statistically significant (Table V).

Patients who received periarticular cocktail analgesia achieved a greater mean walking distance of 34.2 meters, compared to 28.36 meters for those who received epidural analgesia. The p-value of 0.039 indicates that this difference in walking distance is statistically significant, providing evidence that the periarticular cocktail analgesia is associated with improved walking distance compared to epidural analgesia (Table VI).

The Knee Society Scores (KSS) for patients who received either Epidural or Periarticular Cocktail analgesia, both before and after the surgery were compared. For the pre-operative functional scores; Patients in the Epidural group had a mean score of 69.84. Patients in the Periarticular Cocktail group had a mean score of 72.28. The p-value of 0.122 suggests that this pre-operative difference is not statistically significant. For the post-operative scores; The Epidural group had a mean score of 80.16. The Periarticular Cocktail group had a mean score of 88.40. The p-value of 0.000 indicates that this post-operative difference is statistically significant (Table VII).

Table IV. — Distribution of analgesia by range of movement at discharge.

RANGE OF MOVEMENT AT DISCHARGE		ANALGESIA USED		Total
		Epidural	Periarticular Cocktail	
$F_{120} E_{10}$	Count	16	2	0.032
	Percentage	32%	4%	
$F_{120} E_{0-5}$	Count	30	40	
	Percentage	60%	80%	
$F_{120} E_{5-10}$	Count	4	8	
	Percentage	8%	16%	
Total	Count	50	50	
	Percentage	100.0%	100.0%	

Table V. — Comparison of Functional Recovery Metrics Between Epidural and Periarticular Cocktail Analgesia.

	ANALGESIA USED	Mean	Std. Deviation	P value
Number Of Days Taken to Walk 50 Meters Without Brace:	Epidural	3.88	0.526	0.001
	Periarticular Cocktail	3.12	0.476	
Number Of Days Taken to Climb a Flight Of 14 Steps	Epidural	42.60	2.887	0.048
	Periarticular Cocktail	40.65	3.851	
Distance Walked in Six Minutes on Day 10:	Epidural	340.00	32.275	0.000
	Periarticular Cocktail	482.00	55.678	

Table VI. — Walking Distance Comparison by Analgesia Method.

ANALGESIA USED	Mean	Std. Deviation	P value
Epidural	28.36	10.40	0.039
Periarticular Cocktail	34.2	9.09	

Table VII. — Comparison of Pre-operative and Post-operative Knee Society Scores for Epidural and Periarticular Cocktail Analgesia.

	ANALGESIA USED	Mean	Std. Deviation	P value
PRE-OPERATIVE FUNCTIONAL SCORE (KSS)	Epidural	69.84	6.349	0.122
	Periarticular Cocktail	72.28	4.430	
KNEE SOCIETY SCORE POST- OPERATIVE	Epidural	80.16	3.912	0.000
	Periarticular Cocktail	88.40	4.041	

DISCUSSION

Our study was aimed at studying the efficacy of periarticular infiltration of a cocktail of drugs described above in controlling pain and enabling early functional recovery after total knee arthroplasty for those patients presenting to a government medical college Patiala & Rajendra hospital, a tertiary hospital with respective indications during the period April, 2023 to April, 2024. We studied 100 patients who had undergone TKA. The study shows that the periarticular infiltration is significantly better than the epidural injection in the first 24 hours after the surgery. Even after the first 24-48 hours, when we would expect the analgesic effect of the injection to wear out, the pain scores were consistently less in the peri articular injection group than in the epidural group. Functional ability in the first 24 hours was also significantly better in the peri articular injection group. And our results are compared with previous literature available is discussed as

The mean age for the epidural group is 60.28 years, while for the periarticular cocktail group it’s 60.88 years. The p-values provided suggested that the differences observed between the two analgesia methods are not statistically significant indicating that age does not seem to be a determining factor in the choice of analgesia method for this particular study. Bajjuri A et al.²⁶ in their study to observe the efficacy of periarticular cocktail injection in controlling pain and early post-operative range of motion after primary total knee replacement reported that the mean age of the study group was 55.7 (±5.92) years. The results of our investigation align with those of previous studies conducted by Reddy MJ et al.²⁷. Their study revealed that the average age of patients undergoing epidural infiltration was 56 years, while the average age of patients receiving analgesic cocktail was 59 years.

In the present study for female patients, 34 (68%) received epidural analgesia, while 24 (48%) received periarticular cocktail. Among male patients, 16 (32%) had epidural analgesia, and 26 (52%) received peri-articular cocktail. In the study done by Reddy MJ et al.²⁷, there were 43 males and 56 females with females

forming 57% of the study population. Of these 22 males and 27 females had epidural. Twenty-one males and 29 females had pericapsular injection of the cocktail This means that while there appears to be a slight preference for epidural analgesia in females and periarticular cocktail in males, this difference is not large enough to conclude that in our study sex is not a determining factor in the choice of analgesia method for this particular study.

The distribution of pre-operative mobility aid use was not significantly different between the two groups (p=0.658). However, it was observed that more walker aid was used in periarticular cocktail group (40% vs 28%). This could potentially indicate a higher level of pre-operative mobility impairment in this group, making their superior post-operative functional outcomes even more notable due to psychological barrier rather than anatomical or organic cause. Salmon P et al.²⁸ have previously highlighted the importance of considering pre-operative mobility status when evaluating post-operative outcomes in TKR.

For pre-operative pain scores, person administered Epidural analgesia had a slightly higher mean score of 7.24 compared to those receiving Periarticular Cocktail, who had a mean score of 7.12. However, this difference was not statistically significant (p-value 0.641). Persons in the Epidural group had a higher mean knee flexion of 83.84 degrees compared to the Periarticular Cocktail group, which had a mean flexion of 79.36 degrees. There was a noteworthy difference in pre-operative knee flexion as p-value is 0.020. This suggests that while pre-operative pain levels were similar between these study two groups, individuals administered with Epidural analgesia had significantly better knee flexion before the operation when compared to those who were injected with Periarticular Cocktail analgesia. Holm B et al.²⁹ have previously reported that pre-operative functional status can impact post-operative recovery in TKA patients.

Patients who administered with Epidural analgesia reported a higher average NPS on the day of surgery, at day 1, 2, 3 and day-10 compared to those who received Periarticular Cocktail analgesia who reported a lower pain score. The statistical significance of the

difference between the two approaches is shown by the p-value. These findings clearly show that, when it came to controlling post-operative pain, Periarticular Cocktail analgesia outperformed Epidural analgesia. Thorsell M et al.³⁰ reported that post-operative pain relief and mobilisation were faster in patients who underwent local infiltration when compared to epidural anaesthesia. Sreedharan Nair V et al.³¹ found that post-operative pain was significantly less in cocktail injected knee (normal saline, Bupivacaine, Ketorolac and Adrenaline) when compared to the control group i.e., who received the same amount of normal saline.

In present study all patients in two allocated groups 25(100%) were able to do SLR with brace (p-value 1.00, indicating no difference between groups). When supine straight leg lifting without a brace, 4 (16%) of Epidural patients and 9 (36%), of Periarticular Cocktail patients exhibited lag (p-value 0.20, showing the difference is not statistically significant). 2(8%) of Epidural patients and 8(32%) of Periarticular Cocktail patients experienced lag on extension in the sitting posture (p-value 0.07, indicating a trend towards statistical significance but not meeting the conventional threshold of 0.05). Overall, while all patients could perform straight leg raising with a brace, there was a tendency for more patients in the Periarticular Cocktail group to experience lag in leg function without support, although these differences were not statistically significant at the conventional level. These results consistently show superior early mobility in the periarticular cocktail group. This is in line with findings from Tsukada S et al.³² who reported improved early ambulation and knee flexion with periarticular injection compared to epidural analgesia.

While all patients in two allocated groups could perform straight leg raising with a brace, it was observed that more patients in the periarticular cocktail group experiencing lag in leg function without support. However, these differences were not statistically significant. Affas F et al.³³, who reported comparable or better quadriceps function with local infiltration analgesia.

A statistically significant variation in the range of motion during discharge was discovered by the study. However, the distribution suggests that while more patients in the periarticular cocktail group achieved F120 E0-5 (80% vs 60%), a higher percentage of epidural patients achieved F120 E10 (32% vs 4%). Contrary to some earlier research, such as that conducted by Spreng UJ et al.³⁴, this mixed finding indicates that there was no discernible difference in knee flexion between the epidural and local infiltration

analgesia groups. Different cocktail compositions or rehabilitation techniques might be the cause of this disparity.

Pre-operative Knee Society Scores (KSS) were similar between the groups (p=0.122), but post-operative scores were significantly higher in the periarticular cocktail group (88.40 vs 80.16, p <0.001). This indicates better overall knee function in the periarticular cocktail group post-surgery. These findings are consistent with those of Kurosaka K et al.³⁵, who reported improved functional outcomes with periarticular injection compared to epidural analgesia at both short-term and long-term follow-ups.

The improved functional recovery and lower pain scores in the periarticular cocktail group suggest a favourable safety profile. This is supported by a systematic review by Marques EM et al.³⁶, which found that local infiltration analgesia was associated with fewer side effects compared to epidural analgesia

While this study focused on early rehabilitation, the significantly better post-operative Knee Society Scores in the periarticular cocktail group (88.40 vs 80.16, p <0.001) suggest potential for better long-term outcomes. This aligns with findings from Dalury DF.³⁷ who reported sustained benefits of periarticular injection at one-year post-surgery compared to patient controlled epidural analgesia.

Vendittoli et al.³⁸ and Lombardi et al.³⁹ have shown that the postoperative range of flexion between the infiltrated and the control group was the same for the first 5 days and at discharge, respectively. In the current study, the range of active flexion was significantly greater in the infiltrated side compared with the non-infiltrated side at the time of discharge (Table IV). This is not hard to explain, as the pain scores in the current study were consistently lower in the infiltrated side when compared with the non-infiltrated side right until the time of discharge.

Toftdahl et al.⁴⁰, more patients receiving periarticular and intraarticular infiltration of ropivacaine cocktail could walk > 3 m, had lower pain scores during activity, and had lower consumption of opioids on the first postoperative day.

More patients in the periarticular cocktail group experienced lag during supine straight leg raising without a brace and lag on extension in sitting posture, though these differences were not statistically significant, and additionally a small sample size of only hundred patients, which may reduce statistical power and generalizability. The short follow-up period of 10 days limits understanding of long-term outcomes. As a single-centre study, its applicability to other

settings may be limited. These limitations suggest areas for improvement in future research to provide more comprehensive and widely applicable findings on analgesia methods for total knee replacement.

CONCLUSION

Comparing periarticular cocktail analgesia to epidural analgesia, the current study suggests that the former may provide better pain management and enable more successful early rehabilitation. The improved functional outcomes and higher knee scores indicate that the benefits extend beyond pain management, potentially enhancing overall surgical outcomes. In conclusion, this study supports the periarticular analgesic cocktail over epidural analgesia for pain management and early rehabilitation following TKR.

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