The Egyptian Journal of Hospital Medicine (January 2025) Vol. 98, Page 106-115

Continuous Femoral Nerve Blockade versus Continuous Epidural Analgesia for Postoperative Pain Relief in Knee Surgeries

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ABSTRACT
Background: For patients to receive the best treatment and have a positive functional result in the postoperative phase, effective pain management is crucial. In recent years, attempts have been made to improve continuous regional analgesic procedures and find nonopioid analgesic adjuncts. The focus of anesthesia-based acute pain care remains on epidural analgesia. Generally speaking, the majority of current research keeps showing the benefits of epidural analgesia when local anaesthetics (Las) are combined with opioids.
Objective: Compare the benefits of continuous femoral nerve block (CFNB) with those of continuous epidural analgesia (CEA) for postoperative pain management after knee surgeries.
Methods: During six months duration there were 28 patients who had total knee arthroplasties performed at Ain Shams University Hospitals. Of these patients, 14 of them had continuous epidural analgesia, 14 had CFNB.
Results: CFNB and CEA differed significantly in pain scores throughout the first six, twelve, twenty-four, forty-eight, and seventy-two hours, although there was no significant difference in the frequency of adverse effects. There was statistically significant increase in the number of patients achieved knee joint movement > 90^o in CEA group than CFNB group at day 1 (71.4% vs 28.6%) and at day 2 (85.7% vs 50%) and at day 3 (100.0% vs 71.4%) with p-value = 0.023, 0.043 and 0.030 respectively. **Conclusion:** Our research showed that when it came to managing postoperative pain following total knee replacement, CEA provided better analgesia and pain control than CFNB.
Keywords: CFNB, CEA, TKR, Knee Surgeries.

INTRODUCTION
Osteoarthritis is known for its gradual development, which can take years or even decades. The patient may become less active over time, making them more vulnerable to conditions like potential weight gain that are linked to a decline in physical activity. The joints may seem normal in the early stages of the illness. However, if weight-bearing joints are affected, the patient's gait could be antalgic. The predominant symptom of osteoarthritis is deep, achy joint pain that is made worse by prolonged usage. Pain is typically the first cause of morbidity in this condition. Crepitus and decreased range of motion are also common. Gelling, or stiffness at rest, can occur; in the morning, this type of stiffness often subsides within less than half an hour [(1)].

When conservative methods are ineffective for treating symptomatic osteoarthritis of the knee, total knee arthroplasty (TKA) is a potential option. The research has not yet found a possibly workable substitute for cartilage regeneration in patients with endstage degenerative alterations that compromise the articular cartilage in many knee compartments. As a result, TKA has shown consistent, long-lasting, positive effects in these patients in terms of reduced pain and enhanced general QOF [(2)].

The targeted administration of an anesthetic agent or agents to a specific body location is known as regional anesthesia. Regional anesthesia is widely utilized for a number of reasons, such as serving as the main anesthetic method during surgery, managing pain during the perioperative phase, and treating a variety of different acute and/or chronic pain conditions [(3)].

Commonly utilized analgesic treatments for TKA include FNB, epidural block, and intravenous patient-controlled analgesia (PCA). For TKA, PCA of opioids serves as the main analgesic. Opioids do, however, have adverse effects that might impair patient comfort and postpone the initiation of physical therapy. Better pain relief is achieved with epidural analgesia. However, there are several adverse effects, including respiratory depression, urine retention, and perioperative hypotension. Nowadays, the most used analgesic technique for TKA is FNB. It has a low risk of complications and is accurate when guided by ultrasonography [(4)].

Aim of this was to compare the benefits of CFNB with those of CEA for postoperative pain management after knee surgeries.

PATIENTS AND METHODS
Over the course of six months, a randomized controlled clinical experiment was carried out at Ain Shams University Hospitals. Male and female patients receiving primary unilateral TKA for osteoarthritis were recruited at least one day before the planned surgery.

Inclusion Criteria: Between the ages of 40- 75; physical status I to III according to the American Society of Anesthesiologists (ASA); BMI < 35 kg/m^2; and proficiency with the VAS pain score.

Exclusion Criteria: Hepatic and renal insufficiency; blood coagulation abnormalities; a contraindication for femoral block; injection site localization; lower extremities thromboembolic conditions; preexisting neuropathy; drug allergies; and use of opioids during the two weeks before surgery.

Received: 12/09/2024
Accepted: 11/11/2024

Study Tools AND/ OR: Every patient had a preoperative evaluation that included a history, a clinical examination, and laboratory testing (CBC, blood chemistry, coagulation profile and viral markers) according to age, physical status and procedure. All patients had full monitoring (ECG, non-invasive blood pressure and pulse oximeter), oxygen nasal prong (3-5 L/min.), IV access (20-22 G cannula). Patients were prepared for day case procedure (short procedure), with standby full airway management equipment and backup general anesthetics. Epidural sets (epidural catheter,18 G Tuohy needle, Filter Set) spinal needle 25, nerve stimulator needle18-gauge, U/S machine with linear probe, sterilizing techniques, local anesthetics, torniquet time calculated, infusion pumps, premedications (ondansetron, ranitidine and antibiotics), and emergency medications (atropine and ephedrine), were all prepared for use.

Study Procedures:

Every patient fasted for two hours for clear liquids and eight hours for solid foods. Two groups of patients were created using computer-generated randomization. The closed envelope approach was used to randomly divided the patients into two groups. Both patients received spinal anesthesia at L3-L4 space for covering the duration of the surgery, via needle 25, total volume of 3.5-4 ml of heavy marcaine and 25 microgram fentanyl under aseptic techniques.

***CFNB group**:* 14 patients underwent FNBs under ultrasound supervision shortly after surgery before being transferred to the PACU. The nerve was located using the Sonosite ultrasound machine's linear probe. After identifying the nerve, a nerve block needle was placed in-plane or out-of-plane to the probe. Needle placement was regarded satisfactory when the tip was visible near the femoral nerve on the ultrasound monitor, then the catheter was placed in place, 0.125% bupivacaine (12.5 ml marcaine +38.5 normal saline started at 5 ml/h in a 50 ml syringe pump) was given via perineural catheter secured in place, for 72 hours.

CEA group: This group included 14 patients. Blocks were administered to the patient in a sitting position, with rigorous sterile preparation and precautions. The L3-4 or L4-5 interspace was detected and localized with 2% lidocaine. The epidural catheter was placed with an 18 G Tuohy needle and fixed in place using the loss-of-resistance method, and a test dose was administered. Postoperative epidural infusion started, continuous infusion with 0.125% bupivacaine (12.5 ml marcaine +38.5 normal saline + fentanyl 2 μg/ml started at 5 ml/h in a 50 ml syringe pump) was given for 72 h.

Before measurements were taken, both the epidural and femoral catheter insertion sites were covered with a hospital gown, and the patients were examined by an anesthetist who was unaware of their group assignment. Side effects were assessed at the same time intervals. Symptoms included dizziness, drowsiness, nausea, vomiting, pruritus, hypotension, and urine retention. Urinary retention was defined as a bladder capacity larger than 400 ml with inability to empty spontaneously, and only one catheterization was conducted. Hypotension was defined as a fall of more than 30% in mean arterial pressure soon before entering the operation room. We used antihistaminics to treat pruritus.

VAS, using the numeric pain rating, was used to quantify postoperative pain using a 10-cm range (0 = no pain to 10 = acute pain), For a maximum of 72 hours following the patient's release from the postanesthesia recovery unit (PACU), each of these outcomes was documented at various intervals (at 0 hours, 2 hours, 6 hours, 12 hours, 24 hours, 48 hours, and 72 hours). We requested that the patients fill out the VAS while they were at rest and moving around. The anesthetists, who were not aware of the research, took all of these measures.

Postoperative hemodynamic changes: were seen over the first 72 hours following discharge from the PACU as changes in heart rate and MAP.

Postoperative rehabilitation course: which were evaluated as follows once per day: amount of patients who are able to move their knees more than 90 degrees; the furthest a patient can walk while undergoing rehabilitation.

Available rescue analgesics: Non opioid analgesics: 50 mg ketorlac IV, second line, opioid narcotics: nalbuphine IV up to 20 mg.

Study Interventions:

Premedications (ondansetron, ranitidine and antibiotics) were given preoperatively, IV access was established with balanced fluid chart measuring input and output (urinary catheter bag, 3rd space, deficit and blood loss), peripheral nerve block (PNB), epidural analgesia was done under complete aseptic techniques in the OR setting, close monitoring of vital data (blood pressure, heart rate, SpO_2), nasal /O_2 mask with O_2 flow if needed.

Ethical approval:

The Ethics Committee of Ain Shams Faculty of Medicine has given its approval to this investigation. Each participant completed a permission form when all information was received. Throughout its implementation, the study complied with the Helsinki Declaration.

Statistical analysis

The process of managing information and analysis of statistics was conducted using SPSS version 22.0. All data were recorded, tabulated, analysed and statistically compared between both groups to identify any significant differences between them. Frequencies and relative percentages were used to illustrate the qualitative data, which were compared by the X^2- test. The mean ± SD and range were used to express quantitative data. Two independent groups of normally distributed variables (parametric data) were compared using the independent samples t-test. A significance level of $P<0.05$ was established.

RESULTS

We performed TKA on 28 patients over the course of six months. Fourteen of these patients experienced CFNB, while fourteen experienced CEA.

The mean age of the individuals in the CFNB group was 61.00 ± 7.64 years, and 64.3% of them were males. Also, the mean age of the participants in the CEA group was 60.21 ± 8.25 years, and the majority of them (57.1%) were males (Table 1).

Table (1): Comparison between CFNB and CEA according to patient characteristics.

		CFNB	CEA	Test value	P- value	Sig.
		No.= 14	No.= 14			
Age (Years)	Mean±SD	61.00 ± 7.64	60.21 ± 8.25	0.262•	0.796	NS
	Range	47 – 73	47 – 73			
Gender	Females	5 (35.7%)	6 (42.9%)	0.150*	0.699	NS
	Males	9 (64.3%)	8 (57.1%)			
ASA	I	3 (21.4%)	5 (35.7%)	1.500*	0.472	NS
	II	8 (57.1%)	8 (57.1%)			
	III	3 (21.4%)	1 (7.1%)			

**:Chi-square test; •: Independent t-test.*

Primary outcomes:

The VAS pain score was used to assess postoperative pain in both rest and movement scenarios. The results indicated that in rest situations, the CFNB group had a VAS score from 3-6 in the first 6, 12, 24, 48, and 72 hours after recovery from anesthesia which indicates mild pain to moderate pain at rest while CEA group seemed to have zero to mild pain in the first 6, 12, 24, 48, and 72 hours after recovery from anesthesia (Table 2).

Table (2): Comparison between CFNB and CEA according to VAS and numeric pain score at rest

VAS and numeric scale at rest		CFNB	CEA	Test value•	P- value	Sig.
		No.= 14	No.= 14			
4hrs	Mean±SD	4.43 ± 1.22	0.86 ± 0.77	9.248	0.010	HS
	Range	3 – 6	0 – 2			
6hrs	Mean±SD	4.36 ± 1.15	0.93 ± 0.73	9.414	0.010	HS
	Range	3 – 6	0 – 2			
12hrs	Mean±SD	3.93 ± 1.00	1.14 ± 0.77	8.272	0.010	HS
	Range	3 – 6	0 – 2			
18hrs	Mean±SD	3.93 ± 1.00	0.79 ± 0.70	9.655	0.010	HS
	Range	3 – 6	0 – 2			
24hrs	Mean±SD	4.14 ± 1.10	1.00 ± 0.68	9.099	0.010	HS
	Range	3 – 6	0 – 2			
48hrs	Mean±SD	4.21 ± 0.97	0.86 ± 0.77	10.109	0.010	HS
	Range	3 – 6	0 – 2			
72hrs	Mean±SD	4.64 ± 1.08	1.07 ± 0.73	10.239	0.010	HS
	Range	3 – 6	0 – 2			

•: Independent t-test

Assessment of VAS at movement showed that the CFNB had worst scores from 7-9 at 6, 12, 24, and 48 hours with limited range of motion. In contrast, CEA group showed best range of motion with vas score ranging from 1-4 indicating better pain control (Table 3 and figure 1).

Table (3): Comparison between CFNB and CEA according to VAS and numeric pain scale at movement

VAS-numeric pain scale at movement		CFNB No.= 14	CEA No.= 14	Test value•	P- value	Sig.
4hrs	Mean±SD	7.64 ± 0.74	2.21 ± 1.19	14.483	0.010	HS
	Range	7 – 9	1 – 4			
6hrs	Mean±SD	7.71 ± 0.91	1.93 ± 1.00	16.004	0.010	HS
	Range	7 – 9	1 – 4			
2hrs	Mean±SD	7.86 ± 0.86	2.00 ± 1.11	15.582	0.010	HS
	Range	7 – 9	1 – 4			
18hrs	Mean±SD	7.64 ± 0.84	2.07 ± 1.21	14.168	0.010	HS
	Range	7 – 9	1 – 4			
24hrs	Mean±SD	7.64 ± 0.84	2.36 ± 1.15	13.871	0.010	HS
	Range	7 – 9	1 – 4			
48hrs	Mean±SD	7.14 ± 1.70	1.86 ± 0.95	10.143	0.010	HS
	Range	4 – 9	1 – 4			
72hrs	Mean±SD	7.71 ± 0.83	2.14 ± 1.10	15.163	0.010	HS
	Range	7 – 9	1 – 4			

•: *Independent t-test*

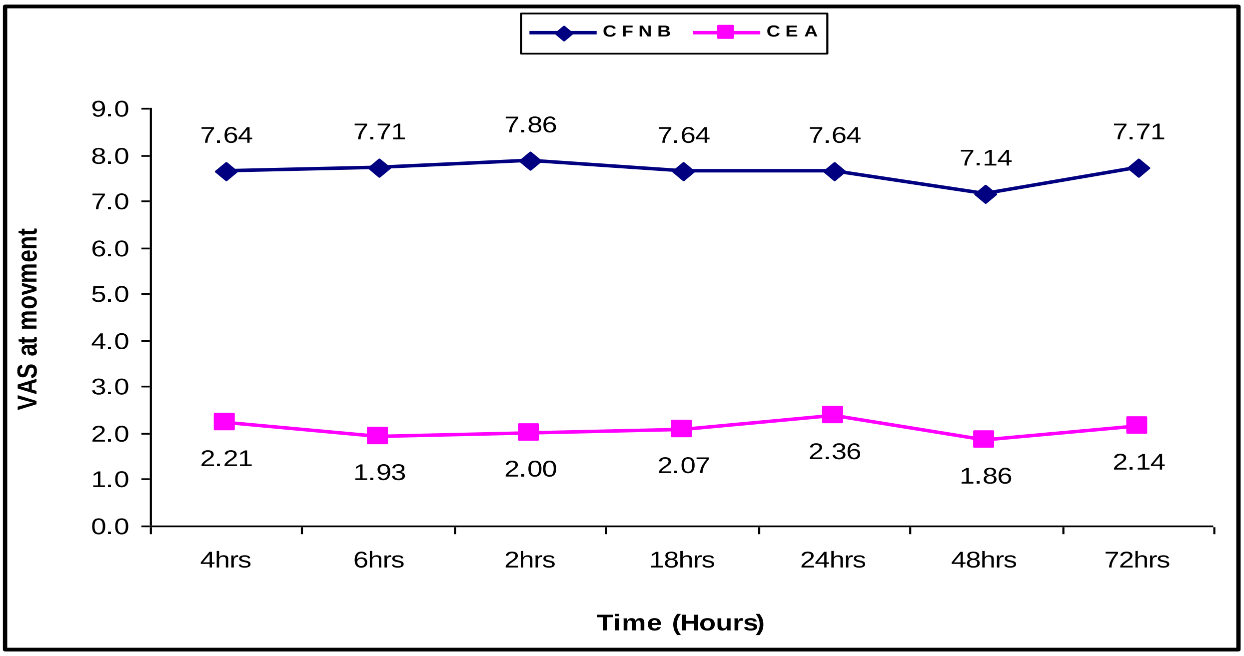

Figure (1): Showing Comparison between CFNB and CEA according to VAS at movement.

- ***Secondary outcome:***

Hemodynamics:

There weren't significant differences between the two groups in hemodynamics, SBP ranged from 120-150 in both groups at 6, 12, 24, 48, and 72 hours postoperatively. Heart rate in the two groups was between 60-90 with some exceptions (Tables 4 and 5 and figures 2 and 3).

Table (4): Comparison between CFNB and CEA according to systolic blood pressure

SBP (mmHg)		CFNB No.= 14	CEA No.= 14	Test value•	P- value	Sig.
4hrs	Mean±SD	134.29 ± 10.89	134.29 ± 10.89	0.000	1.000	NS
	Range	120 – 150	120 – 150			
6hrs	Mean±SD	135.36 ± 10.46	134.29 ± 10.89	0.265	0.793	NS
	Range	120 – 150	120 – 150			
12hrs	Mean±SD	135.36 ± 10.28	135.36 ± 10.46	0.000	1.000	NS
	Range	120 – 155	120 – 150			
18hrs	Mean±SD	135.00 ± 11.60	134.29 ± 10.89	0.168	0.868	NS
	Range	120 – 150	120 – 150			
24hrs	Mean±SD	134.29 ± 9.38	134.29 ± 10.89	0.000	1.000	NS
	Range	120 – 150	120 – 150			
48hrs	Mean±SD	133.21 ± 11.03	134.29 ± 10.89	-0.259	0.798	NS
	Range	120 – 150	120 – 150			
72hrs	Mean±SD	137.14 ± 11.39	134.29 ± 10.89	0.678	0.504	NS
	Range	120 – 150	120 – 150			

•: *Independent t-test*

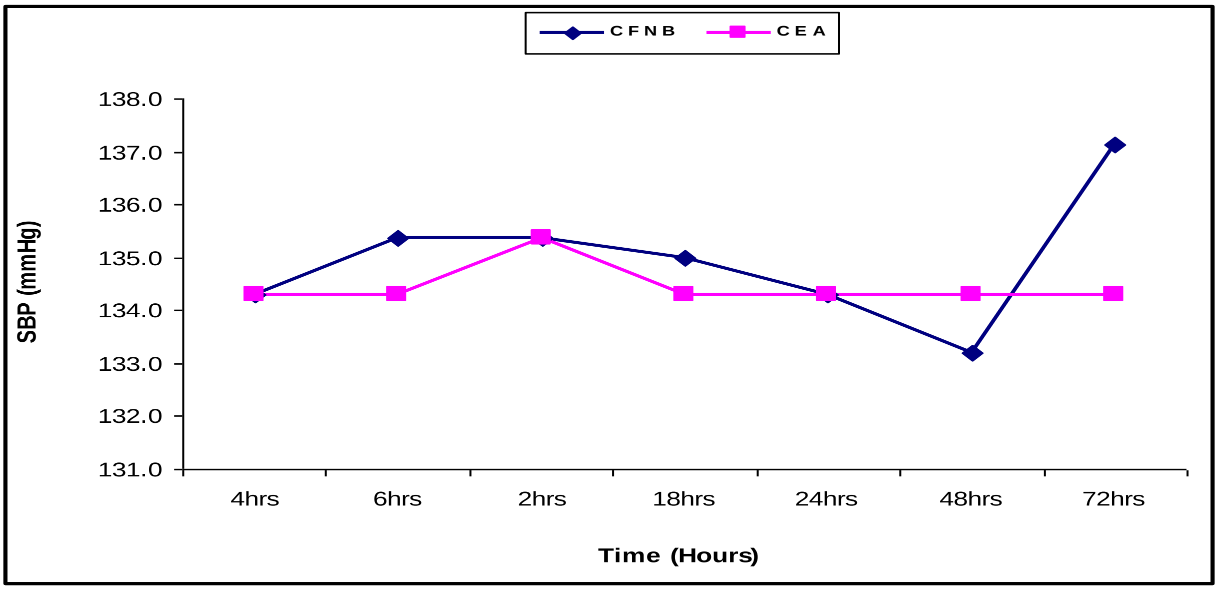

Figure (2): Showing Comparison between CFNB and CEA according to systolic blood pressure.

Table (5): Comparison between CFNB and CEA according to heart rate

Heart rate		CFNB No.= 14	CEA No. 14	Test value•	P- value	Sig.
4hrs	Mean±SD	71.57 ± 4.73	73.86 ± 5.10	-1.229	0.230	NS
	Range	65 – 77	65 – 80			
6hrs	Mean±SD	71.57 ± 4.73	74.43 ± 5.00	-1.552	0.133	NS
	Range	65 – 77	65 – 80			
12hrs	Mean±SD	72.07 ± 5.20	74.07 ± 4.75	-1.063	0.297	NS
	Range	65 – 80	65 – 80			
18hrs	Mean±SD	72.43 ± 5.54	74.14 ± 4.64	-0.887	0.383	NS
	Range	65 – 80	65 – 80			
24hrs	Mean±SD	71.14 ± 5.45	81.71 ± 8.91	-3.787	0.001	NS
	Range	65 – 80	65 – 92			
48hrs	Mean±SD	74.93 ± 4.75	84.36 ± 8.97	-3.477	0.002	NS
	Range	65 – 83	65 – 99			
72hrs	Mean±SD	75.36 ± 4.96	85.07 ± 8.37	-3.737	0.001	NS
	Range	65 – 83	65 – 99			

•: *Independent t-test*

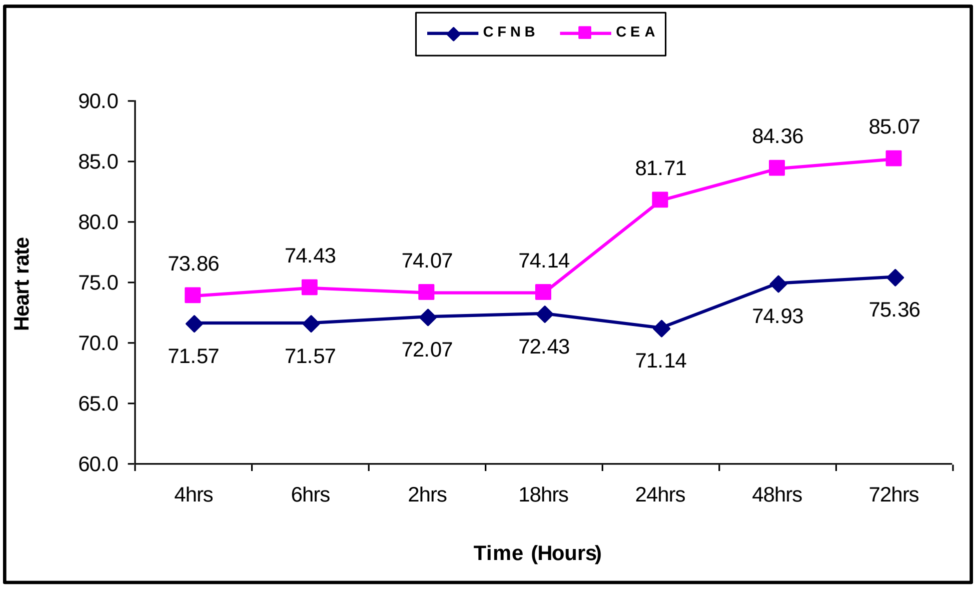

Figure (3): Showing Comparison between CFNB and CEA according to heart rate

Table (6) and figure (4) show that CFNB group experienced less complications than CEA group.

Table (6): Comparison between CFNB and CEA according to incidence of complications

Complications		CFNB No.= 14	CEA No.= 14	Test value*	P- value	Sig.
Nausea	Negative	12 (85.7%)	9 (64.3%)	1.714	0.190	NS
	Positive	2 (14.3%)	5 (35.7%)			
Vomiting	Negative	11 (78.6%)	9 (64.3%)	0.700	0.403	NS
	Positive	3 (21.4%)	5 (35.7%)			
Urinary retention	Negative	14 (100.0%)	7 (50.0%)	9.333	0.002	HS
	Positive	0 (0.0%)	7 (50.0%)			
Headache	Negative	11 (78.6%)	9 (64.3%)	0.700	0.403	NS
	Positive	3 (21.4%)	5 (35.7%)			
Pruritus	Negative	12 (85.7%)	4 (28.6%)	9.333	0.002	HS
	Positive	2 (14.3%)	10 (71.4%)			
Respiratory depression	Negative	12 (85.7%)	7 (50.0%)	9.094	0.043	S
	Positive	2 (14.3%)	7 (50.0%)			

**:Chi-square test*

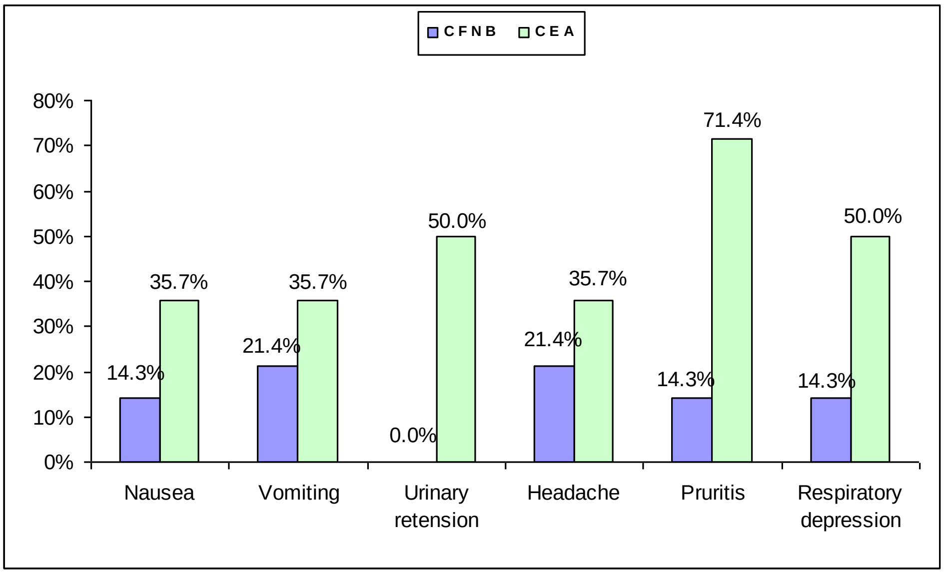

Figure (4): Showing Comparison between CFNB and CEA according to incidence of complications.

There was statistically significant increase in the number of patients achieved knee joint movement > 90° in CEA group than CFNB group at day 1, at day 2, and at day 3 (Table 7).

Table (7): Comparison between the two studied groups regarding secondary outcome

	CFNB (14)			CEA (14)			P^1	P^2	P^3
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3			
Number of patients achieved knee joint movement >90°	4 (28.6%)	7 (50.0%)	10 (71.4%)	10 (71.4%)	12 (85.7%)	14 (100.0%)	0.023	0.043	0.031
Knee joint range of motion (degree)	5 (35.7%)	8 (57.1%)	7 (50.0%)	11 (78.6%)	13 (92.9%)	13 (92.9%)	0.022	0.029	0.012
Daily movement (meter)	9 (64.3%)	10 (71.4%)	8 (57.1%)	14 (100.0%)	14 (100.0%)	14 (100.0%)	0.014	0.031	0.006

P^1: Comparison between CFNB and CEA at day 1; P^2: Comparison between CFNB and CEA at day 2; P^3: Comparison between CFNB and CEA at day 3.

DISCUSSION

Compared to many other postoperative analgesia techniques, PNBs offer strong, site-specific analgesia and are linked to a decreased incidence of adverse effects. Extended analgesia and enhanced functional recovery are offered by continuous catheter methods. These benefits can result in considerable perioperative cost reductions and enable an early release. In a contemporary health care system that prioritizes economical resource usage and a continuous transition to shorter hospital stays and outpatient surgery, this is extremely valuable [(5)].

Postoperative pain management and vas score:

In our study, the VAS pain score was used to assess postoperative pain in both rest and movement scenarios. The results revealed that in rest scenario, the cFNB group had VAS score from 3-6 in the first 6, 12, 24, 48, and 72 hours after recovery from anesthesia which indicates mild pain to moderate pain at rest while CEA group seemed to have zero to mild pain in the first 6, 12, 24, 48, and 72 hours after recovery from anesthesia.

Assessment of VAS score at movement showed that the CFNB had worst scores from 7-9 at 6, 12, 24, and 48 hours with limited range of motion, in contrast, CEA group showed best range of motion with VAS score ranging from 1-4 indicating better pain control.

Vishwanatha and Kalappa [(5)] found, bupivacaine and fentanyl were used in a subarachnoid block as the intraoperative anesthetic for the procedure. The protracted analgesia in the early postoperative time was explained by the administration of intrathecal fentanyl, which prolonged the analgesia without the motor block in both groups.

Over the course of the study, the VAS stayed in the mild pain level. Their study's analgesic effectiveness is comparable to the pattern **Dauri *et al.*** [(6)] saw 36 hours after surgery. On the first, second, and third postoperative days, the VAS at rest during continuous passive motion and during physiotherapy were similar for the two groups [(5)].

Other research has showed that epidural analgesia is more effective than FNB at controlling pain, despite **Sakai *et al.*** [(7)] suggesting that CFNB is a better pain management technique for TKR. Nevertheless, sciatic nerve block and FNB were not combined in these investigations. By lessening posterior knee discomfort, sciatic nerve block might be added to improve pain alleviation. According to research by **Park *et al.*** [(8)]**,** CFNB and sciatic nerve block were just as effective in managing pain as epidural analgesia, and both techniques offered superior pain control both at rest and when moving the knee.

According to the results of the **Park *et al.*** [(8)] sciatic nerve block added to FNB lowers postoperative pain to a level equivalent to epidural analgesia following TKR.

In terms of motor blockage, **Park *et al.*** [(8)] discovered that whereas both limbs were blocked in the EPA group, only the operated lower limb showed motor blockade in the PNB group. Nevertheless, the degree of motor blockage was insufficient to appreciably extend the hospital stay or recovery period. It seems that the impact on motor strength is reduced when analgesic medication is used at low dosages.

When analyzed independently, with or without sciatic block, the research by **Fowler *et al.*** [(9)] found no difference in pain levels between CEA and PNBs. Eighty-three percent of patients in a trial by **Ben-David *et al.*** [(10)] needed continuous sciatic infusion since they did not have equivalent analgesia with CFB alone. 67% of patients who underwent a femoral block needed a sciatic block after surgery, according to **Weber *et al.*** [(11)]. However, in addition to passive and active mobilization of the operated limb, the "unilateral blockade" that CFB achieves promotes early mobilization. **Shanthanna and colleagues** also noted this [12].

According to research by **Shanthanna *et al.*** [12], CFB provided comparable analgesia to CEA following TKR, with the exception of the first six hours, when it was much worse,

Barrington *et al.* [13] demonstrated equal analgesia from the two methods in one of the biggest investigations. According to their observations, calf discomfort was a common complaint among CFB patients. Anatomically, the femoral nerve provides the majority of the nerve supply to the knee joint; however, the sciatic nerve appears to play a significant role in causing leg and calf discomfort [12].

Seo *et al.* [14] retrospective study showed that FNB relieves pain just as well as epidural anesthetic, but without the negative side effects of nausea, vomiting, and itching. There aren't many systemic negative effects and CEA is definitely effective. It has been used extensively in clinical settings. Nevertheless, this process still results in walk restriction, motor block, hypotension, and urine retention.

Patients receiving ultrasound and nerve stimulator guided CFNB for analgesia had a considerably lower VAS at 6 and 12 hours post-TKA than those getting epidural analgesia, and they also needed less parecoxib. Furthermore, CFNB had less of an impact on muscular strength, and patients who received it experienced fewer episodes of nausea and vomiting as well as a quicker time to ambulatory exercise. CFNB is therefore the best technique for analgesia following TKA. This study's length was still brief, though, and careful monitoring of the long-term effects of analgesia in various forms is necessary. Future research is necessary to ascertain whether CFNB might lessen nerve injury. Compared to the PCEA group, the CFNB group's VASs during active and passive excise at 6 and 12 hours post-surgery were significantly lower, indicating that CFNB had superior analgesia, particularly in reducing motor pain [15].

According to **Alsheikh *et al.*** [16]**,** the CEA group experienced a considerably greater incidence of postoperative nausea and vomiting than the Adductor Canal Block group. These results corroborated those of the research by **Kayupov *et al.*** [17]**,** which found that the ACB group had better pain management than the CEA group and experienced less postoperative nausea and vomiting in the early postoperative phase. Furthermore, a meta-analysis by **Gerrard *et al.*** [18] showed that, in comparison to a number other PNB types, CEA was linked to noticeably greater rates of postoperative nausea and vomiting. After TKR, ACB may be regarded as the best analgesic procedure choice based on this level of evidence [16].

During the first eight, twenty-four, and forty-eight hours after surgery, ACB demonstrated statistically significant outcomes in a number of areas as compared to CEA for pain management while at rest. Direct comparison of pain scores, local anesthetic, and opioid intake across the two groups revealed that ACB had much lower visual analog pain scores, despite the belief that it delivers poorer analgesia because of its inadequate sensory coverage of the knee. The advantages of ACB over FNB and local infiltration analgesia is supported by literature [16].

PNB provides the potential benefit of preserving one leg's motor control, which enables early crutch mobility. It is debatable, therefore, whether epidural analgesia and pain management are equivalent. According to some research, epidural analgesia was formerly the "gold standard" for managing pain following TKA and may even be more effective than FNB, particularly in the early postoperative period. However, another research indicated that FNB was superior to epidural. In the trial by **Lu *et al.*** [4]**,** epidural analgesia did not outperform FNB in terms of pain management or postoperative rehabilitation.

Hemodynamics:

Our study showed that there weren't significant differences between the two groups in hemodynamics, SBP ranged from 120-150 in both groups at 6, 12, 24, 48, and 72 hours postoperatively, heart rate in the two groups was between 60-90. **Vishwanatha and Kalappa** [5] study found that neither group's hemodynamics changed significantly during the course of the 72-hour infusion; in line with **Dauri *et al.*'s** study [6].

The main conclusion of a research by **Fowler *et al.*** [9] is that analgesia from a PNB approach employing FNB is similar to that of an epidural but has a reduced risk of hypotension [5].

Complications:

According to our research, the CFNB group saw less side effects and complications than the CEA group.

Study done by **Vishwanatha and Kalappa** [5] found that compared to a single intrathecal morphine dosage, epidural morphine, or a continuous infusion of epidural LA, it has been discovered that the continuous femoral nerve infusion of LA produces comparable analgesia with fewer adverse effects.

The incidence of headache was equal, but the CEA patients had higher rates of pruritus (11 against 1), urine retention (5 versus 1), and dizziness (one patient compared to none in the CFNB group). Bladder catheterization was performed on individuals with urinary retention, reassurance and paracetamol tablets were used to treat a headache in one patient in each group, and no treatment was necessary for those with itching or dizziness [5].

The results of a research by **Park *et al.*** [8] indicated that, in comparison to epidural analgesia, CFNB with single-injection sciatic nerve block had much less adverse effects and offered comparable pain reduction following TKR. Among other adverse effects, those with PNB experienced significantly fewer cases of nausea, vomiting, and urine retention. According to some research, many patients have a variety of adverse consequences following epidural blockage, despite the fact that epidural analgesia has long been regarded as the gold standard for pain treatment following TKR. Urinary retention, pruritus, hypotension, nausea, and vomiting are common side effects; 58–87% of individuals experience at least one side effect.

Zaric *et al.* [19] compared continuous femoral-sciatic nerve block to epidural analgesia following TKR. The peripheral nerve block group saw less adverse effects than the epidural group. Local anesthetic block of S2-4, as well as epidural opioid, can induce urine retention by interfering with natural voiding following epidural blocking. The addition of opioids to local anesthetics for epidural blocking results in postoperative nausea and vomiting. In contrast, peripheral nerve block delivers a more targeted neural inhibition. They did not combine opioids with local anesthetics for PNB.

One limitation of the **Park *et al.*** [8] study is that the two groups used different medicines, which raises the possibility of bias. In contrast to the EPA group, the PNB group experienced less postoperative unfavorable effects. For TKR postoperative pain treatment, CFNB in conjunction with sciatic nerve block might be suggested as a successful substitute for epidural analgesia.

The study by **Shanthanna *et al.*** [12] shows that the epidural group experiences more prevalent side effects than the femoral group. The higher dosage of morphine in the PCEA group may have contributed to the much-decreased incidence of nausea and vomiting in the CFNB group compared to those receiving epidural analgesia.

Patients and healthcare professionals are often concerned about complications brought on by postoperative analgesia following total knee arthroplasty. According to our research, the FNB analgesia group experienced the fewest adverse effects when compared to the PCA and epidural groups. All of the patients in the FNB group did not have any headaches, respiratory depression or desaturation, or urine retention. Additionally, compared to the epidural and PCA groups, the FNB group had a much-decreased prevalence of cardiac complications and nausea and vomiting. As stated by **Patel *et al.*** [20] **and Adogwa *et al.*** [21]**,** early ambulation is made possible by a decrease in side effects. This shortens hospital stays and lowers the risk of nosocomial infections while enabling early ambulation and physical therapy participation, which enhances postoperative rehabilitation and patient satisfaction.

CONCLUSION

Our research showed that when it came to managing postoperative pain following total knee replacement, CEA provided better analgesia and pain control than CFNB.

No funding.
No conflict of interest.

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