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A Comparative study between combined femoral sciatic block vs. epidural analgesia after total knee replacement

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Abstract: Background: Surgeries of the knee are associated with moderate to severe postoperative pain, so these procedures are better to be done under regional anesthetic techniques which reduce neuroendocrinal stress responses, central sensitization of the nervous system and muscle spasms which occur in response to painful stimuli. **Aim of the Work:** to compare between epidural anesthesia and femoral and sciatic nerves block in adult patients undergoing total knee replacement including comparison of analgesic efficacy, side-effects, and complications. **Patients and Methods:** The study was performed upon 30 patients, and randomly distributed among two groups: **Group A:** 15 patients received lumbar epidural anesthesia followed by general anesthesia and **Group B:** 15 patients received femoral and sciatic nerves block followed by general anesthesia. For each patient, the following data were collected: age, sex, weight, height, ASA, duration of surgery, hemodynamic changes, incidence of postoperative complications, pain scores, morphine consumption, rehabilitation indices and duration of hospital stay. **Results:** showed that performing femoral and sciatic nerves block provided effective unilateral analgesia, equivalent rehabilitation and duration of hospital stay in addition to fewer complications in comparison to epidural anesthesia such as hypotension, postoperative vomiting and urinary retention. **Conclusion:** Femoral and sciatic block technique placed under ultra-sound guidance for postoperative pain control provides equivalent analgesia, opioid consumption, postoperative rehabilitation and hospital stay with a lower incidence of hemodynamic side effects when compared to epidural analgesia in patients undergoing moderate to major knee surgeries.

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Key words: femoral sciatic block, epidural analgesia, total knee replacement

1. Introduction

Knee surgery can generate significant postoperative pain. Pain is one of the most common symptoms requiring hospital admissions after outpatient surgery. Poorly treated pain can have negative impact on recovery especially owing to disruption in physiotherapy resulting in stiffness of joints and slow progress in mobility [(1)].

Regional blocks of the lower limb using a combination of a sciatic nerve block with a femoral nerve block is an alternative technique to the conventional neuraxial (spinal or epidural) anesthesia, which is problematic as the patients may be septic with unstable cardiovascular system, and spinal/epidural anesthesia may drop the blood pressure further [(2)].

For complex knee surgery, the use of femoral sciatic block (FSB) was associated with less pain; the use of femoral nerve block (FNB) or FSB was associated with fewer hospital admissions [(2)].

Despite the growing interest in the use of ultrasound (US) imaging to guide performance of regional anesthetic procedures such as peripheral nerve blocks, controversy still exists as to whether US is superior to previously developed nerve localization techniques such as the use of a peripheral nerve stimulator (PNS) [(3)].

Aim of the work

The purpose of this study is to compare efficacy, side effects, opiate consumption and hemodynamic effects of femoral and sciatic nerves block placed under ultrasound guidance versus epidural analgesia, in postoperative period in patients undergoing total knee replacement surgery.

2. Patients and methods

This single center comparative randomized study was performed on thirty ASA I, II and III normal coagulation profile patients presenting to Nasser institute hospitals for total knee replacement surgeries after providing written consents. Participants were instructed about the use of patient controlled analgesia device (PCA) and visual analog pain scale (VAS). Approval was obtained from the research ethics

committee of anesthesia and intensive care department. In this study all patients were preoperatively assessed for evaluation of their medical status.

Patients with the following conditions were excluded from the study: Refusal to participate in the study, Peripheral neuropathies, Hypersensitivity to drugs used for analgesia, Non effective blocks, Infection at the site of puncture, Spinal deformities or history of spinal surgery, Morphine intolerance, coagulation disturbances, patients with chronic pain and rheumatoid arthritis, morbid obesity (BMI > 40 kg/m2), a history of chronic pain, diabetics, chronic renal failure, or psychiatric disorder and drug or alcohol abuse.

Anesthetic protocol:

All anesthetic blocks were performed by the same anesthesiologist, and general anesthesia was induced for all patients. All blocks were performed under complete aseptic techniques, using fenestrated sterile fields, sterile gloves, cap and face mask. Patients were assigned randomly into two equal groups: Group A: (n = 15): patients receiving continuous epidural analgesia (EPI) followed by general anesthesia. Group B: (n = 15): patients receiving ultrasound guided femoral and sciatic nerves block (PNB) followed by general anesthesia.

Methodology

Preoperative day:

Routine preoperative assessment was done for every patient including: history, clinical examination, laboratory investigations (complete blood picture, kidney function tests, liver function tests, coagulation profile) and ECG was done for patients above 40 years. The study protocol was explained to the patients after taking their consent.

Operative day:

Anesthetic technique:

Upon arrival of the patient to the induction room, blood pressure and heart rate were measured and recorded. A suitable peripheral vein was cannulated, 10-30 mcq/kg midazolam was given for sedation and Ringer solution of 10 ml/kg started.

Upon arrival to the operating room, continuous monitoring with electrocardiography, non-invasive blood pressure and pulse oximetry was started.

In all cases Povidone-iodine (Betadine®) was used for antisepsis of the skin of the groin, gluteal and lumbar regions, and the blocks were performed under complete aseptic conditions.

Group A (EPI): 15patients who received lumbar epidural anesthesia: Under complete aseptic conditions and after skin sterilization, local anesthesia was given by infiltration of the skin and subcutaneous tissues with 3-5 ml lidocaine 2%. A 20G lumbar epidural catheter **(Perifix B-BRAUN)** (figure 21) was placed at the L_{3-4} level in the sitting position using loss of resistance technique through an 18G Tuohy needle. Catheters were fixed to the skin leaving 4cm in the epidural space. 3 mL lidocaine 2% with adrenaline (1:200 000) were given to test for intravascular or intrathecal placement. Catheter will be removed and placed in one higher level if heart rate increased more than 10-20% above baseline. Thereafter bupivacaine 0.25% was given in 5-mL aliquots every 5 minutes to attain a level of analgesia at the 10^{th} thoracic dermatome. Onset and level of analgesia were verified using ice pack skin test.

Group B (PNB): A Sono Site 180 plus portable ultrasound unit (Sono Site TM, Bothell, WA, USA) with a 5–12 MHz linear probe and a low frequency curved probe was used to visualize the targeted nerves, needle, distribution of the local anesthetic and the placement of the catheters. The sciatic nerve was identified using the curved probe through posterior approach technique while the patient is in the lateral position with side to be blocked uppermost and hip slightly flexed. After sterilization, entry point was infiltrated by local anesthesia using 3-5 ml lidocaine 2%. 25 mL of bupivacaine 0.375% was administered to encircle the nerve. The femoral nerve was identified using the linear probe under the inguinal ligament lateral to the femoral artery. After local infiltration of entry point with 3-5 ml lidocaine 2%, 30 mL of bupivacaine 0.375% was injected as a bolus encircling the nerve through needle. For patients <70 kg, the doses were reduced proportionately (maximum dose bupivacaine 3 mg kg-1).

Induction of general anesthesia in both groups:

General anesthesia was induced with propofol 2–2.5 mg/kg and fentanyl 0.5 -1ug/kg and maintained with continuous infusion of propofol 50-100µg/kg/min and fentanyl l 0.5-1µg/kg/h. A laryngeal mask airway was inserted, and patients' lungs were ventilated with minute ventilation sufficient to maintain normocapnia (end tidal 30-35mmHg). Infusion rates were adjusted in accord with the patient reaction to surgical stimuli; arterial blood pressure, heart rate, and bispectral index monitor readings (40–50 U were planned during surgery).

Blood pressure (mean pressure) and heart rate (HR) were recorded immediately before the blockade, before skin incision at the beginning of the procedure, and one minute after skin incision then every 10 minutes until the end of the surgery. Ringer infusions and ephedrine were given as required in accord with standard procedure (MAP≤ 60) and total amount of ephedrine used was recorded.

Surgery was performed with a tourniquet inflated to 350 mm Hg. The infusions were stopped after tourniquet deflation at the end of the operation. After

full recovery, laryngeal mask was removed, patient transferred to PACU and full monitoring started

In PACU:

In the PACU, the epidural catheter (patients in the EPI group) was connected to a fersenius syringe pump containing bupivacaine 0.125% and fentanyl 2 µg/mL. Syringe pumps volume was 50 mL for group A, and the infusion rate was 5-10 mL/h. All patients had access to IV morphine PCA infuser set to allow a bolus of 1 mg with a lockout period of 5 min and maximum dose of 20 mg/h. The patients were given paracetamol 1g 4 times daily. If patients had a VAS > 3 at rest, 5 mL bupivacaine 0.5% bolus were given through the catheters. If the pain score is >5, 5 mL of lidocaine 2% bolus was given.

Thromboprophylaxis, low molecular weight heparin (LMWH) subcutaneously was administered daily from the day of surgery (after induction of general anesthesia) until discharge. epidural catheter was removed on the evening of the second postoperative day at least 10 h after LMWH was given.

Patients with nausea and vomiting were given ondansetron 4 mg as required, and dexamethasone 8mg IV if symptoms persisted.

In the ward (Postoperative period):

Twice-daily visits at 2 and 4 h postoperatively and at 11 am and 3 pm on the first, second, and in the morning of the third postoperative days were performed focusing on side effects, pain severity as assessed by VAS scale, PCA morphine consumption, Rehabilitation indices, and Duration of admission.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0**.** **(**Armonk, NY: IBM Corp**)** Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation and median. Significance of the obtained results was judged at the 5% level.

3. Results

As regards age, sex, body weight, height and duration of surgery, there were no statistically significant differences between both groups. (Tables 1, 2).

Table (1): Comparison between the two studied group according to the age, sex, weight and height.

	Epidural nerve block (n = 15)	**Femoral & sciatic NB (n = 15)**	**Test of sig.**	**p**
Age/years				
Median (Min. – Max.)	49.0(39.0 – 50.0)	47.0(38.0 – 50.0)	t=1.306	0.202
Mean ± SD.	47.73 ± 3.08	46.07 ± 3.86		
Sex				
Male	6(40.0%)	9(60.0%)	^{2}= 1.200	0.273
Female	9(60.0%)	6(40.0%)		
Weight/kg				
Median (Min. – Max.)	100.0(89.0 – 130.0)	98.0(80.0 – 112.0)	t=1.391	0.175
Mean ± SD.	101.07 ± 10.46	95.87 ± 10.0		
Height/cm				
Median (Min. – Max.)	158.0(151.0 – 164.0)	160.0(153.0 – 165.0)	t= 1.685	0.103
Mean ± SD.	157.53 ± 3.91	159.80±3.45		

χ^2: **Chi square test** **t: Student t-test** p: p value for comparing between the two groups
*: Statistically significant at p ≤ 0.05

Medical history

Showed no significant statistical difference between both groups *(P-value >0.05) (*table 4).

Table (3): Comparison between the two studied groups according to medical history

Medical history	**Epidural nerve block (n = 15)**	**Femoral & sciatic NB (n = 15)**	χ^2	**p**
No	4(26.7%)	5(33.3%)	0.159	^{FE}p=1.000
Yes	**11(73.3%)**	**10(66.7%)**		
DM	5(33.3%)	5(33.3%)	0.0	1.000
HTN	4(26.7%)	4(26.7%)	0.0	^{FE}p=1.000
Allergic	1(6.7%)	1(6.7%)	0.0	^{FE}p=1.000
Bronchial asthma	2(13.3%)	1(6.7%)	0.370	^{FE}p=1.000
Rheumatic heart	2(13.3%)	2(13.3%)	0.0	^{FE}p=1.000

Blood Pressure

Concerning blood pressure monitoring, a drop in systolic and diastolic blood pressure was more encountered in group A with statistically high significant values corresponding to the 20th and 30th minutes intra operatively respectively (P value <0.001) (table 4).

Table (4): Comparison between the two studied groups according to systolic blood pressure

	Systolic blood pressure (mmHg)		t	P
	Epidural nerve block (n = 15)	Femoral & sciatic NB (n = 15)		
Pre	136.13 ± 18.15	129.60 ± 8.73	1.257	0.223
Intraoperative				
20 min.	96.0 ± 9.10	113.93 ± 25.15	2.597*	0.018*
30 min.	95.27 ± 7.49	117.33 ± 8.37	7.609*	<0.001*
Postoperative				
6 hr.	114.33 ± 14.50	118.87 ± 14.06	0.869	0.392
24 hr.	112.80 ± 14.94	120.13 ± 6.84	1.728	0.100
48 hr.	116.67 ± 12.91	118.73 ± 7.22	0.541	0.594

Data was expressed by using **mean ± SD.** **t: Student t-test** p: p value for comparing between the two groups
*: Statistically significant at p ≤ 0.05

Table (5): Comparison between the two studied groups according to diastolic blood pressure

	Diastolic blood pressure (mmHg)		T	P
	Epidural nerve block (n = 15)	Femoral & sciatic NB (n = 15)		
Pre	81.67 ± 11.60	89.33 ± 14.39	1.607	0.119
Intraoperative				
20 min.	61.0 ± 8.06	73.0 ± 10.88	3.433*	0.002*
30 min.	58.33 ± 6.45	78.07 ± 4.68	9.584*	<0.001*
Postoperative				
6 hr.	68.93 ± 9.22	79.93 ± 10.96	2.967*	0.006*
24 hr.	68.67 ± 6.40	78.0 ± 9.60	3.133*	0.004*
48 hr.	70.67 ± 7.99	80.33 ± 5.50	3.861*	0.001*

Data was expressed by using **mean ± SD.** **t: Student t-test** p: p value for comparing between the two groups
*: Statistically significant at p ≤ 0.05

Heart rate

Heart rate measurements showed significant increase in the heart rate in group B corresponding to the 20thand 30th minutes respectively *(P-value < 0.001).* Otherwise, measurements done during the whole operation were statistically non-significant *(P-value >0.05) (table 7, figure 30).*

Table (6): Comparison between the two studied groups according to heart rate

	Heart Rate (Beat/min.)		t	p
	Epidural nerve block (n = 15)	Femoral & sciatic NB (n = 15)		
Pre	83.27±13.03	85.27±8.97	0.490	0.628
Intraoperative				
20 min.	76.13±6.86	79.47±9.56	1.097	0.282
30 min.	71.53±5.13	79.47±7.31	3.442*	0.002*
40 min.	71.0±4.68	70.80±5.17	0.111	0.912
Postoperative				
6 hr.	71.33±5.60	71.80±4.44	0.253	0.802
24 hr.	68.47±4.78	68.0±4.12	0.286	0.777
48 hr.	66.67±3.39	63.73±3.03	2.495*	0.019*

Data was expressed by using **mean ± SD.** **t: Student t-test** p: p value for comparing between the two groups
*: Statistically significant at p ≤ 0.05

Intraoperative ephedrine administration

Regarding the intraoperative use of ephedrine to treat hypotension episodes, data showed significant higher incidence of ephedrine usage among group A *(P value <0.5).*

Morphine consumption:

No statistical difference detected between both groups regarding morphine consumption (*P-value >0.05*) *(table 7).*

Table (7): Comparison between the two studied groups according to ephedrine and morphine administration

	Epidural nerve block (n = 15)	**Femoral & sciatic NB (n = 15)**	χ^2	**p**
Ephidrine administration				
No	9(60.0%)	11(73.3%)	0.600	0.439
Yes	6(40.0%)	4(26.7%)		
Morphine adminstraion				
No	4(26.7%)	5(33.3%)	0.159	FE p= 1.000
Yes	11(73.3%)	10(66.7%)		

χ^2: **Chi square test** **FE: Fisher Exact**
p: p value for comparing between the two groups

Postoperative Side effects

The incidence of one or more side effect such as sedation, dizziness, nausea and/or vomiting was higher in the group A compared to group B with a statistically difference (*P- value< 0.5*).

Regarding postoperative urinary retention, there was significantly higher incidence of urinary retention in group A *(P-value <0.5) (table 9).*

Table (8): Comparison between the two studied groups according to Post op. complication

Post op. complication	**Epidural nerve block (n = 15)**	**Femoral & sciatic NB (n = 15)**	χ^2	**P**
Urine retention				
No	7(46.7%)	12(80.0%)	3.589	0.058
Yes	8(53.3%)	3(20.0%)		
Others				
No	9(60.0%)	11(73.3%)	0.600	0.439
Yes	6(40.0%)	4(26.7%)		

χ^2: **Chi square test** p: p value for comparing between the two groups

Pain

Pain assessment (VAS) showed higher incidence in group A with a statistically significant difference between both groups *(P value<0.05) (table 9).*

Table (10): Comparison between the two studied groups according to pain

	Pain		**U**	**P**
	Epidural nerve block (n = 15)	**Femoral & sciatic NB (n = 15)**		
2 to 4 hr. postoperative				
Median (Min. – Max.)	1.0(0.0 – 2.0)	1.0(0.0 – 4.0)	81.0	0.202
Mean ± SD.	0.87 ± 0.74	1.53 ± 1.30		
1st day				
Median (Min. – Max.)	7.0(4.0 – 10.0)	4.0(0.0 – 6.0)	17.0*	<0.001*
Mean ± SD.	7.07 ± 1.94	3.13 ± 1.96		
2nd day				
Median (Min. – Max.)	5.0(0.0 – 8.0)	1.0(0.0 – 1.0)	25.50	0.461
Mean ± SD.	4.27 ± 2.58	0.60 ± 0.51		

U: Mann Whitney test p: p value for comparing between the two groups *: Statistically significant at $p \leq 0.05$

Postoperative rehabilitation

Regarding postoperative rehabilitation program designed for both groups, patients in the group B showed better fulfillment of the mobilization program and in the degrees of active knee flexion as evaluated by physiotherapists yet no statistically significant difference could be detected *(P-value >0. 5).*

4. Discussion

Total knee replacement surgery is associated with severe postoperative pain. Inadequate analgesia can produce unnecessary distress, suboptimal knee mobilization and medical complications due to immobility. These factors are likely to delay rehabilitation. A number of analgesic strategies have been adopted to minimize pain after knee arthroplasty. Studies suggest that regional techniques provide superior pain relief and faster postoperative knee rehabilitation than systemic analgesia. Until relatively recently, regional techniques have largely been confined to epidural or spinal approaches. However, peripheral neural blockade has been shown to provide effective analgesia with potentially less morbidity than central neuraxial techniques [(1)].

In the present study we found statistically significant difference in the systolic blood pressure measured intra operatively at 20th and 30th min with more drop in group A (EPI) than group B (PNB){ 96 (9.1) and 95.27(7.49) versus 113.93(25.15) and 117.33(8.37) respectively while in diastolic blood pressure measured intra operatively at 20th and 30th min with more drop in group A (EPI) than group B (PNB)#61(8.06) and 58.33(6.45) versus 73(10.88) and 78.07(4.68)# respectively with a P value < 0.001}. Also there was significant increase in heart rate from baseline readings in the 20th, 30th and 40th minutes in group **B** compared to group **A** (P value < 0.001).

The incidence of ephedrine administration intra-operatively was found to be statistically significant being higher in group A compared to group **B** with a P value < 0.5.

The result agree with a study *by* ***Chelly and his colleaguesin*** [(4)] to determine the effects of continuous femoral infusion (CFI) on total knee arthroplasty recovery. They enrolled a total of 92 patients who were distributed in 3 groups: patients in group 1 received general anesthesia followed by patient-controlled analgesia (PCA) with morphine, patients in group 2 received general anesthesia combined with 3-in-1 paravascular and anterior sciatic blocks followed by continuous femoral infusion (CFI), while patients in group 3 received general anesthesia combined with EPA followed by a continuous EPA infusion. Results showed that the overall cardiovascular stability was increased with the use of blocks, as indicated by a 56% reduction in cardiovascular complications compared with either epidural analgesia or general anesthesia alone. The use of blocks was associated with a reduction of hypotension by 66% and bradycardia by 77% compared with general anesthesia and by 69% and 81% compared with epidural analgesia.

Also agree with **Roukand Kheir,** [(5)] study at which Intra-operative stable arterial blood pressure (at 15-90min. post-injection of local anesthesia) in the femoral-sciatic block group was significant when compared with the epidural group, and with **Fowler et al.,** [(6)] systematic review and meta-analysis of randomized trials (eight studies with total 510 patients), who found that hypotension occurred more frequently in patients who received an epidural more than femoral-sciatic block.

On the contrary **Al-Zahrani et al.,** [(7)] performed ultrasound guided combined continuous femoral block with single shot sciatic blocks (n=25) versus epidural infusion (n=25) for post-operative analgesia following unilateral total knee arthroplasty (both groups received general anesthesia after the regional techniques), and found no significant difference in the mean arterial pressure or the heart rate in the first 72 hours. and also disagree with **Horasanli et al.,** [(8)] who used combined lumbar plexusfemoral block (n=40) versus epidural anesthesia (n=40) for total knee arthroplasty, stated that changes in arterial blood pressure.

Also the results in this study disagree with a study done by **Shanthanna and his colleagues** [(9)] who compared ultrasound-guided continuous femoral nerve blockade versus continuous epidural analgesia for pain relief following total knee replacement. They recorded hypotension as a side effect with higher percentage in the epidural group (4 out 19 patients) compared to the femoral group, however this was found to be statistically non-significant (P value 0.66). The incidence of common side effects (including hypotension) observed with CEA was lower in the CFB group by more than half. Although a statistical difference could not be achieved, which was justified by the authors, probably because of the small number of subjects.

In the present study we compared efficacy of analgesia between both groups using VAS. Patients were assessed in the PACU, on the first and second postoperative days, and in the morning of the third postoperative day. Statistical analysis showed no significant difference between both groups (P value > 0.05).

The results in this study also agree with a study by **Zaric et al.** [(10)], who compared epidural analgesia with continuous femoral and sciatic nerves block in

unilateral total knee replacement. They found median VAS at 2 and 4 hours after conclusion of surgery to be zero in both groups with a P value of 0.07 and 0.14 respectively. On the 1st and 2nd postoperative days, VAS at rest and on mobilization where low and comparable.

Also agree with **Park et al., [11]**in this study they found that femoral nerve block combined with sciatic nerve block was equivalent to epidural analgesia in terms of pain management, and both methods provided excellent pain control at rest and during knee movement at which VAS during the 1st and 2nd day was 1 and zero respectively with a P value of (0.63,0.95) respectively. In accordance with these findings, previous randomized controlled studies have also shown that the addition of sciatic nerve block to femoral nerve block reduces postoperative pain to a level comparable to epidural analgesia after TKR.

The results in this study differ from the study by **Shanthanna et al. [9]** in their study found statistically significant difference in pain assessment using VAS at 6 hours postoperatively being 2.32 ± 1.1 in epidural group compared to 4.26 ± 1.09 in the femoral group (P value <0.001), after which there was a declining trend and scores were essentially similar from 24 h.

Also the results in this study differ from the study by **Davies et al. [12].** Their results showed that the median analgesic efficacy of both groups was greatest at discharge from recovery and at 6 h postoperatively. Pain scores were higher at the 24 and 48 h assessments in both groups. Median (95% CI) analogue scale scores were 0 (0–0), 15 (0–30), 55 (38–75) and 54 (30–67) mm for epidural block and 0.5 (0–22), 21.5 (10–28), 40 (20–50) and 34.5(21–55) mm for combined block. VAS pain scores with the combined blocks were significantly lower at 24 h (P=0.004). These results could be attributed to their use of higher concentrations of bupivacaine (0.375%).

However in a study made by **Sundarathiti et al**. [13] to compare continuous epidural infusion (CEI) with continuous femoral nerve block (CFNB) regarding the postoperative analgesic efficacy, side effects, postoperative knee rehabilitation, and hospital length of stay. They found that pain scores in the CFNB group were significantly higher than those in the CEI group at postoperative 6-12 hours (P value of 0.001 and 0.004 respectively). Failure of the femoral block to block the sciaitc and obturator nerves may explain its decreased efficacy compared to CEI group.

In the present study we compared morphine consumption using the patient controlled analgesia (PCA) device. Both groups used their PCA, yet no significant difference detected (Group A 25.67 ± 5.86 versus group B 26.067 ± 5.46) with a P value 0.785.

The results also agree with the study done by **Zaric et al. [10],** who stated that PCA morphine usage was the same in both groups in the 1st and 2nd postoperative days being 32.6 ± 26 and 32.3 ± 25.7 with a P value 0.83 in the EPI group versus 31 ±26 and 30.2 ± 26.3 in the PNB group respectively with a P value 0.78.

In the present study we found that incidence of side effects such as sedation, dizziness, nausea and/or vomiting were higher in group A compared to group B. 7 patients experienced one or more side effect in group A compared to 1 patient in group B with statistically significant difference (P value=0.05), regarding urinary retention there was significantly higher incidence in group A compared to group B (P value 0.001).

Our results also agree with those of **Zaric et al. [10],** who found that urinary retention was more pronounced in the EPI group on the day of surgery (P=0.002) and the first postoperative day (P=0.001). The combined frequency of moderate and severe degrees of dizziness, pruritus, sedation, PONV, and urinary retention was higher in the EPI group on the first postoperative day (87% of patients had experienced one or more of these side effects as compared with the patients in the PNB group, where only 35% experienced side effects; P =0.0002).

The results in this study is in disagreement with a study by **Shanthanna et al. [9]** who stated that despite the higher incidence of PONV which was twice more common in the continuous epidural group compared to continuous femoral group yet no statistically significant difference could be detected (P value 0.4). Also in their study, only one patient in the femoral group had urinary retention compared to four patients in the epidural group which was statistically non-significant (P value 0.34). Failure to obtain statistical significance was probably due to the small number of subjects.

In the present study, patients in the group B showed better fulfillment of the mobilization program and in the degrees of active knee flexion as evaluated by physiotherapists yet no statistically significant difference could be detected (P value 0.19). Regarding postoperative hospital stay duration, data showed no difference in the durations of hospital stay among both groups (P value 0.084).

The results agree with the study of **Barrington et al. [14]**who stated that there were no significant differences between both groups regarding postoperative range of movement in the operative knee during postoperative days 1–The results in the present study also go in concordance with the study done by **Shanthanna et al. [9]**who found that rehabilitation scores were nearly the same in both groups with P values > 0.05 for flexion, extension and range of motion during the 1st and 2nd postoperative days.

5. Conclusion

The choice of femoral and sciatic block technique placed under ultra-sound guidance for postoperative pain control provides equivalent analgesia, opioid consumption, postoperative rehabilitation and hospital stay with a lower incidence of hemodynamic side effects when compared to epidural analgesia in patients undergoing moderate to major knee surgeries such as total knee replacement. It is also associated with decreased risk of postoperative side effects as sedation, dizziness, nausea and\or vomiting and urinary retention.

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