

Comparative Evaluation of Femoral Nerve Block & Intravenous Fentanyl for Positioning During Spinal Anesthesia in Surgery of Femur Fractures

K. Maheshwar Reddy¹, Vishnu Vardhan Reddy², B. Bhavana³

ABSTRACT

Introduction: Femur fractures configure an important public health issue and are associated with high mortality taxes and lose of functionality. Study aimed to compare the analgesic effects of FNB with intravenous (IV) fentanyl prior to positioning for spinal block in patients with fractured femur.

Material and Methods: Sixty patients scheduled for fractured femur surgery under spinal block. They were grouped as FNB group (n=30) and a fentanyl group (n=30). A spinal block was performed. Pain scores 15 minutes after analgesia and during positioning were recorded. A numeric rating pain scale (0 = no pain, 10 = maximal pain) was used. Additional fentanyl requirement during positioning and satisfaction with patient position maintained for spinal block (yes = satisfactory, no = not satisfactory) were also recorded.

Results: Base line values for Heart Rate (HR), Mean Arterial Pressure (MAP) and type of surgery were comparable in both the groups. We found an insignificant difference in HR ($P > 0.001$) among the groups and a significantly lower MAP in FENT group ($P = 0.0090$). SpO_2 was significantly lower in FENT group ($P < 0.001$).

Conclusion: Femoral nerve block lowers pain and the need for supplementary analgesia requirement.

Keywords: Femoral Nerve Block, Femur Fractures, Intravenous Fentanyl, Spinal Anesthesia.

prior to the surgery was not carried. Analgesics generally used were opioids and non-steroidal anti-inflammatory drugs. But these drugs were having side effects and complications. Hence in cases of femoral fractures, proper pain management is considered as vital.^{3,4}

One such alternative to these oral drugs is femoral nerve block (FNB). It is considered as a safe method which is injected directly or with ultrasound guidance. Parker et al found that FNB effectively reduced pain on movement within 30 minutes than an intravenous analgesic (IVA). Opiates and non-steroidal anti-inflammatory drugs are the common used drugs, but they can bring some complications, which are more severe in aged individuals.^{5,6}

Providing adequate pain relief not only increases comfort in these patients, but has also been shown to improve positioning for spinal block. Analgesics or femoral nerve block (FNB) are often used to help the patient tolerate positioning. There are few data to establish a benefit of one form of anesthetic over another in this situation.^{7,8}

We compared the analgesic effects of FNB with intravenous (IV) fentanyl prior to positioning for spinal block in patients with fractured femur.

MATERIAL AND METHODS

The study was carried out on 60 patients scheduled for surgery under spinal block. The period of study was from January 1 2019 to December 31 2019, after obtaining institutional ethical committee clearance and informed consent from the

INTRODUCTION

Hip fractures are commonest fractures encountered in orthopaedic department. Surgical repair most commonly involves either internal fixation of the fracture or replacement of the femoral head with arthroplasty. Recently spinal anesthesia (SA) is usually preferred to general anesthesia for hip surgeries owing to less chances of mortality as in this procedure intubation is avoided and also the fact that there is reduced blood loss, and superior postoperative analgesia. As there is an unavoidable movement of fracture ends of the femur, extreme pain creates difficulty in patients positioning and creates a challenge for SA administration.^{1,2}

It has been found that periosteum has least pain threshold than deep somatic structures, fractures of femur causes considerable pain. Studies showed that around one-third patients with hip fractures have mild pain at rest, remaining two thirds have moderate to severe pain. However more than 75% of these patients exhibit moderate to severe pain on movement. There are reports of risks of cardiovascular events postoperatively in cases where effective pain control

¹Senior Resident, Department of Anesthesiology, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal Village, Karimnagar, Telangana, ²Associate Professor, Department of Anesthesiology, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal Village, Karimnagar, Telangana, ³Post Graduate Student, Department of Anesthesiology, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal Village, Karimnagar, Telangana, India

Corresponding author: B. Bhavana, Post Graduate Student, Department of Anesthesiology, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal Village, Karimnagar, Telangana, India

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subjects.

Inclusion criteria

1. Patients aged 18–80 years,
2. ASA physical status I–III,
3. Patients being scheduled for surgery under spinal block.

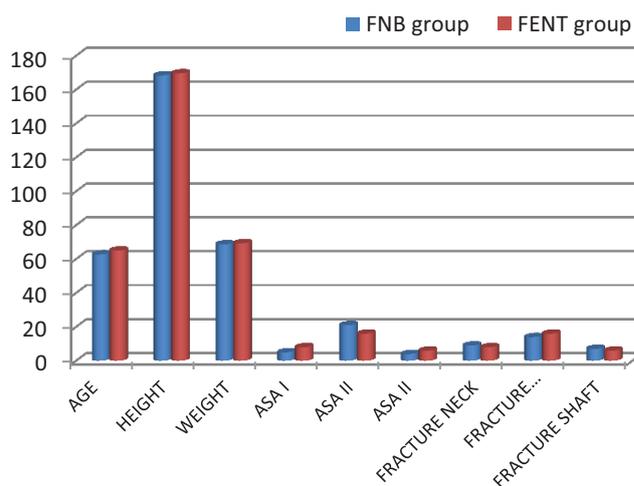
Exclusion criteria

1. Patients with Multiple fractures,
2. Patients with peripheral neuropathy, bleeding disorders, mental disorders, communication failure
3. Patients who are allergic to local anesthetics, and use of analgesics for premedication.

We followed the methodology of Ashok Jadon et al (2014).⁹ The patients were allocated by computer-generated random numbers into two groups of 30 patients each: an FNB group and a fentanyl group. Patients in the FNB group received FNB guided by a peripheral nerve stimulator (Stimuplex; B Braun, Melsungen, AG). Patients in the fentanyl group received two doses of IV fentanyl 0.5 µg/kg with a five-minute interval between doses. Pain scores were assessed at 15 minutes after intervention with FNB or IV fentanyl. The patient was then turned into the lateral position with the fracture site up. Thereafter a spinal block was performed. Pain scores 15 minutes after analgesia and during positioning were recorded. A numeric rating pain scale (0 = no pain, 10 = maximal pain) was used. Additional fentanyl requirement during positioning and satisfaction with patient position maintained for spinal block (yes = satisfactory, no = not satisfactory) were also recorded.

RESULTS

Demographic data is comparable in both the groups [Table 1 and Graph 1]. Base line values for Heart Rate (HR), Mean Arterial Pressure (MAP) and type of surgery were comparable in both the groups. We found an insignificant difference in HR (P>0.001) among the groups and a significantly lower MAP in FENT group (P = 0.0090). SpO₂ was significantly lower in FENT group (P < 0.001) [Table 2 and Graph 2]. Visual analog scale values during positioning (median ± SD) were lower in group FNB when compared with FENT group. Time to perform spinal anaesthesia (mean ± SD) was shorter in group FNB: 15.33 ± 1.64 min versus FENT 19.56 ± 3.09



Graph-1: Demographic Data of The Study Subjects

Variable	FNB group (n=30)	FENT group (n=30)	P value
Age in years: Mean ±SD	62.75± 14.30	65.09±13.92	0.632
Height in cm: Mean ±SD	168.40±12.46	169.62±11.75	0.876
Weight in Kg: Mean ±SD	68.72±7.41	69.38±7.98	0.625
ASA I/II/III	5/21/4	6/22/2	0.831
Fracture Site	Neck	8	-
	Intertrochanteric	14	-
	Shaft	7	-

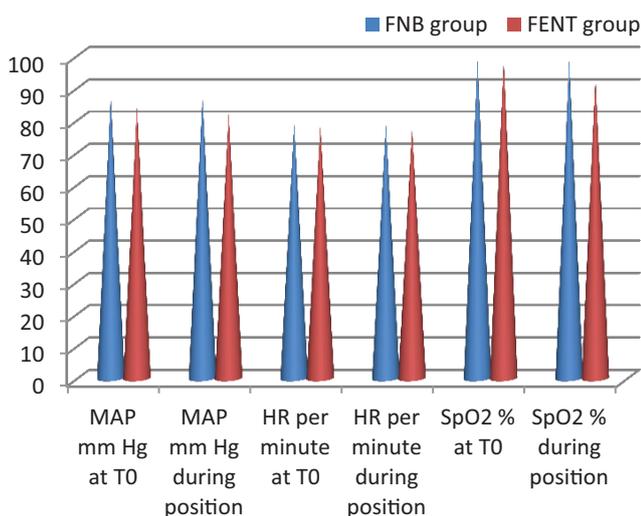
Table-1: Demographic Data of The Study Subjects

Variable	FNB group (n=30)	FENT group (n=30)	P value
MAP mm Hg at T0	87.46±6.32	83.78±8.12	0.0549
MAP mm Hg during position	87.12±6.78	81.97±7.94	0.0090
HR per minute at T0	78.91±10.78	78.38±10.91	0.8505
HR per minute during position	78.26±9.82	77.62±10.02	0.8036
SpO ₂ % at T0	98.37±9.01	98.87±7.93	0.8203
SpO ₂ % during position	98.24±0.89	93.05±0.87	<0.0001

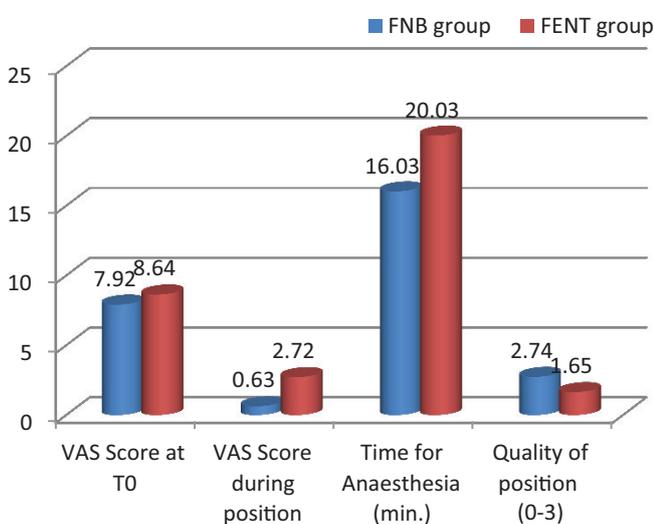
Table-2: Clinical Parameters prior to analgesia and during position

Variable	FNB group (n=30)	FENT group (n=30)	P value
VAS Score at T0	7.92±1.43	8.64±1.38	0.0519
VAS Score during position	0.63±0.39	2.72±1.52	<0.0001
Time for Anaesthesia (min.)	16.03±1.78	20.03±2.98	<0.0001
Quality of position (0-3)	2.74±0.59	1.65±0.93	<0.0001
No. of additional dose of FENT required	0	0	-
Patient acceptance (Yes/No)	22/8	19/11	0.4077

Table-3: Comparison of variables among the groups



Graph-2: Clinical Parameters prior to analgesia and during position



Graph-3: Comparison of variables among the groups

min ($P = 0.000049$). Quality of patient positioning for spinal anaesthesia (median and SD) was higher in group FNB 2.67 ± 0.606 versus FENT 1.967 ± 0.85 ($P = 0.000027$). Patient acceptance was less in group FENT ($P = 0.000031$) [Table 3 and Graph 3].

DISCUSSION

Pain due to any reasons like fractures causes metabolic and endocrinal changes in the body. Untreated pain leads to cardiovascular complications, depression, insomnia, and reduced response to interventions for treating other diseases.^{5-7, 10}

We found that FNB showed better analgesia than IV fentanyl and there was a greater patient satisfaction levels. Our findings were in accordance with Iamaroon et al. Hsu et al carried out a meta-analysis of 10 studies and found the superiority of FNB to IVA.¹²

Many studies also revealed that FNB reduces SA time when compared to IVA. As FNB provides more effectual analgesia, that improves patient positioning, anesthesians and patients preferred FNB for analgesia.^{7, 11, 13-18}

Studies showed that FNB has lower adverse effects like

haematoma, damage to nerve, and intravascular infection. According to Pennington et al FNB are most underutilized in patients with femur fractures and it has a low risk of compartment syndrome.¹⁹

Berry found that FNB provided nearly total pain relief and reduced muscle spasm within a few minutes. He also noticed an insignificant systemic reaction to the block procedure.²⁰

Limitations of the Study

1. Small sample size,
2. More variables to be examined and compared
3. The risk of bias.

CONCLUSION

Femoral nerve block when compared with IV fentanyl lowers pain and the need for supplementary analgesia requirement.

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