

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Comparative Analysis of Diclofenac and Femoral Nerve Block in Patient with Fracture Neck of Femur.

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ABSTRACT

Fracture neck of femur is a common injury in elderly patients, these patients are in considerable pain during transportation to hospital, movement during subsequent radiological investigations, shifting to ward and to the operation theatre. For reducing this pain, drugs like opiates and NSAIDs have been traditionally used. Preoperative femoral nerve block has been reported to alleviate this pain. The aim and objective of the present study seeks to assess, in cases of fracture neck of femur, the effectiveness of femoral nerve block, in making the positioning for neuraxial block less painful; and in reducing postoperative pain. It is compared with diclofenac-a traditionally commonly used analgesic in this setting. A total of 29 patients (Control Group N=15, FNB Group N=14) with fracture neck of femur were recruited for this prospective randomized study done from June 2011 to April 2013. Pain was assessed by using Numerical Rating Scale. Statistical analysis of collected data by using Mann-Whitney U test showed that the p-value < 0.05 therefore there was significant difference between median NRS score just before positioning and while positioning in Control and FNB group. In the control group, 12 patients needed rescue drug. Out of these, 5 patients needed 1mcg/kg and 7 patients needed 1.5mcg/kg of fentanyl. And still, out of these, 3 patients from this group had NRS 7. No patient in FNB group needed rescue analgesic. The difference from FNB group is statistically significant. On the basis of observations, this study conclude that compared to Injection diclofenac, use of femoral nerve block in patients of fracture neck of femur provided better pain relief at rest and during positioning for SAB.

Keywords: diclofenac, femoral nerve, fracture, femur.

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INTRODUCTION

Fracture neck of femur is a common injury in elderly patients, who often have osteoporosis and are prone to falls. As the incidence of osteoporosis rises with age, from 5% in women aged 50 years to 50% at age 85, and from 2.4% to 20% respectively in men,⁽¹⁾ the incidence of fracture neck of femur also rises. It is a particularly painful injury because periosteum, which is richly innervated by pain fibers, has the lowest pain threshold of deep somatic structures.⁽²⁾ These patients are in considerable pain during transportation to hospital, movement during subsequent radiological investigations, shifting to ward and to the operation theatre.

Common treatment is internal fixation or replacement of femoral head with prosthesis. This is very often done under neuraxial block. Placement of neuraxial block requires positioning the patients in either sitting or lateral decubitus, with flexion at hips and lumbar spine. Assuming this position is many times quite painful for these patients, inadequate positioning adds to the already common technical difficulties of giving neuraxial block in these elderly patients who may have reduced intervertebral spaces, poor flexibility, and scoliosis, combined with confusion.

Pain not only prevents optimum positioning, but also may produce undesirable consequences like tachycardia, hypertension, arrhythmias in these patients, many of whom have co-morbidities such as hypertension, diabetes, ischemic heart disease, chronic respiratory disease etc.^(1,2)

For reducing this pain, drugs like opiates and NSAIDs have been traditionally used. But they have undesirable side effects. Opiates may produce respiratory depression, confusion, drowsiness, and nausea/vomiting. NSAIDs have untoward effects on platelet function, kidneys and gastric mucosa.

Preoperative femoral nerve block has been reported to alleviate this pain, making it easier to position the patient comfortably and satisfactorily for giving neuraxial block.⁽³⁻⁶⁾ Moreover, use of long acting local anesthetics for femoral block has been shown to extend analgesia into the postoperative period.⁽⁷⁻⁹⁾ However, some workers found no benefit of FNB over systemic analgesics.^(10,11) Also, its use has not been widely adopted in practice, perhaps due to doubts about its efficacy or concern about complications.

A peripheral nerve stimulator is widely used for giving blocks. It is believed to increase the success rate and safety of the procedure.

The aim and objective of the present study seeks to assess, in cases of fracture neck of femur, the effectiveness of femoral nerve block, in making the positioning for neuraxial block less painful; and in reducing postoperative pain. It is compared with diclofenac-a traditionally commonly used analgesic in this setting.

MATERIALS AND METHODS

Approval was obtained from the ethical committee of our institute and written informed consent of each patient was obtained. A total of 29 patients with fracture neck of femur were recruited for this prospective randomized study done from June 2011 to April 2013. These patients were to be posted for surgery under subarachnoid block.

Criteria for Selecting the Patient

Inclusion Criteria

- ASA grade I and II.
- Age between 50 to 90 years.
- Estimated weight 40 to 75 kg.
- Gender both male and female.
- Hemodynamically stable.
- Patients posted for surgery for fracture neck of femur under

- subarachnoid block.

Exclusion Criteria

- Patient refusal.
- Hypersensitivity to local anaesthetic: lidocaine or bupivacaine.
- Hypersensitivity to diclofenac.
- Contraindication for diclofenac such as renal impairment,
- asthma, acid peptic disease.
- Infection at injection site of femoral nerve block.
- Vascular graft of femoral artery.
- Deranged coagulation profile.
- Peripheral neuropathy.
- Cognitive impairment, confusion, hearing problem affecting communication and patient feedback.

The patients were randomized into two groups using computer generated random numbers:

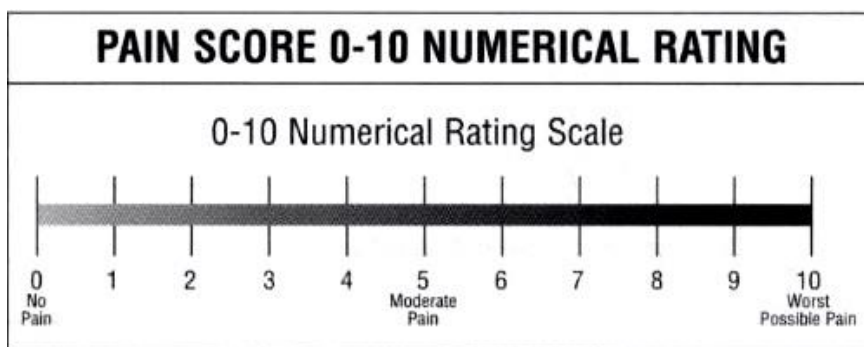
- Control Group:- 15 patients
- Femoral Nerve Block (FNB) Group: -14 patients.

The control group received Inj. diclofenac 75 mg IM one hour before positioning for subarachnoid block. The femoral nerve block group (FNB group) received femoral nerve block 15 min before positioning for the subarachnoid block.

Assessment of Severity of Pain

Quantifying the intensity of pain is an essential part of initial and ongoing pain assessment. A variety of validated pain scales are available to assist in the measurement of pain. In the clinical setting, the Numerical Rating Scale (NRS) (Fig 1) is simple to use and is one of the most common approaches for quantifying pain. Patients indicate their pain intensity on a scale of 0 to 10, with 0 indicating no pain and 10 the worst pain imaginable. The NRS can be a helpful technique for clarifying the relationship between pain and activity, the effectiveness of pain treatments, and the pattern of the patient’s pain.⁽¹²⁾ It has been adequately validated⁽¹³⁾ and used by other workers.⁽¹⁴⁾

Figure 1- Numerical Rating Scale



Rescue Analgesia: Patients which have NRS of 7 or more will give rescue analgesia of fentanyl 1mcg/Kg. After 5 minutes those still having NRS 7 or more will give an additional 0.5 mcg/Kg fentanyl and after another 5 min NRS was noted.

RESULTS

Pain was rated by patient on a Numerical Rating Pain Scale 0-10. 0 = no pain to 10= maximum pain. Pain was assessed at following times (a) At rest, before the intervention (before injection of diclofenac in control group; and before giving FNB in the FNB group) and (b) At the time of positioning for SAB.

Pain Analysis: It is described in tables as follows:

Table 1 shows: *Baseline NRS distribution in both groups. This was taken before giving inj. diclofenac in control group, and before administering FNB in the FNB group.

*NRS in both groups just before positioning and while sitting up.

Table 2 shows analysis of these data. It can be seen that difference in the two groups at baseline is not significant, but highly significant just before positioning (at rest), and during positioning for SAB.

Table 1: Comparison and Analysis of NRS at Pre-anesthetic Check-up, just before positioning and while positioning												
NRS at	Group	NRS										Total
		0	1	2	3	4	5	6	7	8	9	
PAC (Baseline)	Control	0	0	0	0	0	2	4	6	3	0	15
	FNB	0	0	0	0	0	2	4	4	4	0	14
Just before positioning	Control	0	0	2	3	7	3	0	0	0	0	15
	FNB	3	7	4	0	0	0	0	0	0	0	14
While positioning	Control	0	0	0	2	0	0	1	3	5	4	15
	FNB	3	4	4	3	0	0	0	0	0	0	14

Table 2: Analysis of NRS			
NRS	Median NRS		P- Value
	Control	FNB	
PAC (Baseline)	7	7	0.914
Just before positioning	4	1	<0.001
While positioning	8	1.5	<0.001

Statistical analysis of present data by using Mann–Whitney U test showed that the p-value < 0.05 therefore there was significant difference between median NRS score just before positioning and while positioning in Control and FNB group.

Rescue Analgesia: Patients having NRS of 7 or more were given rescue analgesia of fentanyl 1mcg/Kg. After 5 minutes those still having NRS 7 or more were given an additional 0.5 mcg/Kg fentanyl and after another 5 min NRS was noted. (Table 3)

Table 3: Rescue Analgesia Required

(A) 1 Mcg/Kg Fentanyl required				
Group	Fentanyl 1 Mcg/Kg required		Total	P-Value
	Yes	No		
Control	12	3	15	<0.001
FNB	0	14	14	

(B) 1.5 Mcg/Kg Fentanyl required				
Group	Fentanyl 1.5 Mcg/Kg required		Total	P-Value
	Yes	No		
Control	7	8	15	<0.001
FNB	0	14	14	

Statistical analysis of present data by using Fisher’s exact test showed p-value < 0.05 therefore there was significant difference between in requirement of 1st dose and 2nd dose of fentanyl between the two groups. In the control group, 12 patients needed rescue drug. Out of these, 5 patients needed 1mcg/kg and 7

patients needed 1.5mcg/kg of fentanyl. And still, out of these, 3 patients from this group had NRS 7. No patient in FNB group needed rescue analgesic. The difference from FNB group is statistically significant.

DISCUSSION

Fracture neck of femur is a common and serious injury in the elderly population, with huge financial and social impact. Prevalence of osteoporosis rises progressively with age, from 5% in women aged 50 years to 50% at age 85, and from 2.4% to 20% respectively in men.⁽¹⁾ These patients are prone to falls, and because of osteoporosis, even minor trauma can result in a fracture. About 8-10% of people with hip fracture die within 1 month and about 15-30% die within 12 months of injury. Most of these deaths are due to associated conditions and not to the fracture itself, reflecting the high prevalence of comorbidity in this age group.⁽¹⁾

As a result of unmitigated pain, patients may become delirious, stop taking enough food and fluids, become hypertensive, and develop cardiac ischemia and arrhythmias.

Apart from splinting to minimize movement at fracture site, traditional drugs for managing pain are paracetamol, NSAIDs, and opiates.

NSAIDs have undesirable effects on platelet function, kidneys, and gastric mucosa. It is noteworthy that approximately 40% of patients presenting with hip fracture already have at least moderate renal dysfunction (eGFR<60 ml/min/1.73m²).⁽¹⁵⁾

Opiates tend to cause drowsiness, respiratory depression, and nausea/vomiting, as many patients in this age group have COPD and confusion, opiates need to be used with care.

Exploring other safer and more effective options to treat pain in these patients, many workers tried nerve blocks.

The pain of fracture neck of femur is conducted, to a large extent, by the femoral nerve. In addition, there is a variable contribution from other nerves: sciatic, obturator, and lateral cutaneous nerve of thigh. This may be more important for the more proximal (intracapsular) fractures. Therefore femoral block alone may not remove the pain completely, but usually there is a significant reduction.^(8,16-18)

There are reports describing use of psoas sheath block,⁽¹⁹⁾ fascia iliaca block,^(6,20) and femoral nerve block in groin.^(11,21) Psoas sheath block needs the patient to be in lateral position. Fascia iliaca block needs a relatively higher volume of drug. Therefore femoral nerve block, which is also technically easy, was chosen.

The baseline NRS for pain at rest was noted before giving diclofenac in control group and before giving femoral block in the FNB group. It can be seen from Table 1 that there was no significant difference in this reading between the two groups.

No patient needed rescue analgesic in FNB group. In control group, 12 patients needed rescue because of high NRS of 7 and above. Of these, 7 patients needed the 2nd dose of rescue. In spite of this, 3 patients continued to have NRS 7. This clearly reveals significantly better effect of FNB. The rescue dose was restricted to a maximum of 1.5 mcg/Kg because of age and overall relatively poor physical status of these patients. It was felt that higher doses might produce side effects such as desaturation, excessive drowsiness and nausea/vomiting. Salvatore Sia et al used 3.0 mcg/Kg fentanyl for their control group. Their one patient developed desaturation.3 Yun et al, in their study comparing fascia iliaca block with alfentanil for giving sitting position, used alfentanil bolus 10mcg/Kg followed by infusion 0.25mcg/Kg/min in the control group.⁽⁶⁾

To aid positioning patients for spinal block, some workers have used drugs like midazolam, ketamine, and propofol, with equivocal results.⁽²²⁾

Our results agree with those of several other reports describing better analgesia for positioning, with nerve block.^(3-6,20)

We used numerical rating system to assess pain. This is a simpler system compared to VAS, particularly suitable for our old patients with frequent problems with vision and motor co-ordination. This system has been adequately validated and used by other workers.^(11,13)

The final sitting position achieved was graded into optimal and suboptimal. A good position was obtained more often in the FNB group. But the difference between the two groups was not statistically significant. Perhaps a larger sample size endowing a higher power is required to discriminate on this aspect.

CONCLUSION

We conclude that compared to inj. diclofenac, use of femoral nerve block in patients of fracture neck of femur:

- Provided better pain relief at rest.
- Provided better pain relief during positioning for SAB.

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