Original Research Paper

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A CLINICAL COMPARITIVE STUDY OF FASCIA ILIACA COMPARTMENT BLOCK WITH BUPIVACAINE AND BUPIVACAINE WITH DEXAMETHASONE FOR POSITIONING AND DURATION OF POST OPERATIVE ANALGESIA IN PATIENTS WITH FEMUR FRACTURE PLANNED FOR ORIF UNDER SPINAL ANAESTHESIA

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KEYWORDS :

INTRODUCTION

Fracture femur is a common injury which is associated with excruciating pain. Fractures may involve the femoral neck, shaft or distal femur. These operations are more often managed with regional anaesthesia techniques[1]. Positioning for neuraxial blocks is always challenging because, even slight overriding of the fracture ends, is intensely painful [2]. Hence, prior to neuraxial blockade, analgesia is provided by conventional modes of pain relief like non-steroidal anti-inflammatory drugs (NSAIDs), systemic opioids and also by peripheral nerve blocks such as Fascia iliaca compartment block (FICB). Conventional pain treatment (NSAIDs and IV morphine) has undesirable side-effects, many of those being particularly unwanted in patients with high comorbidity.

Systemic Opioids may cause respiratory depression, hypotension , dizziness, mental confusion, constipation, itching, urine retention and nausea. NSAIDs may cause gastrointestinal haemorrhage and alter renal function. Amongst the procedures, FICB is believed to be advantageous because of its safety and efficacy. It has been demonstrated that FICB provides effective analgesia for fracture femur when given preoperatively.[3]

In comparison to epidural analgesia peripheral nerve blocks(PNB) despite providing effective unilateral analgesia, also reduces the incidence of opiod related and autonomic side effects , produces less motor blockade and fewer neurological complications.[4,5]

FICB despite providing effective unilateral analgesia, also reduces the incidence of opioid-related and autonomic side-effects, produces less motor blockade, and fewer, neurological complications.

Many adjuvants like epinephrine, clonidine, opioids, ketamine, and midazolam were combined with local anaesthetics to prolong the duration of analgesia from nerve blocks, but have met with limited success. However, the glucocorticoid DEXAMETHASONE has been shown to be effective in a small number of preclinical [6,7] and clinical studies [8-11]. DEXAMETHASONE produces a degree of vasoconstriction, so one theory suggests that the drug acts by reducing local anaesthetic absorption. According to another theory dexamethasone potentiates the activity of inhibitory potassium channels on nociceptive C-fibers(via glucocorticoid receptors), thereby decreasing their activity[12].It has been demonstrated to provide better quality and longer duration of analgesia when compared to intravenous opioids and NSAIDs.By administering the block 30 minutes prior to shifting, patients are comfortable during shifting and positioning. The severity of postoperative pain will be assessed by using visual analogue score (VAS) upon admission to the post-operative wards. Patients with VAS score 4 and above will be given intravenous tramadol(100mg) as rescue analgesia.

AIMS AND OBJECTIVES OF THE STUDY

To compare the efficacy of bupivacaine alone and bupivacaine with dexamethasone in USG guided fascia iliaca compartment block in fracture femur patients in terms of following parameters

1.Positioning during spinal anaesthesia
2. Duration of post operative analgesia
3. Onset time , peak effect and total duration of sensory blockade
4. Onset time, peak effect and total duration of motor blockade
Complications/side effects if any.

MATERIALS AND METHODS

SOURCE OF DATA

The study will be conducted at KVG medical college hospital, sullia on ASA grade 1and 2 patients aged between 18 to 60-years who are planned for ORIF of fracture femur under Spinal anaesthesia.

SAMPLING DESIGN: CROSS SECTIONAL OBSERVATIONAL STUDY

DURATION OF STUDY :FEB 2021 TO AUGUST 2022
PLACE OF STUDY: KVG MEDICAL COLLEGE AND HOSPITAL SULLIA DK
SAMPLING METHOD: UNIVERSAL RANDOM SAMPLING
SAMPLE SIZE : 60(30 IN EACH GROUP)

STUDY POPULATION: The data was collected after obtaining informed consent 60 patients of femur fracture aged 18-60 years posted for ORIF under SA. The patients were assessed for inclusion and exclusion criteria during the mentioned period of study.

METHOD OF COLLECTION OF DATA-

Inclusion criteria:

- Patients aged 18–60 yrs;
- Patients with proximal ,shaft and distal femoral fractures planned for open reduction and internal fixation;
- Patients with ASA-PS (American Society of Anesthesiology Physical Status) Grade 1 and 2.

Exclusion criteria:

- Patients refusing to participate in the study;
- Patients with allergy to local anaesthetics, peripheral neuropathy, bleeding diathesis, previous femoral bypass surgery, inguinal hernia, inflammation or infection over injection site;
- Patients with psychiatric disorders and polytrauma. ASA 3,4,5 patients.

METHODS:

This study was conducted in the department of anesthesia at KVG medical college and hospital sulli , a tertiary care teaching hospital in dakshin kannada district of Karnataka over a period of 18 months from 1st feb 2021 to 30 august 2022. Those who fulfilled the inclusion and exclusion criteria (60 patients aged18-60yrs) were selected for the study and divided into two groups.

- All patients underwent pre-anaesthetic evaluation prior to surgery and written informed consent was obtained.

Investigations

- CBC (Complete Blood Count)
- TLC (Total leukocyte Count)
- RBS (Random Blood Suger)
- BT,CT (Bleeding time, Clotting time)
- Urine sugar,albumin

- RFT,electrolytes
- ECG (Electrocardiography
- HIV HBSAg HCV
- Chest xray PA view

PREPARATION OF EQUIPMENTS AND DRUGS

- Adequate preparation of OT and machine.
- Spinal needle 25G quinckebabcocks
- Dexamethasone 8 mg
- Inj bupivacaine 0.25%
- Short bevelled needle 26 and a half

Patients were randomly divided based on computer generated random numbers into one of the TwoGroups: Dexamethasone Group (D), and Bupivacaine Group (B).

Group B: Received 2 ml of normal saline with 28 ml of 0.25% Bupivacaine. Total volume- 30 ml.

Group D: Received 8 mg dexamethasone 2 ml with 28 ml of 0.25% Bupivacaine. Total volume:30ml.

All patients subjected to preanesthetic evaluation including medical history, physical examination and laboratory tests.The patients were premedicated with tablet alprazolam 0.5 mg the night before surgery.Patients kept NPO for 6 hours.In the preoperative waiting room, patients were put on standard monitoring including Non-invasive Blood Pressure (NIBP), pulse oximetry, electrocardiogram and baseline readings were noted. IV line was secured. Baseline VAS (Visual Analogue Scale) score for pain was noted.USG guided Fascia Iliaca Compartment Block was administered to all patients 30 min prior to surgery. A short bevelled needle was used. After puncturing Fascia Iliaca and negative aspiration, 30ml of predetermined drug was injected in 5 ml aliquots over 2–3 minutes. An expanding anechoic collection just below Fascia Iliaca was the visual confirmation of correct placement of drug.All vital parameters, and VAS score for pain was noted when patient positioned for Subarachnoid block. The SAB then be administered using Inj Bupivacaine 0.5% (Heavy)- 3.4ml,and surgery was started after confirming the level of subarachnoid block. Postoperatively, complaints of pain was assessed using VAS scores for the first postoperative day at immediate postop time, 2, 6, 12, 18 and 24 hrs postoperatively and scores of '4' or more were given Inj Tramadol 100 mg IV as rescue analgesia.

FOLLOW UP PERIOD : NIL

STATISTICALANALYSIS-

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi- square test was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. Normality of the continuous data, was tested by Kolmogorov–Smirnov test and the Shapiro–Wilk test.

Independent t test was used as test of significance to identify the mean difference between two quantitative variables.

Graphical representation of data: MS Excel and MS word were used to obtain various types of graphs such as bar diagram.

p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel**,** SPSS version 22 **(**IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

SAMPLE SIZE ESTIMATION:

GROUP 1: 4.6+- 4(E1+S.P1)

GROUP 2: 3.6 +- 1.1(X2 +- S.P2)

$N=(Z_{1-\alpha/2}+Z_{1-\beta})^2((S.D_1)^2+(S.D_2)^2)/(\overline{X}_1-\overline{X}_2)^2$

Here $Z_1a/_2$value of normal deviate at considerable level of confidence ie 1.96 level of significance at 95% 0f confidence interval

$Z_{1-\beta}$value of normal deviate at power of study ie 0.84 power of study at 80% of confidence interval.

S1.(1.4) = SD of variable in group 1 S2(1.1) = SD of variable in group 2 X1 (4.6) = mean of variable in group 1 X2(3.6) =. Mean of variable in group 2

Substituting the above values in the formula, minimum sample size was estimated to be 23.7116 per group, Hence in our study 30 per group sample size was taken.

RESULTS

Age distribution in years

Mean age of subjects in Group B was 37.77 ± 11.83 years and in Group D was 36.90 ± 9.89 years.

In Group B, majority of subjects were in the age group 31 – 40 years (33.3%) and in Group D was 18-30 years (36.7%). There was no significant difference in age distribution between two groups.

Gender distribution

In Group B, 73.3% were males and 26.7% were females. In Group D, 76.7% were males and 23.3% were females. There was no significant difference in gender distribution between two groups.

Anthropometric details

Mean weight in Group B was 74.57 ± 2.92 Kg and in Group D was 75.37 ± 3.10 Kg. There was no significant difference in weight distribution between two groups.

Mean Height in Group B was 164.20 ± 3.19 Kg and in Group D was 164.57 ± 2.98 Kg. There was no significant difference in Height distribution between two groups.

Mean BMI in Group B was 27.69 ± 1.59 and in Group D was 27.86 ± 1.64. There was no significant difference in BMI distribution between two groups.

ASA distribution In Group B, 66.7% had ASA Grade I and 33.3% had Grade II. In Group D, 56.7% had ASA Grade I and 43.3% had Grade II. There was no significant difference in ASA grade between two groups.

Onset of sensory block

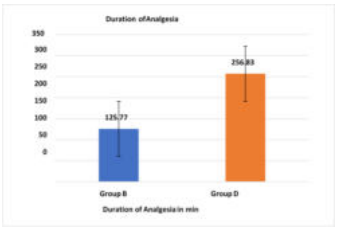
Onset of sensory block (min)	Group B		Group D		Total	
	N	%	N	%	N	%
2	0	0.0%	5	16.7%	5	8.3%
3	0	0.0%	8	26.7%	8	13.3%
4	12	40.0%	11	36.7%	23	38.3%
5	14	46.7%	4	13.3%	18	30%
6	4	13.3%	2	6.7%	6	10%
Total	30	100%	30	100%	60	100%
Chi square test = 19.26, p=<0.0001*, statistically significant						

In Group B, 40% had onset at 4 min, 46.7% had onset at 5 min and 13.3% had onset at 6 min. In Group D, 16.7% had onset at 2 min, 26.7% had onset at 3 min, 36.7% had onset at 4 min, 13.3% had onset at 5 min and 6.7% had onset at 6 min. There was significant difference in Onset of sensory block between two groups.

Duration of Analgesia

	Group B	Group D	T value	P value
Duration of Analgesia in min	125.77 ± 3.115	256.83 ± 16.9	-41.76	<0.0001*

Mean Duration of Analgesia in Group B was 125.77 ± 3.115 min and in Group D was 256.83Mean± 16.9 min. There was significant difference in Duration of Analgesia b/w 2 groups.



Complications

In Group B, 3.3% had bradycardia, 6.7% had Hypotension and 6.7%

had Nausea, Vomiting and in Group D, 10% had hypotension and 10% had Nausea, Vomiting.

Table 21: VAS Score comparison between two groups at different periods of follow-up

VAS	Group B		Group D		P value
	Mean	SD	Mean	SD	
2 Hours	3.13	0.43	2.43	0.50	<0.001*
6 Hours	4.33	1.06	2.23	0.43	<0.001*
12 Hours	3.70	0.99	3.17	0.46	0.01*
18 Hours	5.07	0.87	4.17	0.87	<0.001*
24 Hours	3.63	1.07	3.27	0.58	0.104

At 2hrs Mean VAS score in Group B was 3.13 ± 0.43 and in Group D was 2.43 ± 0.50. There was significant difference in VAS score between two groups at 2 hrs.

Similarly, at 6 hrs, Mean VAS score in Group B was 4.33 ± 1.06 and in Group D was 2.23 ± 0.43. There was significant difference in VAS score between two groups at 6 hrs.

Similarly, at 12 hrs, Mean VAS score in Group B was 3.70 ± 0.99 and in Group D was 3.17 ± 0.46. There was significant difference in VAS score between two groups at 12 hrs.

Similarly, at 18 hrs, Mean VAS score in Group B was 5.07 ± 0.87 and in Group D was 4.17 ± 0.87. There was significant difference in VAS score between two groups at 18 hrs.

Similarly, at 24 hrs, Mean VAS score in Group B was 3.63 ± 1.07 and in Group D was 3.27 ± 0.58. There was no significant difference in VAS score between two groups at 24 hrs

DISCUSSION

Patients who received Bupivacaine with dexamethasone had significant prolongation of analgesia and required fewer doses of rescue analgesics as compared to patients who received Bupivacaine alone for FICB. The FICB was first described in 1989 and was performed initially on children and later on adults. It was mainly used to provide analgesia following surgical procedures in the hip, femur and knee, treatment of burns on the thigh and in prehospital treatment of fracture femur [13 14].

Candal-Couto et al., demonstrated that FICB allows patients being able to tolerate a sitting position with femoral neck fractures [15].

FICB is more effective in blocking lateral cutaneous nerve of thigh and femoral nerve [16]. The FICB is not only easy to perform but it is also associated with minimal risk as the analgesic is injected at a safe distance from the femoral artery and femoral nerve. It is always safe to perform the FICB prior to spinal anaesthesia as the patient can respond during administration of the local anaesthetic and can prevent intraneuronal injections [17].

Patient positioning was easier in patients who received FICB before administration of spinal anesthesia.

SUMMARY

The study was conducted at KVG medical college hospital, sullia on ASA grade 1and 2 patients aged between 18 to 60-years who were planned for ORIF of fracture femur under Spinal anaesthesia.Patients were randomly divided based on computer generated random numbers into one of the Two Groups: Dexamethasone Group (D), and Control Group (B).

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All patients were subjected to preanesthetic evaluation including medical history, physical examination and laboratory tests.The patients were premedicated with tablet alprazolam 0.5 mg the night before surgery. Patients were kept NPO for 6 hours.

In the preoperative waiting room, patients were put on standard monitoring including Non- invasive Blood Pressure (NIBP), pulse oximetry, electrocardiogram and baseline readings were noted. IV line was secured. Baseline VAS (Visual Analogue Scale) score for pain was noted.

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Our study demonstrates that FICB done prior to spinal anaesthesia would ensure patient comfort during positioning for sub arachanoid block and also ensure post operative analgesia. Prolonged postoperative analgesia was noted in patients receiving dexamethasone as an adjuvant.

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