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A Clinical Comparison of Dexamethasone and Dexmedetomidine as Adjuvant to Ropivacaine in Fascia Iliaca Compartment Block in Patients with Hip and Femur Fracture under Spinal Anaesthesia

[1]Esita Dutta, [2]Manabendra Sarkar, [3]Dibas Saha and [4]Atif Ali
[1-4]Department of Anaesthesiology, Nil Ratan Sircar Medical College and Hospital, Sealdah, Raja Bazar, Kolkata, West Bengal 700014, India

ABSTRACT

One of the basic biological phenomena is pain. According to the International Association for the Study of Pain, Pain is an unpleasant sensory and emotional experience connected to tissue damage that has occurred or may occur. Positioning for spinal anaesthesia is challenging in hip and femur fracture patients. Fascia iliaca compartment block (FICB) is a low skilled technique that helps positioning and provide post operative analgesia. Dexamethasone and Dexmedetomidine are adjuvant that prolong analgesia. In order to evaluate any potential adverse effects of Dexamethasone and Dexmedetomidine, hemodynamic measures such as heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) and oxygen saturation should be compared. Assessment of pain during positioning of patient for spinal anaesthesia following landmark guided Fascia iliaca compartment block (FICB) and assessment of the duration of post operative analgesia following surgery as measured by the Numerical Rating Scale (NRS score <3) are primary aim of our study. This study was prospective, randomized, single blind controlled study. This study was conducted for one and half years (March 2020-August 2021) at Nil Ratan Sircar Medical College and Hospital. The study was performed in the patients posted for hip and femur fracture under spinal anaesthesia. The study began after obtaining permission from ethics committee of this institute and also after obtaining approval of The West Bengal University of Health Sciences. Total 60 patients were included in this study. 30 patients were given FICB with 30ml of 0.25% Ropivacaine with 8mg of Dexamethasone and rest 30 patients received FICB with 0.25% Ropivacaine with 100ug of Dexmedetomidine. Data were analysed using SPSS V.24 software. Categorical data were processed by frequencies and proportion, whereas continuous data were processed by mean standard deviation. Chi square test used for qualitative data and Student t test for quantitative data as tests of significance, considering P<0.05 as statistically significant. In patients of Group A, the mean amount of rescue analgesics required in first twenty four (24 hour) post-operative hour was 105±37.4 mg of injection Diclofenac i.m. In Group B patients the mean Amount of rescue analgesic was 75±4.7 mg of injection Diclofenac i.m. Distribution of mean Amount of rescue analgesic between the Groups was statistically significant (p<0.0001). The total duration of post operative analgesia between 2 groups was statistically significant (Group A 678±28.2 minutes and in group B 930.7±30 minutes and p<0.000)). In Group B, 1 patient had nausea, 1 patient had Bradycardia and 2 patients had hypotension. Association of Adverse effects within groups was not statistically significant (p = 0.232). Patients with hip and femur fractures experience less discomfort when positioned for spinal anaesthesia after using the Fascia iliaca compartment block (FICB). For Fascia iliaca compartment block (FICB) in patients with hip and femur fractures, adding of Dexamethasone or Dexmedetomidine as adjuvant to Ropivacaine prolongs post-operative analgesia. Also addition of Dexmedetomidine with Ropivacaine offers longer postoperative analgesia than Ropivacaine with Dexamethasone.

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Key Words
Fascia iliaca compartment block, dexamethasone, spinal anaesthesia, hip fracture and adjuvant therapy, ropivacaine, dexmedetomidine

Corresponding Author
Atif Ali,
Department of Anaesthesiology, Nil Ratan Sircar Medical College and Hospital, Sealdah, Raja Bazar, Kolkata, West Bengal 700014, India
mdatifali08@gmail.com

Author Designation
[1,3]Senior Resident
[2]Professor
[4]Medical Officer

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INTRODUCTION

One of the basic biological phenomena is pain. According to the International Association for the Study of Pain, pain is an unpleasant sensory and emotional experience associated with actual or impending tissue damage. Pain is consistently undervalued and undertreated. The primary function of anaesthesia is to reduce discomfort and relief of pain during surgery.

Compared to general anaesthesia, spinal anaesthesia is the technique most frequently used for lower limb surgeries because it reduces the need for systemic analgesics, avoids needless airway manipulation, allows for early ambulation, attenuates the surgical stress response and offers excellent muscle relaxation. Pre operative regional lower limb nerve blocks along with spinal anaesthesia offers longer duration post operative analgesia which attenuates undesirable adverse effects in patients belong to advanced age with significant comorbidities with femur and hip fractures. FICB is a cost effective, low skilled, safe method of managing post-operative pain and administering surgical analgesia in health care facilities without Ultrasound facility effectively. In cases of lower limb procedures, such as femur fractures, anaesthetists encounter significant challenges in positioning the patients for spinal anaesthesia because of severe pain. Therefore, it is important to relief pain of the patients to enable proper posture during spinal anaesthesia. A modified femoral nerve block technique is known as a fascia iliaca compartment block (FICB). In 1989, Dalens and associates first described the fascia iliaca compartment block (FICB)[1]. FICB blocks femoral nerve, lateral femoral cutaneous nerve and occasionally obturator nerve and genitofemoral nerve. Fascia iliaca compartment block using landmark technique has several advantages over femoral nerve block, such as less neuropraxia, low skill technique and ease of administration using anatomical landmarks to provide analgesia in patients with hip and femur fractures. It also lacks major vessels nearby. Numerous studies have also demonstrated that by lowering discomfort, fascia iliaca compartment block (FICB) expedites the positioning for spinal anaesthesia[2]. With a Pka of 8.2, Ropivacaine is a long-acting amide local anaesthetic that is 94% bound to plasma proteins. To increase the length of analgesia, a variety of additives are added to local anaesthetics, including steroids like Dexamethasone, nonopioids and alpha2 adrenergic agonists like Clonidine and Dexmedetomidine. In this study, we compared the effects of Dexamethasone and Dexmedetomidine as additive to Ropivacaine in FICB. Individuals who are prone to hip fractures are often older and have substantial concomitant comorbidities like hypertension, diabetes mellitus and ischaemic heart disease. Hip fractures are painful and proper pain management is required since insufficient pain management can lead to negative consequences such as tachycardia, hypertension, an increased risk of severe cardiovascular events and delirium as a result of sympathetic activation[3]. However, conventional pain treatment modalities (systemic opioids, non-steroidal anti-inflammatory drugs) have undesirable adverse effects and many of those are particularly harmful in elderly patients[4]. This increases the relevance of multimodal analgesia for individuals with hip fractures. The landmark guided FICB can be given by unskilled person in hospital facilities, emergencies to relief pain without ultrasound machine (USG) effectively without significant adverse effect but ultrasound guided FICB has more success rate over landmark technique[5]. It has been demonstrated that the α-2 agonist Dexmedetomidine can extend the duration of peripheral nerve blocks without causing any notable side effects. A similar strategy has been employed with success that is intravenous (IV) infusion of Dexmedetomidine combined with fascia iliaca compartment block (FICB). A synthetic glucocorticoid called Dexamethasone is also used to with anaesthetics to lengthen the duration of analgesia in peripheral nerve block procedures. Studies comparing Bupivacaine with Dexmedetomidine and Dexamethasone in FICB are still scarce[6].

Objectives of the Study

General Objectives: Assessment of pain during positioning of patient after giving Fascia iliaca compartment block (FICB) for spinal anaesthesia in terms of Numerical Rating Scale (NRS).

Duration of post operative analgesia in terms Of Numerical Rating Scale (NRS score <3)

Specific Objectives: To compare hemodynamic parameters namely heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) and 02 saturation and to assess any side effects associated with dexamethasone and dexmedetomidine.

Requirement of first rescue analgesic post operatively.

MATERIALS AND METHODS

Study Design: The study was prospective, randomized, single blind controlled study.

Period of Study: One and half years (March 2020-August 2021).

Study Setting: The study was performed in the patients posted for hip and femur fracture under spinal anaesthesia. The study began after obtaining

permission from ethics committee of this institute and also approval of The West Bengal University of Health Sciences.

Place of the Study: Nil Ratan Sircar Medical College and Hospital

Sample Size: 60.

Inclusion Criteria:

- Patients belonging to ASA Grade I, II
- Patients of either sex between the age group 18-65 Years
- Patients with hip and femur fracture posted for surgery under subarachnoid block
- Patients who give a valid informed consent

Exclusion Criteria:

- Patients not satisfying Inclusion Criteria
- Patients belonging to ASA Grade III, IV
- Patients with hemorrhagic disorder, neurological disorders, psychiatric disorders, congestive cardiac failure, chronic kidney disease, chronic liver disease
- Previous femoral bypass Surgery
- Patients with allergy to local anesthetics
- Patients with poly-trauma, infection over injection Site
- Morbid obesity
- Patients who was administered with supplementary epidural or general anaesthesia (in patients with prolonged surgeries where conversion was required)
- Patients with spinal deformities
- Patients on anticoagulants or dual antiplatelet
- Patients who refuse to give consent
- Patients with language barrier

Sampling Procedure

On the Day Before Surgery: After receiving approval from Ethics Committee, written informed consent from the patient (Bengali, Hindi and English) was obtained. Six hour preoperative fasting guideline was followed.

On the Day of Surgery: Study was carried out in Orthopedic Operation Theatre of N.R.S Medical College and Hospital. A detail history from the Patients was taken and thorough physical examination including assessment of airway and ASA Status was performed. Routine pre operative investigations was done.

Monitoring: After getting informed consent heart Rate, blood pressure, SpO_2 and Numerical Rating Scale score was obtained in preoperative room.

Iv access with a 18 g lv cannula was done and preloaded with RL/RI Solution @10 m 1/Kg body weight at pre anaesthetic care room.

Premedication: After posting the patient to operation theatre premedication with lnj Glycopyrrolate 200 µg and Inj Midazolam 1mg iv was given.

15 m1 of 0.5% Ropivacaine to be mixed with 15 mL of distilled Water to get 0.25% Ropivacaine Solution.

Now Patients Of Group A received Fascia Iliaca Compartment Block with 30 m1 of 0.25% Ropivacaine along with Dexamethasone 8mg as and adjuvant where as Group B Patients received Fascia Iliaca Compartment Block with 30 mL of 0.25% Ropivacaine along with Dexmedetomidine 100ug as an adjuvant after taking aseptic measures.

Fascia Iliaca Compartment Block was given in supine position to the patients with Landmark Technique:

- 1st Anterior Superior iliac spine (ASIS) and Pubic tubercle was palpated and marked with skin marker. Line joining these two at the level of inguinal ligament is divided into three equal parts
- Insertion point of needle was junction between medial 2/rd and lateral 1/3d
- 18 g Venflon needle was inserted at insertion point perpendicular to skin 2 cm below inguinal ligament
- When the needle passed through fascia lata first pops was felt and 2nd one when it passed through fascia Iliaca
- After this angle was reduced to 30 degree and the needle was further advanced 1-2 mm and anesthetic solution containing 30 m1 of 0.25% Ropivacaine with either 8mg of Dexamethasone Or 100 µg of Dexmedetomidine was injected after negative aspiration of blood was confirmed.
- Sensory blockade after 15 min of fascia Iliaca compartment block was obtained by Pin Prick Test and motor blockade By Modified Bromage Score. Time Of fascia Iliaca compartment block was noted.
- Now blood pressure, SpO_2, ECG, Pulse Rate, Numerical rating Score was monitored every 5 min till 15 min.
- There was block failure in four patients, so data of 56 patients was considered for statistical analysis.
- Then Patients was positioned for spinal anaesthesia.
- Blood pressure, Heart rate, SPO_2, Numerical rating score (NRS Score) was noted during positioning.
- Blood pressure, heart rate, SPO_2 before giving spinal anaesthesia was noted.

- Spinal Anaesthesia was given with 2.5-3 mL of 0.5% Inj Heavy Bupivacaine and time of spinal anaesthesia was noted.

Intraoperatively: Blood pressure, Heart rate, SPO_2, NRS Score was monitored 5 min, 10 min, 30 min and 60 min. When the mean arterial pressure (MAP) decreased 20% below the baseline inj Phenylephrine 50 µg i.v given. When heart rate (HR) became below 60 beats/min and the patient was hemodynamically unstable inj Glycopyrrolate 200 µg i.v was given.

Postoperatively: Patients was evaluated for pain by monitoring blood pressure, heart rate, SP02, Numerical rating score at 0, 30 min, 1 hrs, 2 hrs, 4 hrs, 6 hrs, 12 hrs, 24 hrs.

Time for post operative rescue analgesics was noted (When Numerical Rating Score >3), Inj Diclofenac Sodium 75mg im was used as rescue analgesic.

Any adverse effect like hematoma at injection site, local anesthetic toxicity, intravascular injection, hypotension or hypertension, bradycardia, sedation will be monitored. Sedation was monitored By Ramsay Sedation Score.

Modified Bromage Score

Score	Criteria
I	Complete block (Unable to move feet or knees)
II	Almost complete block (Able to move feet only)
III	Partial block (Able to move knee, feet)
IV	None (Full flexion of knees and feet)

Ramsay Sedation Scale

Score	Criteria
1	Patient is anxious, agitated or restless
2	Patient is cooperative, oriented and tranquil alert
3	Patients responds to command
4	Asleep but with brisk response to light glabellar tap or loud auditory stimulus
5	Asleep, sluggish response to light glabellar tap or loud auditory stimulus
6	Asleep, no response

Numerical Rating Scale: Asking the patient about pain intensity, onset, variation (0-10; where 0-no pain, 10-unbearable pain). If it shows >3/10 then rescue analgesic (inj Diclofenac sodium 75 mg im) will be given.

Sample Size: Sample size for each arm was determined by the following formula:

$$n = \frac{2(Z_{\alpha/2} + Z_{\beta})^2 SD^2}{(\mu 1 - \mu 2)^2}$$

Where:

n : Sample size in each of the groups

µ1 : Population mean in treatment group 1

µ2 : Population mean in treatment group 2

µ1-µ2 : The difference the investigator wishes to detect = difference between mean values

SD^2 : Population variance

$Z_{\alpha/2}$: 1.96 (considering 95% confidence interval and type I error of 5%) from Z table

b : 0.84 (considering 80% power of the test) from Z table

µ : Minimum clinically important difference of NRS score between 2 groups taken at 2.5

The mean difference between 2 population group taken as 2 hour from the previous study to make the study significant.

Now putting all the values in the formula:

$$n = \frac{2(1.96 + 0.84)^2 2.5^2}{2 \times 2} = 25$$

Considering 20% block failure total no of sample size = 30 in each group.

The study population was total 60 patients 18-65 years of age, ASA I and II, patients of either sex who attended pre anesthetic check-up for hip and femur fracture surgeries at Nil Ratan Sircar Medical College and Hospital, Kolkata.

RESULT

A total sixty patients were enrolled in the study and thirty patients were randomly selected to be included in each group. There was total 4 cases of block failure, 2 in each group.

Graphical representation of data and statistical software: The data was tabulated in Microsoft Excel software and Microsoft word were used to obtain various types of graphs and analyzed with SPSS V.24 software.

Independent t-test and Chi square test were used for the comparisons between the groups. Student t test was for quantitative data and chi square test for qualitative data.

The p-value ≤ 0.05 was considered as statistically significant.

In Group A, 8 patients had Neck 0f femur fracture, 5 patients had Shaft fracture and 15 patients had Inter trochanteric fracture.

Table 1: Comparison of fracture site between the groups

Group	Neck of Femur	Shaft of femur	Inter trochanter	p-value
Group A	8	5	15	0.673
Group B	10	4	14	

Table 2: Comparison of duration of surgery between the groups

Group	Mean	SD	p-value
Group A	103	11	0.274
Group B	110.3	7.6	

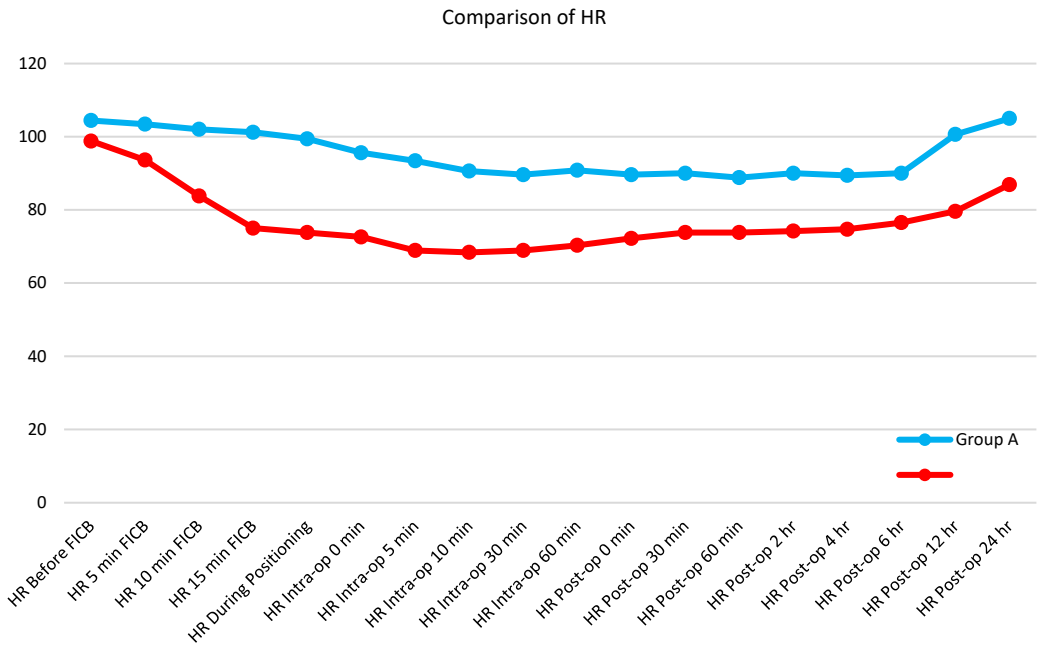

Fig. 1: Line diagram showing heart rate comparison between the two groups, *Statistically significant difference exist when p value <0.005

In Group B, 10 patients had Neck of femur fracture, 4 patients had Shaft of femur fracture, 14 patients had Inter trochanter fracture.

Association of Fracture site between Groups was not statistically significant (p = 0.673).

In Group A, the mean duration of surgery of patients was 103±11.

In Group B, the mean duration of surgery of patients was 110.3±7.6.

Distribution of mean duration of surgery between Groups was not statistically significant (p = 0.274).

Comparison of HEART RATE (HR) between the groups at different time interval: In this study, there was statistically significant decrease in mean HR in group B from 10 minutes of giving FICB to 6 hour post operatively but there was no significance bradycardia (Fig. 1).

Comparison of Mean arterial pressure (MAP) between the groups at different time intervals: In this study, there was statistically significant difference in mean MAP between two groups from 10 minutes after giving FICB to intraoperatively 30 minutes duration. At other intervals there was no significant difference between two groups. Mean MAP is lower in group B than group A (Fig. 2).

Numerical rating scale score (NRS SCORE) comparison between two groups at different time interval: In group A mean NRS score at 5 min was 4±0.7 and in group B was 3.6±0.5. Similarly at 10 min interval mean NRS score for group A was 2.2±0.8 and group B was 2±0.7 but the data is statistically insignificant. Mean NRS score 12 hrs post operatively was 5±1.2 in group A and 1.4±0.5 in group B which was high in group A than group B which was statistically significant (p-value = 0.027) (Fig. 3).

Table 3: Comparison of Duration of Analgesia between the groups

Group	Mean	SD	Mean difference	p-value
Group A	678.4	28.2	252.4	0.000*
Group B	930.7	30		

*Statistically significant difference exists between the groups (p≤0.05)

Table 4: Comparison of Amount of rescue analgesic between the groups

Group	Mean	SD	Mean Difference	p-value
Group A	105	37.4	28	0.000*
Group B	75	4.7		

*Statistically significant difference exists between the groups (p≤0.05)

In Group A, the mean Duration of Analgesia of patients was 678.4±28.2. In Group B, the mean Duration of Analgesia of patients was 930.7±30.

Distribution of mean Duration of Analgesia between Groups was highly statistically significant (p<0.000).

In Group A, the mean Amount of rescue analgesic of patients was 105±37.4 mg of inj Diclofenac i.m. In Group B, the mean Amount of rescue analgesic of patients was 75±4.7 mg of inj Diclofenac i.m. Distribution of mean Amount of rescue analgesic between the Groups was statistically significant (p<0.000) (Table 4).

In Group B, 1 patient had Nausea, 1 patient had Bradycardia and 2 patients had Hypotension.

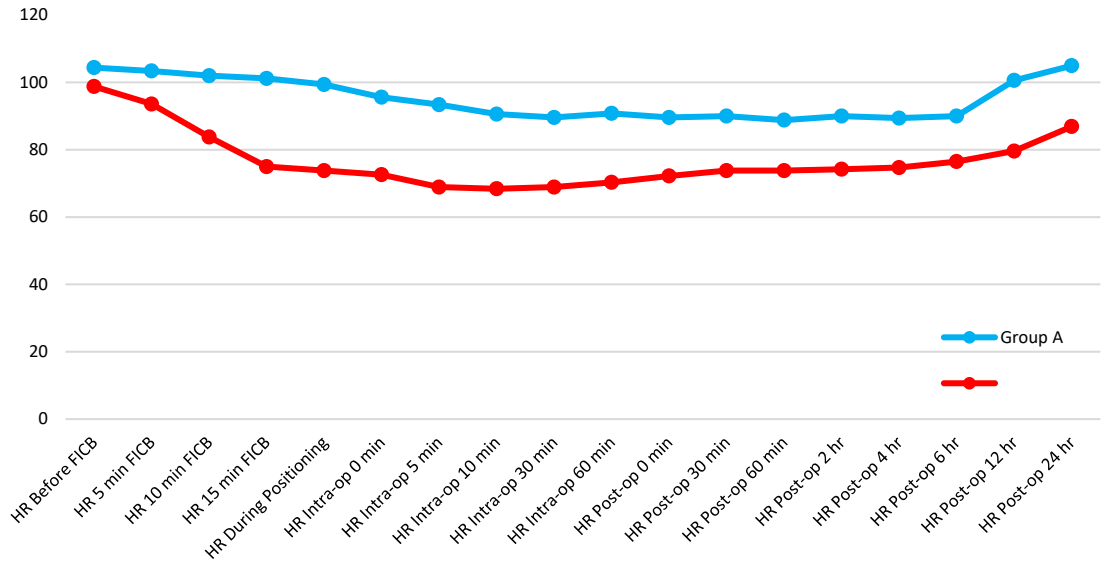

Fig. 2: Linear diagram showing mean arterial pressure comparison between two groups at different time intervals, *Statistically significant difference exists if p-value <0.005

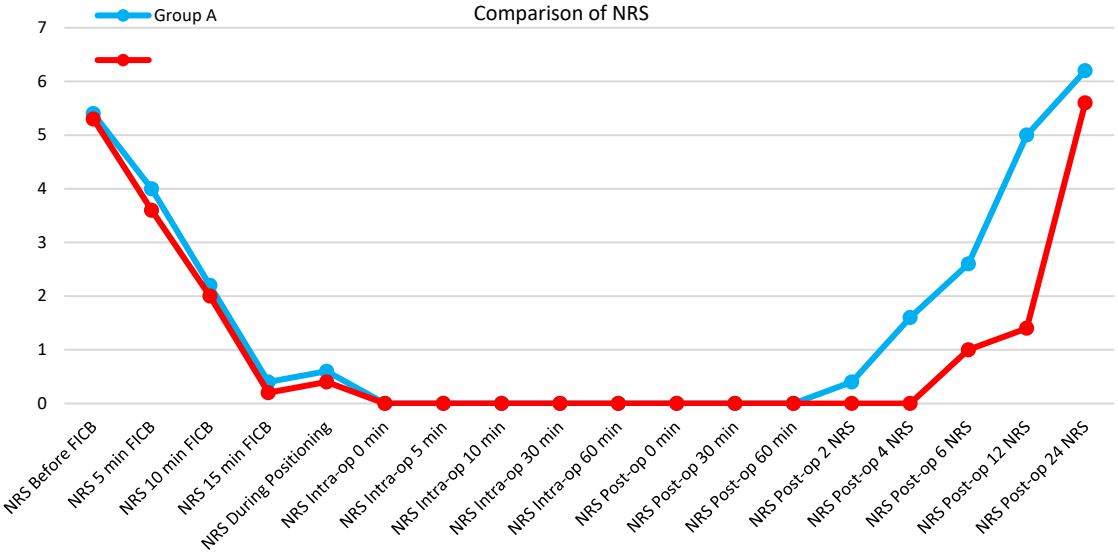

Fig. 3: Line diagram showing NRS score in two groups at different intervals

Table 5: Comparison of adverse effects between the groups

Group	Nausea	Bradycardia	Hypotension	None	p-value
Group A	0	0	0	28	0.232
Group B	1	1	2	24	

Association of Adverse effects with Group was not statistically significant (p = 0.232) (Table 5).

DISCUSSION

Hip fractures are prevalent in both the elderly due to osteoporosis and the young due to automobile accidents. Long-term quality of life is improved by effective pain management. An essential component of multimodal analgesia, fascia iliaca compartment block (FICB) is used to treat burn patients and give postoperative analgesia following lower limb orthopedic procedures[6]. This single intervention blocks mainly the femoral nerve, lateral femoral cutaneous nerve and occasionally obturator nerve, genitofemoral nerve. However, FICB is more of a sensory block.

The precision of anaesthetic injections has risen and procedural safety has enhanced due to ultrasound guidance. Adjuvants to local anaesthetics in FICB extend postoperative analgesia and decrease the need for medications, especially opioids that have adverse effects on bodily systems including nausea and vomiting, which has been a point of concern for anaesthetists.

Landmark-directed procedures of pain associated with hip and femur fractures, the fascia iliaca compartment block is a simple and generally safe technique. By reducing discomfort, it also facilitates the positioning process for spinal anaesthesia. Better operating conditions were achieved with addition of adjuvants with local anaesthetics which prolong duration of analgesia.

Steroids are extremely strong immunosuppressive and anti-inflammatory drugs. The duration of analgesia following subcutaneous, intercostal block, intra-articular and epidural anaesthesia can be extended by adding a modest quantity of Dexamethasone to local anaesthetics. Strong alpha-2 agonist Dexmedetomidine acts on presynaptic and postsynaptic nerve terminals in the central nervous system by reducing sympathetic outflow and norepinephrine release, which causes analgesia, drowsiness and anxiety.

Multiple studies have shown that adding Dexmedetomidine to Ropivacaine could improve the effectiveness, hasten the onset of action and prolong the time of giving first analgesics.

Our study was conducted in orthopedic operation theatre of Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal from March 2020 to august 2021 with 60 patients who satisfied inclusion criteria.

However there was block failure in 4 patients. So the statistical calculations contained remaining 56 patients with 28 patients in each group.

We used student t test for quantitative data and chi square test for qualitative data.

Suresh *et al*.[7] demonstrated that when given as an adjuvant to ordinary Bupivacaine, Dexamethasone increased the duration of the FICB block by 1.5-2 times. In combination with Dexamethasone, the duration of post-operative analgesia was 16.33±5.69 hours, while in Bupivacaine alone, it was 7.85±1.62 hours.

In our study we found that the mean duration of analgesia for Dexamethasone with Ropivacaine was 678.4±28.2 minutes which is greater than plain Ropivacaine.

Sun *et al*.[8] conducted an investigation including eighty proximal femoral fracture emergency room patients. Group R was given Ropivacaine, whereas group DR received Ropivacaine combined with Dexmedetomidine.

Every patients was given the fascia iliaca compartment block that Dalens described. Group R received 30 mL of 0.4% Ropivacaine injection, whereas the DR group received 30 mL of 1 μg kg^{-1} Dexmedetomidine injection with 0.4 % Ropivacaine.

Results showed that Fascia iliaca compartment block in DR group had early relieve of pain caused by passive activity without inducing obvious adverse reactions in the patients suffering from proximal femoral fractures.

In our investigation, we found that the mean Numerical rating scale (NRS) score dropped in both groups after 10 minutes of giving FICB that facilitates positioning for spinal anaesthesia.

Sana *et al*.[6] utilized landmark based FICB in 90 patients undergoing for fracture neck of femur surgery under spinal anaesthesia. They showed that, in comparison to using just Bupivacaine alone, adding Dexamethasone or Dexmedetomidine to it prolongs postoperative analgesia. There were three groups of patients. Group I: Patients in this group were given 0.9% normal saline + 0.25% Bupivacaine. Patients in Group II got both Dexamethasone and 0.25% Bupivacaine. Group III patients were given both Dexmedetomidine and 0.25% Bupivacaine.

The three groups had similar onset time for FICB ($p>0.05$). Thirty minutes after FICB, there was no pinprick sensation in 27 (90%) patients in group I, 25 (83%) patients in group II and 26 (87%) patients in group III. In group III, the pulse rate decreased significantly ($p<0.05$) within 30 minutes following FICB.

There was a very significant difference in the post-operative duration of analgesia between groups I and II, I and III and II and III according to the study . Better post-operative analgesia is obtained when Dexmedetomidine is added to Bupivacaine instead of Bupivacaine combined with Dexamethasone.

We also observed in our study that there was significant reduction in pulse rate ($p<0.05$) in group B 10 minutes after FICB. Mean duration of analgesia in group Dexamethasone was 678.4±28.2 minutes whereas it is 930.7±30 minutes in group Dexmedetomidine which was statistically significant ($p<0.05$).

Gupta *et al*.[9] studied two groups treated with 0.25% of Levobupivacaine and 0.25% Ropivacaine in fascia iliaca block. They found that the duration of analgesia is similar in both the groups and the difference is statistically insignificant (572.0±269.2 vs. 534.55±166.90 minutes).

In this study Dexmedetomidine was added as additive in both groups. Duration of analgesia in group LD (Levobupivacaine with Dexmedetomidine) was 955.3±114.5 minutes and in group RD (Ropivacaine with Dexmedetomidine) it was 894.6±91.3 minutes. This shows the synergism or additive nature of Dexmedetomidine.

In our investigation, the addition of Dexmedetomidine to Ropivacaine (Group B) resulted in a mean duration of analgesia of 930.7±30 minutes, greater than that of Ropivacaine combined with Dexamethasone (Group A).

Sriramka *et al*.[10] in a study In the fascia iliaca compartment block for trochanteric fracture, the effect of Dexmedetomidine with Levobupivacaine and Ropivacaine with Dexmedetomidine was found to be slightly longer in the group treated with Levobupivacaine LD (955.3±114.5 minutes) than in the group treated with Ropivacaine RD (894.6±91.3) with ($p<0.027$). The overall analgesic demand (group LD: 112 mg; IQR: 105-122 vs. Group RD: 115 mg; IQR: 104-118, $p = 0.034$) was shown to be statistically different, but clinically unimportant. None of the patients who took part showed any indications of neurotoxicity.

In our study we found that the mean duration of analgesia when Dexmedetomidine added to Ropivacaine was 930.7±30 minutes and the requirement of total rescue analgesic was found to be 75±4.7 mg of injection Diclofenac i.m in first 24 hour. Shamin *et al*.[11] did a retrospective study with 203 patients evaluated based on the combination of the anaesthesia and drugs in fascia iliaca compartment block. Patients were divided into six groups. Pain scores were assessed at 6 hourly intervals for 24 hr.

- **Group 1:** SAB+FICB (0.25% Bupivacaine)
- **Group 2:** SAB+FICB (0.25% Bupivacaine +1 μg kg^{-1} of Dexmedetomidine)
- **Group 3:** SAB+FICB (0.25% Bupivacaine +4 mg of Dexamethasone)
- **Group 4:** GA+FICB (0.25% Bupivacaine)
- **Group 5:** GA+FICB (0.25% Bupivacaine +1 μg kg^{-1} of Dexmedetomidine)
- **Group 6:** GA+FICB (0.25% Bupivacaine +4 mg of Dexamethasone)

In all six groups, postoperative analgesia at 0, 6 and 12 hours was similar and not statistically significant ($p>0.05$). Dexmedetomidine and Dexamethasone as adjuvants produced better postoperative analgesia after 18 hours and at 24 hours, Dexmedetomidine was more effective than Dexamethasone as an adjuvant. During the postoperative phase, rescue analgesia with simple Bupivacaine was most necessary. Compared to dexamethasone as an adjuvant (Group 3) and plain Bupivacaine (Groups 1, 4), post-operative nausea and vomiting was less common in patients treated with Dexmedetomidine (Group 2, 5). In any of the six groups, there were no postoperative adverse events in the form of bradycardia or hypotension.

In our investigation, we discovered that, at 12 hours post-operatively, Dexmedetomidine, when used as an adjuvant, was superior to Dexamethasone for postoperative analgesia. This difference was statistically significant ($p<0.05$). The average length of analgesia in the Dexamethasone group was 678.4±28.2 minutes, but in the Dexmedetomidine group it was 930.7±30 minutes. This difference in length was statistically significant ($p<0.05$). Patients receiving Dexmedetomidine in our trial, however, reported nausea more frequently than those receiving Dexamethasone. In the Dexmedetomidine group of our trial, we had two patients with hypotension, one patient with bradycardia and one patient with nausea.

Sabra *et al*.[12] conducted a study on 57 patients who underwent hip arthroplasty. The patients were given supra-inguinal fascia iliaca after subarachnoid block and before skin incision where group C received 40 mL normal saline, group R received 40 mL Ropivacaine 0.2% and group D received a mixture of Dexmedetomidine 2 μg kg^{-1} diluted in 0.2% Ropivacaine with 40 mL total volume.

Group C differed statistically significantly from the other two groups at these periods (comparison between C and R and C and D at 1 hour, $p<0.001$; at 3 hours, $p<0.001$ and at 6 hours, $p = 0.001$). There was no discernible difference between groups R and D ($p>0.05$). In terms of pethidine intake, group C consumed significantly more than group R when compared to both groups (comparison between group C vs. group R and group C vs. group D at first 12 h $p<0.001$ and $p<0.001$, at first 24 hour $p<0.001$ and $p<0.001$, respectively). However, group R and group D consumed similar amounts of Pethidine during the first 12 hours ($p>0.05$).

Regarding the time for first analgesic request it was significantly delayed in the group D (573.33±95.10 min) compared to group C (242.82±48.34 min) and group R (381.91±65.10 min) ($p = 0.013$).

In our study (infrainguinal FICB) we found that mean NRS score was 1.4 at 12 hour postoperatively. Time for rescue analgesic was 930.7±30 minutes in patients with Dexmedetomidine as adjuvant and 678.4±28.2 minutes in Dexamethasone group.

Dubey *et al*.[13] a total of 60 patients undergoing surgery for hip fractures participated in a study comparing the use of ropivacaine alone or in combination with dexamethasone as an adjuvant to reduce pain during positioning for neuraxial blockade with ultrasound-guided fascia iliaca compartment block. Patients in Group A received 40 milliliters of 0.25% ropivacaine mixed with two milliliters of saline, while patients in Group B received the same 40 milliliters of 0.25% Ropivacaine mixed with eight milligrams of Dexamethasone.

After 30 minutes of the block, there is no discernible change in the heart rates of the two groups. For the first 30 minutes following the administration of FICB block, there was no significant difference in the systolic blood pressure of either group ($p>0.05$). Just before to the block, Group B's diastolic blood pressure (DBP) was much lower than Group A's; however, there

was no significant difference in DBP over time. The mean pain score decreased gradually from 6.7 in Group A and 6.6 in Group B at 0 min to score of 2 at the end of 30 min in both the group. This improvement was achieved earlier in Group B compared to Group A, although the difference was not significant ($p>0.05$). Time of rescue analgesic was noted with the VAS score was significantly more in Group B ($p\leq0.004$).

In our investigation, we discovered that after administering FICB with dexamethasone, group A's heart rate did not significantly decrease. In ten minutes, the mean pain score (NRS Score) dropped from 5.4-2.2. The analgesic's rescue time was 678.4±28.2 minutes.

CONCLUSION

Patients with hip and femur fractures experience less discomfort when positioned for spinal anaesthesia after giving the fascia iliaca compartment block (FICB). Addition of Dexamethasone or Dexmedetomidine to Ropivacaine in fascia iliaca compartment block (FICB) prolongs post-operative analgesia in patients with hip and femur fracture. Furthermore, Ropivacaine with Dexmedetomidine offers longer postoperative analgesia than Ropivacaine with Dexamethasone.

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