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RESEARCH ARTICLE

COMPARISON OF FASCIA ILIACA COMPARTMENT BLOCK AND INTRAVENOUS FENTANYL FOR ANALGESIA DURING POSITIONING FOR SPINAL ANESTHESIA IN HIP FRACTURE SURGERIES

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Abstract

Effective pain management in hip fracture surgeries is crucial for optimal recovery. Spinal anesthesia is commonly used but positioning patients can be challenging, especially in frail, elderly individuals. Two main approaches for managing pain during positioning are the fascia iliaca compartment block (FICB) and intravenous fentanyl. FICB, a regional anesthesia technique, targets the lumbar plexus, providing longer-lasting pain relief with fewer systemic side effects compared to opioids. It reduces the need for additional analgesics, improving patient comfort and reducing intraoperative complications. FICB is especially beneficial in elderly patients with comorbidities. Intravenous fentanyl offers rapid pain relief but has a shorter duration and carries risks such as respiratory depression, sedation, and nausea, particularly in the elderly. Frequent dosing may lead to inconsistent pain control. Studies show that FICB provides superior pain relief and fewer side effects than fentanyl, making it a preferable choice for hip fracture surgeries. This study aims to compare their efficacy.

Objective:

1. To study the effect of analgesia for positioning during spinal anaesthesia using VAS
score in fascia iliaca compartment block and intravenous fentanyl
2. To compare the effect of analgesia in fascia iliaca compartment block and intravenous
fentanyl
3. The time taken for giving spinal anaesthesia

Materials and method: This study is on patients undergoing hip fracture surgery under subarachnoid block and was done in basaweshwara teaching and general hospital,MR medical college gulbarga. It was a Prospective interventional study included 60consented patients of age group 30 to 60 years belonging to American society of anesthesiologist's class I or II and posted for hip fracture surgery under subarachnoid block.

Results: This study included 60 patients, 30 in each group. Group A-30 patients received preoperative USG fascia iliaca compartment block.Group B- 30 patients received 1mcg/kg IV fentanyl 5 minute before placing in sitting position for spinal blockade. The mean Visual Analog Scale (VAS) score during positioning was significantly lower in Group A (1.13 ± 1.25) compared to Group B (2.33 ± 1.58) with a

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highly significant difference ($p<0.001$), while the mean time to perform spinal anesthesia was significantly shorter in Group A (4.79 ± 0.54 minutes) than in Group B (5.14 ± 0.57 minutes), with a p-value of 0.017; the age distribution between the two groups showed no significant difference, with 46.7% of Group A and 66.7% of Group B in the 51-60 age group ($p=0.143$).

Conclusion: In conclusion, the Fascia Iliaca Compartment Block is a superior analgesic technique compared to intravenous fentanyl for providing pain relief during positioning for spinal anesthesia in patients undergoing hip fracture surgeries. The benefits of FICB, including effective pain relief, prolonged analgesia, and reduced side effects, make it a valuable tool in optimizing pain management in this patient population.

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Introduction:-

Pain management in hip fracture surgeries is crucial for optimal outcomes and recovery. Spinal anesthesia is commonly used due to its effectiveness in providing pain relief and facilitating surgery. However, positioning patients for spinal anesthesia can be challenging, especially in frail, elderly patients with limited mobility. Effective analgesia during this phase is essential to prevent discomfort and complications.

Two common methods for pain management during positioning are the fascia iliaca compartment block (FICB) and intravenous fentanyl. FICB is a regional anesthesia technique that targets the lumbar plexus, providing sensory block to the hip joint and proximal thigh. Studies show FICB significantly reduces pain, minimizes opioid use, and improves patient comfort during positioning and surgery. It offers prolonged analgesia, which aids in smoother spinal anesthesia positioning and reduces intraoperative complications. FICB is also associated with fewer systemic side effects compared to opioids, making it a preferred choice for elderly patients with comorbidities.

Intravenous fentanyl, a potent opioid analgesic, provides rapid onset pain relief but with a shorter duration of action. It allows for quick adjustments in pain management, beneficial in a dynamic surgical setting. However, fentanyl use carries the risk of side effects such as respiratory depression, sedation, and nausea, particularly in elderly patients. Frequent dosing or infusion is often required, which can lead to inconsistent pain control and potential complications.

Studies have compared the efficacy of FICB and intravenous fentanyl in hip surgery patients. FICB has been shown to provide superior pain relief with fewer side effects, while fentanyl offers rapid relief but with higher risks of complications. This study aims to compare the efficacy of FICB and intravenous fentanyl for analgesia during spinal anesthesia positioning in hip fracture surgeries..

Objective:-

1.To study the effect of analgesia for positioning during spinal anaesthesia using VAS score in fascia iliaca compartment block and intravenous fentanyl
2.To compare the effect of analgesia in fascia iliaca compartment block and intravenous fentanyl
3.The time taken for giving spinal anaesthesia

Materials and Methods:-

This study is on patients undergoing hip fracture surgery under subarachnoid block and was done in basaweshwara teaching and general hospital,MR medical college Kalaburagi, during the period of 1st August 2022 to 31st January 2024[18 months], was approved by the Institutional Ethical Committee . This was a Prospective interventional study conducted on 60 patients over a period of 3 months. Pre-anaesthetic evaluation was done and written preoperative consent was obtained.

Sample Size= 60 [30 IN EACH GROUP]
Group A-30 patients received preoperative USG fascia iliaca compartment block.

Group B- 30 patients received 1mcg/kg IV fentanyl 5 minute before placing in sitting position for spinal blockade.

In the study 60 subjects were choosen.The patients were randomly allocated into 2groups of 30 each after applying inclusion and exclusion criteria.

Inclusion Criteria:
1. Patients between the age group 30 to 60 years
2. Patients belonging to ASA Grade I and II
3. Patients with hip fracture posted for surgery under subarachnoid block.

Exclusion Criteria
1. Patients with haemorrhagic diathesis and neurological disorders.
2. Patients with allergy to local anaesthetics or opioids.
3. Patients with polytrauma, infection over the injection site.
4. Morbid obesity BMI >35
5. Patients with spinal deformities

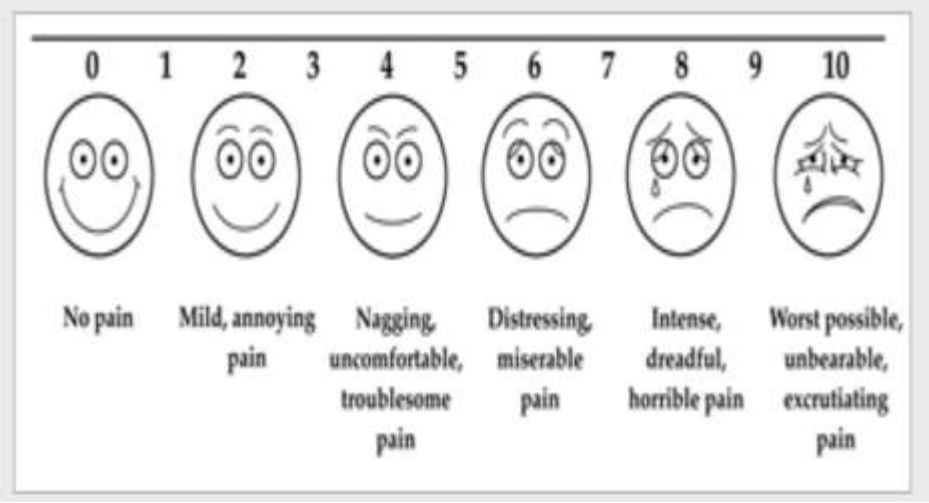
Procedure:-

Patients were shifted to the preoperative room half an hour prior to the procedure. Baseline vitals (pulse rate, blood pressure, oxygen saturation, respiratory rate, ECG) were recorded, and an 18G IV cannula was inserted. A local anesthetic test dose of 0.1 ml of 2% lignocaine was given the previous night, and all patients received intravenous ondansetron (0.1mg/kg).

In Group A, patients were placed supine. An ultrasound machine was used to visualize the femoral artery and iliacus muscle beneath the fascia iliaca. A 20ml injection of 0.5% ropivacaine was administered under ultrasound guidance. The fascia iliaca block was performed 15 minutes before the subarachnoid block.

Group B patients received titrated doses of intravenous fentanyl (1 mcg/kg). After the block/fentanyl, hemodynamic measures (heart rate, blood pressure, respiratory rate, SpO2) were monitored at 5-minute intervals. Visual analog scale scores were recorded to assess analgesia during positioning.

Visual Analogue Scale Score



The Patient positioning quality for spinal anesthesia was assessed by a blinded anesthesiologist using a 0-3 scale:
0 – satisfactory
1 - good
3 – optimal

Under aseptic conditions, a subarachnoid block was performed at L3-L4 with a 25G Quincke needle and 0.3mg/kg of 0.5% heavy bupivacaine. The time to perform spinal anesthesia was recorded.

Patient satisfaction was evaluated
1: satisfactory
2: not satisfactory.

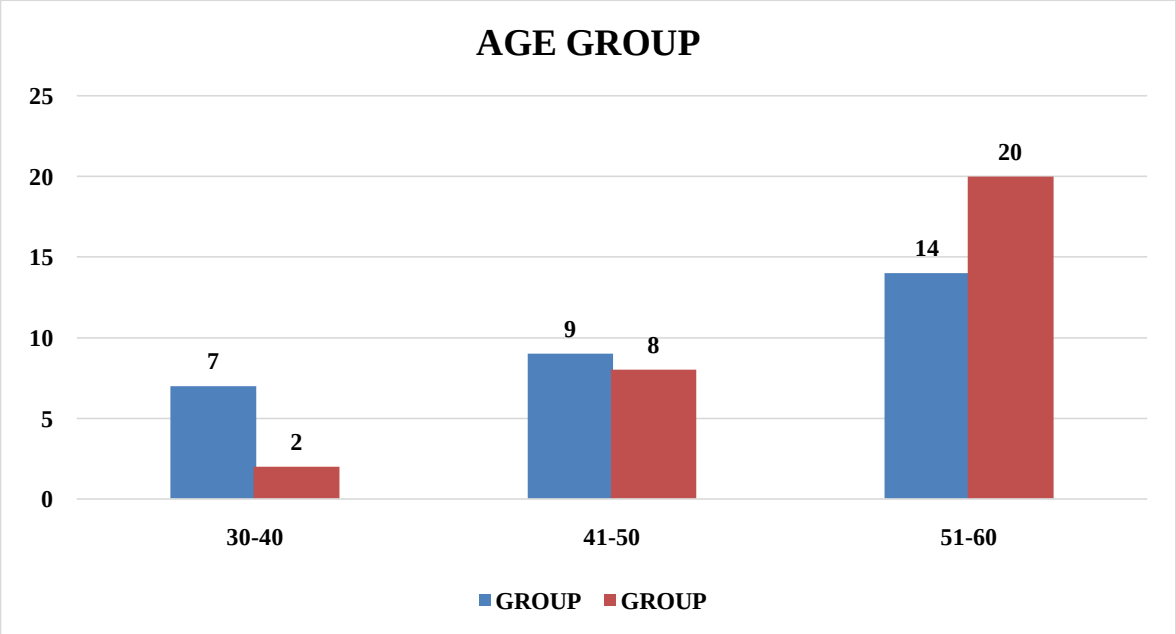
Postoperative analgesia was standardized with IV tramadol 50mg every 8 hours, starting with the first dose upon pain complaint. Data were collected for statistical analysis.

Statistical Analysis:
Collected data was analysed statistically using SPSS 20.0 software. chi-square test and analysis of variance (ANOVA) test was used as test of significance. P value <0.05 was considered statistically significant

Results:-

Age Group

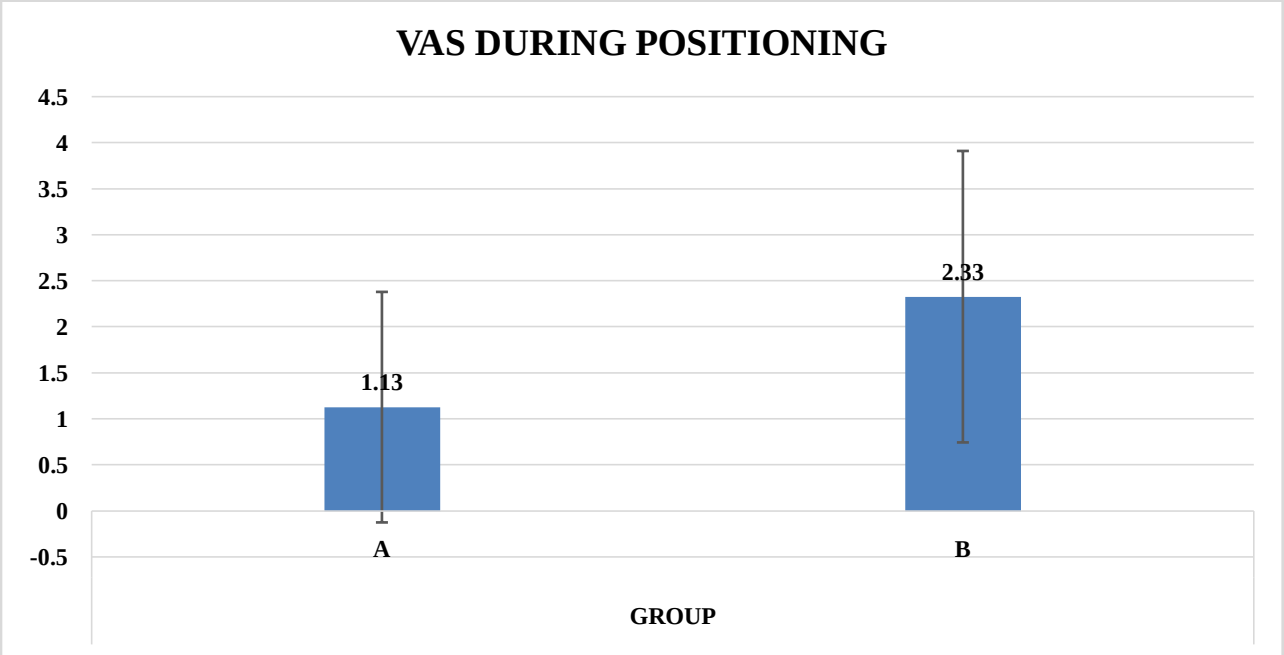
AGE GROUP		G		P VALUE
		A	B	
30-40	Count	7	2	0.143
	%	23.3%	6.7%	
41-50	Count	9	8	
	%	30%	26.7%	
51-60	Count	14	20	
	%	46.7%	66.7%	
Total	Count	30	30	
	%	100%	100%	



In Group A, the age distribution was as follows: 23.3% (n=7) were in the 30-40 age group, 30% (n=9) were in the 41-50 age group, and 46.7% (n=14) were in the 51-60 age group. In Group B, the distribution was 6.7% (n=2) in the 30-40 age group, 26.7% (n=8) in the 41-50 age group, and 66.7% (n=20) in the 51-60 age group. The difference in age distribution between the groups was not statistically significant (p=0.143).

Vas During Positioning

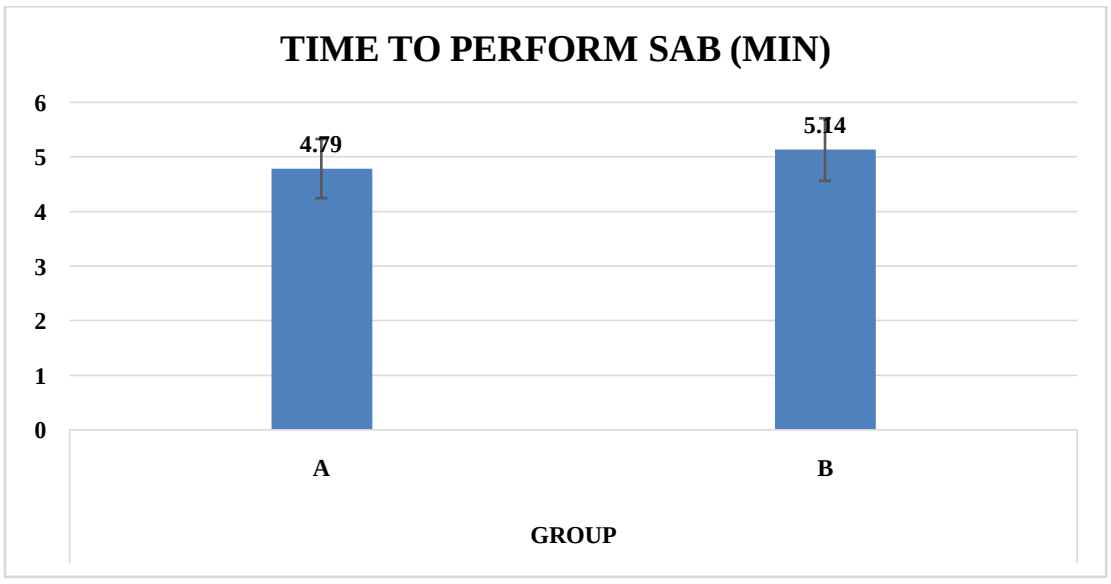
		G		P VALUE
		A	B	
VAS DURING POSITIONING	MEAN	1.13	2.33	<0.001
	SD	1.252	1.583	



The mean Visual Analog Scale (VAS) score during positioning was 1.13 ± 1.252 for Group A and 2.33 ± 1.583 for Group B. The difference in VAS scores between the groups was highly significant (p<0.001).

Time To Perform Sab (MIN)

		G		P VALUE
		A	B	
TIME TO PERFORM SAB (MIN)	MEAN	4.79	5.14	0.017
	SD	0.54177	0.572	



The mean time to perform spinal anesthesia was 4.79 ± 0.54177 minutes in Group A and 5.14 ± 0.57 minutes in Group B. The difference was statistically significant (p=0.017).

Discussion:-

Hip fracture surgeries, often performed on elderly patients, are associated with significant pain, especially during perioperative positioning for spinal anesthesia. Proper pain management is crucial for reducing discomfort, improving cooperation, and enhancing overall outcomes. Two common analgesic techniques are Fascia Iliaca Compartment Block (FICB) and intravenous fentanyl. This study compares the efficacy of these two techniques during positioning for spinal anesthesia in patients undergoing hip fracture surgeries.

In our study, Group A received preoperative ultrasound-guided FICB, while Group B received intravenous fentanyl 5 minutes before assuming the sitting position for spinal blockade. The two groups were comparable in terms of age, sex, and weight distribution with no statistically significant differences. The mean number of days since the fracture was 4.2 ± 1.157 days in Group A and 4.23 ± 1.135 days in Group B, showing no significant difference.

The groups differed significantly in their Visual Analog Scale (VAS) scores during positioning, with Group A reporting lower pain (1.13 ± 1.252) compared to Group B (2.33 ± 1.583). The quality of positioning was also better in Group A. Patient satisfaction scores were lower in Group A, however.

In previous studies, such as Swain et al., prior to analgesic intervention, VRS pain scores showed no significant difference between groups. However, 93.3% of patients in the FICB group were satisfied with the analgesia technique, compared to 70% in the fentanyl group. In Javeedulla Baig's study, patients in the FICB group had lower VAS scores after 20 minutes compared to the intravenous fentanyl group, and the positioning quality for spinal anesthesia was statistically better in the FICB group (p=0.05).

Regarding hemodynamic parameters, the heart rates of both groups were comparable before the intervention. After 10 minutes, mean arterial pressure decreased significantly in both groups due to pain relief, but Group B experienced a more significant decrease, likely due to fentanyl's effects like myocardial depression and bradycardia. However, no serious complications requiring intervention occurred. SpO2 values did not differ significantly between the groups before and 5-10 minutes post-intervention, though a difference was observed at 15 minutes, with Group B showing lower SpO2 during positioning.

The respiratory rates of both groups were comparable before the block, but Group B had a significantly lower respiratory rate at 5, 10, and 15 minutes post-intervention. Despite the lower respiratory rate in Group B, no patient had a rate <12/min or saturation <95%. Only three patients in Group B experienced drowsiness as a side effect of fentanyl, but spinal anesthesia was performed in the lateral position in these cases.

In terms of spinal anesthesia performance, the mean time to perform the procedure was 4.79 ± 0.54177 minutes in Group A and 5.14 ± 0.57 minutes in Group B, a statistically significant difference (p=0.017). The time to first rescue analgesic postoperatively was significantly longer in Group A (5.60 ± 0.89 hours) than in Group B (2.12 ± 0.66 hours), indicating longer pain relief in the FICB group.

Swain et al. found that FICB was associated with shorter times for central nerve block (CNB) performance and fewer attempts, suggesting superior positioning quality compared to fentanyl. Similarly, Javeedulla Baig observed longer analgesia duration in the FICB group. In Rajashree et al.'s study, the postoperative analgesic requirement was lower in the FICB group.

Our study confirms that FICB is more effective than intravenous fentanyl for analgesia during positioning for spinal anesthesia in hip fracture surgeries. It provides better pain relief, superior hemodynamic stability, and fewer adverse effects, making it a preferred choice in this patient population.

Advantages of FICB:

- **Effective Pain Relief**: FICB provides more consistent and effective analgesia, evidenced by lower VAS scores.
- **Reduced Opioid-Related Side Effects**: FICB minimizes opioid use, reducing the risk of side effects like respiratory depression and nausea.

- **Prolonged Analgesia**: FICB offers extended pain relief, aiding early mobilization and recovery.
- **Improved Hemodynamic Stability**: The regional nature of FICB helps maintain better hemodynamic stability, minimizing hypotension and bradycardia risks.

Limitations of FICB:

- **Ultrasound Availability**: The need for ultrasound guidance may limit FICB use in settings without such equipment.
- **Technical Expertise**: FICB requires training and expertise in regional anesthesia.
- **Individual Variation**: Patient factors, such as anatomical variations and pain tolerance, may affect the efficacy of both FICB and intravenous fentanyl.

Conclusion:-

In conclusion, the Fascia Iliaca Compartment Block is a superior analgesic technique compared to intravenous fentanyl for providing pain relief during positioning for spinal anesthesia in patients undergoing hip fracture surgeries. The benefits of FICB, including effective pain relief, prolonged analgesia, and reduced side effects, make it a valuable tool in optimizing pain management in this patient population.

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