

A COMPARATIVE STUDY ON THE EFFECTS OF PRE-OPERATIVE FASCIA ILIACA PLANE BLOCK ON HIP SURGERIES DONE UNDER SPINAL ANAESTHESIA IN ELDERLY PATIENTS, VS. NO BLOCK ON POST OPERATIVE PAIN SCORES

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ABSTRACT

BACKGROUND

Hip surgery is one of the common surgeries performed in orthopaedics. It is mainly done in elderly population as they are more prone to fractures, due to osteoporotic bone and tendency to fall. Pain reduction is a major concern in this group due to advanced age and associated comorbid conditions. In addition to patient suffering, pain leads to increased hospital stay and morbidity due to delirium. Effort has been made to reduce pain by giving opioids, NSAIDS, long acting intrathecal opioids, epidurals and recently using nerve blocks especially using ultrasound. Several blocks have been tried like femoral nerve block, three in one block, fascia iliaca block and sciatic block. The advantage of intraoperative block is the continuation of effect in post-operative period, less requirement of opioids and early mobilization, less delirium and overall less initial mortality. Here we tried to study the effect of intraoperative 35% ropivacaine and dexmedetomidine 50 micrograms given as FICB.

MATERIALS AND METHODS

50 elderly patients with only hip fracture admitted between 2017 to 2018, above 60 years of age, were subjected to the study. Patients included those who consented to procedure under spinal anaesthesia. They were explained about the procedure, the willingness for block, the risk factors involved and taught about VAS scale for pain assessment.

Inclusion Criteria- Elderly patients above 60 years of age, male/female, hip surgery alone, cases done under spinal with 5% bupivacaine.

Exclusion Criteria- Patients with contraindications for block like coagulopathy- including drug induced, infection at site, inguinal hernia, poor mentation, stroke, patient refusal, allergy to any of the drug component, patient with bradycardia with heart rate less than 60.

RESULTS

The patients who were given preoperative blocks were having analgesia for over 8 hours to 18.3 hours. They had a satisfactory VAS score of less than 3 up to 24 hr with paracetamol and rescue doses of tramadol.

CONCLUSION

FICB is effective fascial plane block for post-operative hip pain. It reduces the post-operative stay. Mixing dexmedetomidine increases the total duration by 18- 24.3 hrs. with minimum hemodynamic instability and sedation.

KEYWORDS

Fascia Iliaca Compartment Block, Dexmedetomidine, Hip Fracture, Postoperative Analgesic Requirement.

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BACKGROUND

Hip fracture surgery is one of the common orthopaedic surgeries done in the geriatric population, leading to significant mortality and morbidity as a result of inadequate

pain management in the postoperative period. Several coexisting causes lead to this poor approach to pain control such as dementia, systemic diseases such as cardiac diseases, renal and respiratory disease. The use of opioids liberally has been associated to several post-operative morbidity like delirium, increase hospital stay, respiratory depression, dryness, urinary retention, nausea etc. Use of NSAIDS liberally is not safe due to side effects like renal dysfunctions, coagulation problems and peptic ulcer. The use of regional block for postoperative pain control can avoid this problem and also provide good pain relief and early mobilisation reducing hospital stay and mortality.¹ Several blocks are possible like femoral nerve block, three in one block, lumbar plexus block and fascia iliaca block. The

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advantage of fascia iliaca block is simple to perform with no major complications.^{2,3} The use of fascia iliaca compartment block for postoperative analgesia in paediatrics was described by Dalens in hip surgery for the first time.⁴ Later several authors described its use in adult hip and knee arthroplasty for postoperative pain management. Nowadays it is included in the comprehensive pain management in acute hip fracture both for preoperative and postoperative period. In fascia iliaca the site of local anaesthetic deposit is deep to fascia iliaca plane and above the iliacus muscle. FICB blocks 3 nerves namely Femoral nerve, Obturator Nerve and Lateral cutaneous nerve of thigh. The extent of block of each nerve varies with Femoral and Lateral cutaneous nerve more commonly involved in the block than obturator nerve. Previously done as a blind procedure using blunt needle and double pop technique, one pop for fascia late and other for fascia iliaca. The effectiveness was not very high when done blindly and the block was not popular. With the use of ultrasound, the accuracy of local anaesthetic deposit and effectiveness of the block has improved. Several authors use volume from 30 ml to 40 ml for performing their block. Success rate was 35% to 45% in blind technique vs. 82%-87% when ultrasound was used for performing the block. Different concentration and type of local anaesthetic were used like ranging from. 125% Bupivacaine, 35% Ropivacaine. 2% Ropivacaine, 125% bupivacaine etc. to perform the block. Very low concentration was supplemented by some authors with adjuvants like dexmedetomidine, clonidine, opioid and dexamethasone mixed with the local anaesthetic for performing the block. This improved the quality of block. In our study we used ropivacaine. 35% and 50 microgram dexmedetomidine in 25 patients vs. no block to compare the analgesic requirements and VAS score for 24 hours postoperatively. Also, common postoperative problems like nausea, delirium respiratory depression bradycardia etc. were monitored and incidence was compared in FICB plus SA and SA alone group. Use of low concentration alone without adjuvant with lead to poor quality analgesia postoperative. Dexmedetomidine will reduce postoperative delirium in addition.

Aim and Objectives

- To study the usefulness of FICB intraoperatively on postoperative pain
- To study the usefulness in administering spinal anaesthesia.

MATERIALS AND METHODS

This prospective study was conducted in Department of anaesthesia and perioperative medicine Sree Gokulam Medical College during 2017 January to 2018 January. 50 patients were subjected randomly to spinal anaesthesia alone or spinal and fascia iliaca compartment block (FICB) before giving spinal anaesthesia in operation theatre. Preoperative patient consent and VAS (Visual analog score) briefing was done. Hospital ethical committee approval was obtained for the study. This randomized double-blind clinical trial was done with patients either receiving block before spinal anaesthesia or no block. The primary outcome

measured was pain score post-operative. Other parameters were measured like postoperative delirium, nausea and vomiting, and respiratory depression.

Inclusion Criteria

- Patient willingness.
- Weight above 50 kg.
- Cooperation from patient for block under local anaesthesia.
- Hip fracture only.
- No contraindication for SA or block.
- No drug allergy.
- No associated head injury.
- No dementia.

Exclusion Criteria

- Patient refusal.
- Psychiatric patient.
- Major Coagulation abnormalities.
- Major systemic diseases like renal cardiac etc.
- Bradycardia heart rate below 60/min.
- Patient with bilateral procedure.
- Patient unwilling for procedure.
- Patient with more than one fractures.

50 patients were randomised to receive FICB before spinal anaesthesia or no block before spinal anaesthesia. The patients were mostly above 65 years with no head injury or dementia. Before giving spinal anaesthesia, patients were administered block randomly. Ultrasound-guided block was given above the inguinal crease in the fascia iliaca plane. Good spread was confirmed by an echoing spread of local anaesthesia in Fascia Iliaca plane. 30 ml of. 35% Ropivacaine with 50 microgram Dexmedetomidine was given in all patients above 50 kg. After 20 minutes the patients were taken to operation theatre and spinal anaesthesia was administered after placing pre-induction monitors like ECG, NIBP, SpO2 Patient without block were given ketorolac 30 mg to reduce pain during positioning. Patients were given spinal in lateral position or sitting position. 3 ml of local. 5% bupivacaine heavy was given after lumbar puncture. Intraoperative vitals were monitored and maintained continuously till surgery was over. Post procedure all patients were admitted in ICU for 24 hours. Pain score using VAS scale was accessed at 20 minutes, 6 hrs., 12 hrs. and 24 hrs. Postoperatively rescue analgesia was given with IV Tramadol 50 mg bolus till pain score was below 3. All patients were administered iv Paracetamol 1 gm. 8 hourly in both groups. Patients who were given block but failed to have reduction in VAS score after 20 minutes before spinal anaesthesia were excluded from the study. Episodes of bradycardia, hypotension, respiratory depression, nausea were managed according to institution practice. Postoperatively, patients were monitored for pain at 6, 12, and 24 hours after block using VAS scale and documented. Total amount of tramadol consumed in 24 hours was noted in both groups. Data were analysed by using paired t test. Non-parametric data were analysed using ANCOVA. All statistical analysis was done using Microsoft office excel.

Statistical Analysis

This randomized controlled trial including 50 patients showed that there is significant difference in VAS score between two groups. Statistically the difference was noted up to 24 hours post-operative. The groups were comparable with regard to complications. Both groups had very few complications. Younger patients had lower pain score compared to elderly patients.

RESULTS

VAS Score

At 20 min to 24 hr was significant (mean at 20 min 1.88 Std. Deviation. 666 vs. 7 Std. Deviation 1.041, at 24 hrs. VAS score was 2.52 std. 510 vs 6.16 vs 1.248.

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	29	58.0	58.0	58.0
	Female	21	42.0	42.0	42.0
	Total	50	100.0	100.0	100.0

Table 2. Gender - Percentages

Age		
N	Valid	50
	Missing	0
Mean		69.26
Std. Deviation		7.353

Table 1. Age-Mean and SD

Paired Samples Statistics						
			Mean	N	Std. Deviation	Std. Error Mean
Block Given	Pair 1	PreVAS	7.44	25	1.193	.239
		VAS 20 min.	1.88	25	.666	.133
Block not Given	Pair 1	PreVAS	8.08	25	.759	.152
		VAS 20 min.	7.00	25	1.041	.208

Table 3 Comparison between, before the Treatment and After 20 Minutes (Paired t Test)

Block			Paired Differences				t	df	Sig. (2 tailed)	
			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
Block Given	Pair 1	PreVAS – VAS 20 min	5.560	1.446	.289	4.963	6.157	19.230	24	
Block not Given	Pair 1	PreVAS – VAS 20 min	1.080	1.412	.282	.497	1.663	3.825	24	.001

Table 4. Paired Sample Test

Descriptive Statistics				
Block		Mean	Std. Deviation	N
Block Given	VAS 20 min	1.88	.666	25
	VAS 6 hrs.	1.80	.816	25
	VAS 12 hrs.	1.64	.700	25
	VAS 24 hrs.	2.52	.510	25
Block not Given	VAS 20 min	7.00	1.041	25
	VAS 6 hrs.	6.20	1.581	25
	VAS 12 hrs.	5.04	.790	25
	VAS 24 hrs.	6.16	1.248	25

Table 5. VAS Over Time (Repeated Measure ANOVA)

Measure: MEASURE 1 Transformed Variable: Average						
Block	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Block given	Intercept	384.160	1	384.160	718.056	.000
	Error	12.840	24	.535		
Block not Given	Intercept	3721.000	1	3721.000	1.313 E3	.000
	Error	68.000	24	2.833		

Table 6. Test of between- Subjects Effects

Dependent Variable: VAS 20 min						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	Hypothesis	21.048	1	21.048	29.856	.000
	Error	31.070	44.073	.705 ^a		
Age	Hypothesis	3.627	1	3.627	5.107	.029
	Error	31.248	44	.710 ^b		
PreVAS	Hypothesis	.167	1	.167	.236	.630
	Error	31.248	44	.710 ^b		
Block	Hypothesis	277.699	1	277.699	401.496	.017
	Error	.854	1.235	.692 ^c		
Gender	Hypothesis	.073	1	.073	.105	.795
	Error	.787	1.138	.691 ^d		
block * gender	Hypothesis	.690	1	.690	.971	.330
	Error	31.248	44	.710 ^b		
a. .008 MS (gender) + MS (Error)						
b. MS (Error)						
c. MS (block * gender) + .098 MS (Error)						
d. MS (block * gender) + .061 MS (Error)						
Table 7. Factor Contributed to Reduction in Pain (ANCOVA) Test of between- Subjects Effects						

Factors contributed to sustaining of pain relief (20 minutes to 24 hours) – Multivariate Repeated Measure ANOVA Tests of Between-Subjects Effects						
Measure: MEASURE 1 Transformed Variable: Average						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	
Intercept	43.304	1	43.304	25.431	.000	
age	5.746	1	5.746	3.374	.073	
preVAS	.191	1	.191	.112	.739	
gender	.470	1	.470	.276	.602	
block	704.542	1	704.542	413.750	.000	
gender * block	.049	1	.049	.029	.866	
Error	74.924	44	1.703			
Table 8. Presence of Block and Lower Age Significantly Contributed to the Reduction in Pain						

Block was the only factor found significant.

DISCUSSION

Hip surgery is a common surgery in orthopaedics Multidisciplinary care has reduced mortality to 8.2% in recent years. Opioids and NSAIDS were the mainly used analgesia for postoperative pain management. Side effects like nausea vomiting and confusion and respiratory depression added to morbidity and mortality, increased hospital stay and delayed ambulation. With the use of ultrasound guided nerve blocks for postoperative analgesia the requirement of opioids has come down drastically. In addition, early mobility and reduced post-operative stay were possible.⁵

In a RCT involving 48 hip surgeries Fascia iliaca compartment block vs. IM morphine FICB administered preoperative provided ease of administration of SA and effective postoperative operative pain control.^{6,7}

Foss N et al used FICB for acute pain control in hip fracture and found oral morphine requirement of 48.5 vs. 31.5 in SA group compared to FICB group.⁸ They also noted 50% reduction in delirium in FICB group. In another study done by Castillon p et al in 216 patients’ cohort he founded FICB in emergency room for patients greater than 65 years

VAS score before and after block was 6.16 vs 2.99 and was significant statistical. In another comparison between femoral nerve block and FICB after Total hip arthroplasty both block successful reduced postoperative pain and opioids consumption without severe adverse effect.⁶ In a study involving 28 children for fracture femur. 25% bupivacaine 1 ml/kg or bupivacaine and dexmedetomidine by Ghada fathy el rahmawy et al requirement of rectal paracetamol in 24 hrs. was less in Dexmedetomidine plus Bupivacaine group compared to Bupivacaine alone.⁹ There was no bradycardia, hypotension etc. or respiratory depression. Incidence of agitation was less with Dexmedetomidine addition, onset of analgesia and requirement of Sevoflurane was also less in children given Dexmedetomidine. The mechanism of analgesia was due to selective a2 blocking, it reduces norepinephrine neurotransmitter and increase potassium concentration in neurons. Animal study has also showed improve analgesia and rapid onset with dexmedetomidine. In a case report by Lee Paracetamol and fascia iliaca block was given for femoral thrombectomy in a patient with recent myocardial infarction as the sole anaesthesia successfully. Yang L et al in Journal

of pain research compared FICB vs no block the pain score was less in 4, 12, and 24 hours with reduced requirement of morphine and as a consequence less nausea and vomiting.¹⁰ The pop technique had lower rate of success 35-45% compared to real time us guided blocks which has more than 80% success rate. Seunguk Bang MD et al in 22 patients aged 70-90 yrs. for hip bipolar arthroplasty FICB with 40 ml of 0.2% bupivacaine pain at 4 hrs., 8 hrs., 12 hrs. were less than without block. Total requirement of fentanyl was 246.3 vs. 351.4 in patient given FICB.

In another study by L Hanningfield, A Gulati et al in 104 hip fracture admitted in emergency room pain score was lower in patient at 2 and 8 hours at when block was given successful 20-40 ml was given on weight bases. In successful blocks pain was reduced by 50% after 2 hours of block. 67% of patient had successfully blocks. In another study in pre hospital care of patients 20 ml of Lidocaine 1.5% with epinephrine was injected in the fascia iliaca plane block pain measured with Simplified Verbal Scoring (SVS) from 0-4, SVS after block was 0-2 after 10 min Kaldirim u et al.¹¹ Foss N Bal gave 1% Mepivacaine in emergency room with normal saline vs IM Morphine and Saline in Fascia Iliaca compartment pain relief was superior in FICB compared to Morphine alone. In another study comparing infra inguinal vs supra inguinal approach, supra inguinal approach was superior with 24 hr morphine requirement less.

Hebbard P et al in anatomical study using dye injection concludes that injection at the fascia iliaca fossa spreads extensively to block femoral and lateral femoral cutaneous nerve without the need to inject near femoral nerve and likelihood of causing nerve damage.¹² In a study by Dulaney-Cripe E he used continuous infusion in FICB in hip fracture patients and the pain score in VAS score reduced from 4.1 to 1.7 on VAS scale and length of stay also reduces from 5.9 days to 4.8 days.¹³ In another randomised study, double blind, placebo –controlled trial by Shariat et al they found it more useful than placebo in hip arthroplasty patients.¹⁴

The use of Dexmedetomidine as a adjuvant to local anaesthesia is common in regional blocks. They have been tried in various nerve blocks, caudal and spinal anaesthesia here we tried dexmedetomidine in FICB. A Lot of study have shown rapid onset longer duration and less postoperative agitation in patients given dexmedetomidine. Our study has also shown better postoperative analgesia improved ambulation and less postoperative stay in patients given FICB with local anaesthetics and dexmedetomidine. Less need for tramadol in postoperative period reduces sedation and nausea vomiting allows early food intake and early discharge addition of Dexmedetomidine improve quality of block. More distal injection may explain lack of spread in fascial plain and some even perform distal occlusion to help spread proximally.¹⁵

Single oral analgesic and FICB are included in post hip fracture pain management by NICE and AAGBI guidelines. Less opioid use and hospital stay was seen with blocked patient compared to no block group.^{16,17}

Many studies have shown that postoperative opioids like morphine consumption was less with fascia iliaca block.

CONCLUSION

Fascia Iliaca Compartment Block is a useful tool in multimodal analgesia care. Use of ultrasound has improved its accuracy and ease of administration. Along with local anaesthetic, addition of adjuvant has improved its duration and quality of analgesia even with lower concentration. Using lower concentration will reduce complication and more volume can be used leading to good spread. FICB has reduced the overall opioid consumption post operatively. Supra inguinal proximal blocks help in better spread than distal blocks.

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