



Comparison of the Efficacy of Bupivacaine and Ropivacaine in Pericapsular Nervegroup Block in Positioning For Spinal Anaesthesia and Perioperative Analgesia

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ABSTRACT

Introduction: The pericapsular nerve group block (PENG) is a versatile regional anaesthesia technique described in 2018, developed primarily in total hip arthroplasties (THA) for postoperative analgesia with motor sparing benefits. The block is thought to provide more complete analgesia to the hip by depositing local anaesthetic within the myofascial plane of the psoas muscle and superior pubic ramus. **Objectives:** To compare the efficacy of 0.25 % bupivacaine and 0.2% ropivacaine in Pericapsular nerve group block in positioning for Spinal Anaesthesia and also perioperative analgesia. **Methodology:** The present RCT was carried out in patients undergoing unilateral surgeries in and around the hip joint at Navodaya Medical College Hospital, Raichur from January 2021 and June 2022 with 2 groups, one group with 0.25 % bupivacaine and other group with 0.2% ropivacaine with 30 patients in each group. **Results:** Mean age of Group B and Group R was 50.50±9.72 and 52.50±7.70 years. Mean VAS at rest in Group B and Group R 10 minutes after block was 4.57±1.55 and 2.47±1.76 respectively (p<0.05). Mean VAS at rest in Group B and Group R 20 minutes after block was 2.07±1.23 and 1.33±0.84 respectively (p<0.05). Mean VAS at movement at 10, 20 and 30 minutes in Group B and Group R was (5.57±1.72 vs 3.63±2.11), (2.83±1.18 vs 1.77±0.90) and (2.40±0.93 vs 1.47±0.78). Mean duration of analgesia was 8.03±2.19 vs 9.87±3.06 minutes in Group B and R respectively. **Conclusion:** In this study, Ropivacaine group has given better results than Bupivacaine group in terms of Lower VAS scores at rest and movement in the initial 30 minutes after block administration Duration of action. The perioperative analgesia in terms of VAS score from 30 minutes to time of rescue analgesia were comparable in both groups with no statistically significant difference.

Keywords: Pericapsular nerve group block, bupivacaine, ropivacaine.

INTRODUCTION

Elderly people are quite prone to hip fractures because of age related osteoporosis and other degenerative changes [1]. The surgical reduction and fixation of the fractures are the only definitive treatment in most patients [2]. Opioids and various other drugs are used to relieve the associated pain prior to the surgery but the related adverse effects like nausea, vomiting, respiratory depression, hypotension, and delirium preclude their much use [3]. Femoral Nerve Block (FNB) and Fascia Iliaca Block (FIB), are used for achieving effective perioperative analgesia because of their opioid-sparing effects but the analgesic effect of these blockades is only moderate as the obturator nerve (ON) is not adequately affected [6]. The anterior hip capsule is the richly innervated by ON, accessory obturator nerve (AON) and femoral nerve (FN) [4, 5]. The high articular branches of FN and AON are consistently found between the anterior inferior iliac spine (AIIS) and the ilio-pubic eminence (IPE), whereas the ON is located close to the infero-medial acetabulum [6]. The pericapsular nervegroup (PENG) block is an ultrasound guided approach, which blocks these articular branches of FN, ON, AON and is found to be very effective as a regional anaesthesia technique for hip fracture surgeries [7]. The pericapsular nerve group block (PENG) is a regional anaesthetic technique described in 2018,

developed primarily in total hip arthroplasties (THA) for postoperative analgesia with motor sparing benefits. The block is thought to provide more complete analgesia to the hip by depositing local anesthetic within the myofascial plane of the psoas muscle and superiorpubic ramus [8]. Furthermore, the blocking and understanding of the terminal nerves that innervate the hip joint have also been described in patients with chronic hip pain. The indications for THA often include degenerative hip disease and traumatic hip fractures. These indications for surgery are relatively common in the elderly population and are associated with significant morbidity and mortality [9]. Operative intervention, such as THA, has also been associated with significant pain [10]. Historically, the most commonly performed peripheral nerve blocks include lumbar plexus block, a femoral nerve block, or a fascia iliaca compartment block to manage post-operative analgesia [11]. With the understanding that additional articular branches (i.e., from the sciatic nerve) these blocks will provide incomplete analgesia to the hip and may also predispose the patient to fall due to weakness of the quadriceps muscles [12]. Therefore the ideal block technique should provide complete analgesia of the hip joint and without muscle weakness. Neuraxial anaesthesia (NA) is a commonly used technique for fractured hip surgery. However, positioning for NA is difficult due to severe pain in fractured limb and regional techniques like femoral nerve block and fascia iliaca block have been used to reduce the pain during positioning [13, 14]. Pericapsular nerve group block or PENG block is a novel regionalnerve block to provide analgesia in fractured hip patients [15, 16]. It is primarily anultrasound-guided (USG) technique where target area is the pelvic rim (superior pubicramus) near iliopectineal eminence, deep to fascia of iliopsoas muscle [15]. Articular branches of femoral nerve and accessory obturator nerves, which cross over the bony rim, are primary targets of the PENG block [15]. However, by increasing volume of local anaesthetic drug; other nerves (obturator, femoral, genitofemoral, and lateral femoral cutaneous nerve) can be blocked [17]. With increased understanding of local anaesthetic drug spread (through contrast study), the indications of this block are increasing [18, 19]. Other than its peri-operativeuse and analgesia for hip surgeries, PENG block has been used for surgical anaesthesia toreduce the dislocated hip and varicose vein striping procedure [20]. This block has been recently described as an effective option for hip analgesia, as it targets the articular branches that supply the hip. Hence we planned this RCT with the objective to compare the efficacy of 0.25% bupivacaine and 0.2% ropivacaine in Pericapsular nerve group block in positioning for Spinal Anaesthesia and also perioperative analgesia.

OBJECTIVES

To compare the efficacy of 0.25 % bupivacaine and 0.2% ropivacaine in Pericapsular nerve group block in positioning for Spinal Anaesthesia and also perioperative analgesia.

MATERIALS AND METHODS

Study Setting: Department of Anaesthesia, Navodaya Medical College Hospital, Raichur.

Study Population: All patients satisfying inclusion criteria undergoing unilateral surgeries inand around the hip joint at Navodaya Medical College Hospital, Raichur.

Study Period: 1.5 years (From June 2022 and December 2023)

Study Design: Randomized controlled trials

Sample Size: Mean and SD of pre-procedure VAS at rest and pre-procedure VAS at 150 passive SLR were 7.45 ± 1.53 and 9.45 ± 0.75

$d = \text{mean difference} = 2Z\alpha/2 = 2.58$ standard normal variate at 99% confidence interval

$Z_{1-\beta} = 1.282$ at 90% power of test

$\sigma = \text{pooled standard deviation} = SD = 1.211$

Sample size formula

$n = \frac{2(Z\alpha/2 + Z_{1-\beta})^2 (\sigma)^2}{d^2}$

d^2

$n = \frac{2(2.58 + 1.282)^2 (1.211)^2}{(2)^2}$

$(2)^2$

$n = 17.45 \cong 17$

$n = 17$ is the minimum sample size for each group.

Minimum sample size for our study was 17 in each group. We have 2 groups. So accordingly total sample size was 34. But we planned to include 30 patients in each group.

Sampling Technique: Simple Random sampling method

Inclusion Criteria:



Figure 2: Ultrasonography machine - Sony Logiq C5 premium

Figure 3 Low frequency curvilinear probe draped with sterile glove.



Figure 3: Low frequency curvilinear probe draped with sterile glove

Study Population

Sixty patients posted for elective unilateral surgeries in and around Hip joint (30 in each group) between 18-65 years, categorized under American Society of Anaesthesiologists (ASA) physical status I and II were included in our study, after the conditions of the inclusion and exclusion criteria were satisfied.

- A. Group B (N=30) – PENG block with 20 ml of 0.25% Bupivacaine under ultrasonography guidance.
- B. Group R (N =30) – PENG block with 20 ml of 0.2% Ropivacaine under ultrasonography guidance.

METHODS OF DATA COLLECTION:

Patients of either gender aged between 18-65 years will be randomly allocated using computer generated numbers to one of the two groups (Group B -0.25% Bupivacaine, Group R -0.2% Ropivacaine) of 30 patients each. After

thorough preoperative evaluation, appropriate investigations, nil per oral instructions, IV line is secured over the upper limb of the non-operative side. Patients will be assessed for pain using VAS scores during rest and active sideways movement of the fractured limb and noted before block administration. The block is administered under ultrasound guidance with low frequency curvilinear probe which is placed parallel to the inguinal crease, at the level of anterior superior iliac spine and scanning is done with gradual caudad movement of the probe. After the anterior inferior iliac spine (AIIS) is visible, the probe is turned slightly medial until the hyper echoic continuous shadow of superior pubic ramus is visible. The psoas muscle with prominent tendon is then identified just above the pubic ramus. The target is the plane between these two structures. Figure 4 Scanning and sonoanatomy.



Figure 4: Scanning and sonoanatomy

Aligning the pubic ramus in the center of the image and targeting the pubic ramus just medial to the Anterior inferior iliac spine, a 22G 100 mm needle is introduced and 20 mL 0.25% bupivacaine is administered using ultrasound guided out-of-plane technique and the spread of local anaesthetic below the psoas tendon is noted. Pain scores will be assessed ten minutes after the procedure at rest and movement of the limb and at the time of positioning for spinal anaesthesia. The patient will be assessed perioperatively for analgesic efficacy 10 minutes, 30 minutes, 60 minutes and hourly for first 6 hours, 2nd hourly for the next 6 hours and 4th hourly till 24 hours after the procedure. Pain assessment will be performed using visual analog scale (VAS) scores at the above intervals. Figure 5 During drug deposition.



Figure 5: During drug deposition

Duration of analgesia: defined as the period from the time of administration of test drug to the first demand for pain relief (VAS score >4) Quality of Analgesia is described as:

- Excellent (VAS score 0)
- Good (VAS score 1-3)
- Average (VAS score 4-7)
- Poor (VAS score 7-10)

VISUAL ANALOGUE SCALE/GRAPHIC RATING SCALE

The Visual Analogue Scale (VAS) consists of a straight line with the endpoints defining extreme limits such as ‘no pain at all’ and ‘pain as bad as it could be’. The patient is asked to mark his pain level on the line between the two endpoints. The distance between ‘no pain at all’ and the mark then defines the subject’s pain. This tool was first used in psychology by Freyd in 1923. If descriptive terms like ‘mild’, ‘moderate’, ‘severe’ or a numerical scale is added to the VAS, ones peaks of a Graphic Rating Scale (GRS). A line-length of 10 or 15 cm showed the smallest measurement error compared to 5- and 20-cm versions and seems to be most convenient for respondents. Figure 6 VAS Score.

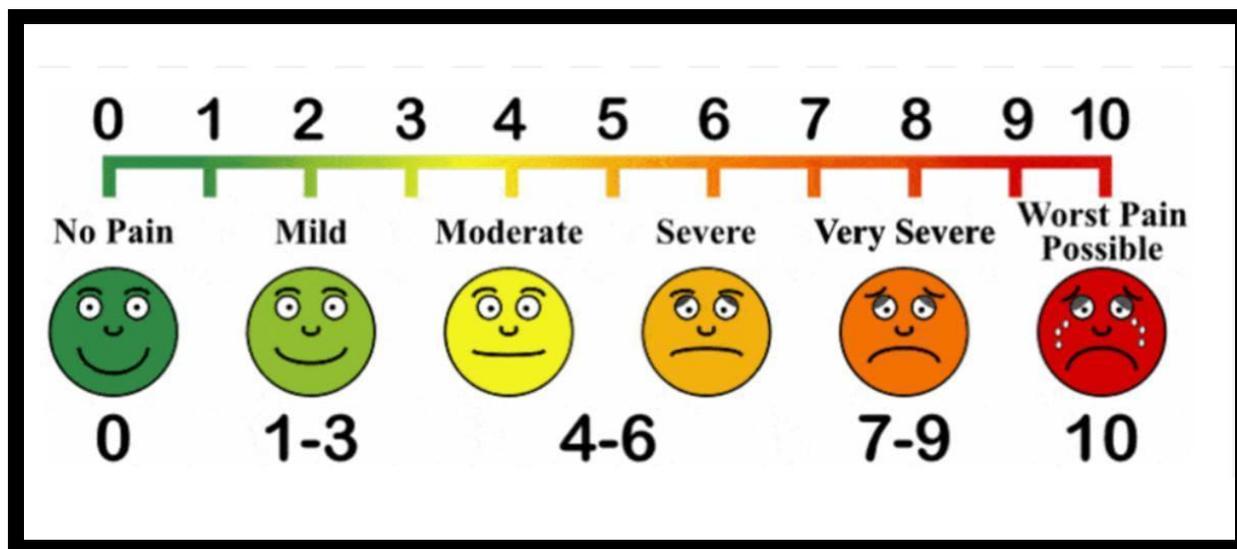


Figure 6: VAS Score

Statistical analysis:

Data was collected by using a structure proforma. Data entered in MS excel sheet and analysed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of proportions. Quantitative data was expressed in terms of Mean and Standard deviation. Comparison of mean and SD between two groups was done by using unpaired t test to assess whether the mean difference between groups is significant or not. Descriptive statistics of each variable was presented in terms of Mean, standard deviation, standard error of mean. A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered as highly significant.

RESULTS

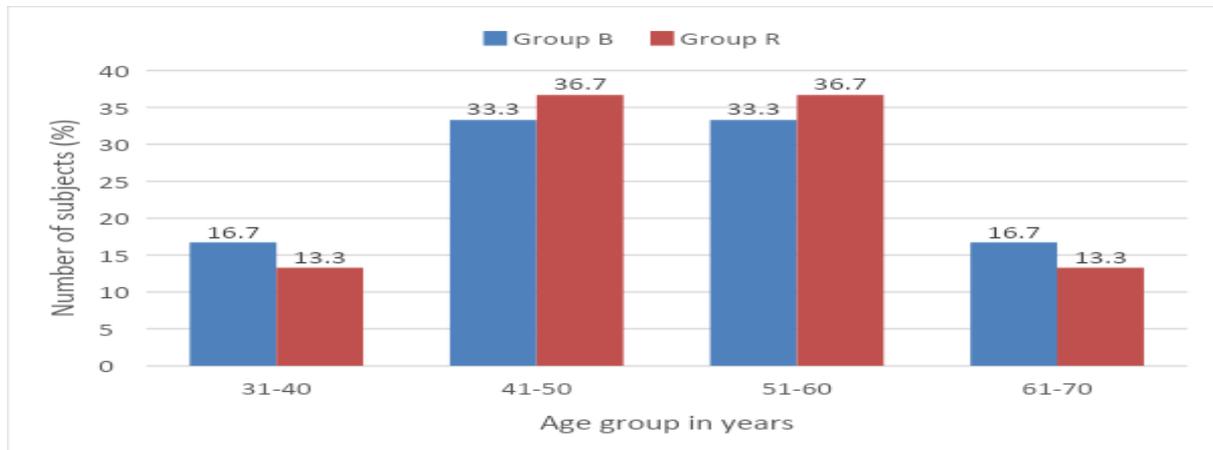
Table 2: Distribution according to age group between Group B and Group R

		Group B		Group R		Total	p
		No	%	No	%		
Age group in years	31-40	5	16.7	4	13.3	9	0.95
	41-50	10	33.3	11	36.7	21	
	51-60	10	33.3	11	36.7	21	
	61-70	5	16.7	4	13.3	9	
Total		30	100.0	30	100.0	60	

We included 30 patients in Group B and 30 in Group R belonging to ASA -Grade I and II and undergoing elective unilateral surgeries in and around Hip joint.

Majority of the patients from Group B were from 41-50 years and 51-60 years age group i.e. 10(33.3%) each followed by 5(16.7%) each from 31-40 years and 61-70 years. Majority of the patients from Group R were from 41-50 years and 51-60 years age group i.e. 11(36.7%) each followed by 4(13.3%) each from 31-40 years and 61-70 years.

Mean age of the patients from Group B and Group R was 50.50 ± 9.72 and 52.50 ± 7.70 years respectively.

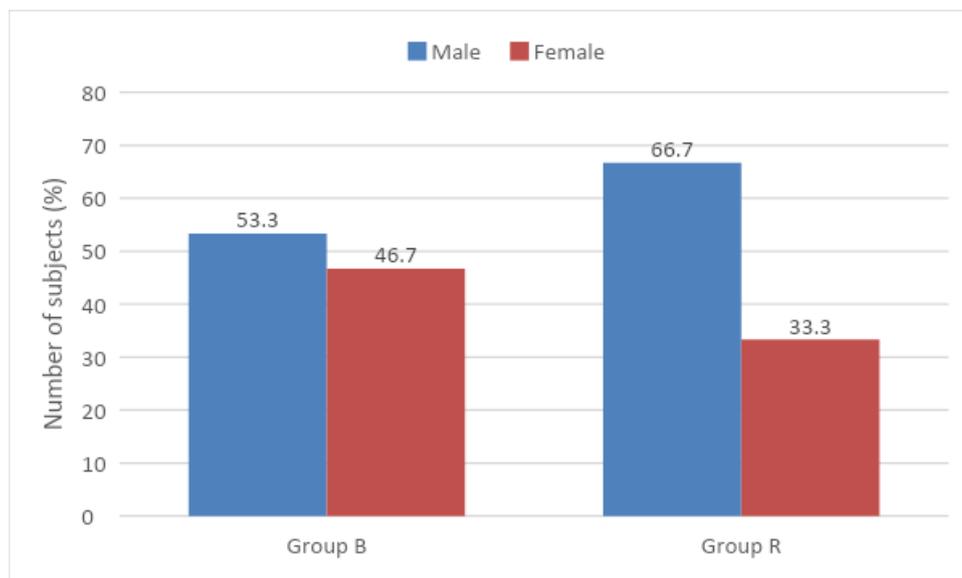


Graph 1: Bar diagram showing Distribution according to age group between Group B and Group R

Table 3: Distribution according to gender between Group B and Group R

		Group B		Group R		Total	p
		No	%	No	%		
Gender	Male	16	53.3	20	66.7	36	0.29
	Female	14	46.7	10	33.3		
Total		30	100.0	30	100.0	60	

Proportion of males in Group B were 53.3% males and in Group R were 66.7%. Proportion of females in Group B were 46.7% males and in Group R were 33.3%.



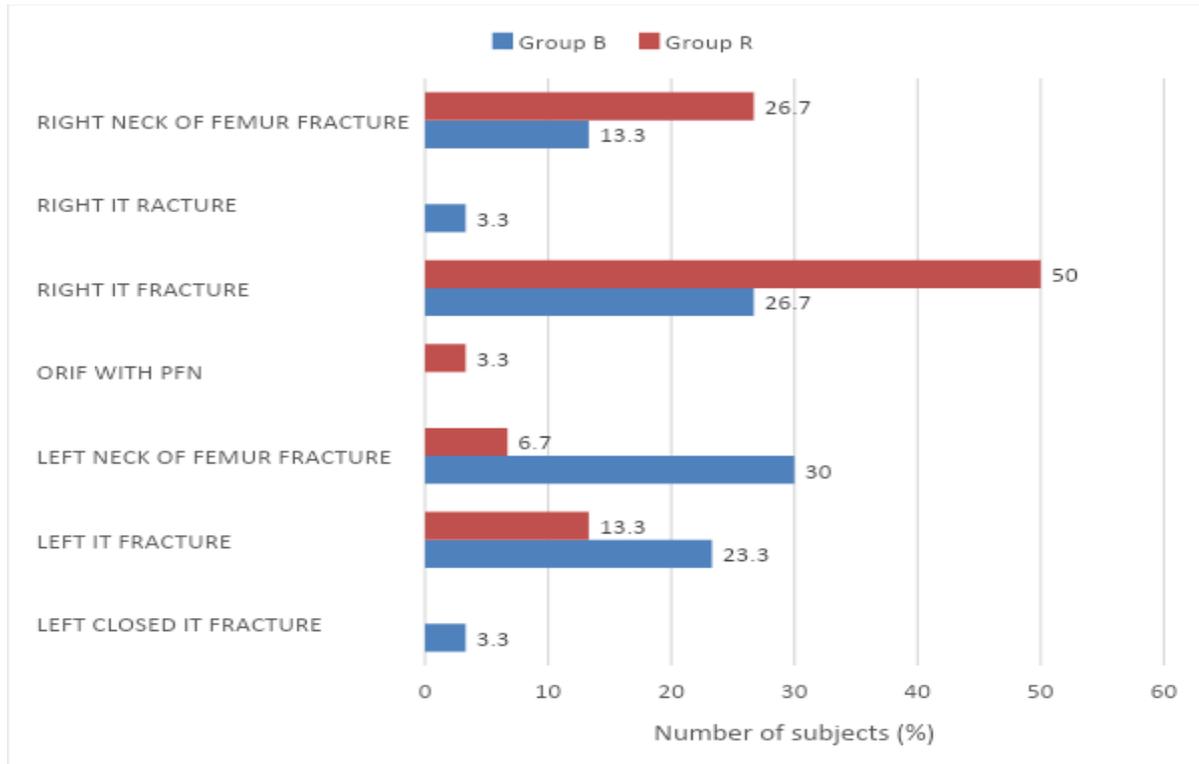
Graph 2: Bar diagram showing Distribution according to gender between Group B and Group R

Table 4: Distribution according to diagnosis between Group B and Group R

		Group B		Group R		Total	p
		No	%	No	%		
Diagnosis	Left Closed It Fracture	1	3.3	0	0.0	1	0.11
	Left It Fracture	7	23.3	4	13.3		
	Left Neck of Femur Fracture	9	30.0	2	6.7		

	Orif With PFN	0	0.0	1	3.3	1
	Right It Fracture	8	26.7	15	50.0	22
	Right It Racture	1	3.3	0	0.0	1
	Right Neck of Femur Fracture	4	13.3	8	26.7	12
Total		30	100.0	30	100.0	60

Diagnosis in our study revealed that majority of the cases from Group B had left neck fracture femur in 9 cases i.e. 30% followed by right intertrochanteric fracture in 8(26.7%) and left IT fracture in 7 (23.3%) cases. Majority of the cases from Group R had right IT fracture in 15(50%) cases followed by right neck of femur fracture in 8(26.7%) cases.

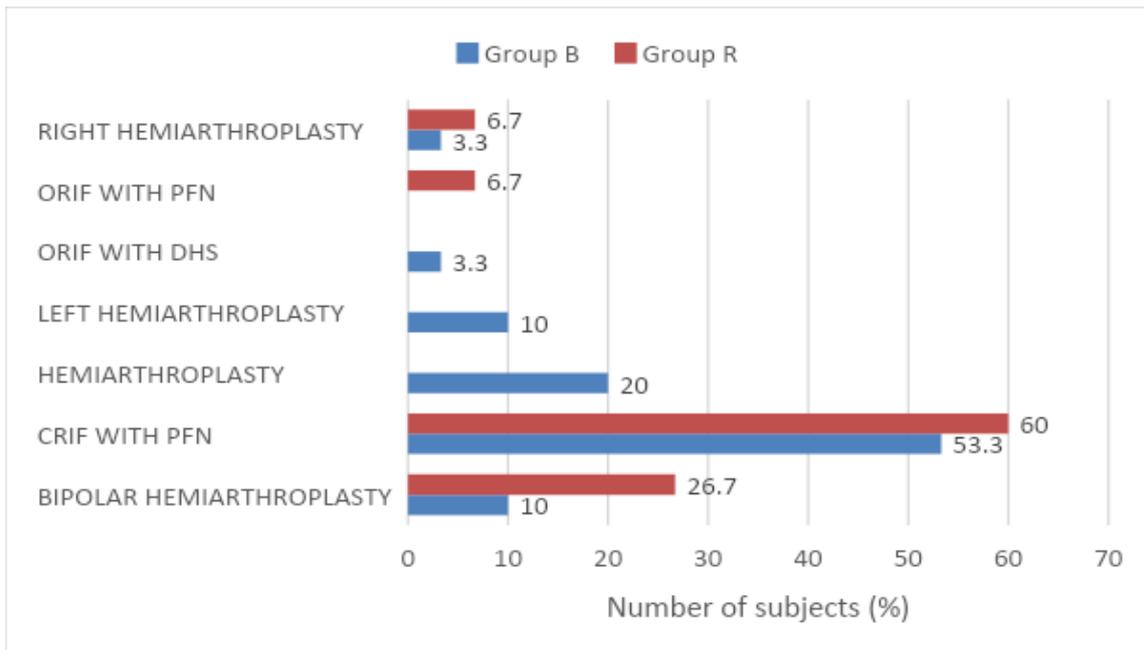


Graph 3: Bar diagram showing Distribution according to diagnosis between Group B and Group R

Table 5: Distribution according to surgical procedures between Group B and Group R

Surgical Procedure	Group B		Group R		Total	p
	No	%	No	%		
BIPOLAR HEMIARTHROPLASTY	3	10.0	8	26.7	11	0.023
CRIF WITH PFN	16	53.3	18	60.0	34	
HEMIARTHROPLASTY	6	20.0	0	0.0	6	
LEFT HEMIARTHROPLASTY	3	10.0	0	0.0	3	
ORIF WITH DHS	1	3.3	0	0.0	1	
ORIF WITH PFN	0	0.0	2	6.7	2	
RIGHT HEMIARTHROPLASTY	1	3.3	2	6.7	3	
Total	30	100.0	30	100.0	60	

Most commonly followed procedure in both the groups was CRIF with PFN in 16(53.3%) and 18(60%) in Group B and Group R respectively. Bipolar hemiarthroplasty was performed in 10% cases in Group B and 26.7% cases in Group R respectively.

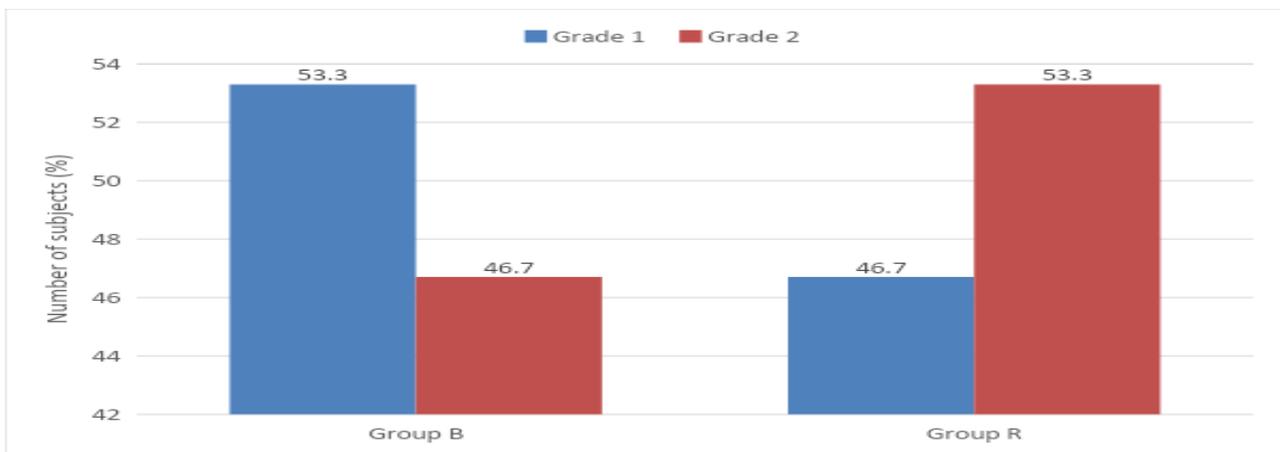


Graph 4: Bar diagram showing Distribution according to surgical procedures between Group B and Group R

Table 6: Distribution according to ASA grades between Group B and Group R

		Group B		Group R		Total	p
		No	%	No	%		
ASA grade	1	16	53.3	14	46.7	30	0.6
	2	14	46.7	16	53.3	30	
Total		30	100.0	30	100.0	60	

Proportion of cases with ASA grade 1 in Group B were 53.3% and in Group R were 46.7%. Proportion of cases with ASA grade 2 in Group B were 46.7% and in Group R were 53.3% respectively.

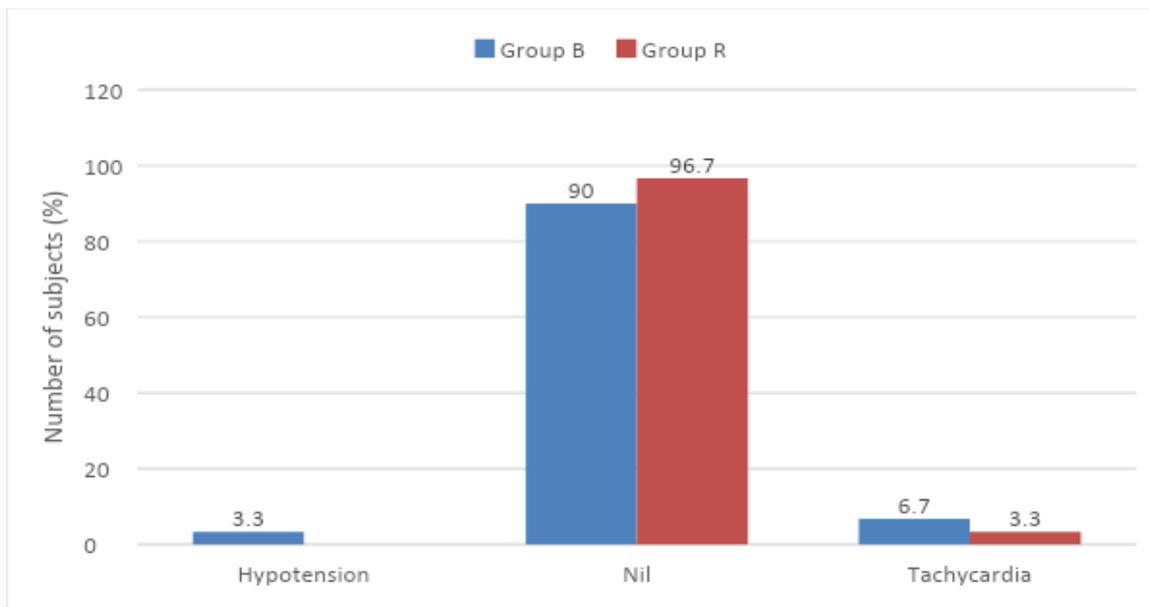


Graph 5: Bar diagram showing Distribution according to ASA grades between Group B and Group R

Table 7: Distribution according to adverse effects between Group B and Group R

		Group B		Group R		Total	p
		No	%	No	%		
Adverse effects	Hypotension	1	3.3	0	0.0	1	0.49
	Nil	27	90.0	29	96.7	56	
	Tachycardia	2	6.7	1	3.3	3	
Total		30	100.0	30	100.0	60	

Incidence of hypotension was 3.3% in Group B as compared to 0% in Group R. Incidence of tachycardia was 6.7% in Group B as compared to 3.3% in Group R. This difference in the incidence of adverse effects between two groups was statistically not significant ($p>0.05$).



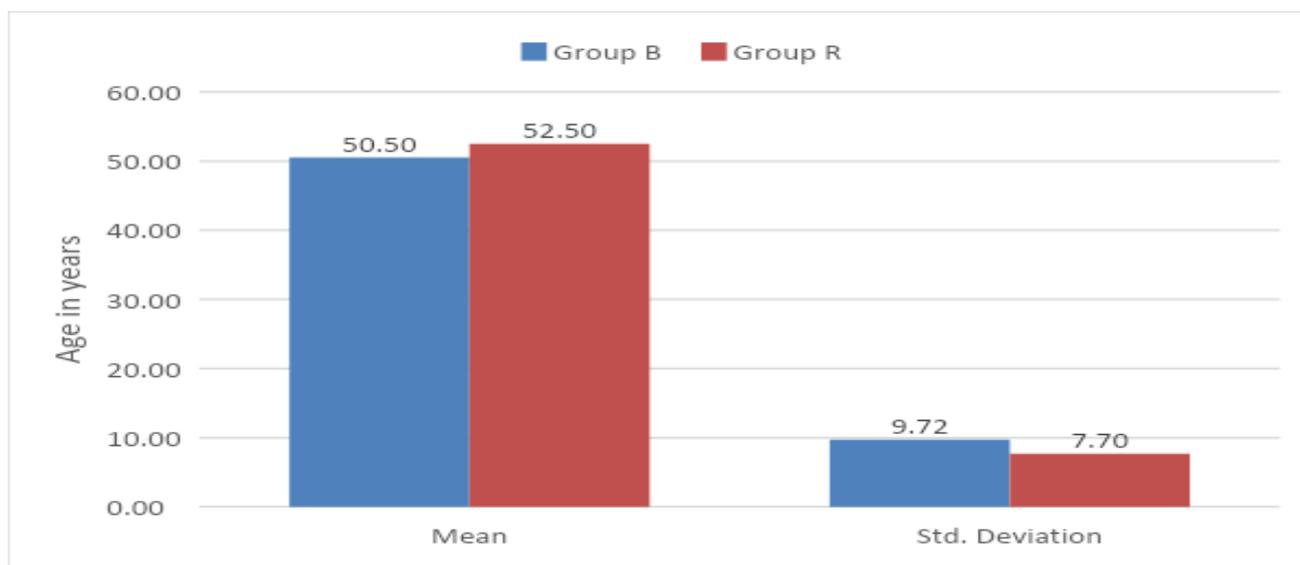
Graph 6: Bar diagram showing Distribution according to adverse effects between Group B and Group R

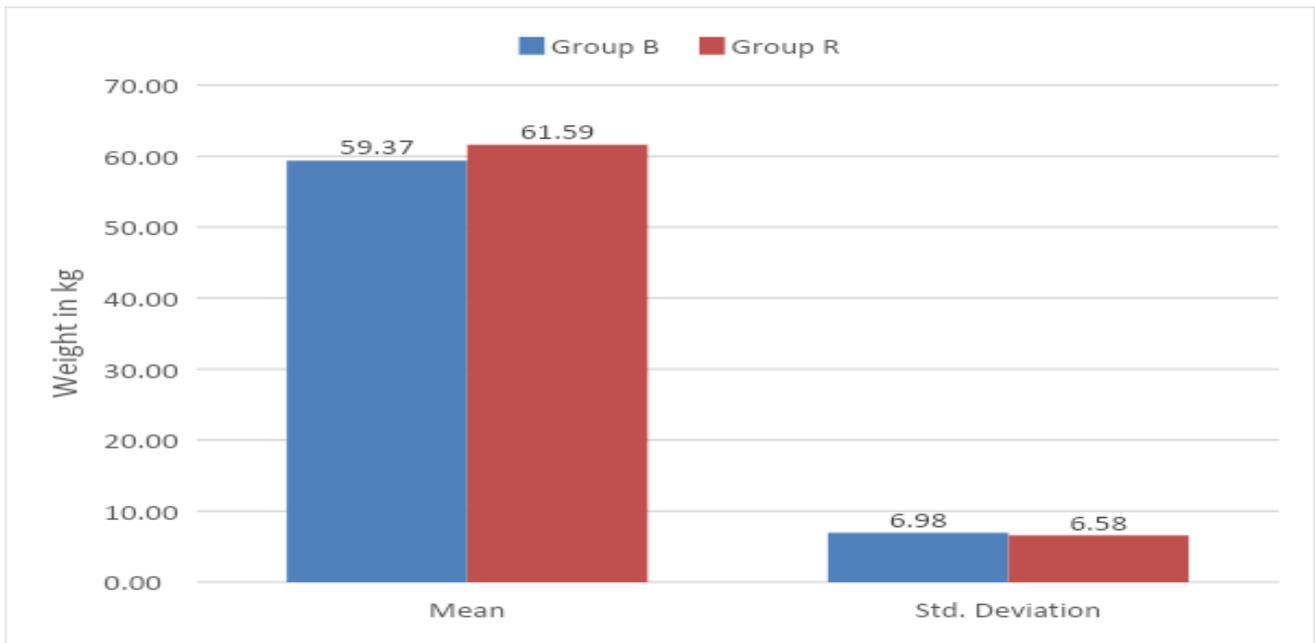
Table 8: Comparison of mean age and weight between Group B and Group R

Group		N	Mean	Std. Deviation	t	p	Inference
Age	Group B	30	50.50	9.72	-0.883	0.381	Not significant
	Group R	30	52.50	7.70		(>0.05)	
Weight (kg)	Group B	30	59.37	6.98	-1.256	0.214	Not significant
	Group R	29	61.59	6.58		(>0.05)	

Mean age of the cases from Group B was 50.50 ± 9.72 years as compared to 52.50 ± 7.70 years from Group R. When we compared the mean age of the cases between two groups, the difference was statistically not significant ($p>0.05$). It means age was comparable in both the groups.

Mean weight of the cases from Group B was 59.37 ± 6.98 kg as against 61.59 ± 6.58 kg from Group R. When we compared the mean weight of the cases between two groups, the difference was statistically not significant ($p>0.05$). It means weight was comparable in both the groups.





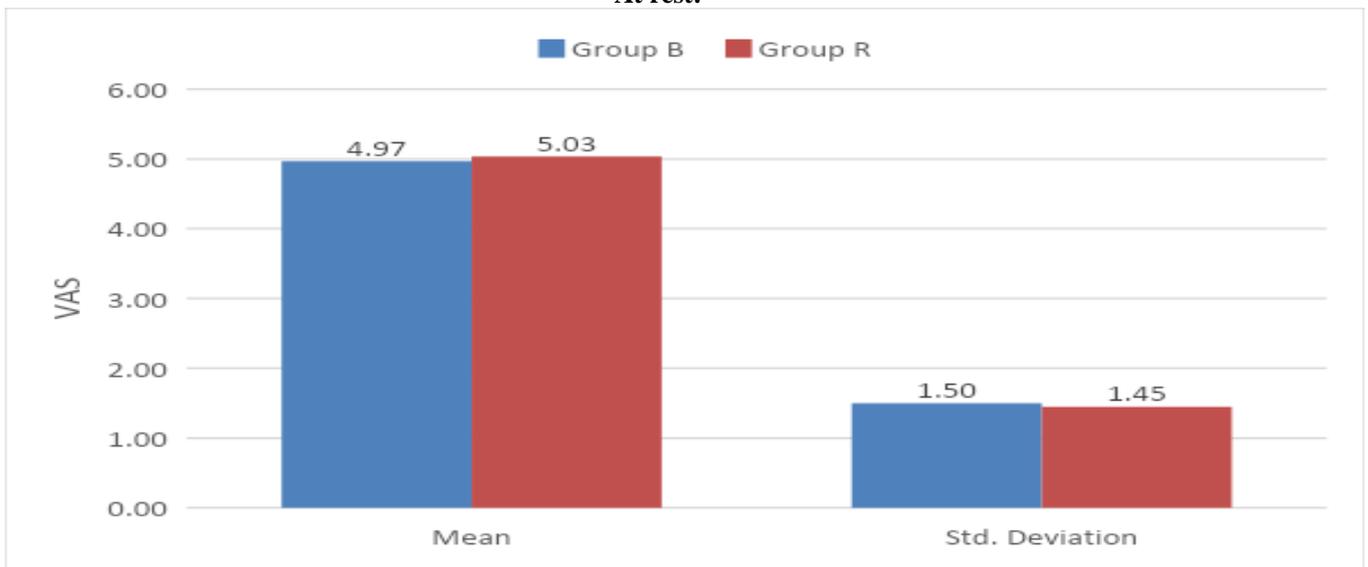
Graph 7: Bar diagram showing Comparison of mean age and weight between Group B and Group R

Table 9: Comparison of Pre block VAS between Group B and Group R

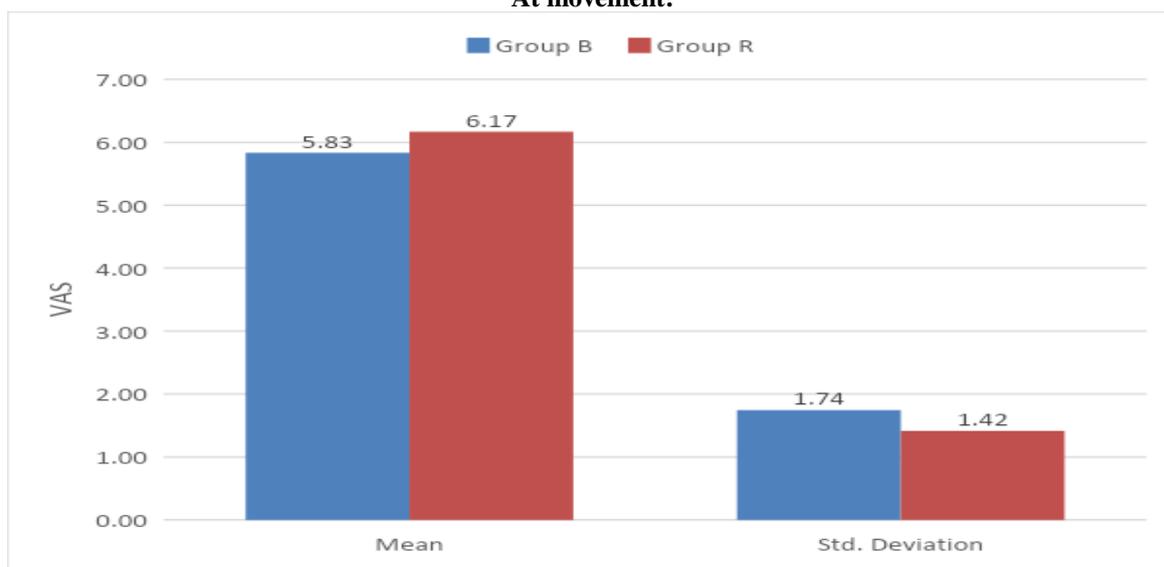
Group		N	Mean	Std. Deviation	t	p	Inference
At rest	Group B	30	4.97	1.50	-0.175	0.862 (>0.05)	Not significant
	Group R	30	5.03	1.45			
At movement	Group B	30	5.83	1.74	-0.813	0.420 (>0.05)	Not significant
	Group R	30	6.17	1.42			

Mean VAS at rest before block was in Group B and Group R was 4.97 ± 1.50 and 5.03 ± 1.45 respectively whereas mean VAS at movement before block was in Group B and Group R was 5.83 ± 1.74 and 6.17 ± 1.42 respectively.

At rest:



At movement:



Graph 8: Bar diagram showing Comparison of Pre block VAS at rest and at movement between Group B and Group R

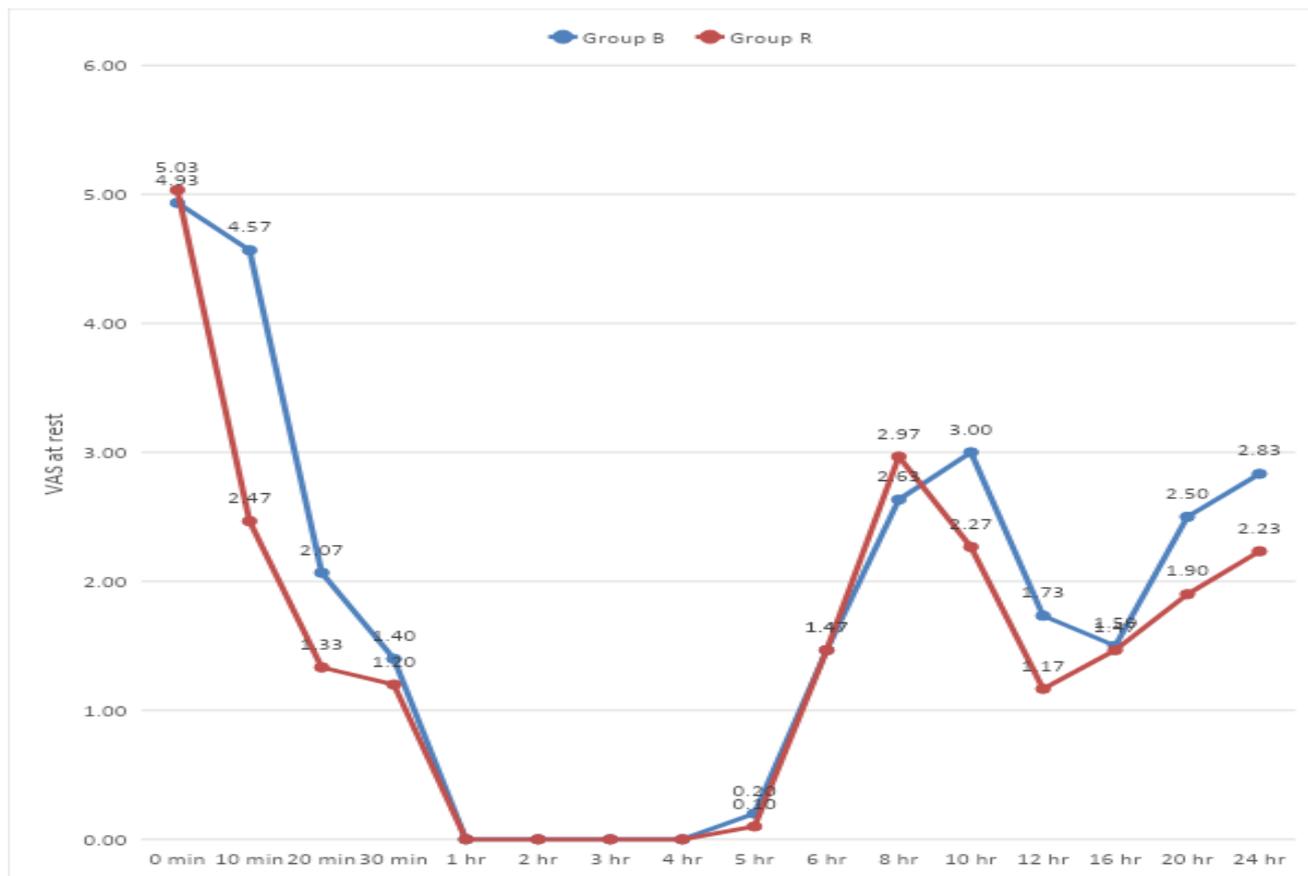
Table 10: Comparison of VAS at rest between Group B and Group R

Group	N	Mean	Std. Deviation	t	p	Inference	
0 min	Group B	30	4.93	1.51	-0.262	0.794 (>0.05)	Not significant
	Group R	30	5.03	1.45			
10 min	Group B	30	4.57	1.55	4.915	0.0001 (<0.01)	Highly significant
	Group R	30	2.47	1.76			
20 min	Group B	30	2.07	1.23	2.693	0.009 (<0.01)	Highly significant
	Group R	30	1.33	0.84			
30 min	Group B	30	1.40	0.81	1.012	0.316 (>0.05)	Not significant
	Group R	30	1.20	0.71			
1 hr	Group B	30	0.00	.000 ^a	--	--	--
	Group R	30	0.00	.000 ^a			
2 hr	Group B	30	0.00	.000 ^a	--	--	--
	Group R	30	0.00	.000 ^a			
3 hr	Group B	30	0.00	.000 ^a	--	--	--
	Group R	30	0.00	.000 ^a			
4 hr	Group B	30	0.00	.000 ^a	--	--	--
	Group R	30	0.00	.000 ^a			
5 hr	Group B	30	0.20	0.81	0.562	0.576 (>0.05)	Not significant
	Group R	30	0.10	0.55			
6 hr	Group B	30	1.47	1.94	0.000	1.000 (>0.05)	Not significant
	Group R	30	1.47	1.91			
8 hr	Group B	30	2.63	2.03	-0.579	0.565 (>0.05)	Not significant
	Group R	30	2.97	2.41			
10 hr	Group B	30	3.00	2.00	1.249	0.217 (>0.05)	Not significant
	Group R	30	2.27	2.52			
12 hr	Group B	30	1.73	1.64	1.282	0.205 (>0.05)	Not significant
	Group R	30	1.17	1.78			
16 hr	Group B	30	1.50	1.20	0.089	0.929 (>0.05)	Not significant
	Group R	30	1.47	1.66			
20 hr	Group B	30	2.50	1.70	1.505	0.138 (>0.05)	Not significant
	Group R	30	1.90	1.37			
24 hr	Group B	30	2.83	1.56	1.592	0.117 (>0.05)	Not significant
	Group R	30	2.23	1.36			

Mean VAS at rest 10 minutes after the drug administration in Group B and Group R was 4.57 ± 1.55 and 2.47 ± 1.76 respectively. When we compared the mean VAS of the cases between two groups, the difference was statistically significant ($p < 0.05$). It means mean VAS score was significantly less in Group R as compared to Group B in our study.

Mean VAS at rest 20 minutes after the drug administration in Group B and Group R was 2.07 ± 1.23 and 1.33 ± 0.84 respectively. When we compared the mean VAS of the cases between two groups, the difference was statistically significant ($p < 0.05$). It means mean VAS score was significantly less in Group R as compared to Group B in our study.

It was also observed that there was no significant difference in the mean VAS score from 30 minutes after the drug administration till 24 hrs in our study.



Graph 9: Line diagram showing Comparison of VAS at rest between Group B and Group R

Table 11: Comparison of VAS at movement between Group B and Group R

Group	N	Mean	Std. Deviation	t	p	Inference	
0 min	Group B	30	5.77	1.74	-0.434	0.666 (>0.05)	Not significant
	Group R	30	5.97	1.83			
10 min	Group B	30	5.57	1.72	3.895	0.0001 (<0.01)	Highly significant
	Group R	30	3.63	2.11			
20 min	Group B	30	2.83	1.18	3.947	0.0001 (<0.01)	Highly significant
	Group R	30	1.77	0.90			
30 min	Group B	30	2.40	0.93	4.215	0.0001 (<0.01)	Highly significant
	Group R	30	1.47	0.78			
1 hr	Group B	30	0.00	.000 ^a	--	--	--
	Group R	30	0.00	.000 ^a			
2 hr	Group B	30	0.00	.000 ^a	--	--	--
	Group R	30	0.00	.000 ^a			
3 hr	Group B	30	0.00	.000 ^a	--	--	--
	Group R	30	0.00	.000 ^a			

4 hr	Group B	30	0.00	.000 ^a	--	--	--
	Group R	30	0.00	.000 ^a	--	--	--
5 hr	Group B	30	0.57	1.48	-0.257	0.798	Not significant
	Group R	30	0.67	1.54		(>0.05)	
6 hr	Group B	30	2.50	2.22	0.058	0.954	Not significant
	Group R	30	2.47	2.26		(>0.05)	
8 hr	Group B	30	3.70	2.44	0.049	0.961	Not significant
	Group R	30	3.67	2.86		(>0.05)	
10 hr	Group B	30	3.37	2.40	1.462	0.149	Not significant
	Group R	30	2.40	2.71		(>0.05)	
12 hr	Group B	30	2.30	2.00	0.899	0.372	Not significant
	Group R	30	1.83	2.02		(>0.05)	
16 hr	Group B	30	2.10	1.30	0.240	0.811	Not significant
	Group R	30	2.00	1.88		(>0.05)	
20 hr	Group B	30	2.97	1.50	0.744	0.460	Not significant
	Group R	30	2.67	1.63		(>0.05)	
24 hr	Group B	30	3.10	1.47	0.250	0.803	Not significant
	Group R	30	3.00	1.62		(>0.05)	

Mean VAS at movement 10 minutes after the drug administration in Group B and Group R was 5.57 ± 1.72 and 3.63 ± 2.11 respectively. When we compared the mean VAS of the cases between two groups, the difference was statistically significant ($p < 0.05$). It means mean VAS score was significantly less at 10 minutes in Group R as compared to Group B in our study.

Mean VAS at rest 20 minutes after the drug administration in Group B and Group R was 2.83 ± 1.18 and 1.77 ± 0.90 respectively. When we compared the mean VAS of the cases between two groups, the difference was statistically significant ($p < 0.05$). It means mean VAS score was significantly less at 20 minutes in Group R as compared to Group B in our study.

Mean VAS at rest 30 minutes after the drug administration in Group B and Group R was 2.40 ± 0.93 and 1.47 ± 0.78 respectively. When we compared the mean VAS of the cases between two groups, the difference was statistically significant ($p < 0.05$). It means mean VAS score was significantly less at 30 minutes in Group R as compared to Group B in our study.

It was also observed that there was no significant difference in the mean VAS score from 1 hours after the drug administration till 24 hrs in our study.



Graph 10: Line diagram showing Comparison of VAS at movement between Group B and Group R

Table 12: Comparison of preoperative vital parameters between Group B and Group R

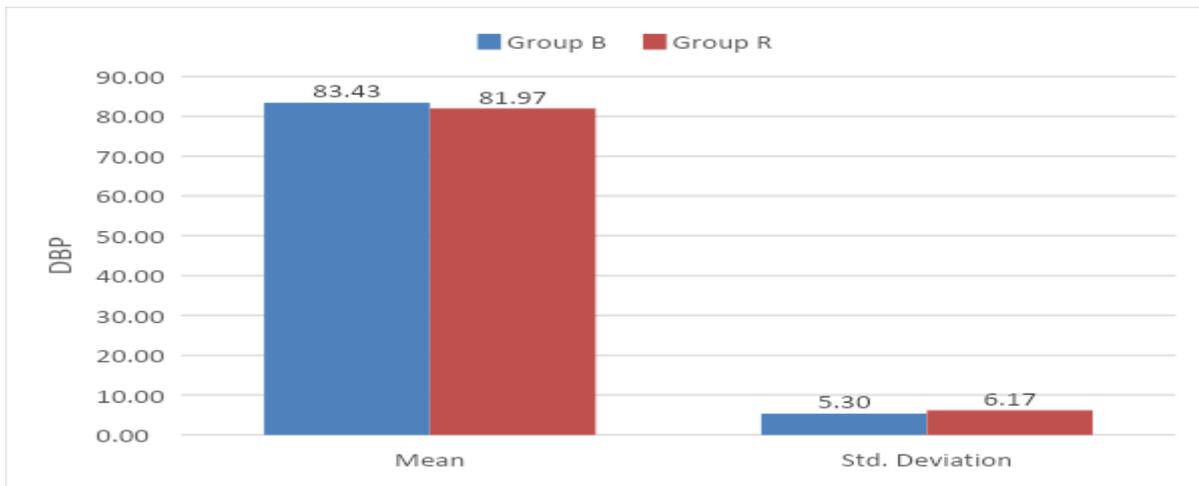
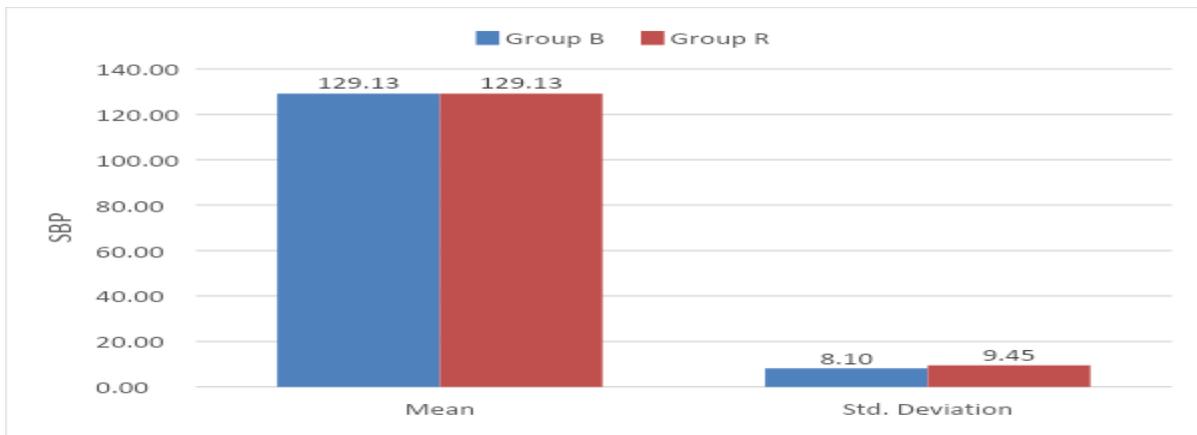
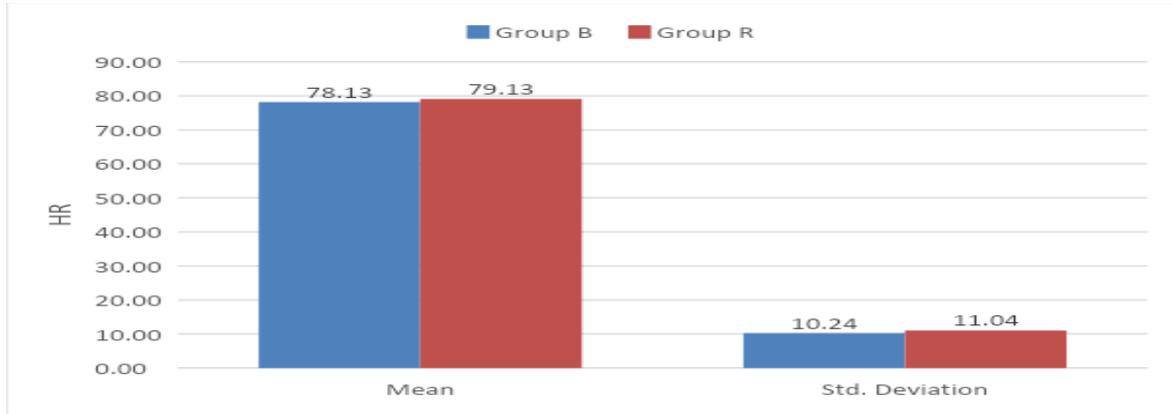
Group	N	Mean	Std. Deviation	t	p	Inference	
HR	Group B	30	78.13	10.24	-0.364	0.717	Not significant
	Group R	30	79.13	11.04		(>0.05)	
SBP	Group B	30	129.13	8.10	0.0001	1.000	Not significant
	Group R	30	129.13	9.45		(>0.05)	
DBP	Group B	30	83.43	5.30	0.988	0.327	Not significant
	Group R	30	81.97	6.17		(>0.05)	
SPO2	Group B	30	100.00	0.00	--	1.0	Not significant
	Group R	30	100.00	0.00		(>0.05)	

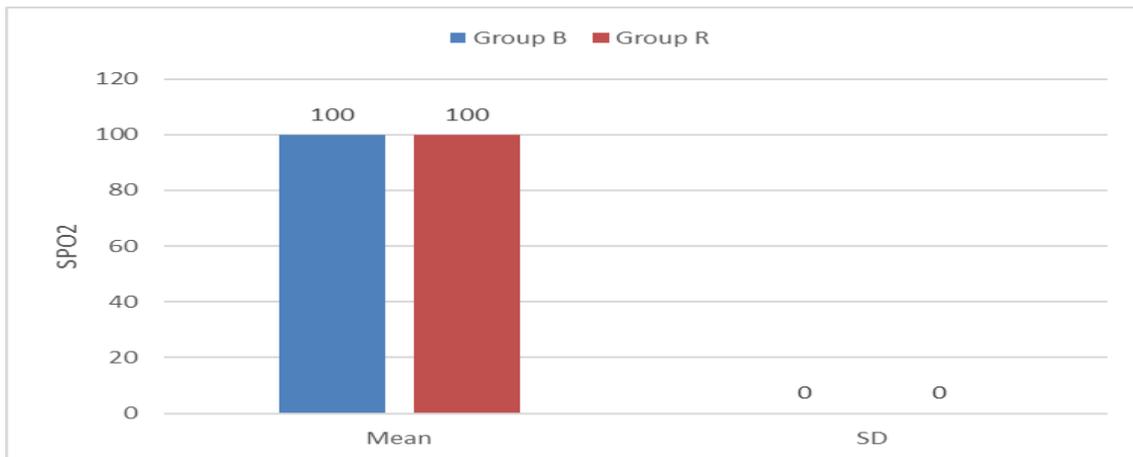
Mean preoperative HR in Group B and Group R was 78.13 ± 10.24 and 79.13 ± 11.04 respectively. When we compared the mean HR of the cases between two groups, the difference was statistically not significant ($p > 0.05$). It means mean preoperative HR was comparable in both the groups.

Mean preoperative SBP in Group B and Group R was 129.13 ± 8.10 and 129.13 ± 9.45 respectively. When we compared the mean SBP of the cases between two groups, the difference was statistically not significant ($p > 0.05$). It means mean preoperative SBP was comparable in both the groups.

Mean preoperative DBP in Group B and Group R was 83.43 ± 5.30 and 81.97 ± 6.17 respectively. When we compared the mean DBP of the cases between two groups, the difference was statistically not significant ($p > 0.05$). It means mean preoperative DBP was comparable in both the groups.

Mean preoperative SPO2 in Group B and Group R was 100±0 and 100±0 respectively. When we compared the mean SPO2 of the cases between two groups, the difference was not statistically significant ($p>0.05$). It means mean preoperative SPO2 in Group B and Group R comparable in our study.





Graph 11: Bar diagram showing Comparison of preoperative vital parameters between Group B and Group R

Table 13: Comparison of intra operative vital parameters between Group B and Group R

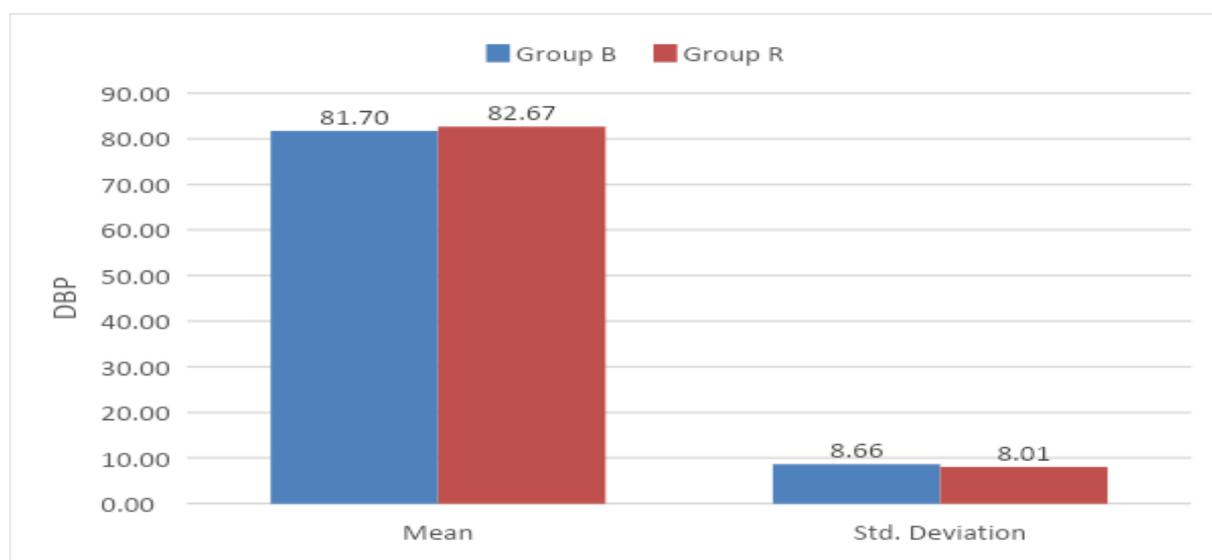
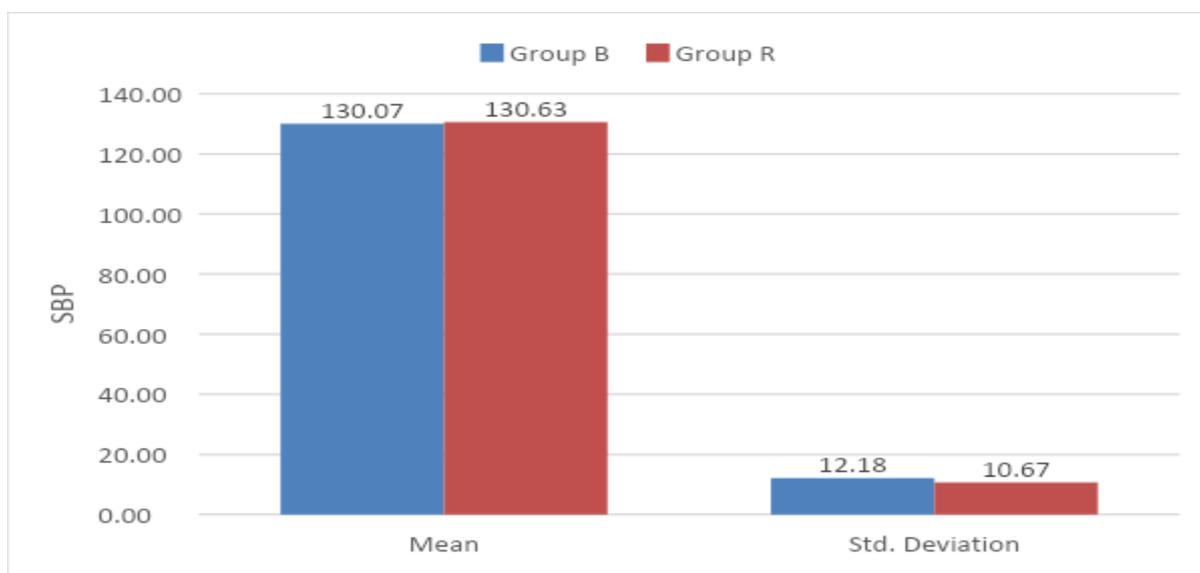
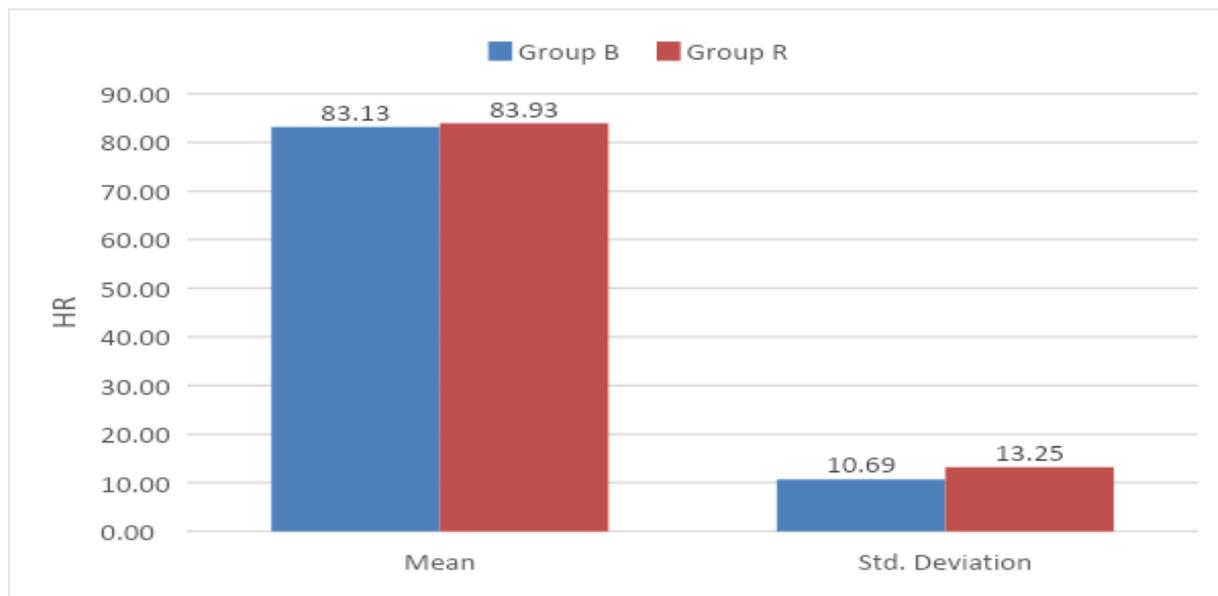
Group	N	Mean	Std. Deviation	t	p	Inference	
HR	Group B	30	83.13	10.69	-0.257	0.798	Not significant
	Group R	30	83.93	13.25		(>0.05)	
SBP	Group B	30	130.07	12.18	-0.192	0.849	Not significant
	Group R	30	130.63	10.67		(>0.05)	
DBP	Group B	30	81.70	8.66	-0.449	0.655	Not significant
	Group R	30	82.67	8.01		(>0.05)	
MAP	Group B	30	83.53	8.34	-0.120	0.905	Not significant
	Group R	30	83.80	8.83		(>0.05)	

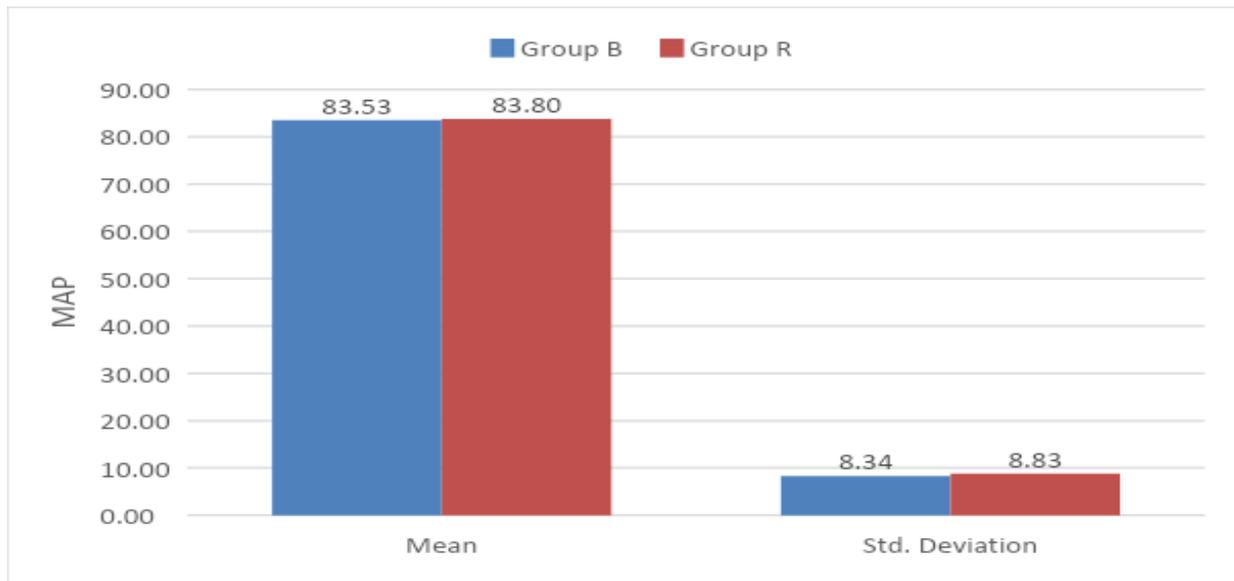
Mean intraoperative HR in Group B and Group R was 83.13 ± 10.69 and 83.93 ± 13.25 respectively. When we compared the mean HR of the cases between two groups, the difference was statistically not significant ($p > 0.05$). It means mean intraoperative HR was comparable in both the groups

Mean intraoperative SBP in Group B and Group R was 130.07 ± 12.18 and 130.63 ± 10.67 respectively. When we compared the mean SBP of the cases between two groups, the difference was statistically not significant ($p > 0.05$). It means mean intraoperative SBP was comparable in both the groups

Mean intraoperative DBP in Group B and Group R was 81.7 ± 8.66 and 82.67 ± 8.01 respectively. When we compared the mean DBP of the cases between two groups, the difference was statistically not significant ($p > 0.05$). It means mean intraoperative DBP was comparable in both the groups

Mean intraoperative MAP in Group B and Group R was 83.53 ± 8.34 and 83.8 ± 8.83 respectively. When we compared the mean MAP of the cases between two groups, the difference was statistically significant ($p < 0.05$). It means mean intraoperative MAP was comparable in both the groups.



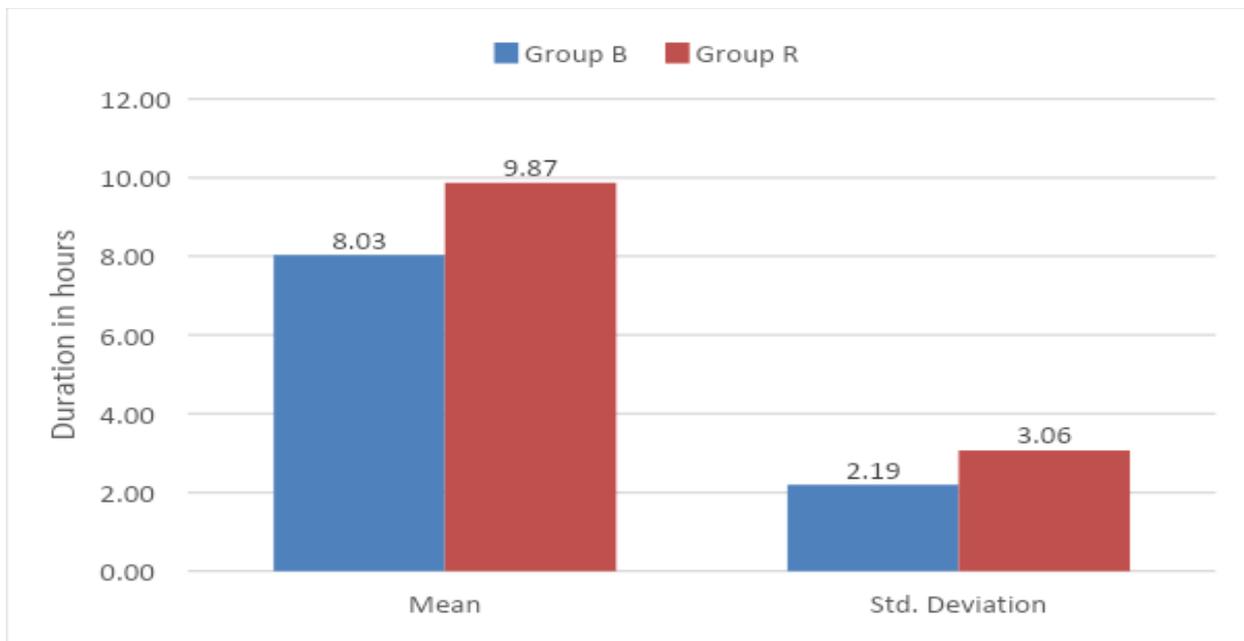


Graph 12: Bar diagram showing Comparison of intra operative vital parameters between Group B and Group R

Table 14: Comparison of mean duration for rescue analgesia between Group B and Group R

Group	N	Mean	Std. Deviation	t	p	Inference
Duration for rescue analgesia	Group B	30	8.03	-2.669	0.010	Highly significant
	Group R	30	9.87		(<0.01)	

Mean duration for rescue analgesia in Group B and Group R was 8.03 ± 2.19 and 9.87 ± 3.06 hours respectively. When we compared the mean duration for rescue analgesia between two groups, the difference was statistically significant ($p < 0.05$). It means mean duration for rescue analgesia was less in Group B as compared to Group R in our study.

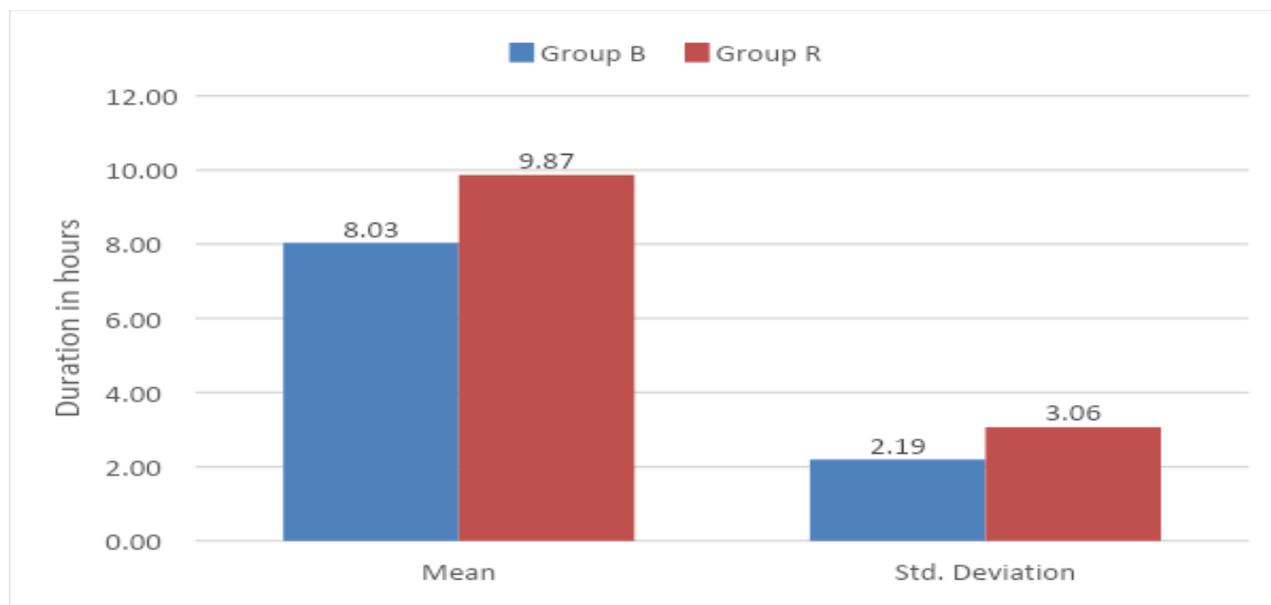


Graph 13: Bar diagram showing Comparison of mean duration for rescue analgesia between Group B and Group R

Table 15: Comparison of duration of analgesia between Group B and Group R

Group	N	Mean	Std. Deviation	t	p	Inference
Duration of analgesia	Group B	30	8.03	-2.669	0.010	Highly significant
	Group R	30	9.87		(<0.01)	

Mean duration of analgesia in Group B and Group R was 8.03 ± 2.19 and 9.87 ± 3.06 hours respectively. When we compared the mean duration of analgesia between two groups, the difference was statistically significant ($p < 0.05$). It means mean duration of analgesia was less in Group B as compared to Group R in our study.



Graph 14: Bar diagram showing Comparison of duration of analgesia between Group B and Group R

CONCLUSION

Conclusion drawn in our study comparing 0.25% Bupivacaine and 0.2% Ropivacaine in Pericapsular Nerve Group Block to facilitate positioning for spinal anaesthesia in Hip surgeries says that 0.2% Ropivacaine gives better results than 0.25% bupivacaine in terms of:

- Lower VAS scores at rest and movement in the initial 30 minutes after block administration
- Duration of action
- Mean VAS score was significantly less at 10 minutes in Group R as compared to Group B in our study ($p < 0.05$).
- Mean VAS score was significantly less at 20 minutes in Group R as compared to Group B in our study ($p < 0.05$).
- Mean VAS score was significantly less at 30 minutes in Group R as compared to Group B in our study ($p < 0.05$).
- Mean duration for rescue analgesia was less in Group B as compared to Group R in our study ($p < 0.05$).
- Mean duration of analgesia was less in Group B as compared to Group R in our study ($p < 0.05$).

The perioperative analgesia in terms of VAS score from 30 minutes to 24 hours of our study were comparable in both groups with no statistically significant difference.

Our study suggests that 0.2% Ropivacaine is more efficacious in its analgesic profile and duration of analgesia than 0.25% Bupivacaine in Pericapsular nerve group block in positioning for spinal anaesthesia.

LIMITATIONS

- Inclusion criteria includes patients from age 18 years to 60 years, as the age increases, the pain threshold decreases. This can be a confounding factor.
- Analgesia due to subarachnoid block can act as a confounding factor in determining duration of analgesia.
- The PENG block remains in its infancy with most data in the literature arising from case reports or case series.
- There is also no consensus on optimum injectate and volume, making comparisons between studies difficult.

RECOMMENDATIONS

From the analysis of our study, we recommend

- The PENG block is a novel regional anaesthesia technique which can be viewed as an alternative to FN block or FICB in the treatment of pain originating from the hip.
- Larger studies are required to determine its true efficacy when compared with other regional techniques and its safety, as well as optimum injectate volume.
- Duration of action of PENG block can be increased by either adding adjuvants or by using continuous PENG block technique using a catheter.

- Studies comparing the efficacy of PENG block after different types of hip surgery (hemiarthroplasty vs. DHS, for example) and after procedures involving different surgical approaches to the hip (anterior vs. posterior) may be areas of interest for the future.

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