

INTRODUCTION

Genicular Nerve Block (GNB) is beneficial in early ambulation and faster patient discharge since it selectively blocks articular branches and is motor-sparing.

- This study aimed to compare the analgesic efficacy of ultrasound (US) guided GNB with US-guided Adductor Canal Block (ACB) in patients undergoing arthroscopic Anterior Cruciate Ligament Reconstruction (AACL R).

METHODS

- This randomized, double-blind study was conducted on 38 American Society of Anesthesiologists (ASA) I/II adults undergoing AACL R. In the operating room, spinal anesthesia was administered.

- Under all aseptic precautions, subarachnoid block was given at L3-L4 intervertebral space using a 25-gauge Quincke spinal needle using 10-15 mg (2.0 – 3.0 ml) of hyperbaric bupivacaine (0.5%) with 10µg fentanyl. The patient was then positioned supine.

- After administration of the spinal block, peripheral nerve blocks were administered as per the group allocation.

- Patients in Group GNB (n=19) received US-guided GNB with 3 mL of 0.25% bupivacaine and 2 mg dexamethasone in proximity to each of the three nerves: superior lateral, superior medial, and inferior medial genicular nerves (Figure 1).

- Patients in Group ACB (n=19) received US-guided ACB with 20 mL of 0.25% bupivacaine with 6 mg dexamethasone.

- Postoperative rescue analgesia was provided by intravenous (IV) PCA morphine. The pump settings were morphine: 1 mg/ml; bolus dose: 1 ml, lockout interval 10 min and maximum dose 5 mg/h. The time from block administration to the first pressing of the PCA button by the patient was recorded as the time to rescue analgesia. The primary outcome was Numerical Rating Scale (NRS) pain scores over 24 h. The secondary outcome was the duration of analgesia and 24 h morphine consumption.

- Categorical variables were presented as frequency and proportion. Continuous variables were presented as mean ± standard deviation or median (IQR). Chi square test was used to test statistical significance of cross tabulation between categorical variables. Independent t-test or Mann-Whitney U test was used to compare continuous variables between two the groups. P value < 0.05 was considered statistically significant. IBM SPSS version 21 was used for statistical analysis.

Comparison of Genicular Nerve Block with Adductor Canal Block for Postoperative Pain Management in Adults undergoing Arthroscopic Anterior Cruciate Ligament Reconstruction

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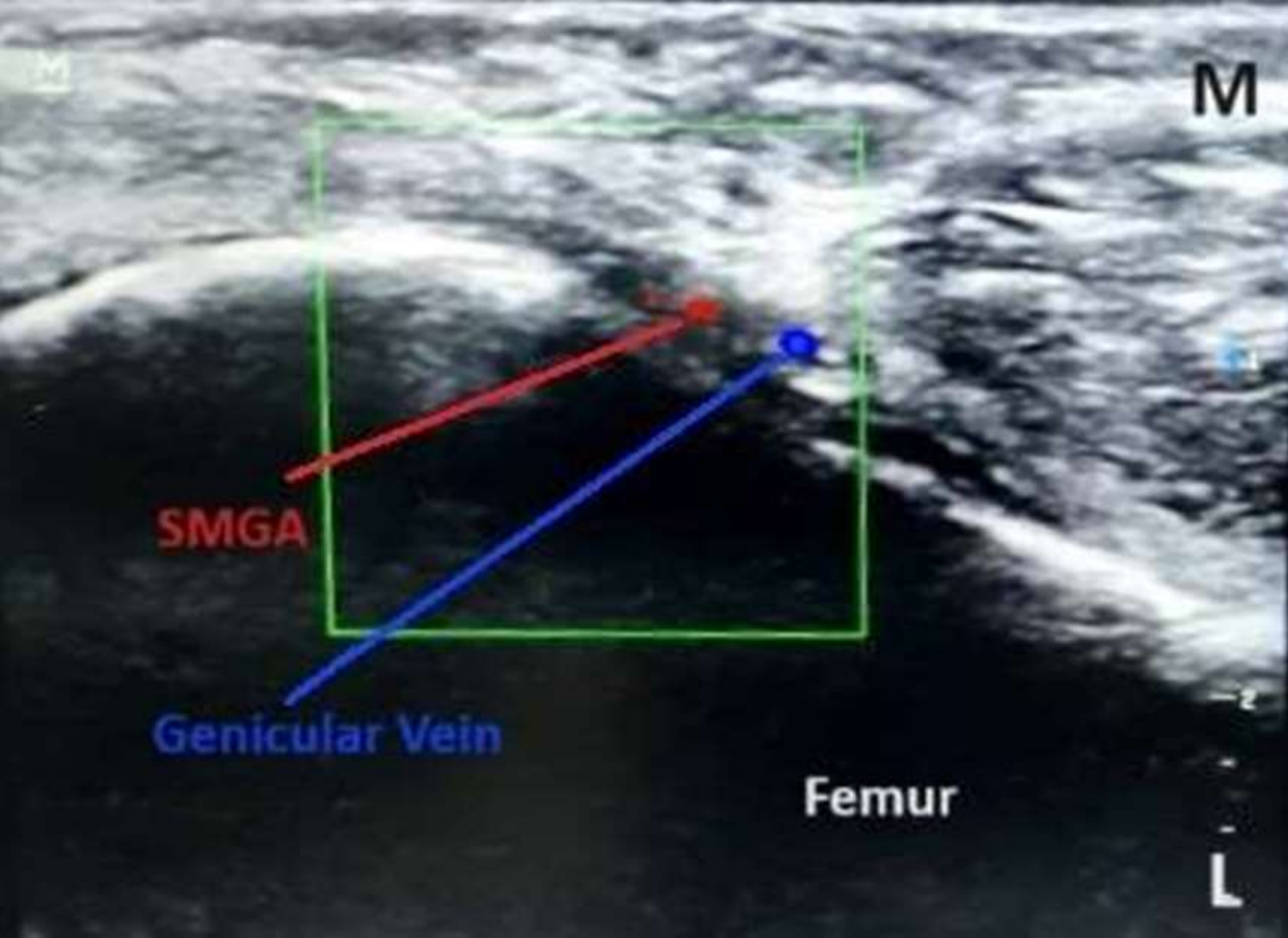


Figure 1: Site of drug injection in Superior Medial Genicular nerve block

*SMGA- Superior Medial Genicular Artery, M-Medial, L-Lateral

Time point (h)	Morphine consumption(mg),Mean (SD)				Mean Difference (95% CI)	P-value
	Group ACB(n=19)	(95% CI)	Group GNB(n=19)	(95% CI)		
0 h	0.00(0.00)	-	0.00(0.00)	-	-	1.0
2 h	0.00(0.00)	-	0.00(0.00)	-	-	1.0
4 h	0.00(0.00)	-	0.00(0.00)	-	-	1.0
6 h	0.16(0.69)	(-0.15,0.47)	0.11(0.46)	(-0.1,0.32)	0.05 (-0.33, 0.44)	0.78
8 h	0.68(1.38)	(0.06,2.14)	0.95(1.31)	(0.36,1.54)	-0.26 (-1.15, 0.62)	0.55
12 h	1.37(1.71)	(0.6,2.14)	1.26(1.48)	(0.59,1.93)	0.11 (-0.95, 1.16)	0.84
24 h	2.47(1.93)	(1.6,3.34)	2.47(2.12)	(1.52,3.42)	0.00 (-1.33, 1.33)	1.0

Table 2: Comparison of morphine consumption between the groups

Data expressed as mean (SD); h=hour, SD = Standard Deviation, CI = Confidence Interval, ACB = Adductor Canal Block, GNB =Genicular Nerve Block, n=number of patients

Time Point (h)	Group ACB (n=19)	Group GNB (n=19)	Effect size, r (95% CI)	P-value
NRS scores at rest				
0 h	0(0,0)	0(0,0)	–	1.000
2 h	0(0,0)	0(0,0)	–	1.000
4 h	0(0,0)	0(0,0)	–	1.000
6 h	0(0,0)	0(0,0)	0.077 (0.005,0.36)	0.673
8 h	2(0,4)	2(0,4)	0.02 (0.006,0.38)	0.806
12 h	1(0,3)	1(0,2)	0.005 (0.005,0.39)	0.964
24 h	2(1,2)	1(1,2)	0.226 (0.03,0.54)	0.429
NRS scores during physical activity				
0 h	0(0,0)	0(0,0)	–	1.000
2 h	0(0,0)	0(0,0)	–	1.000
4 h	0(0,0)	0(0,0)	–	1.000
6 h	0(0,0)	0(0,0)	0.077 (0.005,0.36)	0.637
8 h	2(0,4)	2(0,4)	0.02 (0.006,0.38)	0.902
12 h	2(0,3)	2(1,2)	0.005 (0.005,0.39)	0.976
24 h	2(1,2)	1(1,2)	0.226 (0.03,0.54)	0.101

Table 1: Comparison of NRS scores during rest between the groups.

Data expressed as median (IQR); h=hour, IQR = Interquartile Range, CI = Confidence Interval, ACB = Adductor Canal Block, GNB =Genicular Nerve Block, NRS= Numerical Rating Scale



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RESULTS

- The two groups had a statistically insignificant difference in pain scores. NRS scores at rest and physical activity at 24 h were similar in both the groups, [(p=0.429 and p=0.101 respectively) (Table 1)].
- The mean time (SD) to rescue analgesia was similar in both the groups (Group GNB: 820.79 (483.65) min [95% CI: (603.31, 1038.27 min)]; Group ACB: 858.95 (460.06) min [95% CI: (652.08,1065.82 min), p=0.805]; with mean difference [95 % Confidence Interval (CI)]: 38.16 ([-272.42, 348.74 min]).
- The mean (SD) 24 h morphine consumption was also similar in both groups (Group GNB: 2.47 (2.12) mg [95% CI: (1.52, 3.42 mg)]; Group ACB: 2.47 (1.93) mg) [95% CI: (1.6, 3.34 mg)]; mean difference [95% CI: 0.00 (-1.33, 1.33 mg)]; p=1.000).

DISCUSSION

- This study highlights that ACB and GNB provide comparable postoperative analgesia in patients undergoing AACL R.
- The NRS scores and postoperative opioid requirements were similar in patients receiving ACB and GNB.
- Although, there was a trend towards shorter time the mean time to first rescue analgesia was lower in the GNB group (820.79 min), compared to the ACB group (858 min), it was statistically non-significant.
- The nerve supply to the knee joint involves a complex interplay between various branches of obturator, femoral and sciatic nerves.
- ACB provides analgesia primarily to the anterior structures of the knee joint, sparing the posterior capsule of the knee joint.
- GNB is theoretically superior as it blocks all intra-articular sensory genicular nerves supplying the knee joint. This makes GNB a unique block as there is no sparing of any area of the knee joint capsule.

CONCLUSION

- US-guided GNB has an analgesic efficacy similar to US-guided ACB for patients undergoing arthroscopic ACL R.

REFERENCES

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