

# Method Of Anesthesia In Knee Arthroplasty: Measuring A Retrospective Cohort

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## Background

- Total knee arthroplasty (TKA) is one of the most frequently performed surgeries in the United States.
- Prior to 2018, our group used a traditional approach to control postoperative pain following TKA, that included general anesthesia and a series of PNBs (single injections of IPACK, femoral nerve, genicular nerves, and adductor canal catheter).
- In 2018, our group transitioned to the use of a novel series of preoperative, single-injection PNBs (a combination of IPACK, obturator nerve, lateral femoral cutaneous nerve, and adductor canal targeting the nerve to the vastus medialis and saphenous nerve), in addition to spinal anesthesia (SA) with propofol sedation intraoperatively.
- This poster presents the results of this novel approach compared to the original by assessing factors such as hospital and PACU LOS, opioid consumption, PONV, postoperative pain scores, and ambulation distance.

## Methods

- In this poster we present a retrospective, Institutional Review Board-approved (IRB Number: HHC-2019-0006), single-center, cohort observational, cross-sectional study data to compare clinical outcomes between two groups of TKA patients.
  - Group 1: Patients who underwent TKA during 2017 and received general anesthesia (GA) and a series of PNBs.
  - Group 2: Patients who underwent TKA during 2018 and received a novel series of preoperative single injection PNBs with spinal anesthesia and propofol sedation.
- Primary analyses compared the following clinical outcomes between the two groups:
  - Hospital and PACU LOS, MME analgesia, pain scores, PONV scores, and ambulation distance.
- For the primary analyses, categorical variables were examined using a chi-square test, continuous variables were examined using an independent samples t-test (when the data were normally distributed), and a Mann Whitney U Test was used when data were not normally distributed.

**Table 1.** Baseline demographics and characteristics of patients in Group 1 & Group 2. Values are mean (SD) or number (proportion).

Variable	Group 1 (GA+PNBs) (n=282)	Group 2 (nPNBs +SA) (n=507)	Both groups (N=789)	P value
Age; y	67.2 (9.0)	67.9 (8.9)	67.6 (8.9)	0.297
Sex; male	107 (37.9%)	186 (36.7%)	293 (37.1%)	0.726
Race				0.043
White or Caucasian	231 (81.9%)	445 (87.8%)*	676 (85.7%)	
Black or African American	23 (8.2%)	33 (6.5%)	56 (7.1%)	
Asian	4 (1.4%)	1 (0.2%)*	5 (0.6%)	
Other	24 (8.5%)	28 (5.5%)	52 (6.6%)	
Body mass index (kg/m <sup>2</sup> )	33.0 (7.4)	31.8 (6.0)	32.2 (6.5)	0.014
Total Comorbidities	1.9 (1.8)	1.9 (1.9)	1.9 (1.8)	0.843
ASA physical status				0.280
1	1 (0.4%)	6 (1.2%)	7 (0.9%)	
2	175 (62.1%)	339 (66.9%)	514 (65.1%)	
3	105 (37.2%)	161 (31.8%)	266 (33.7%)	
4	1 (0.4)	1 (0.2%)	2 (0.3%)	

**Table 2.** Postoperative pain scores at rest and during activity of patients in groups 1&2. Values are mean (SD).

Variable	Group 1 (GA+PNBs) (n=282)	Group 2 (nPNBs +SA) (n=507)	Both groups (N=789)	P value
Minimum pain at rest	1.0 (1.5)	1.1 (1.5)	1.1 (1.5)	0.922
Maximum pain at rest	7.9 (1.7)	6.1 (2.4)	6.8 (2.3)	<0.001
Average pain at rest	4.4 (1.5)	3.5 (1.7)	3.8 (1.7)	<0.001
Minimum pain with activity	2.4 (2.2)	2.4 (2.4)	2.4 (2.3)	0.780
Maximum pain with activity	7.9 (1.8)	6.5 (2.4)	7.0 (2.3)	<0.001
Average pain with activity	5.4 (1.7)	4.5 (2.1)	4.8 (2.0)	<0.001

## Results

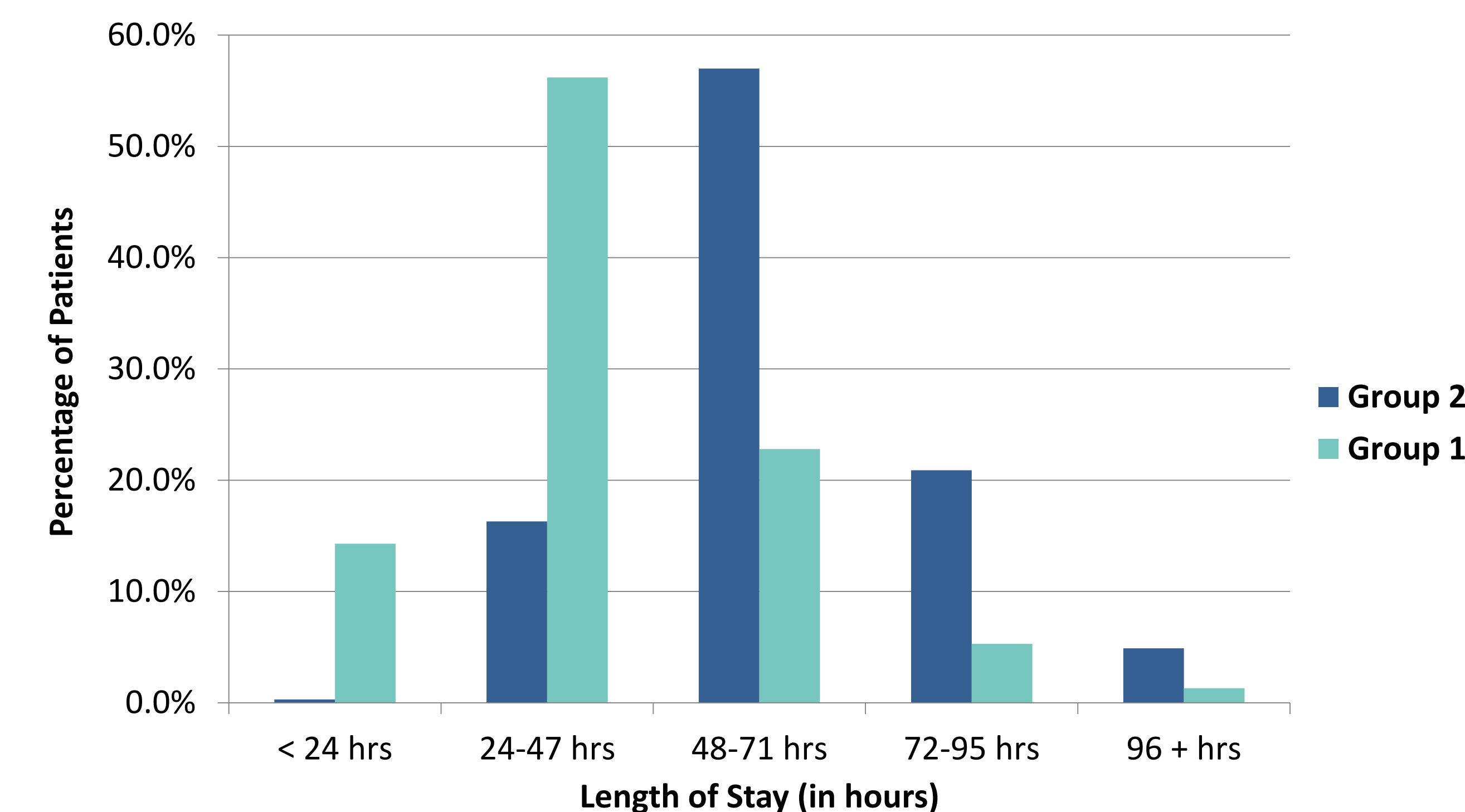
**Table 3.** Hospital and PACU length of stay, and postoperative ambulated distance of patients in groups 1&2. Values are median, IQR.

Variable	Group 1 (GA+PNBs) (n=282)	Group 2 (nPNBs +SA) (n=507)	Both groups (N=789)	P Value
Hospital length of stay; h	53.3, 23.2	29.6, 23.4	47.5, 26.1	<0.001
PACU length of stay; min	143, 78	105, 58	119, 68	<0.001
Ambulated distance; ft	300, 285	350, 200	325, 215	0.047

**Table 4.** Use of antiemetics, opioids, and non-opioid pain medication of patients in groups 1&2. Values are median, IQR or number (proportion).

Variable	Group 1 (GA+PNBs) (n=282)	Group 2 (nPNBs +SA) (n=507)	Both groups (N=789)	P Value
Opioid analgesics; MME				
Total	106, 144	95, 130	98, 132	0.075
Post-op	92, 128	80, 121	83, 125	0.064
Postoperative non-opioid pain medication doses	18, 11	20, 13	19, 12	0.001
Antiemetic medication doses	0, 1	0, 1	0, 1	0.292
Chronic opioid users	35 (12.4%)	84 (16.6%)	119 (15.1%)	0.118

**Figure 1.** Hospital length of stay for Group 1 and Group 2 patients



## Summary

- Our data illustrate that the use of a novel series of PNBs and spinal anesthesia significantly decreased hospital and PACU LOS, and significantly increased postoperative ambulation distance on days 0-3 (Ps<.01). Table 3, Figure 1.
- Average and maximum pain scores at rest and activity were significantly elevated in Group 1 (Ps<.01), while minimum pain score at rest and activity were similar between groups (Ps>.05). Table 2.
- There was a trend for a decrease in postoperative opioid use in Group 2 patients which was not statistically significant (P>.05). Antiemetic use was not statistically different between groups (P>.05). Group 2, did report a significant increase in postoperative non-opioid use (P<.01). Table 4.
- Overall, the novel anesthesia method had a **positive impact** on hospital and PACU LOS, distance ambulated, and pain scores.
- While a decrease in postoperative opioid use in Group 2 was not statistically significant, these patients reported a significant increase in postoperative non-opioid use.
- The continued opioid crisis places further emphasis on continuing to develop opioid-reducing or sparing techniques for patients undergoing TKA.

## References

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