Decreased Opioid Consumption and Length of Stay Using an IPACK and Adductor Canal Nerve Block Following Total Knee Arthroplasty

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Introduction

Total knee arthroplasty (TKA) is a very successful treatment for end-stage knee osteoarthritis but many patients undergoing this can experience significant postoperative pain.

Peripheral nerve blocks such as a femoral and sciatic block combination have proven to provide effective pain relief following TKA. However, some of these nerve blocks have residual motor deficits which prevent immediate postoperative ambulation and prevent early hospital discharge.

The purpose of this study was to compare outcomes in patients undergoing primary TKA with femoral and sciatic (Fem+Sci) nerve blocks versus the interspace between the popliteal artery and the posterior capsule of the knee and adductor canal (IPACK+ACB) combination sensory nerve blocks.

Methods

100 consecutive primary TKAs performed by a single surgeon using the same surgical approach and implant design were prospectively reviewed.

The first 50 patients received Fem+Sci nerve blocks and the second 50 received IPACK+ACB blocks preoperatively.

Differences in opioid requirements, length of stay (LOS), distance walked, Western Ontario McMasters University Osteoarthritis Index (WOMAC), Knee Society (KSS) function scores, Visual Analog Scores (VAS) for pain at rest and with activity, and postoperative complications were analyzed. There were no differences between groups with respect to age, sex, ASA or BMI.

Images and Tables

Patient Demographics				
	All Patients	IPACK+ACB Group	FEM+SCI Group	p-value difference between groups
Number of patients	100	50	50	-
Preoperative Diagnosis	Osteoarthritis: 100	Osteoarthritis: 50	Osteoarthritis: 50	-
Males	35 (35 %)	16 (32 %)	19 (38 %)	p=0.6753
Females	65 (65 %)	34 (68 %)	31 (62 %)	p=0.6753
Mean Age at Surgery (Years)	65.2 ± 9.2	65.5 ± 9.7	64.9 ± 8.7	p=0.7380
Mean BMI (kg/m ²)	29.5 ± 4.8	29.9 ± 4.8	29.1 ± 4.8	p=0.3955
Mean ASA score	2.37	2.31	2.44	p=0.208
Mean Length of Stay (Days)	1.8 ± 0.7	1.48 ± 0.74	2.02 ± 0.55	p<0.0001

Discharge Date			
IPACK+ACB	POD#1	31	62%
	POD#2	16	32%
	POD#3	1	2%
FEM+SCI	POD#1	7	14%
	POD#2	35	70%
	POD#3	8	16%
p-value	POD#1	p<0.0001	
	POD#2	p=0.0003	
	POD#3	p=0.0309	

Physical Therapy Performance		
	Distance walked POD#0 (ft)	Distance walked POD#1 (ft)
IPACK+ACB	21.40	204.40
FEM+SCI	5.31	155.17
p-value	<0.0001	0.0111

Intravenous Morphine Equivalent Units					
	POD#0	POD#1	POD#2	2 week visit	6 week visit
IPACK+ACB	8.66	15.69	13.35	6.22	0.64
FEM+SCI	7.56	23.99	15.17	9.33	1.30
p-value	0.3622	<0.001	0.4281	0.0251	0.1669

Results

62% of patients were discharged on postoperative day (POD) #1 in the IPACK+ACB group compared to 14% in the Fem+Sci group ($p<0.0001$).

The IPACK+ACB patients had a shorter LOS (average 1.48 days versus 2.02 days, $p<0.0001$), ambulated further on POD#0 (average 21.4 feet versus 5.3 feet, $p<0.0001$), required less narcotics the day after surgery (average 15.7 versus 24.0 morphine equivalents $p<0.0001$) and at 2 weeks postoperative (average 6.2 versus 9.3 morphine equivalents, $p=0.025$), and required less manipulations for postoperative stiffness (1 versus 5, $p=0.204$).

WOMAC, KSS, and VAS scores were not significantly different between groups.

Conclusion

Given the expected future increase in patients undergoing primary TKA along with the subsequent increased healthcare system cost burden and current emphasis on reducing opioid consumption due to concerns of abuse and addiction, decreasing length of stay and opioid consumption are of paramount interest to all stakeholders.

This study suggests that the use of a combination IPACK and adductor canal block will provide improved ambulation leading to earlier discharge and decrease postoperative opioid consumption and appears to be a better alternative to femoral and sciatic motor nerve blocks for primary TKA patients.