

Genicular Nerve Blocks and Periprosthetic Joint Infection Risk After Total Knee Arthroplasty

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INTRODUCTION

- Periprosthetic joint infection (PJI) is a serious complication after total knee arthroplasty (TKA), with significant patient and healthcare impact ¹.
- The growing use of genicular nerve blocks (GNB) for perioperative pain management has raised concerns about a potential association with PJI, due to the relative proximity of the injection site to the operative site.
- Current evidence is limited to case reports², and systematic reviews have not shown a clear association but are limited by heterogeneous data³.
- This study evaluates whether preoperative GNB increases the risk of PJI following primary TKA.

METHODOLOGY

- We designed a retrospective cohort study with IRB approval to include adult patients who underwent primary TKA by a single surgeon between January 2020 and December 2025, identifying those who received genicular nerve blocks as part of their perioperative care.
- These patients were compared with a matched control group of TKA patients operated on by the same single surgeon.
- Data was extracted from the electronic health record (Epic) and linked institutional datasets, including patient demographics, comorbidities, anesthetic techniques, and postoperative outcomes.
- The primary endpoint is patients who meet SSI criteria within 90 days of surgery, with secondary outcomes including all-cause complications within 90 days after surgery.

STUDY POPULATION

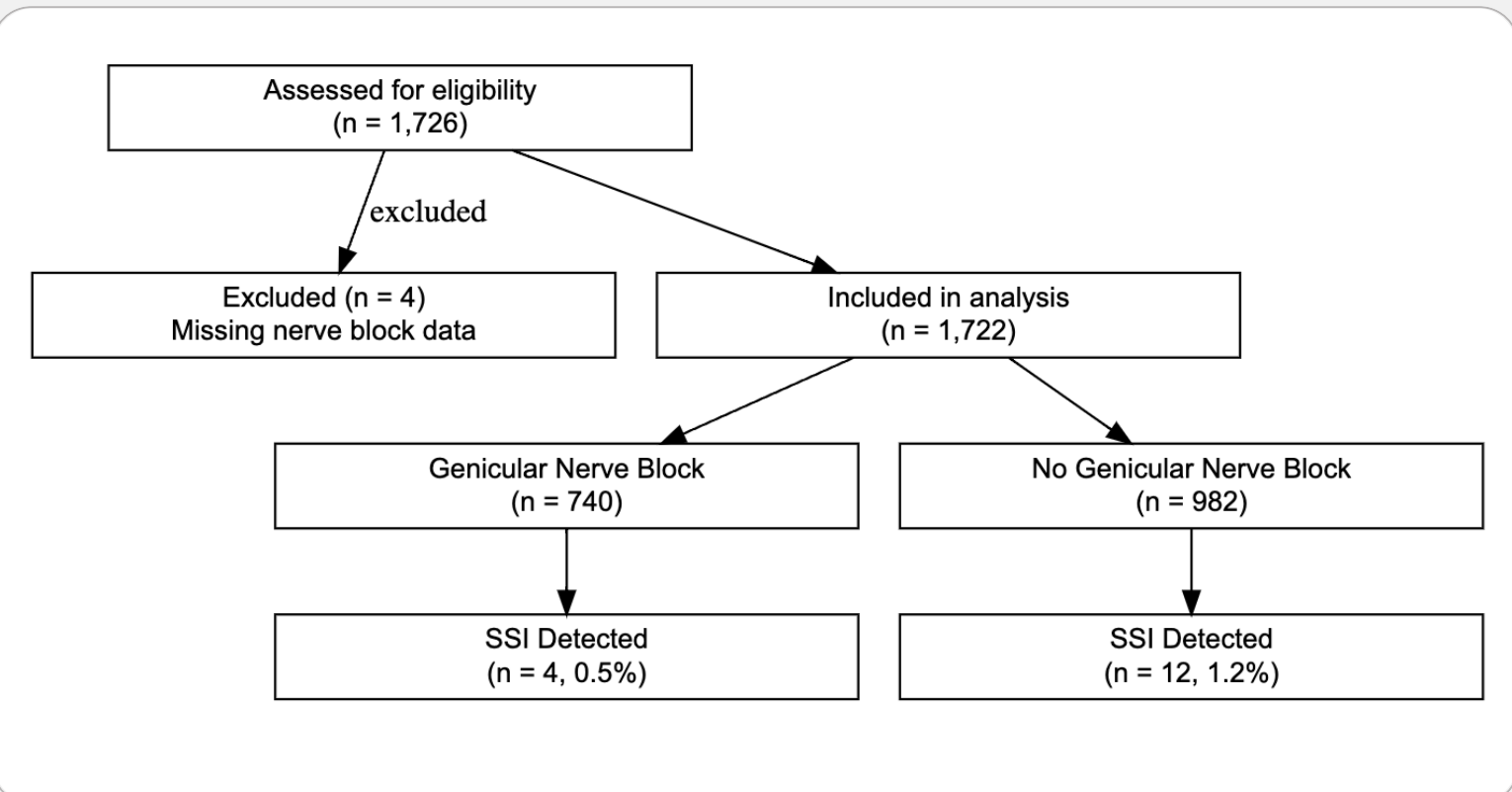


Diagram 1. Study participants

Table 1. Study population and demographics			
	No genicular nerve block	Genicular nerve block	P-value
n	982	740	
Age (Yrs) (mean (SD))	68.64 (8.16)	69.56 (8.61)	0.023
BMI. (mean (SD))	31.22 (5.54)	31.58 (5.70)	0.18
Gender = M (%)	422 (43.0)	295 (39.9)	0.213
Asa Rating (%)			0.199
I - Healthy	12 (1.2)	3 (0.4)	
II - Mild Systemic Disease	519 (52.9)	389 (52.6)	
III - Severe Systemic Disease	451 (45.9)	347 (46.9)	
IV - Incapacitating Disease	0 (0.0)	1 (0.1)	
Diabetes Mellitus (%)	89 (9.1)	107 (14.5)	0.001
SSI Detected (%)	12 (1.2)	4 (0.5)	0.228

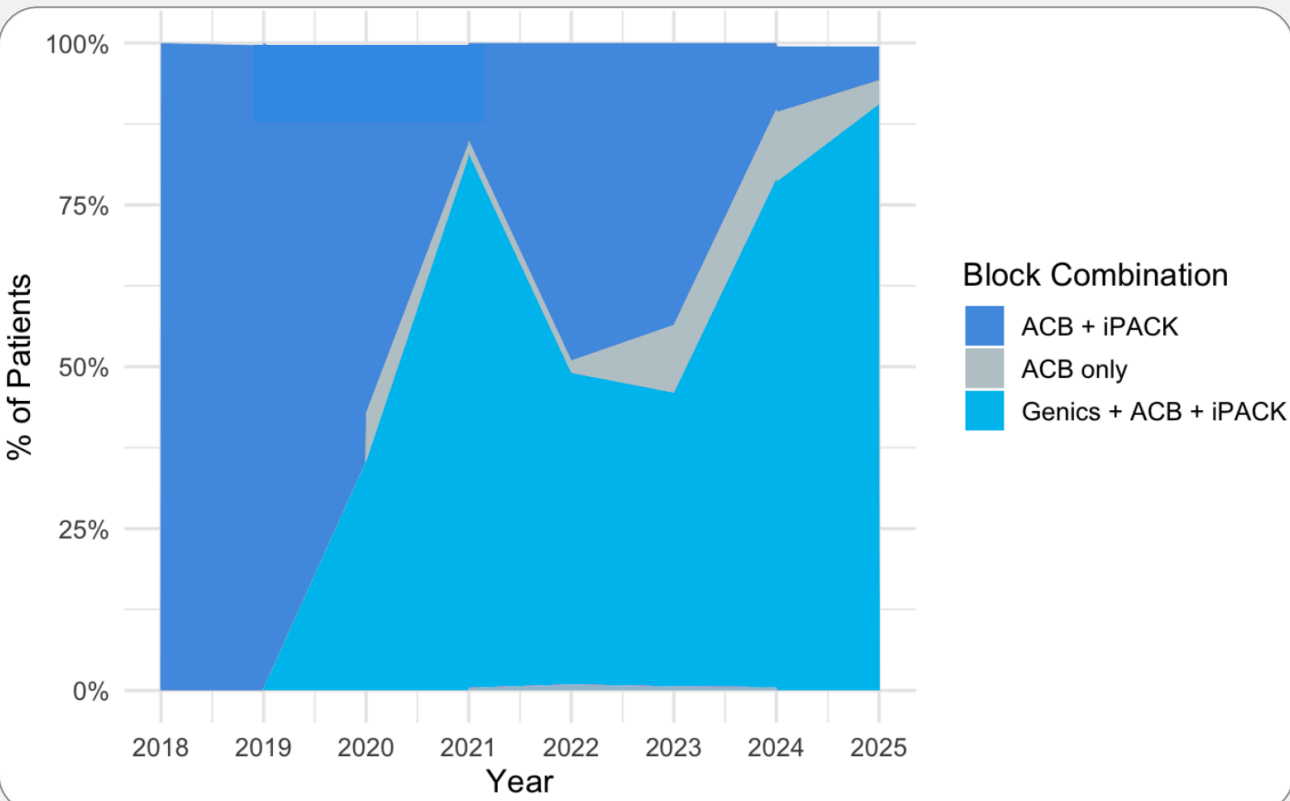


Diagram 2. Proportion of nerve block types over study period, demonstrating increasing popularity of GNB

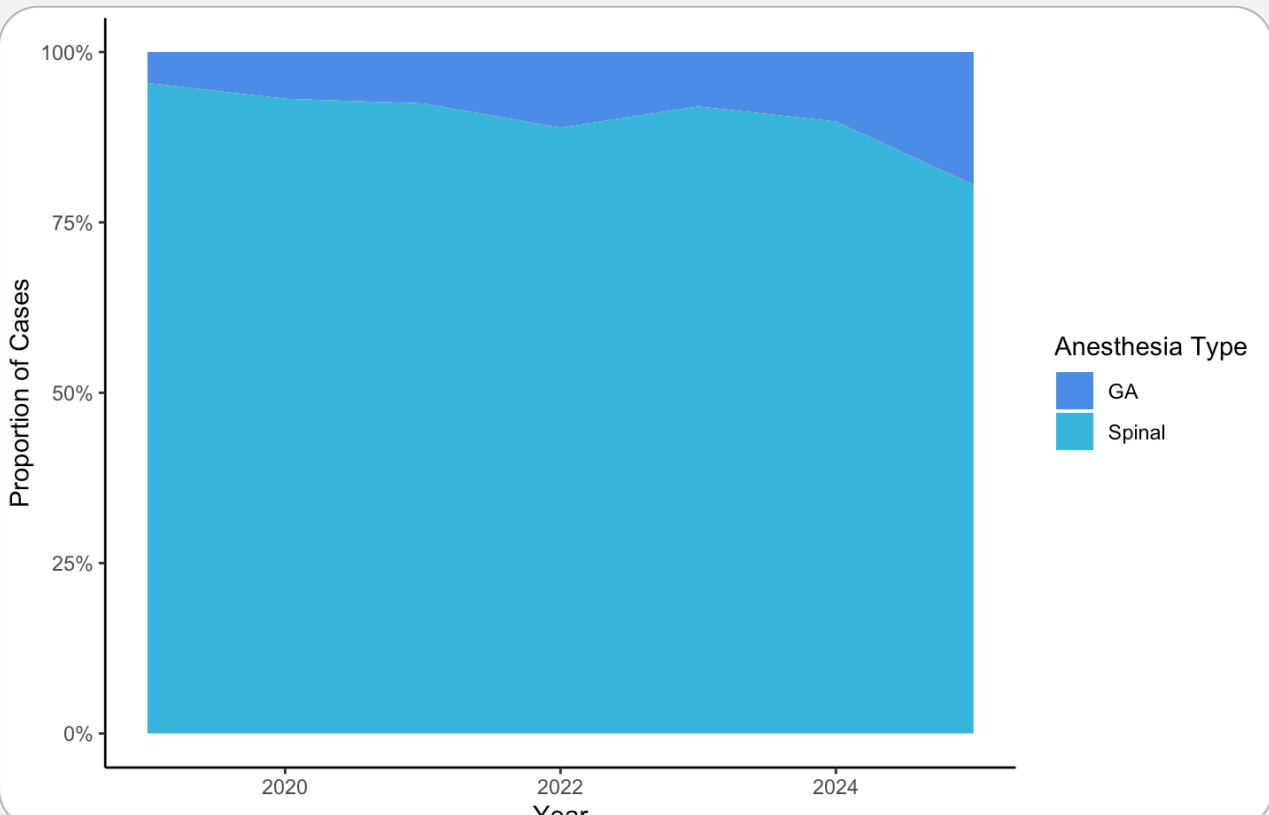


Diagram 3. Anesthesia type over study period

RESULTS

Table 2. Univariate analysis – Significant associations with SSI			
Variable	OR	CI	P-value
Gender (M)	1.091	0.39- 2.94	0.863
Age (yrs)	0.921	0.88-0.97	0.001
ASA III-IV	1.49	0.55-4.19	0.99
BMI	1.136	1.04- 1.24	0.004
Diabetes Mellitus	3.605	1.13- 10.02	0.019
Genicular nerve block	0.439	0.12- 1.27	0.156

Abbreviations: CI = Confidence Interval, OR = Odds Ratio

Univariate analysis evaluating variables associated with SSI

- Increased body mass index and Diabetes Mellitus were significantly associated with higher odds of PJI, while increasing age was associated with lower odds.
- Genicular nerve block was not significantly associated with PJI.

RESULTS

Table 3. Multivariable Firth Logistic Regression — Predictors of SSI/PJI

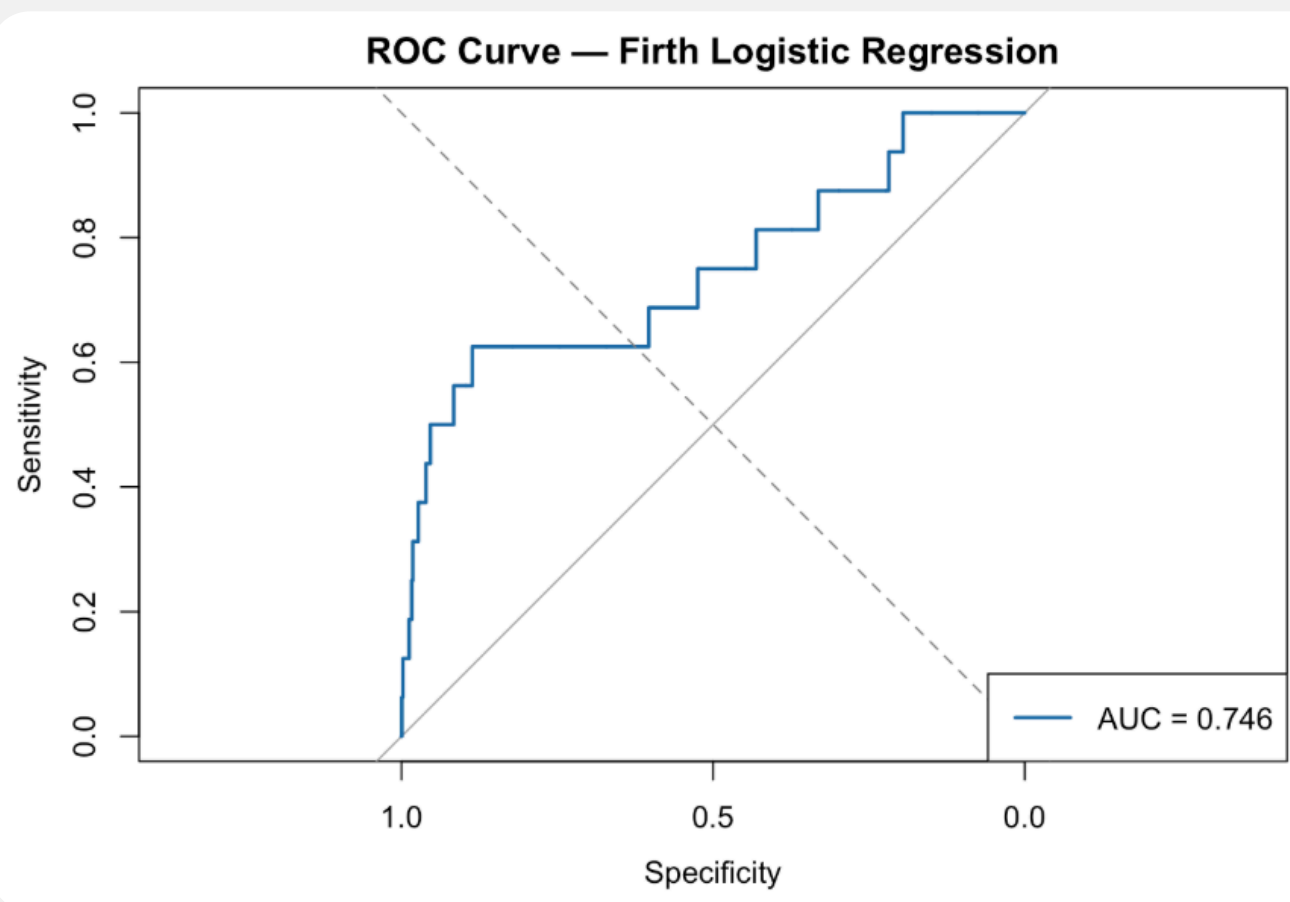
Characteristic	N	Event N	OR	95% CI	p-value
Genicular Nerve Block	1,722	16			
0			—	—	
1			0.43	0.15, 1.24	0.12
Age (years)	1,722	16	0.93	0.88, 0.98	0.004
BMI (kg/m ²)	1,722	16	1.09	1.00, 1.19	0.045
Diabetes	1,722	16			
N			—	—	
Y			3.91	1.39, 11.0	0.010

Abbreviations: CI = Confidence Interval, OR = Odds Ratio

Multivariable regression analysis evaluating independent associations showed diabetic patients had a significantly higher risk of SSI with an odds ratio of 3.9.

Higher BMI also had a higher risk of infection with older age interestingly appearing to be protective.

GNB were not significantly associated with SSI



Model diagnostics show acceptable performance with AUC >70% , despite very low event rate

CONCLUSION

- This study provides a focused evaluation of the relationship between preoperative genicular nerve blocks and periprosthetic joint infection following primary total knee arthroplasty.
- GNB were not associated with increased surgical site infection following TKA. Diabetes Mellitus remained the strongest predictor of infection.
- This study is limited by its single-center design and the low incidence of infection rates, which may reduce statistical power to detect small effects. Firth logistic regression was used to address potential bias and improve model stability and estimation.
- Future directions: Larger multicenter studies are needed to confirm these findings and further evaluate the safety of GNB in patients undergoing primary TKA.

References

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