

Postoperative Complications in Non-Tobacco Nicotine Users After Total Hip Arthroplasty

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INTRODUCTION: Introduction: Nicotine use is associated with increased complications after total joint arthroplasty, but data on non-tobacco nicotine dependence (NTND), including vaping and smokeless nicotine, are limited. This study evaluates perioperative and postoperative outcomes in NTND patients undergoing total hip arthroplasty (THA).

METHODS: Methods: A retrospective cohort study using the TriNetX database identified primary THA patients (2003–2023). Patients were 1:1 propensity-matched into NTND (n=10,495) and non-nicotine user (n=10,495) groups. Systemic complications (90 days) and prosthesis-related complications (2 years) were assessed.

RESULTS: Results: NTND patients exhibited significantly higher rates of systemic complications within 90 days, including sepsis (0.8 vs. 0.5%, RR 1.59, p=0.009), deep vein thrombosis (1.5% vs. 1.0%, RR 1.52, p=0.001), stroke (0.8% vs. 0.6%, RR 2.63, p< 0.001), pneumonia (1.6% vs. 0.6%, RR 2.64, p< 0.001), and renal failure (2.2% vs. 1.5%, RR 1.42, p=0.001). Perioperative anemia (14.7% vs. 11.7%, RR 1.26, p< 0.001) and transfusion rates (3.4% vs. 2.9%, RR 1.2, p=0.016) were also significantly elevated. Opioid use was significantly higher in NTND patients (88.0% vs. 81.2%, RR 1.09, p< 0.001). NTND patients had increased readmission (9.0% vs. 5.7%, RR 1.58, p< 0.001) and emergency department visit rates (9.5% vs. 6.1%, RR 1.56, p< 0.001). Prosthesis-related complications at two years were also significantly more common in NTND patients, including mechanical loosening (0.6% vs. 0.4%, RR 1.65, p=0.012), prosthetic joint infection (1.6% vs. 1.2%, RR 1.33, p=0.014), prosthetic joint dislocation (1.4% vs. 1.1%, RR 1.28, p=0.048), and revision THA (4.1% vs. 2.7%, RR 1.54, p< 0.001).

DISCUSSION AND CONCLUSION: Conclusion: NTND patients undergoing THA experience increased medical and surgical complications. As vaping and smokeless nicotine use rise, preoperative screening and cessation strategies should be explored to optimize surgical outcomes.

Table 3: Propensity Matched Outcomes Analysis

Complication	% of Outcomes, THA-NTND	% of Outcomes, THA-Control	Risk Ratio (95% CI)	p-value
Sepsis	0.8%	0.5%	1.59 (1.23-2.05)	<0.001
Septic Shock Infection	1.5%	1.0%	1.67 (1.33-2.12)	<0.001
Wound Disruption	1.2%	0.7%	1.73 (1.37-2.29)	<0.001
Pulmonary Embolism	1.0%	0.8%	1.3 (1.07-1.55)	0.004
Deep Vein Thrombosis	1.5%	1.0%	1.52 (1.28-1.81)	<0.001
Myocardial Infarction	0.3%	0.3%	1.03 (0.82-1.29)	0.808
Stroke	0.8%	0.6%	1.64 (1.37-2.02)	<0.001
Pneumonia	1.6%	0.6%	2.64 (2.17-3.2)	<0.001
Renal Failure	2.2%	1.5%	1.42 (1.17-1.74)	<0.001
Anemia	14.7%	11.7%	1.26 (1.18-1.35)	<0.001
Transfusion	3.4%	2.9%	1.2 (1.13-1.40)	0.016
Readmission	9.0%	5.7%	1.58 (1.53-1.64)	<0.001
ED Visit	9.5%	6.1%	1.56 (1.52-1.61)	<0.001
Opioid Use	88.0%	81.2%	1.09 (1.07-1.10)	<0.001
Mechanical Loosening	0.6%	0.4%	1.65 (1.12-2.44)	0.012
Revision THA	4.1%	2.7%	1.54 (1.37-1.73)	<0.001
Prosthetic Joint Infection	1.6%	1.2%	1.33 (1.07-1.64)	0.014
Prosthetic Joint Dislocation	1.4%	1.1%	1.28 (1.07-1.53)	0.014
Prosthesis Fracture	0.8%	0.7%	1.14 (0.84-1.55)	0.388

Table 1: Pre-Propensity Matched Demographics and Comorbidities

Characteristic	THA-NTND (n=10,742)	THA-Control (n=10,526)	p-value
Age, years	69	68.2	<0.001
Male, n (%)	5,381 (51.3)	48,374 (46.0)	0.003
Female, n (%)	4,851 (46.2)	56,642 (46.3)	<0.001
American Indian or Alaska Native, n (%)	41 (0.4)	219 (0.2)	<0.001
Asian, n (%)	1,561 (1.5)	4,166 (3.8)	<0.001
Black or African American, n (%)	1,499 (14.3)	10,625 (10.0)	<0.001
Native Hawaiian or Other Pacific Islander, n (%)	43 (0.4)	415 (0.3)	<0.001
White, n (%)	7,977 (76.0)	62,751 (77.5)	<0.001
Other Race, n (%)	120 (1.2)	1,592 (1.3)	0.143
Unknown Race, n (%)	593 (5.6)	7,431 (7.3)	<0.001
Hispanic or Latino, n (%)	222 (2.1)	2,489 (2.4)	0.047
Not Hispanic or Latino, n (%)	8,395 (80.0)	55,921 (80.5)	0.187
Unknown Ethnicity, n (%)	1,878 (17.9)	20,313 (17.1)	0.028
Chronic Kidney Disease, n (%)	480 (4.5)	6,051 (5.8)	<0.001
Diabetes, n (%)	1,440 (14.2)	12,361 (10.6)	<0.001
Isolated Hypertension, n (%)	5,021 (47.8)	44,874 (37.5)	<0.001
Body Mass Index 20-29 kg/m ² , n (%)	440 (4.3)	1,998 (1.9)	0.013
Body Mass Index 30-39 kg/m ² , n (%)	748 (7.3)	4,698 (4.6)	<0.001
Body Mass Index ≥40 kg/m ² , n (%)	274 (2.6)	2,528 (2.1)	0.001

Table 2: Post-Propensity Matched Demographics and Comorbidities

Characteristic	THA-NTND (n=10,495)	THA-Control (n=10,495)	p-value
Age, years	69	68.9	0.663
Male, n (%)	5,381 (51.3)	5,381 (51.1)	0.803
Female, n (%)	4,851 (46.2)	4,851 (46.3)	0.889
American Indian or Alaska Native, n (%)	41 (0.4)	37 (0.4)	0.65
Asian, n (%)	1,561 (1.5)	1,761 (1.7)	0.1
Black or African American, n (%)	1,499 (14.3)	1,457 (13.9)	0.468
Native Hawaiian or Other Pacific Islander, n (%)	43 (0.4)	37 (0.3)	0.524
White, n (%)	7,977 (76.0)	8,032 (76.3)	0.372
Other Race, n (%)	124 (1.2)	118 (1.1)	0.814
Unknown Race, n (%)	593 (5.6)	600 (5.7)	0.513
Hispanic or Latino, n (%)	222 (2.1)	218 (2.1)	0.772
Not Hispanic or Latino, n (%)	8,395 (80.0)	8,395 (79.1)	0.790
Unknown Ethnicity, n (%)	1,878 (17.9)	1,869 (17.8)	0.871
Chronic Kidney Disease, n (%)	480 (4.5)	679 (6.5)	0.078
Diabetes, n (%)	1,440 (14.2)	1,440 (13.8)	0.428
Isolated Hypertension, n (%)	5,021 (47.8)	5,089 (47.7)	0.868
Body Mass Index 20-29 kg/m ² , n (%)	440 (4.3)	389 (3.7)	0.059
Body Mass Index 30-39 kg/m ² , n (%)	748 (7.3)	732 (6.7)	0.074
Body Mass Index ≥40 kg/m ² , n (%)	274 (2.6)	232 (2.2)	0.059