

Impact of Tobacco Use on Short- and Long-Term Outcomes Following Total Hip Arthroplasty for Avascular Necrosis

Zina Smadi, Daniel E Pereira, Shriyaus Lingam, Rahaf M Muwalla, Abdullah Ghali, Khaled J Saleh

INTRODUCTION:

Avascular necrosis (AVN) affects an estimated 10,000 to 20,000 individuals annually in the United States and often leads to joint collapse and debilitating pain. For patients with advanced disease, total hip arthroplasty (THA) remains the gold standard surgical treatment. While smoking and tobacco use have been implicated in both the development and progression of AVN, their specific impact on outcomes following THA remains poorly understood. This study aims to evaluate short-term (90-day) and long-term (2-year) postoperative outcomes following THA in patients with AVN, comparing those with a history of smoking or tobacco use to non-users.

METHODS:

A retrospective cohort analysis was conducted utilizing TriNetX database to identify patients who had a diagnosis of AVN and underwent THA between 2003-2023 and had a two year follow-up. Patients were stratified into two cohorts based on tobacco and smoking, resulting in 8,971 patients in the smoking group and 17,144 patients in the control group. Propensity score matching, using a 1:1 nearest neighbor approach, was conducted to balance demographics and medical comorbidities, resulting in 8,626 patients per cohort. Statistical analyses included Student's t-tests and chi-square tests to compute risk ratios (RR), 95% confidence intervals, and p-values.

RESULTS:

Tobacco use was significantly associated with increased 90-day risks of sepsis (RR 1.66, p=0.009), wound disruption (RR 1.31, p=0.006), pneumonia (RR 1.69, p=0.001), anemia (RR 1.22, p=0.014), ED visits (RR 1.49, p<0.0001), admissions (RR 1.33, p<0.0001), blood transfusion (RR 1.32, p=0.047), 1-component revision (RR 3.18, p<0.0001), 2-component revision (RR 1.53, p=0.019), and any return to OR (RR 1.80, p<0.0001). At 2 years, tobacco users had higher risks of periprosthetic fracture (RR 1.58, p=0.002), periprosthetic joint infection (RR 1.62, p<0.0001), deep I&D (RR 1.59, p=0.022), prosthesis removal (RR 2.12, p<0.0001), 1-component revision (RR 2.10, p<0.0001), 2-component revision (RR 1.40, p=0.002), hip revision (RR 1.62, p<0.0001), and return to OR (RR 1.63, p<0.0001).

DISCUSSION AND CONCLUSION:

Tobacco use is associated with significantly increased risks of both short-term and long-term complications following total hip arthroplasty for avascular necrosis. These findings highlight the importance of preoperative tobacco cessation counseling to mitigate adverse postoperative outcomes.

Table 1: 90 Day Outcomes in Tobacco Group vs Control Group

Outcome	% Outcomes in Tobacco Group	% Outcomes in Control	Risk Ratio (RR)	95% Confidence Interval	P-Value
Sepsis	0.9%	0.5%	1.661	(1.133, 2.434)	0.009
Wound Disruption	2.9%	2.2%	1.306	(1.080, 1.580)	0.006
PE	0.4%	0.5%	0.821	(0.529, 1.274)	0.379
DVT	1.0%	0.8%	1.208	(0.880, 1.658)	0.242
MI	0.4%	0.2%	1.526	(0.867, 2.685)	0.140
Stroke	0.4%	0.3%	1.316	(0.765, 2.264)	0.319
Pneumonia	1.3%	0.8%	1.690	(1.220, 2.340)	0.001
Anemia	5.0%	4.1%	1.215	(1.039, 1.420)	0.014
Renal Failure	1.4%	1.2%	1.220	(0.924, 1.611)	0.160
Transfusion	5.3%	4.6%	1.161	(0.978, 1.377)	0.087
ED visits	5.6%	3.8%	1.493	(1.253, 1.780)	<0.0001
Admission	6.1%	4.6%	1.329	(1.149, 1.537)	<0.0001
Blood Transfusion	1.4%	1.1%	1.321	(1.003, 1.738)	0.047
Opioid Use	0.4%	0.2%	1.719	(0.975, 3.031)	0.058
Deep I&D	0.4%	0.3%	1.142	(0.689, 1.896)	0.606
Superficial I&D	0.2%	0.2%	0.883	(0.441, 1.767)	0.725
Prosthesis Removal	0.3%	0.2%	1.799	(0.958, 3.380)	0.064
1 Component Revision	1.0%	0.3%	3.179	(2.081, 4.856)	<0.0001
2 Components Revision	0.9%	0.6%	1.530	(1.069, 2.191)	0.019
Any Return to OR	2.3%	1.3%	1.799	(1.428, 2.267)	<0.0001

Table 2: 2 Year Outcomes in Tobacco Group vs Control Group

Outcome	% Outcomes in Tobacco Group	% Outcomes in Control	Risk Ratio (RR)	95% Confidence Interval	P-Value
Periprosthetic Fracture	1.4%	0.9%	1.575	(1.181, 2.100)	0.002
Mechanical Loosening	1.0%	0.7%	1.334	(0.964, 1.847)	0.081
Periprosthetic Joint Infection	2.8%	1.7%	1.618	(1.321, 1.980)	<0.0001
Superficial I&D	0.4%	0.3%	1.311	(0.809, 2.124)	0.269
Deep I&D	0.7%	0.5%	1.589	(1.066, 2.370)	0.022
Prosthesis Removal	1.0%	0.5%	2.118	(1.469, 3.054)	<0.0001
1 Component Revision	2.2%	1.0%	2.100	(1.637, 2.695)	<0.0001
2 Components Revision	2.3%	1.6%	1.400	(1.129, 1.735)	0.002
Hip Revision	4.0%	2.4%	1.624	(1.371, 1.923)	<0.0001
Return to OR	4.8%	3.0%	1.632	(1.399, 1.903)	<0.0001