

# Low-Dose Aspirin as the Safest Prophylaxis for Venous Thromboembolism Following Total Hip Arthroplasty Across All Patient Risk Profiles

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**INTRODUCTION:** Venous thromboembolism (VTE) is a severe complication following total hip arthroplasty (THA), significantly affecting patient morbidity, mortality, and healthcare resource use. Common prophylactic options include aspirin, low-molecular-weight heparins (LMWH), warfarin, and newer direct oral anticoagulants (DOACs). Aspirin is increasingly favored due to its ease of use, safety, and cost-effectiveness. Despite endorsements by guidelines such as the International Consensus Meeting (ICM-VTE, 2022), large scale evidence evaluating aspirin's effectiveness across diverse patient risk profiles in THA remains scarce. Thus, our study assessed whether low-dose aspirin (LDA) provides superior safety and efficacy compared to other anticoagulants in preventing VTE after THA across various patient risk strata.

**METHODS:** This retrospective cohort analysis utilized the TriNetX database encompassing 141,334 primary THA cases between 2012 and 2025. Patients were categorized into low and high VTE-risk groups according to ICM-VTE criteria. 1:1 Propensity-score matching created balanced cohorts comparing patients on LDA (81 mg daily) versus alternative anticoagulants (LMWH, DOACs, warfarin, rivaroxaban). The primary outcomes included incidences of deep vein thrombosis (DVT), pulmonary embolism (PE), and bleeding complications at 90 days post-surgery, while secondary outcomes included infections, mortality, and healthcare utilization metrics. A p-value <0.05 was considered statistically significant.

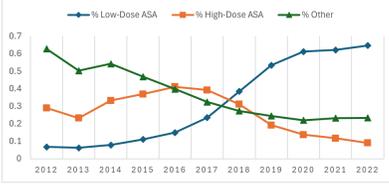
**RESULTS:** Among high-risk patients, LDA significantly decreased the incidence of DVT (OR: 0.371; 95% CI: 0.282–0.489; p<0.05) and PE (OR: 0.509; 95% CI: 0.369–0.704; p<0.05) compared to alternative anticoagulants. Similarly, low-risk patients receiving LDA had significantly reduced DVT (OR: 0.219; 95% CI: 0.148–0.323; p<0.05) and PE rates (OR: 0.402; 95% CI: 0.257–0.628; p<0.05). Notably, LDA substantially lowered major hemorrhagic complications in both high-risk (OR: 0.143; 95% CI: 0.076–0.269) and low-risk (OR: 0.122; 95% CI: 0.063–0.236) groups (both p<0.05). Additionally, patients on LDA experienced significantly lower incidences of periprosthetic joint infection (PJI), surgical site infections (SSI), transfusions, hospital readmissions, and emergency department visits compared to alternative anticoagulants across both risk cohorts (all p<0.05) (Tables 1). Additionally, combining LDA with other agents, was still associated with increased VTE risk relative to LDA only prophylaxis (Table 2). Longitudinal analysis of prophylaxis trends (2012-2022) demonstrated rising use of LDA, accompanied by decreasing utilization of high-dose aspirin and other anticoagulants (Figure 1).

## DISCUSSION AND CONCLUSION:

Our findings support LDA as an effective and safer agent compared to traditional anticoagulants in preventing thromboembolic events post-THA across both high- and low-risk patient populations. Aspirin demonstrated significantly lower incidences of DVT, PE, major hemorrhagic events, and secondary postoperative complications, thereby markedly reducing healthcare utilization and improving patient safety outcomes. These outcomes validate the recent International Consensus Meeting's recommendation for aspirin as first-line prophylaxis, demonstrating clear advantages over other anticoagulant regimens. The efficacy of aspirin observed aligns with previous randomized trials and observational studies showing equivalent or superior prophylactic effectiveness compared to traditional anticoagulants, especially in reducing major bleeding and wound complications. Our comprehensive population-based study reinforces aspirin's viability as the optimal choice across diverse patient profiles, negating the necessity for aggressive anticoagulation even in patients historically considered high-risk. The notably lower complication rates associated with aspirin prophylaxis, such as decreased infections and reduced healthcare interventions, represent critical improvements in perioperative safety and resource management. The findings advocate a significant clinical paradigm shift, favoring the routine use of aspirin due to its substantial safety and cost-efficiency benefits over LMWH, DOACs, and warfarin, traditionally prescribed based on perceived thrombotic risk.

In conclusion, low-dose aspirin appears to be a safe and effective prophylactic agent for preventing venous thromboembolism following total hip arthroplasty across all patient risk profiles, exhibiting superior efficacy, significantly reduced bleeding complications, and lower postoperative healthcare utilization compared to alternative anticoagulants. Our evidence supports current guideline recommendations advocating aspirin as the prophylactic standard, given its established safety profile, ease of administration, and economic advantages. These findings support aspirin's universal adoption for THA patients, fundamentally altering contemporary prophylactic strategies toward greater safety, effectiveness, and efficiency.

### USAGE RATE TRENDS OF ASPIRIN AND OTHER ANTICOAGULANTS



Low Risk Profile for VTE				High Risk Profile for VTE			
Measure	Aspirin Only †	Other Anticoagulants †	Odds Ratio (95% CI) P	Measure	Aspirin Only †	Other Anticoagulants †	Odds Ratio (95% CI) P
Medical Outcomes							
Deep Vein Thrombosis	31 (0.14%)	141 (0.65%)	0.219 (0.146, 0.323) <b>&lt;0.05</b>	Deep Vein Thrombosis	70 (0.4%)	186 (1.1%)	0.371 (0.282, 0.489) <b>&lt;0.05</b>
Pulmonary Embolism	27 (0.12%)	67 (0.31%)	0.402 (0.217, 0.629) <b>&lt;0.05</b>	Pulmonary Embolism	56 (0.3%)	109 (0.6%)	0.509 (0.309, 0.794) <b>&lt;0.05</b>
Hemorrhage	<10‡	81 (0.37%)	0.122 (0.063, 0.236) <b>&lt;0.05</b>	Hemorrhage	<10‡	76 (0.4%)	0.143 (0.076, 0.269) <b>&lt;0.05</b>
GI Bleeding	33 (0.15%)	46 (0.21%)	0.714 (0.456, 1.117) 0.671	GI Bleeding	45 (0.3%)	54 (0.3%)	0.83 (0.558, 1.233) 0.36
Periprosthetic Joint Infection	126 (0.58%)	187 (0.86%)	0.535 (0.335, 0.841) <b>&lt;0.05</b>	Periprosthetic Joint Infection	212 (1.2%)	316 (1.8%)	0.665 (0.556, 0.790) <b>&lt;0.05</b>
Surgical Site Infection	52 (0.24%)	38 (0.17%)	1.369 (0.901, 2.061) 0.14	Surgical Site Infection	99 (0.5%)	98 (0.5%)	1.011 (0.764, 1.338) 0.94
Myocardial Infarction	24 (0.11%)	47 (0.22%)	0.511 (0.312, 0.836) <b>&lt;0.05</b>	Myocardial Infarction	48 (0.3%)	57 (0.3%)	0.848 (0.578, 1.246) 0.40
Stroke	30 (0.14%)	43 (0.20%)	0.697 (0.417, 1.112) 0.13	Stroke	25 (0.1%)	37 (0.2%)	0.675 (0.466, 1.021) 0.13
Transfusion	134 (0.62%)	453 (2.15%)	0.284 (0.214, 0.345) <b>&lt;0.05</b>	Transfusion	165 (0.9%)	380 (2.2%)	0.356 (0.309, 0.505) <b>&lt;0.05</b>
Mortality	27 (0.12%)	84 (0.38%)	0.321 (0.208, 0.495) <b>&lt;0.05</b>	Mortality	46 (0.3%)	117 (0.6%)	0.469 (0.292, 0.772) <b>&lt;0.05</b>
THA Revision	158 (0.73%)	229 (1.05%)	0.687 (0.561, 0.843) <b>&lt;0.05</b>	THA Revision	223 (1.2%)	296 (1.6%)	0.749 (0.626, 0.893) <b>&lt;0.05</b>
Healthcare Utilization							
ED Visits	336 (1.59%)	702 (4.35%)	0.724 (0.646, 0.812) <b>&lt;0.05</b>	ED Visits	404 (2.3%)	601 (3.3%)	0.837 (0.741, 0.945) <b>&lt;0.05</b>
Inpatient Readmission	846 (4.66%)	1,745 (11.86%)	0.334 (0.306, 0.366) <b>&lt;0.05</b>	Inpatient Readmission	775 (4.3%)	1,517 (8.7%)	0.348 (0.318, 0.417) <b>&lt;0.05</b>

† The values indicate the number of patients, with percentages shown in parentheses. ‡ Patient counts of <10 are not reported on L2bNEX. Significant values are bolded (p < 0.05). VTE = Venous Thromboembolism, CI = Confidence Interval, GI = Gastrointestinal, ED = Emergency Department.

Low Risk Profile for VTE				High Risk Profile for VTE			
Measure	Aspirin + Other Anticoagulants †	Odds Ratio (95% CI) P	Measure	Aspirin + Other Anticoagulants †	Odds Ratio (95% CI) P		
Medical Outcomes							
Deep Vein Thrombosis	14 (0.2%)	46 (0.8%)	0.302 (0.166, 0.530) <b>&lt;0.05</b>	Deep Vein Thrombosis	31 (0.4%)	60 (0.9%)	0.51 (0.338, 0.789) <b>&lt;0.05</b>
Pulmonary Embolism	12 (0.2%)	23 (0.4%)	0.521 (0.259, 1.049) <b>&lt;0.05</b>	Pulmonary Embolism	21 (0.3%)	36 (0.5%)	0.573 (0.334, 0.982) <b>&lt;0.05</b>
Hemorrhage	≤10‡	≤10‡	-	Hemorrhage	≤10‡	14 (0.2%)	-
GI Bleeding	11 (0.2%)	22 (0.4%)	0.481 (0.233, 0.944) <b>&lt;0.05</b>	GI Bleeding	24 (0.3%)	34 (0.5%)	0.704 (0.417, 1.189) 0.19
Periprosthetic Joint Infection	39 (0.6%)	35 (0.6%)	1.112 (0.701, 1.737) 0.65	Periprosthetic Joint Infection	85 (1.2%)	121 (1.7%)	0.695 (0.526, 0.919) <b>&lt;0.05</b>
Surgical Site Infection	21 (0.3%)	23 (0.4%)	0.912 (0.504, 1.650) 0.76	Surgical Site Infection	51 (0.7%)	55 (0.7%)	0.929 (0.634, 1.362) 0.71
Myocardial Infarction	≤10‡	14 (0.2%)	-	Myocardial Infarction	24 (0.4%)	25 (0.4%)	1.262 (0.959, 1.676) 0.88
Stroke	≤10‡	18 (0.3%)	-	Stroke	11 (0.2%)	19 (0.3%)	0.579 (0.275, 1.216) 0.15
Transfusion	38 (1.0%)	91 (1.6%)	0.402 (0.275, 0.588) <b>&lt;0.05</b>	Transfusion	72 (1.0%)	152 (2.2%)	0.343 (0.303, 0.601) <b>&lt;0.05</b>
Mortality	13 (0.2%)	32 (0.5%)	0.405 (0.212, 0.772) <b>&lt;0.05</b>	Mortality	32 (0.4%)	61 (0.8%)	0.523 (0.348, 0.803) <b>&lt;0.05</b>
THA Revision	55 (0.9%)	60 (1.0%)	0.636 (0.436, 0.933) 0.61	THA Revision	91 (1.2%)	143 (2.0%)	0.716 (0.518, 0.989) <b>&lt;0.05</b>
Healthcare Utilization							
ED Visits	168 (3.8%)	181 (4.5%)	0.835 (0.674, 1.035) 0.10	ED Visits	213 (5.2%)	203 (5.0%)	1.058 (0.865, 1.289) 0.57
Inpatient Readmission	189 (3.9%)	189 (5.0%)	0.637 (0.437, 0.932) <b>&lt;0.05</b>	Inpatient Readmission	227 (5.6%)	225 (6.0%)	0.942 (0.782, 1.132) 0.52

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