Impact of Preoperative Platelet Count on Postoperative Complications and Mortality Following Total Hip Arthroplasty: A Retrospective Cohort Analysis Using the ACS NSQIP Database

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INTRODUCTION: Total hip arthroplasty (THA) is among the most common orthopedic procedures worldwide, yet factors influencing postoperative complications and mortality remain incompletely understood. Prior studies suggest abnormal platelet counts may influence perioperative bleeding potentially affecting outcomes in major orthopedic procedures. This study evaluated the association between preoperative platelet counts and postoperative complications and mortality in patients undergoing THA.

METHODS: We conducted a retrospective analysis using the ACS NSQIP database (2010-2022) of adults undergoing primary THA. Patients were stratified by preoperative platelet counts: thrombocytopenia (<150 x 10^3/μL), normal (150-400 x 10^3/μL), and thrombocytosis (>400 x 10^3/μL). Postoperative complications were defined as acute myocardial infarction, pneumonia, sepsis, septic shock, surgical site bleeding, mechanical complications, pulmonary embolism, and periprosthetic joint/wound infection. Multivariable regression analyses assessed associations between platelet categories and outcomes while controlling for confounders including age, sex, BMI, comorbidities, smoking status, operative time, and anesthesia type.

RESULTS: Of 304,078 patients, 13,876 (4.6%) had thrombocytopenia, 281,678 (92.6%) had normal counts, and 8,524 (2.8%) had thrombocytosis. After adjusting for confounders, thrombocytosis was independently associated with increased postoperative complications (OR=1.73; 95% CI: 1.51-1.97; p<0.001), while thrombocytopenia showed no significant association. Both platelet abnormalities were associated with increased mortality risk: thrombocytopenia conferring 74% higher odds (OR=1.74; 95% CI: 1.40-2.15; p<0.001) and thrombocytosis 70% higher odds (OR=1.70; 95% CI: 1.17-2.39; p=0.004) compared to normal platelet counts.

DISCUSSION AND CONCLUSION: This analysis reveals distinct risk profiles for platelet abnormalities following THA. While both conditions increase mortality risk, only thrombocytosis increases postoperative complications. These findings align with expected pathophysiology: thrombocytosis may promote both bleeding (via dysfunction) and thrombosis (via hypercoagulability), while thrombocytopenia may reflect systemic illness affecting survival. Preoperative platelet abnormalities may aid risk stratification, though further studies should explore underlying mechanisms and evaluate targeted perioperative interventions to improve outcomes in high-risk patients.

Table 1: Univariable Analysis of Patients Undergoing Total Hip Arthroplasty with Thrombocytopenia, Thrombocytosis, or Normal platelet count

Characteristic	<150 N = 13,876	150–400 (Reference) N = 281,678	>400 N = 8,524	p-value
Age (years)				**<0.001**
18-39	248 (1.8%)	6,182 (2.2%)	405 (4.8%)	
40-49	529 (3.8%)	16,173 (5.7%)	719 (8.4%)	
50-59	2,136 (15%)	57,066 (20%)	1,791 (21%)	
60-69	4,163 (30%)	96,774 (34%)	2,727 (32%)	
70-79	4,272 (31%)	75,175 (27%)	1,994 (23%)	
80+	2,528 (18%)	30,308 (11%)	888 (10%)	
Sex				**<0.001**
Female	4,959 (36%)	156,495 (56%)	6,479 (76%)	
Non-Female	8,917 (64%)	125,108 (44%)	2,043 (24%)	
Unknown	0	75	2	
Race				**<0.001**
White	10,177 (73%)	205,144 (73%)	6,004 (70%)	
Asian	196 (1.4%)	4,781 (1.7%)	184 (2.2%)	
Black or African American	1,081 (7.8%)	22,265 (7.9%)	973 (11%)	
Native Hawaiian or Pacific Islander	75 (0.5%)	1,655 (0.6%)	69 (0.8%)	
Other	16 (0.1%)	521 (0.2%)	19 (0.2%)	
Unknown/Not Reported	2,331 (17%)	47,312 (17%)	1,275 (15%)	
Ethnicity				**<0.001**
Non-Hispanic	11,009 (79%)	223,322 (79%)	6,896 (81%)	
Hispanic	476 (3.4%)	9,547 (3.4%)	332 (3.9%)	
No Response	2,391 (17%)	48,809 (17%)	1,296 (15%)	
BMI Classification				**<0.001**
Healthy	2,910 (21%)	54,523 (20%)	2,333 (28%)	
Underweight	212 (1.5%)	2,560 (0.9%)	260 (3.1%)	
Overweight	4,554 (33%)	92,597 (33%)	2,540 (30%)	
Obese	6,002 (44%)	129,595 (46%)	3,288 (39%)	
Unknown	198	2,403	103	
ASA Classification				**<0.001**
1-No Disturb	249 (1.8%)	9,565 (3.4%)	145 (1.7%)	
2-Mild Disturb	4,509 (33%)	144,623 (51%)	4,035 (47%)	
3-Severe Disturb	8,103 (58%)	121,250 (43%)	4,099 (48%)	
≥4-Life Threat / Moribund	1,000 (7.2%)	5,886 (2.1%)	234 (2.7%)	
Unknown	15	354	11	
Smoking Status	1,808 (13%)	34,770 (12%)	1,687 (20%)	**<0.001**
Preoperative Functional Health Status				**<0.001**
Independent	13,248 (96%)	274,403 (98%)	8,120 (96%)	
Partially Dependent	517 (3.7%)	5,852 (2.1%)	336 (4.0%)	
Totally Dependent	57 (0.4%)	391 (0.1%)	29 (0.3%)	
Unknown	54	1,032	39	
Immunosuppressive Therapy	799 (5.8%)	10,557 (3.7%)	624 (7.3%)	**<0.001**
Surgical Indication				**<0.001**
Other	3,739 (27%)	38,001 (13%)	1,902 (22%)	
Inflammatory Arthritis	17 (0.1%)	274 (<0.1%)	27 (0.3%)	
Osteoarthritis	10,120 (73%)	243,403 (86%)	6,595 (77%)	
Emergency Procedure	490 (3.5%)	2,772 (1.0%)	139 (1.6%)	**<0.001**
Unknown	0	1	0	
Diabetes				**<0.001**
No	11,431 (82%)	247,068 (88%)	7,339 (86%)	
Non-Insulin	1,643 (12%)	26,447 (9.4%)	902 (11%)	
Insulin	802 (5.8%)	8,163 (2.9%)	283 (3.3%)	
Postoperative Complications	369 (2.8%)	4,108 (1.5%)	270 (3.3%)	**<0.001**
Unknown	11,183	601	332	
Death	122 (0.9%)	532 (0.2%)	37 (0.4%)	**<0.001**
Unknown	0	1	0	

1 n (%); Mean (SD)
2 Pearson's Chi-squared test; Kruskal-Wallis rank sum test

Table 2: Adjusted Multivariable Regression of Platelet Count with Postoperative Complication and Mortality Rate

Platelet Count	Postoperative Complication OR[a] (95% CI[b])	p-value	Mortality Rate OR[a] (95% CI[b])	p-value
150–400 x 10^3/μL (Ref)	—	—	—	—
<150 x 10^3/μL	0.98 (0.87, 1.09)	0.694	1.74 (1.40, 2.15)	<0.001
>400 x 10^3/μL	1.73 (1.51, 1.97)	<0.001	1.70 (1.17, 2.39)	0.004

[a] Odds Ratio [b] Confidence Interval