Polycythemia vera is not associated with increased DVT or PE risk in primary THA

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INTRODUCTION:
Polycythemia vera (PV) patients undergoing primary total hip arthroplasty (THA) may be associated with increased rates of pulmonary embolism (PE) and deep vein thrombosis (DVT). Current literature does not have much data regarding outcomes following THA amongst PV patients. The primary purpose of this study is to compare DVT and PE rates after primary THA in PV patients.

METHODS:
The New York Statewide Planning and Research Cooperative System (SPARCS) database was queried for all patients undergoing primary THA using ICD 9/10 PCS codes. Patients undergoing primary THA for fracture or oncologic diagnoses were excluded. Patients with PV were identified using ICD 9/10 CM diagnosis codes and propensity matched to patients without PV using age, gender, race, insurance, and medical comorbidities defined by Elixhauser index as covariates. Categorical variables were compared with Pearson's Chi-squared test and continuous variables were compared using Wilcoxon rank sum tests with an alpha set at 0.05. Cox proportional hazard regression models were used to evaluate hazard ratios for DVT and PE at 12 months.

RESULTS:
A total of 1,147 with and 2,294 without PV THA patients were included in the study. There was no statistically significant difference in age, gender, race, insurance, or likelihood to have an obesity diagnosis between the two cohorts. Patients with PV were more likely to have a smoking/nicotine use diagnosis (39% vs. 23%, p<0.001). The most common primary indication for surgery in both groups was osteoarthritis (96% vs 95%).

The mean length of stay in the PV cohort was shorter than those without (2.9 +/- 1.80 vs 3.6 +/- 1.83, p<0.001). Patients with PV were more likely to be discharged home (67% vs 50%, p<0.001) and conversely less likely to be discharged to a skilled nursing facility (22% vs 31%, p<0.001). Patients with PV were less likely to have postoperative anemia (19% vs. 30%, p<0.001) and less likely to have postoperative blood transfusions (10% vs. 29%, p<0.001). The revision rate in patients with PV was higher than those without at 3-months (1.7% vs. 0.4%, p<0.001) and 12-months (2.1% vs. 0.7%, p<0.001), but there was no statistically significant difference in overall cumulative revision rate between the two cohorts.

There was no statistically significant difference in emergency room visit rate at 3 months, DVT at 3 months, DVT at 12 months, PE at 3 months, PE at 12 months, 3-month mortality rate, or 12-month mortality rate between the two cohorts. PV was not associated with increased rates of DVT at 12 months (2.5% vs 2.4%; odds ratio [OR] 1.18, 95% confidence interval [CI] 0.73-1.86, P = 0.5), or PE at 12 months (1.5% vs 0.8%; OR 2.09, 95% CI 1.05-4.14, P = 0.033)

DISCUSSION AND CONCLUSION:
The results of this study demonstrate that PV is not associated with increased DVT or PE rates in primary THA. There is no statistically significant difference in DVT rates at 3 months or 12 months, or PE rates at 3 months or 12 months, for patients with PV after primary THA.

Characteristic	Matched Control, N = 2,294[1]	Polycythemia Vera, N = 1,147[1]	p-value	q-value[2]
Age	65.8 (10.84)	65.8 (10.58)	0.7[3]	>0.9
Age (bins)			0.7[4]	>0.9
0-40	22 (1.0%)	7 (0.6%)		
40-60	713 (31%)	367 (32%)		
60-80	1,339 (58%)	665 (58%)		
80+	220 (9.6%)	108 (9.4%)		
Gender			>0.9[4]	>0.9
Female	994 (43%)	497 (43%)		
Male	1,300 (57%)	650 (57%)		
Race			>0.9[4]	>0.9
Black	79 (3.4%)	40 (3.5%)		
Hispanic	80 (3.5%)	38 (3.3%)		
White	2,040 (89%)	1,018 (89%)		
Other or Unknown	95 (4.1%)	51 (4.4%)		
Insurance			>0.9[4]	>0.9
Private	985 (43%)	491 (43%)		
Medicare	1,211 (53%)	602 (52%)		
Medicaid	65 (2.8%)	34 (3.0%)		
Other	33 (1.4%)	20 (1.7%)		
Obesity Diagnosis	516 (22%)	291 (25%)	0.060[4]	0.2
Smoking/Nicotine Use Diagnosis	529 (23%)	453 (39%)	<0.001[4]	<0.001
Elixhauser Index	1.6 (5.0)	1.6 (4.9)	0.9[3]	>0.9

[1] Mean (SD); n (%)
[2] Benjamini & Hochberg correction for multiple testing
[3] Wilcoxon rank sum test
[4] Pearson's Chi-squared test

Characteristic	Matched Control, N = 2,294[1]	Polycythemia Vera, N = 1,147[1]	p-value	q-value[2]
LOS (days)	3.6 (1.83)	2.9 (1.80)	<0.001[3]	<0.001
Disposition			<0.001[4]	<0.001
Home	1,151 (50%)	763 (67%)		
Skilled Nursing Facility	709 (31%)	252 (22%)		
Inpatient Rehab	403 (18%)	121 (11%)		
Other	31 (1.4%)	11 (1.0%)		
Postoperative Anemia	691 (30%)	218 (19%)	<0.001[4]	<0.001
Postoperative Blood Transfusion	659 (29%)	115 (10%)	<0.001[4]	<0.001
Emergency Room Visit Rate at 3 months	382 (17%)	211 (18%)	0.2[4]	0.3
Inpatient Readmission Rate at 3 months	215 (9.4%)	86 (7.5%)	0.067[4]	0.12
DVT at 3 months	39 (1.7%)	26 (2.3%)	0.2[4]	0.3
DVT at 12 months	54 (2.4%)	29 (2.5%)	0.8[4]	0.8
Pulmonary Embolism at 3 months	14 (0.6%)	13 (1.1%)	0.10[4]	0.2
Pulmonary Embolism at 12 months	18 (0.8%)	17 (1.5%)	0.055[4]	0.12
Revision Rate at 3 months	9 (0.4%)	19 (1.7%)	<0.001[4]	<0.001
Revision Rate at 12 months	16 (0.7%)	24 (2.1%)	<0.001[4]	<0.001
Overall Revision Rate	63 (2.7%)	37 (3.2%)	0.4[4]	0.5
3 Month Mortality Rate	9 (0.4%)	6 (0.5%)	0.6[5]	0.6
12 Month Mortality Rate	13 (0.6%)	11 (1.0%)	0.2[4]	0.3

[1] Mean (SD); n (%)
[2] Benjamini & Hochberg correction for multiple testing
[3] Wilcoxon rank sum test
[4] Pearson's Chi-squared test
[5] Fisher's exact test

	DVT (12 months)					Pulmonary Embolism (12 Months)					
Characteristic	N	Event N	OR[1]	95% CI[1]	p-value	q-value[2]	N	Event N	OR[1]	95% CI[1]	p-value	q-value[2]
Characteristic												
Matched Control	2,294	54	1.00	—			2,294	18	1.00	—		
Polycythemia Vera	1,147	29	1.18	0.73-1.86	0.5	0.6	1,147	17	2.09	1.05-4.14	0.033	0.065
Scaled Age (x10 years)	3,441	83	1.16	0.92-1.45	0.2	0.3	3,441	35	1.14	0.81-1.62	0.5	0.5
Gender												
Female	1,491	35	1.00	—			1,491	21	1.00	—		
Male	1,950	48	1.10	0.70-1.75	0.7	0.7	1,950	14	0.50	0.24-1.00	0.054	0.065
Elixhauser Index	3,441	83	1.07	1.03-1.11	<0.001	0.002	3,441	35	1.10	1.04-1.16	<0.001	0.002
Smoking/Nicotine Use Diagnosis			0.45	0.24-0.80	0.009	0.027			0.40	0.15-0.93	0.049	0.065
Obesity Diagnosis			1.93	1.12-3.21	0.014	0.028			3.47	1.62-7.22	<0.001	0.003

[1] OR = Odds Ratio, CI = Confidence Interval
[2] Benjamini & Hochberg correction for multiple testing