

Robotic-Assistance in Total Hip Arthroplasty Associated with Decreased Dislocation Rates

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INTRODUCTION:

As the use of robotics in total hip arthroplasty (THA) continues to gain popularity, differences in clinical outcomes when compared to manual techniques have remained unclear. This study aimed to compare postoperative complications between patients undergoing robotic-assisted techniques and manual THA for primary osteoarthritis at 90 days, 1 year, and 2 years.

METHODS:

Using an all-payer national database, we identified 405,048 patients who underwent either robotic-assisted or manual THA for primary osteoarthritis. A propensity match was performed for age, sex, a comorbidity index, chronic kidney disease, obesity, and diabetes, resulting in 7,652 patients in each cohort. We assessed postoperative outcomes, including surgical site infections, pulmonary emboli, venous thromboemboli, wound complications, dislocations, aseptic revisions, primary joint infections (PJI), and periprosthetic fractures (PPFx). We completed bivariate analyses via *Chi*-square tests to assess categorical variables. We utilized students *t*-tests to compare continuous variables, including age and comorbidities. Odds ratios (ORs) were calculated for complications using 95% confidence intervals (CIs).

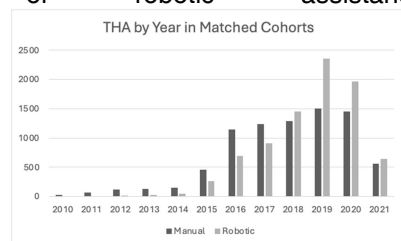
RESULTS:

The robotic-assisted cohort had lower rates of dislocation at 90 days (0.93 versus 1.41%, odds ratio (OR) 0.65, 95% confidence interval (CI) 0.48 to 0.88, $P = 0.007$), 1 year (1.32 versus 1.92%, OR 0.68, 95% CI 0.53 to 0.88, $P = 0.004$), and 2 years (1.66 versus 2.1%, OR 0.79, 95% CI 0.62 to 0.99, $P = 0.049$). Total surgical complications were significantly lower in the robotic-assisted cohort at 1 year (5.29 versus 6.16%, OR 0.85, 95% CI 0.74 to 0.98, $P = 0.0205$), but were similar at 90 days and 2 years. At 90 days, the rates of medical complications, including surgical site infections, pulmonary emboli, venous thromboemboli, and wound complications, were similar (all $P > 0.05$). The rates of PJI, aseptic revision, PPFx, and aseptic loosening were similar at all time points (all $P > 0.05$).

DISCUSSION AND CONCLUSION:

Patients who underwent robotic-assisted THA had lower rates of dislocation at 90 days, 1 year, and 2 years. This finding supports the use of robotic assistance in total hip arthroplasty.

	Robotic-Assisted THA n=7,652	Manual THA n=397,396	p-value
Mean age in years	64 ± 11	65 ± 10	< 0.001
Mean ECI	4.62 ± 3.17	4.4 ± 3.16	< 0.001
Sex	n (%)	n (%)	0.002
Women	4220 (0.55)	226223 (0.57)	
Men	3432 (0.45)	171173 (0.43)	
Alcohol abuse	630 (0.08)	32466 (0.08)	0.857
CKD	1089 (0.14)	68667 (0.17)	< 0.001
Hypothyroidism	2182 (0.29)	110322 (0.28)	0.089
Obesity	3887 (0.52)	180718 (0.46)	< 0.001
Tobacco use	3418 (0.45)	171608 (0.43)	0.010
Anemia	1359 (0.18)	68464 (0.17)	0.228
Diabetes	1229 (0.16)	69458 (0.17)	0.001
Chronic pulmonary disease	2508 (0.33)	132288 (0.33)	0.352



	Robotic-Assisted THA n=7,652 (%)	Manual THA n=7,652 (%)	p-value
90-day complications			
PJI	67 (0.88)	88 (1.15)	0.106
Aseptic Revision	72 (0.94)	62 (0.81)	0.435
SSI	70 (0.91)	88 (1.15)	0.174
PE	12 (0.16)	16 (0.21)	0.570
VT	45 (0.59)	52 (0.68)	0.541
WC	93 (1.22)	73 (0.95)	0.138
Dislocation	71 (0.93)	108 (1.41)	0.007
Periprosthetic fracture	70 (0.91)	54 (0.71)	0.176
Aseptic loosening	14 (0.18)	15 (0.2)	1
Total complications	294 (3.84)	327 (4.27)	0.178
1-year complications			
PJI	87 (1.14)	112 (1.46)	0.087
Aseptic Revision	100 (1.31)	108 (1.41)	0.625
Dislocation	101 (1.32)	147 (1.92)	0.004
Periprosthetic fracture	80 (1.05)	65 (0.85)	0.243
Aseptic loosening	37 (0.48)	39 (0.51)	0.909
Total complications	405 (5.29)	471 (6.16)	0.021
2-year complications			
PJI	101 (1.32)	118 (1.54)	0.278
Aseptic Revision	122 (1.59)	130 (1.7)	0.657
Dislocation	127 (1.66)	161 (2.1)	0.049
Periprosthetic fracture	92 (1.2)	70 (0.91)	0.097
Aseptic loosening	62 (0.81)	53 (0.69)	0.454
Total complications	504 (6.59)	532 (6.96)	0.375