

# Robotic-assisted THA is Associated with Decreased Risk of Revision for Dislocation: An AJRR Analysis

Gregory J Kirchner, Connor Riley, Emily Jimenez, Jeffrey Benjamin Stambough, Lucas Nikkel

## INTRODUCTION:

Robotic-assisted total hip arthroplasty (RA-THA) continues to grow as an alternative to conventional, manual techniques (C-THA). However, our understanding is limited whether robotics affords advantages in this setting. Utilizing the American Joint Replacement Registry (AJRR), we questioned if RA-THA decreases all-cause revision or revision due to dislocation at 2 years.

## METHODS:

AJRR and its Medicare claims data linkage were used to create a retrospective cohort comparison of patients aged 65 years or older who underwent primary elective RA-THA (n=113,477) or C-THA (n=10,988) between 2017 and 2021. Mixed-effect cox regression models were used to determine hazard of all-cause revision and revision for dislocation at 2 years. Covariates included age, race, gender, Charlson comorbidity index, length of stay, year of surgery, and anesthesia type. Surgeon and institution were controlled as the random effect within these models. Due to growing adoption of RA-THA during the study period, significant differences between groups were also analyzed post-hoc for the most recent two years within the study timeframe (2020 and 2021).

## RESULTS:

After controlling for confounding variables, the risk of all-cause revision at two years was similar between RA-THA and C-THA (1.9% vs 2.1%; HR 0.9 [95% CI 0.7 to 1.1]; p=0.4). Revision due to dislocation was lower in RA-THA (0.3%) compared to C-THA (0.6%; HR 0.5 [95% CI 0.3 to 0.9]; p=0.029). When isolating the analysis to the most recent period (2020 and 2021), there was an even greater decrease in revision due to dislocation associated with RA-THA compared to C-THA (HR 0.4 [95% CI 0.2 to 0.8]; p=0.006).

## DISCUSSION AND CONCLUSION:

RA-THA is not associated with decreased risk of all-cause revision at 2 years, but RA-THA is associated with a nearly 50% decrease in revision due to dislocation compared to C-THA.

	Surgical Procedure		Total (N = 124,465)	P Value
	Conventional THA (N = 113,477)	Robot Assisted THA (N = 10,988)		
<b>All-cause Revision at Two Years</b>				
No	111,120 (97.42%)	10,780 (98.11%)	121,900 (97.94%)	0.19
Yes	2,357 (2.08%)	208 (1.89%)	2,565 (2.06%)	
<b>Revision for Dislocation</b>				
No	112,788 (99.39%)	10,953 (99.68%)	123,741 (99.42%)	<0.001
Yes	689 (0.61%)	35 (0.32%)	724 (0.58%)	

Table 1. Univariate analysis comparing RA-THA to C-THA

Outcome	Hazard Ratio	95% CI	P-value
All-cause Revision at Two Years	0.902	0.714 – 1.140	0.398
Revision for Dislocation	0.538	0.308 – 0.941	0.029

Table 2. Mixed-effect Cox regression models with surgeon and institution controlled as random effect.

	Hazard Ratio	95% CI	P-value
Later Years 2020 and 2021	0.373	0.200 – 0.771	0.006

Table 3. Post-hoc analysis of risk of revision due to dislocation using most recent two years within the study timeframe.