

Five-Fold Increased Risk of Prosthetic Joint Infection Observed in the Morbidly Obese Population Undergoing Robotic Total Hip Arthroplasty

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INTRODUCTION: Robotic total hip arthroplasty (THA) systems are becoming a mainstay of orthopaedic practice, with estimates reporting that the majority of THA procedures will be performed with the assistance of a robot by 2030. Rapid development of this technology calls for careful consideration of patient selection and optimization of postoperative outcomes. Our study aimed to examine complications following robotic THA in morbidly obese patients, defined by a body mass index (BMI) of ≥ 40 . Endpoints of interest include periprosthetic fracture (PPFX), prosthetic joint infection (PJI), surgical site infection (SSI), aseptic revision, and aseptic loosening for up to two years.

METHODS: A national all-payer database was used to identify patients by International Procedural Code- 10th Edition (ICD-10) codes. Patients who had a high BMI (≥ 40) and a normal BMI (20 to 25) who underwent robotic-assisted THA during the years 2010 and 2021 were included in the study (n = 764). Individuals were excluded from the study with a history of trauma, malignancy, and/or rheumatoid arthritis. A multifactorial propensity score match was completed to produce a High BMI group (n = 267) and a Normal BMI group (n = 264). For complications of interest, Chi-square analyses were performed for each outcome at 90 days, one year, and two years postoperatively. Odds Ratios (OR) were calculated using 95% confidence intervals (CI).

RESULTS: Patients in the High BMI cohort demonstrated increased rates of PJI at 90 days (OR 5.95, 95% CI 1.31 to 26.87), one year (OR 5.35, 95% CI 1.54 to 18.59), and two years (OR 3.83, 95% CI 1.41 to 10.41). Rates of PPFX, SSI, aseptic revision, and aseptic loosening were similar between groups.

DISCUSSION AND CONCLUSION: Patients classified with morbid obesity who underwent robotic-assisted THA had a five-fold increased risk for PJI at 90 days and one year postoperatively. The significant risk for PJI persisted for up to two years. Careful monitoring of morbidly obese patients in the postoperative period is essential for favorable outcomes following robotic THA.

Odds Ratio of Complications Following Robotic THA		
	High BMI	95% CI
PPFX	OR	95% CI
90 Days	0.19	0.02 – 1.62
One Year	0.23	0.05 – 1.11
Two Years	0.23	0.05 – 1.11
PJI		
90 Days	5.95	1.31 – 26.87
One Year	5.35	1.54 – 18.59
Two Years	3.83	1.41 – 10.41
Aseptic Revision		
90 Days	1.15	0.35 – 3.82
One Year	0.83	0.30 – 2.33
Two Years	0.96	0.35 – 2.58
Aseptic Loosening		
90 Days	0.96	0.06 – 15.37
One Year	1.92	0.17 – 21.30
Two Years	1.44	0.24 – 8.68

THA: Total Hip Arthroplasty; BMI: Body Mass Index; OR: Odds Ratio; CI: Confidence Interval; PPFX: Periprosthetic Fracture; PJI: Prosthetic Joint Infection; SSI: Surgical Site Infection.

Incidence of Complications Following Robotic THA			
	High BMI (n = 267)	Normal BMI (n = 264)	p-value
PPFX			
90 Days	*	*	0.198
One Year	*	*	0.095
Two Years	*	*	0.095
PJI			
90 Days	12 (4.5)	*	0.019
One Year	16 (6.0)	*	0.007
Two Years	19 (7.1)	*	0.009
SSI			
90 Days	*	0	0.144
Aseptic Revision			
90 Days	*	*	1
One Year	*	*	0.930
Two Years	*	*	1
Aseptic Loosening			
90 Days	*	*	1
One Year	*	*	1
Two Years	*	*	1

THA: Total Hip Arthroplasty; BMI: Body Mass Index; PPFX: Periprosthetic Fracture; PJI: Prosthetic Joint Infection; SSI: Surgical Site Infection. (* Denotes an incidence less than 11)

Patient Demographics			
	High BMI (n = 267)	Normal BMI (n = 264)	p-value
Age (SD)	62 (9.4)	69 (10.5)	<0.001
CCI (SD)	2.24 (2.0)	2.02 (2.2)	0.163
Sex			
Female	297 (59.4)	197 (74.6)	<0.001
Male	203 (40.6)	67 (25.4)	
AA	26 (5.2)	29 (11.0)	0.005
COPD	159 (31.8)	70 (26.5)	0.152
CKD	88 (17.6)	47 (17.8)	1.000
CHF	115 (23.0)	50 (18.9)	0.228
(Nonhypertensive)			
CAD	180 (36.0)	84 (35.6)	0.977
Diabetes (Complicated)	187 (37.4)	22 (8.3)	<0.001
HIV			
HTN	460 (92.0)	202 (76.5)	<0.001
Hypothyroidism	198 (39.6)	108 (40.9)	0.784
Liver Disease	130 (26.0)	52 (19.7)	0.064
TU	262 (52.4)	127 (48.1)	0.292

THA: Total Hip Arthroplasty; BMI: Body Mass Index; SD: Standard Deviation; CCI: Charlson Comorbidity Complex; AA: Alcohol Abuse; COPD: Chronic Obstructive Pulmonary Disease; CKD: Chronic Kidney Disease; CHF: Congestive Heart Failure; CAD: Coronary Atherosclerotic Disease; HIV: Human Immunodeficiency Virus; HTN: Hypertension; TU: Tobacco Use (* Denotes a value less than 11)