Five Year Implant Survivorship and Implant Complications Among Patients undergoing Primary THA for Osteonecrosis Versus Osteoarthritis

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INTRODUCTION:

Long-term implant survivorship of total hip arthroplasty (THA) may differ in patients with osteonecrosis (ON) or osteoarthritis (OA). This study aimed to compare two- and five-year implant complications – including dislocations, aseptic loosenings, periprosthetic joint infections (PJIs), periprosthetic fractures, and all-cause revisions – following THA for ON versus OA.

METHODS:

A nationwide database was queried from 2010 to 2021 for patients undergoing primary THA for ON or OA with ≥5-year follow-up. Patients who had sickle cell disease, leukemia, active corticosteroid use, human immunodeficiency virus, or genetic diseases were excluded. A total of 43,893 patients with ON (<50 years: N=6,435; ≥50 years: N=37,458) were 1:5 ratio matched to 218,935 patients with OA (<50 years: N=31,808; ≥50 years: N=187,127) by age, sex, and comorbidities. The primary outcomes compared were 2- and 5-year implant complications, analyzed in cohorts stratified by age (<50 and ≥50 years old). Multivariable logistic regression computed the odds ratios (OR) of implant complications. P<0.003 was significant.

RESULTS:

In patients <50 years of age, ON was associated with increased odds of hip dislocation at 2 years (OR:1.59, P<0.0001) and 5 years (OR:1.52, P<0.0001) compared to OA. Among patients ≥ 50 years, ON was associated with increased odds of THA complications at 2 and 5 years, including dislocations (2 years: OR:1.67, P<0.0001; 5 years: OR:1.60, P<0.0001), aseptic loosenings (2 years: OR:1.60, P<0.0001; 5 years: OR:1.46, P<0.0001), PJIs (2 years: OR:1.41, P<0.0001; 5 years: OR:1.43, P<0.0001), and all-cause revisions (2 years: OR:1.68, P<0.0001; 5 years: OR:1.55, P<0.0001). Periprosthetic fractures were significantly more common in the ON group at five years (OR:1.41, P=0.0008).

DISCUSSION AND CONCLUSION:

THA for ON, particularly in patients older than 50 years, is associated with increased odds of short- to mid-term implant complications compared to OA. This data informs arthroplasty surgeons and their patients on the expected longitudinal implant outcomes associated with varying indications for THA.

Table 1. 2-Year Implant Survivorship and Implant-Related Complications Among Patients <50 Years of Age Undergoing Primary Total Hip Arthroplasty for Osteonecrosis Compared to Osteoarthritis

	Osteonecrosis N (%)	Osteoarthritis N (%)	OR	95% CI	*P*-value
Periprosthetic Fractures	22 (0.3)	96 (0.3)	1.07	0.73 – 1.82	0.822
Aseptic Loosenings	72 (1.1)	365 (1.1)	1.12	0.83 – 1.48	0.456
PJIs	142 (2.2)	852 (2.7)	0.91	0.74 – 1.11	0.403
Dislocations	199 (3.1)	749 (2.4)	1.59	1.32 – 1.90	**<0.0001**
Revisions	205 (3.2)	951 (3.0)	1.22	1.02 – 1.45	0.026

PJIs = Peri-Prosthetic Joint Infections; OR = Odds-Ratio; 95% CI = 95% Confidence Interval
# Models controlled for age, gender, alcohol abuse, coagulopathy, drug abuse, COPD, diabetes, hypertension, obesity, tobacco use. Osteoarthritis diagnoses are the reference cohort.

Table 2. 5-Year Implant Survivorship and Implant-Related Complications Among Patients <50 Years of Age Undergoing Primary Total Hip Arthroplasty for Osteonecrosis Versus Osteoarthritis

	Osteonecrosis N (%)	Osteoarthritis N (%)	OR	95% CI	*P*-value
Periprosthetic Fractures	42 (0.7)	192 (0.6)	1.12	0.74 – 1.64	0.574
Aseptic Loosenings	142 (2.2)	677 (2.1)	1.17	0.95 – 1.44	0.147
PJIs	200 (3.1)	1190 (3.7)	0.88	0.73 – 1.04	0.147
Dislocations	267 (4.1)	1,051 (3.3)	1.52	1.29 – 1.78	**<0.0001**
Revisions	273 (4.2)	1,374 (4.3)	0.98	0.94 – 1.29	0.197

PJIs = Peri-Prosthetic Joint Infections; OR = Odds-Ratio; 95% CI = 95% Confidence Interval
# Models controlled for age, gender, alcohol abuse, coagulopathy, drug abuse, COPD, diabetes, hypertension, obesity, tobacco use. Osteoarthritis diagnoses are the reference cohort.

Table 3. 2-Year Implant Survivorship and Implant-Related Complications Among Patients ≥50 Years of Age Undergoing Primary Total Hip Arthroplasty for Osteonecrosis Compared to Osteoarthritis

	Osteonecrosis N (%)	Osteoarthritis N (%)	OR	95% CI	*P*-value
Periprosthetic Fractures	132 (0.4)	585 (0.3)	1.29	0.98 – 1.67	0.062
Aseptic Loosenings	491 (1.3)	1,884 (1.0)	1.60	1.39 – 1.84	**<0.0001**
PJIs	897 (2.4)	3,608 (1.9)	1.41	1.27 – 1.56	**<0.0001**
Dislocations	1,004 (2.7)	3,642 (1.9)	1.67	1.51 – 1.84	**<0.0001**
Revisions	1,143 (3.1)	4,338 (2.3)	1.68	1.54 – 1.84	**<0.0001**

PJIs = Peri-Prosthetic Joint Infections; OR = Odds-Ratio; 95% CI = 95% Confidence Interval
# Models controlled for age, gender, alcohol abuse, coagulopathy, drug abuse, COPD, diabetes, hypertension, obesity, tobacco use. Osteoarthritis diagnoses are the reference cohort.

Table 4. 5-Year Implant Survivorship and Implant-Related Complications Among Patients ≥50 Years of Age Undergoing Primary Total Hip Arthroplasty for Osteonecrosis Versus Osteoarthritis

	Osteonecrosis N (%)	Osteoarthritis N (%)	OR	95% CI	*P*-value
Periprosthetic Fractures	219 (0.6)	924 (0.5)	1.41	1.15 – 1.72	**0.0008**
Aseptic Loosenings	766 (2.0)	3,124 (1.7)	1.46	1.31 – 1.63	**<0.0001**
PJIs	1,159 (3.1)	4,768 (2.5)	1.43	1.31 – 1.57	**<0.0001**
Dislocations	1,313 (3.5)	5,033 (2.7)	1.60	1.47 – 1.74	**<0.0001**
Revisions	1,451 (3.9)	5,900 (3.2)	1.55	1.43 – 1.68	**<0.0001**

PJIs = Peri-Prosthetic Joint Infections; OR = Odds-Ratio; 95% CI = 95% Confidence Interval
# Models controlled for age, gender, alcohol abuse, coagulopathy, drug abuse, COPD, diabetes, hypertension, obesity, tobacco use. Osteoarthritis diagnoses are the reference cohort.