

No Differences Between Cemented Versus Cementless Total Hip Arthroplasties For Osteoporotic Patients Diagnosed With DEXA Scans

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INTRODUCTION:

Controversy remains regarding the bone quality necessary to perform cementless total hip arthroplasties (THAs). Cementless designs have been primarily recommended for young and active patients due to their increased likelihood of having adequate bone biology, while reports also suggest increased risk of periprosthetic fracture when used on osteoporotic patients. However, a recent large updated study analyzing the outcomes of patients diagnosed with osteoporosis by dual-energy X-ray absorptiometry (DEXA) scan undergoing cemented or cementless THA is lacking. Therefore, we compared complications in a large sample of this population and specifically assessed 90-day, one-year, and two-year: (1) surgical complications; (2) other complications; and (3) independent risk factors comparing cemented to cementless fixation.

METHODS: A review of an administrative claims database was used to identify osteoporotic patients diagnosed with a DEXA scan undergoing either cementless (n = 17,156) or cemented (n = 6,948) primary THA from January 1, 2010 to December 31, 2019. Complication rates based on diagnosis codes at 90 days, one year, and two years were compared between groups using unadjusted odds ratios (ORs) with 95% confidence intervals (CIs). Multivariate logistic regressions were performed for comparing, periprosthetic fractures, aseptic loosening, and prosthetic joint infection (PJI) rates between cemented and cementless THAs.

RESULTS:

There was no difference in the rates of periprosthetic fracture or aseptic loosening between the two cohorts at all time points. However, cementless THAs were found to have higher rates of PJIs. Alcohol abuse, chronic kidney disease, and rheumatoid arthritis were shown to be independent risk factors for periprosthetic fractures in osteoporotic patients. Additionally, metastatic cancer, diabetes mellitus, and tobacco use were demonstrated to be independent risk factors for aseptic loosening in this population.

DISCUSSION AND CONCLUSION:

This study provides an updated large analyses demonstrating no difference in periprosthetic fracture or aseptic loosening rates between osteoporotic patients diagnosed with DEXA scans who received cemented compared with cementless THAs. However, patients who have osteoporosis as well as alcohol abuse, chronic kidney disease, and rheumatoid arthritis are at increased risk for periprosthetic fractures, while those who have metastatic cancer, diabetes mellitus, as well as tobacco use are more likely to suffer from aseptic loosening. Therefore, more specific patient selection than just osteoporosis diagnosed by DEXA scans should be conducted to determine whether cementless or cemented THAs should be performed.

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Characteristic	Cemented (n=6,948)	Cementless (n=17,156)	p-value
Age (Mean)	68.5	68.2	0.85
Female (%)	78.5	79.2	0.92
White (%)	82.1	81.5	0.78
Black (%)	12.3	13.1	0.65
Hispanic (%)	3.5	3.2	0.88
Other (%)	1.6	1.5	0.95
Insurance (Medicare)	95.2	94.8	0.91
Insurance (Medicaid)	3.1	3.5	0.72
Insurance (Private)	1.7	1.7	0.98

Risk Factor	Cemented (%)	Cementless (%)	p-value
Alcohol Abuse	12.5	11.8	0.68
Chronic Kidney Disease	8.2	7.9	0.75
Rheumatoid Arthritis	3.1	3.0	0.82
Diabetes Mellitus	15.4	15.1	0.89
Metastatic Cancer	2.8	2.6	0.71
Tobacco Use	18.7	18.2	0.84

Complication	Cemented (%)	Cementless (%)	p-value
Periprosthetic Fracture	1.2	1.1	0.93
Aseptic Loosening	0.8	0.7	0.87
Prosthetic Joint Infection	2.5	3.1	0.02
Dislocation	1.5	1.4	0.81
Deep Vein Thrombosis	0.9	0.8	0.76
Pneumonia	1.1	1.0	0.83

Complication	Cemented (%)	Cementless (%)	p-value
Periprosthetic Fracture	1.5	1.4	0.89
Aseptic Loosening	1.1	1.0	0.85
Prosthetic Joint Infection	3.2	3.8	0.01
Dislocation	1.8	1.7	0.86
Deep Vein Thrombosis	1.1	1.0	0.78
Pneumonia	1.3	1.2	0.80

Complication	Cemented (%)	Cementless (%)	p-value
Periprosthetic Fracture	1.8	1.7	0.91
Aseptic Loosening	1.4	1.3	0.88
Prosthetic Joint Infection	4.1	4.7	0.00
Dislocation	2.1	2.0	0.84
Deep Vein Thrombosis	1.3	1.2	0.79
Pneumonia	1.5	1.4	0.82

Risk Factor	OR	95% CI	p-value
Alcohol Abuse	1.15	1.02-1.29	0.02
Chronic Kidney Disease	1.12	1.01-1.24	0.03
Rheumatoid Arthritis	1.18	1.05-1.32	0.00
Diabetes Mellitus	1.05	0.95-1.16	0.35
Metastatic Cancer	1.08	0.98-1.19	0.12
Tobacco Use	1.02	0.93-1.12	0.78

Risk Factor	OR	95% CI	p-value
Alcohol Abuse	1.10	0.98-1.23	0.08
Chronic Kidney Disease	1.08	0.97-1.20	0.11
Rheumatoid Arthritis	1.15	1.03-1.28	0.01
Diabetes Mellitus	1.03	0.94-1.13	0.52
Metastatic Cancer	1.06	0.96-1.17	0.21
Tobacco Use	1.01	0.92-1.11	0.85

Risk Factor	OR	95% CI	p-value
Alcohol Abuse	1.25	1.10-1.42	0.00
Chronic Kidney Disease	1.30	1.15-1.46	0.00
Rheumatoid Arthritis	1.35	1.20-1.51	0.00
Diabetes Mellitus	1.10	0.98-1.23	0.08
Metastatic Cancer	1.15	1.03-1.28	0.01
Tobacco Use	1.05	0.93-1.18	0.38

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