

Postoperative Osteoporosis Therapy in Patients Undergoing Arthroplasty for Femoral Neck Fractures Prevents Periprosthetic Fractures

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INTRODUCTION:

Hip fractures are very common in older adults, affecting over 300,000 people annually in the United States. Patients who sustain these injuries frequently experience worsening of their health, functional status, and independence. As femoral neck fractures are generally considered pathognomonic for osteoporosis, most patients with these injuries should receive appropriate anti-osteoporotic medical therapy. However, most data indicates that actual treatment rates are low. One concern in this patient population is the risk of periprosthetic fracture after arthroplasty, as these patients have known poor bone quality and risk factors for falls. The present study sought to evaluate whether anti-osteoporotic medical therapy decreases the incidence of periprosthetic fractures after arthroplasty for fracture.

METHODS:

Patients older than 49 who underwent hemiarthroplasty or total hip arthroplasty for a femoral neck fracture from 2010 to 2020 were identified in a large national insurance database. Patients were stratified based on whether they started anti-osteoporotic therapy (bisphosphonates, teriperatide, abaloparatide, denosumab, raloxifene, or calcitonin) within one year of arthroplasty. The primary aim of this study was to compare the incidence of periprosthetic fractures between patients who were treated for osteoporosis and those who were untreated. Patients with a periprosthetic fracture within one year of primary surgery were excluded to allow sufficient time for anti-osteoporotic therapy to become effective. Kaplan-Meier curves were used to compare implant survival free of periprosthetic fracture for those who were treated for osteoporosis to those who were not treated. A Cox proportional hazards model was used to calculate risk adjusted hazard ratios between the two cohorts. Patients were only included if they had a follow-up period of at least 1-year.

RESULTS:

A total of 2,399 patients who underwent hemiarthroplasty or total hip arthroplasty for femoral neck fracture were treated for osteoporosis within 1 year following surgery and 39,031 patients were not. Patients' demographic information can be found in Table 1. The average follow-up period for those treated for osteoporosis was 4.81 years compared to 4.21 years for those not treated. Patients who received osteoporosis treatment within 1 year following surgery had a significantly lower adjusted risk for periprosthetic fracture when compared to those that were not treated (HR: 0.679; SE: 0.178; p=0.010). The Kaplan-Meier curve is shown in Figure 1.

DISCUSSION AND CONCLUSION:

Most patients who undergo arthroplasty for femoral neck fracture do not receive appropriate anti-osteoporotic therapy. However, the present study shows that osteoporosis treatment is effective in decreasing periprosthetic fracture incidence in this high-risk patient population. This provides further evidence supporting the importance of osteoporosis treatment for hip fracture patients in the postoperative period.

Figure 1. Kaplan Meier for Periprosthetic Fracture >1 year After Arthroplasty for Femoral Neck Fracture Based on Osteoporosis Treatment Status

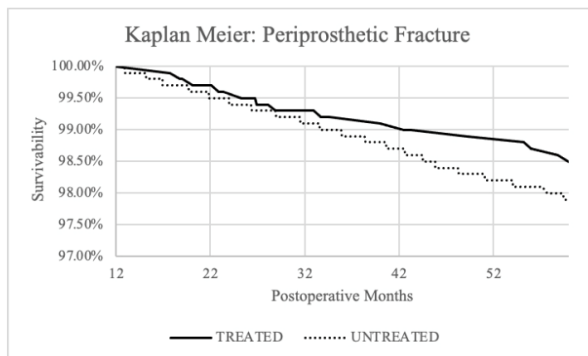


Table 1: Demographics Comparing Patients Treated for Osteoporosis to Those Not Treated Following Arthroplasty for Femoral Neck Fracture

	Treated		Untreated		P-value
	n	%	n	%	
Total	41,430	2,399	37,031	94.2%	<0.001
Age	71		71.68		<0.001
Gender					<0.001
Male	12,749	54	12,693	31.8%	<0.001
Female	26,681	2,095	26,623	68.2%	<0.001
CHF	12,331	446	11,681	29.9%	<0.001
Arthritis	18,849	1,138	18,759	48.0%	<0.001
Vascular Disease	11,867	492	11,752	29.6%	<0.001
Pulm Csm Diseases	5,224	205	5,054	12.6%	<0.001
PVD	14,613	607	14,009	35.7%	<0.001
HTN	26,446	1,614	24,826	63.0%	<0.001
Paralysis	2,389	102	2,377	6.0%	<0.001
Other neurological disorders	6,922	300	6,527	16.7%	<0.001
COPD	15,013	614	14,495	36.1%	<0.001
Diabetes Mellitus	9	371	10,394	26.6%	<0.001
Hypertension	11,897	744	11,151	28.7%	<0.001
CKD	11,965	494	11,771	29.8%	<0.001
Liver Disease	4,496	271	4,225	10.8%	<0.001
PVD	983	40	986	2.3%	<0.001
Renovascular Disease and CVD	2,011	829	1,182	3.0%	<0.001
Compartment	4,024	166	4,024	10.0%	<0.001
Tumor and neoplasia disorders	27,757	1,131	26,624	67.8%	<0.001
Blood loss events	5,124	209	4,915	12.5%	<0.001
Deficiency anemia	4,653	442	4,211	10.6%	<0.001
Alcohol abuse	1,648	67	1,581	3.9%	<0.001
Drug abuse	2,818	176	2,642	6.6%	<0.001
Psychosis	4,339	202	4,137	10.4%	<0.001
Depression	14,619	947	14,612	35.9%	<0.001
Obesity	5,882	139	5,743	14.3%	<0.001
Smoking	5,880	245	5,635	14.1%	<0.001
Vitamin D Deficiency	5,851	389	5,462	13.8%	<0.001
Dementia	2,151	81	2,070	5.1%	<0.001