Impact of Heart Failure on 90-Day Outcomes and Costs After Primary Total Knee Arthroplasty

Background: Heart failure (HF) is a common comorbidity among patients undergoing total knee arthroplasty (TKA) and may increase perioperative risk and episode costs. This study evaluated the association of HF with short-term complications, readmissions, and facility costs after primary TKA.

Methods: A retrospective cohort study was performed using the Premier PINC AI database to identify elective primary TKA encounters from 2016 to 2022. HF was defined using ICD-10 diagnosis codes. Demographics, comorbidity burden, and hospital characteristics were compared between patients with and without HF. Multivariable regression models assessed the independent association of HF with any inpatient complication, 90-day readmission, and index encounter cost after adjustment for demographic and clinical covariates.

Results: Among 586,528 primary TKA encounters, 17,999 (3.1%) involved patients with HF. Compared with patients without HF, those with HF were older (70.8 vs 66.9 years, $P<0.001$) and had a greater comorbidity burden (Elixhauser count 4.6 vs 2.0, $P<0.001$). Unadjusted rates of any inpatient complication (4.0% vs 1.0%, $P<0.001$) and 90-day readmission (11.0% vs 6.0%, $P<0.001$) were higher in the HF cohort. HF patients also had longer length of stay and higher index and post-discharge costs (all $P<0.001$). After adjustment, HF remained independently associated with any inpatient complication (odds ratio [OR] 1.15, 95% confidence interval [CI] 1.05-1.26, $P=0.003$), 90-day readmission (OR 1.16, 95% CI 1.07-1.24, $P<0.001$), and increased index encounter cost (beta +$638, 95% CI $397-$880, $P<0.001$).

Conclusions: HF is associated with greater comorbidity burden, modestly increased odds of short-term complications and readmission, and higher index facility costs after primary TKA. These findings support inclusion of HF in perioperative risk stratification and optimization pathways for arthroplasty patients.

Table 2. Costs and Clinical Outcomes by Heart Failure Status in Primary Total Knee Arthroplasty

Variable	No HF	HF	p-value
Index Cost (Mean ± SD, US$)	15023.56 ± 20.72	16668.00 ± 61.30	<0.001
90 Day Cost (Mean ± SD, US$)	4518.23 ± 21.32	7083.48 ± 166.24	<0.001
90 Day Readmission, n (%)	14,628 (6.0)	1,029 (11.0)	<0.001
Any Inpatient Complication, n (%)	6,885 (1.0)	662 (4.0)	<0.001
Length of Stay (Mean ± SD, days)	1.27 ± 0.00	1.91 ± 0.02	<0.001

Column data reported as number of patients (%) or mean ± SD.

Table 4. Multivariate Analyses for Effect of Heart Failure on 90 Day Readmissions in Primary Total Knee Arthroplasty

Variable	OR	CI	p-value
Intercept	0.018	0.015 – 0.02	<0.001
Heart Failure	1.155	1.073 – 1.243	<0.001
Age in years (Unit of Change 10)	1.181	1.154 – 1.209	<0.001
Female	0.798	0.772 – 0.825	<0.001
Asian	0.968	0.844 – 1.111	0.646
Black	1.056	0.998 – 1.119	0.059
Other	1.142	1.047 – 1.245	0.003
Hispanic	0.818	0.752 – 0.889	<0.001
Medicaid	1.042	0.958 – 1.135	0.339
Medicare	1.014	0.968 – 1.062	0.561
Other	0.913	0.826 – 1.01	0.076
Uninsured	0.684	0.503 – 0.93	0.015
Elixhauser Comorbidity Index (per 1)	1.166	1.154 – 1.179	<0.001