Predicting Contralateral Second Hip Fracture Risk Within 5 Years of First Hip Fracture: A New Risk Tool to Guide Patient/Family Counseling and Bone Health Treatment

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Purpose: We sought to (1) evaluate factors associated with contralateral second hip fracture within 5 years of index hip fracture (IHFx) and (2) create a tool that calculates contralateral second hip fracture risk within 5 years of IHFx.

Methods: This was a retrospective review of hip fracture patients from November 1, 2014 to July 31, 2022. Inclusion criteria were age ≥55 years and OTA 31A/B fracture. Exclusion criterion was death before 5 years from IHFx. Patients were cohorted by single or second hip fracture status. Multivariable stepwise logistic regression was used to develop a second hip fracture risk tool using covariates from univariable analysis (P<0.05 significant) and was compared to the FRAX (Fracture Risk Assessment Tool).

Results: 695 single hip fracture (1HFx) patients were compared to 78 second hip fracture (2HFx) patients. Analysis revealed that baseline dementia (2HFx 48.7% vs 1HFx 23.7%, P<0.001), ICU admissions (2HFx 12.8% vs 1HFx 4.2%, P = 0.003), discharge to subacute rehabilitation (2HFx 39.7% vs 1HFx 15.3%, P<0.001) and 90-day readmission (2HFx 16.7% vs 1HFx 5.8%, P<0.001) were associated with 2HFx. An equation was derived to determine second hip fracture risk with the above variables (AUROC [area under receiver operating characteristic curve] 0.710 vs FRAX 0.561) (Table 1) (online tool: sttgmacom.wordpress.com).

Conclusion: Five-year second hip fracture risk can be calculated using this new tool to guide patient/family counseling and bone health treatment.

Table 1: Multivariable analysis of factors associated with risk of having a 2nd Hip fracture within 5 years of sustaining a 1st Hip Fracture.

	Coefficient	O.R.	Sig.
Baseline Dementia prior to 1HFx hospitalization	1.03	2.802	<0.001
ICU during 1HFx hospitalization	1.088	2.967	0.008
Discharge Location after 1HFx hospitalization	-.805	.447	<.001
90-day readmission after 1HFx hospitalization	.922	2.515	0.013
Constant	-1.193	0.303	.004

Dementia, ICU, discharge location and 90-day readmission measured as dichotomous outcomes. Discharge location measured as home vs. subacute rehab vs. skilled nursing facility. Equation=(1/(1+EXP(-(-1.193+1.03*(Baseline Dementia) +1.088*(ICU Admission)-0.805*(Discharge Location) +0.922*(90-day readmission)))))