



Frailty Independently Predicts Postoperative Complications After Elective Surgery for Diabetic Foot Ulcers

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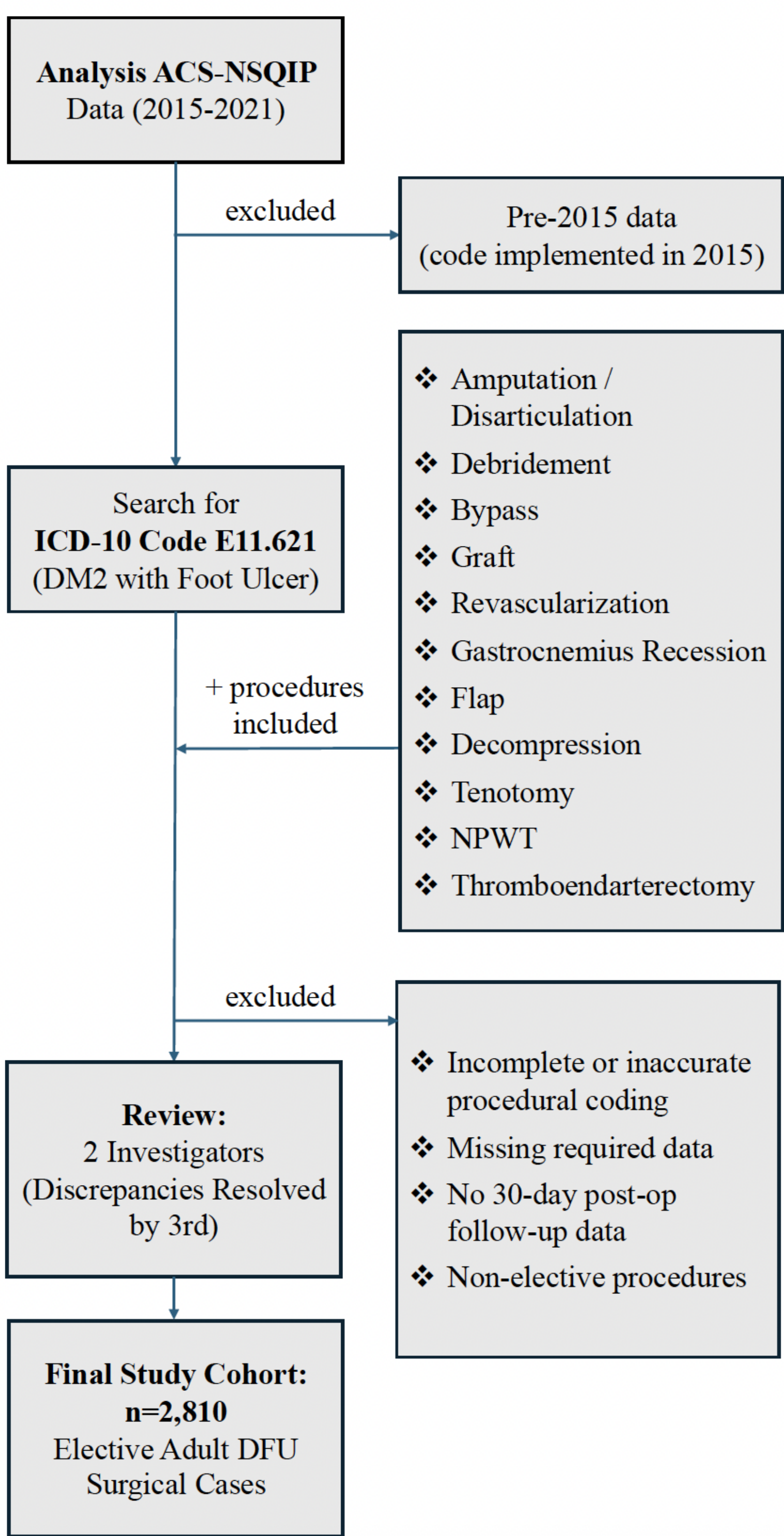


Figure 1. Flow diagram of THE study design, ICD-10, International Classification of Diseases; DM2, Diabetes mellitus type 2; NPWT, negative pressure wound therapy.

Background

Diabetic foot ulcers (DFUs) represent a major cause of morbidity, hospitalization, and limb loss. Despite high perioperative risk, current stratification models inadequately capture cumulative physiologic vulnerability. Frailty has emerged as a multidimensional predictor of adverse surgical outcomes. We evaluated whether frailty, quantified by the Five-Item Modified Frailty Index (mFI-5), independently predicts postoperative complications in patients undergoing elective DFU surgery.

Methods

We performed a retrospective cohort study using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database (2015–2021). Adults with type 2 diabetes and ICD-10–coded DFUs (E11.621) undergoing elective surgical management were included. Patients were stratified as prefrail (mFI-5 ≤ 2) or frail (mFI-5 > 2). Primary outcome was any 30-day postoperative complication (composite of mortality, reoperation, readmission, surgical and medical complications). Multivariable logistic regression assessed the independent association between frailty and outcomes, adjusting for clinically relevant confounders.

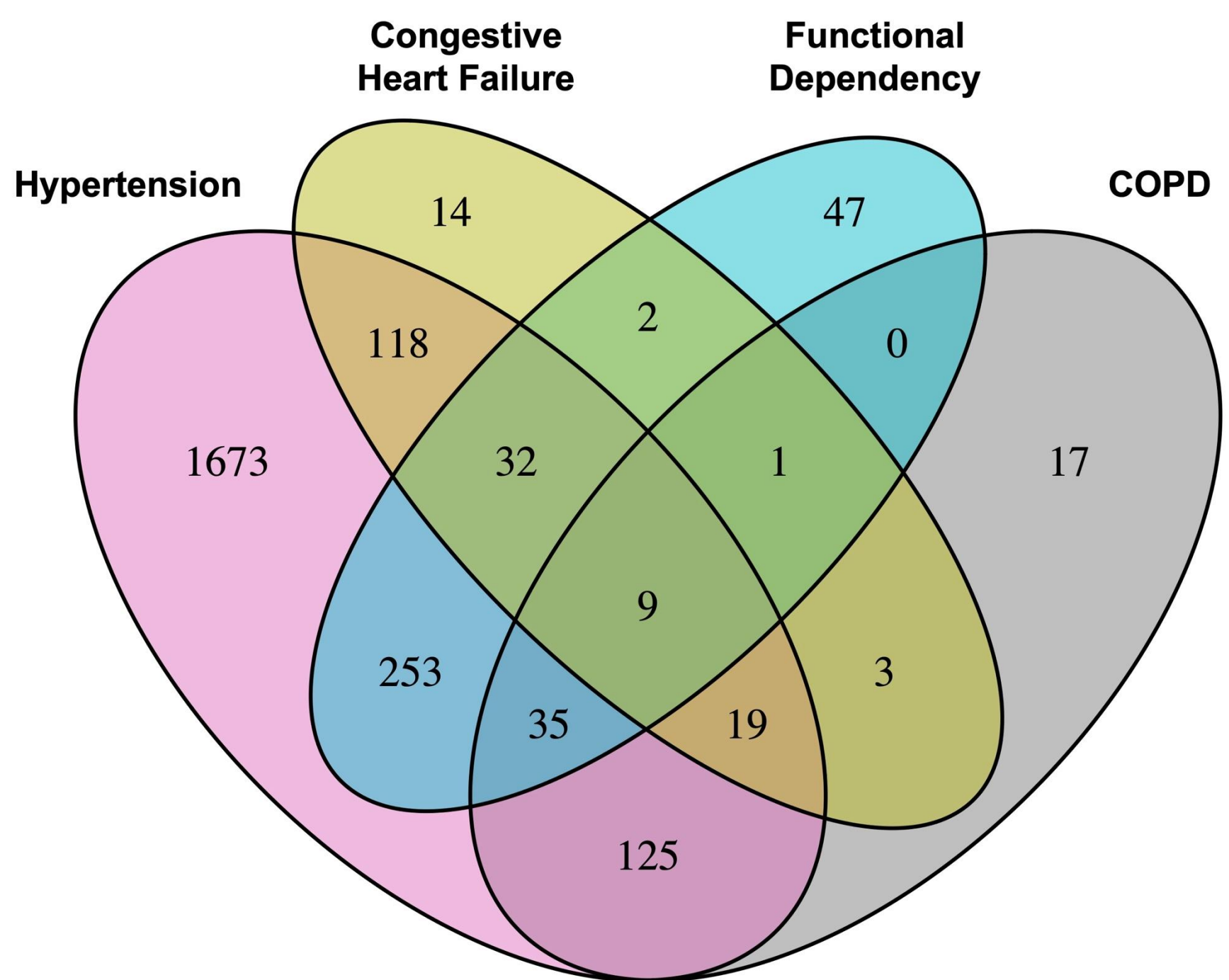


Figure 2. Overlap of mFI-5 Frailty Components in the Study Cohort. Venn diagram illustrating the overlap of four components of the 5-item modified Frailty Index (mFI-5) in patients undergoing surgery for diabetic foot ulcers. Diabetes was excluded from the diagram as all patients in the study cohort had diabetes by definition. A total of 2,819 patients were included, of whom 2,105 were classified as low frailty risk (mFI-5 ≤ 2) and 714 as high frailty risk (mFI-5 > 2). COPD, chronic obstructive pulmonary disease.

Results

Among 2,819 patients, 714 (25.3%) were classified as frail. Frail patients were older and exhibited higher rates of insulin-treated diabetes, COPD, CHF, dialysis dependence, dyspnea, bleeding disorders, and functional dependence (all $p < 0.05$). Overall complications occurred more frequently in frail versus prefrail patients (50.6% vs. 32.9%, $p < 0.001$), as did mortality (4.1% vs. 1.6%, $p = 0.003$). In adjusted models, frailty independently predicted any postoperative complication (OR 1.34, 95% CI 1.05–1.70, $p = 0.02$) and medical complications (OR 1.53, 95% CI 1.12–2.07, $p = 0.007$), though not surgical complications alone. Frail patients were more frequently discharged to nonhome facilities (40.8% vs. 35.4%, $p = 0.02$).

Table 1. Results of multivariate logistic regression modeling for High Risk of Frailty (mFI-5 ≥ 2) as a predictor of postoperative complications. Statistically significant p-values are highlighted in bold.

Variable	OR	[95% CI]	<i>p</i> -Value
Any Complication	1.34	[1.05–1.70]	0.020
Surgical Complications	1.18	[0.89–1.55]	0.236
Medical Complications	1.53	[1.12–2.07]	0.007

The model demonstrated a good fit to the data as assessed by the Hosmer-Lemeshow test ($p = 0.95$), indicating no significant discrepancy between predicted and observed outcomes.

Conclusion

Frailty, as measured by the mFI-5, independently predicts postoperative morbidity and mortality after elective DFU surgery. Integrating preoperative frailty screening into multidisciplinary perioperative workflows may improve shared decision-making, optimize resource allocation, and guide targeted perioperative optimization strategies in this high-risk population.