A frailty index to predict mortality, resource utilization and costs in patients undergoing coronary artery bypass graft surgery in Ontario

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Introduction: People living with frailty are vulnerable to poor outcomes after coronary artery bypass graft (CABG) surgery and incur high healthcare costs. Frailty-defining instruments for use in population-level research in this surgery setting have not been established.

Objectives: (i) to develop a preoperative frailty index for CABG surgery (pFI-C) using administrative data in Ontario; **(ii)** to assess pFI-C suitability in predicting clinical and economic outcomes; **(iii)** to compare pFI-C predictive capabilities to other established indices.

Methods: A retrospective cohort study was conducted using health administrative data of 50,743 CABG surgery patients. The pFI-C was constructed comprised of 27 frailty-related health deficits. Associations between index scores and one-year postoperative mortality, resource use and healthcare costs (in 2021 CAD) were assessed using multivariable regression models. Capabilities of the pFI-C in predicting mortality were evaluated using concordance-statistics; the goodness of fit of the models was assessed using Akakie Information Criterion.

Results: As assessed by the pFI-C, 22% of the cohort lived with frailty. Patient pFI-C score was strongly associated with mortality per 10% increase (OR 3.04; 95% CI [2.83,3.27]), and was significantly associated with resource utilization and healthcare costs (Wald test p-values <0.001 for all outcomes). The predictive performances of the pFI-C, Charlson and Elixhauser indices and Johns Hopkins Aggregated Diagnostic Groups were similar, and mortality models containing the pFI-C had a c-statistic of 0.784. Cost models containing the pFI-C showed the best fit.

Conclusions: The pFI-C identified a clinically relevant subgroup of high-risk patients and is predictive of mortality, and significantly associated with resource utilization and costs after CABG surgery. This index could be employed by other researchers to account for frailty at the population level. At the clinical level, the pFI-C should be studied as to its ability to identify individuals living with frailty who could benefit from targeted perioperative healthcare interventions.