Readmissions after major cancer surgery among older adults

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Background. *Decreasing readmissions has become a focus of emerging efforts to improve the quality and affordability of health care. However, little is known about reasons for readmissions after major cancer surgery in the expanding elderly population (≥65 years) who are also at increased risk of adverse operative events. We sought to identify (1) the extent to which older age impacts readmissions and (2) factors predictive of 30- and 90-day readmissions after major cancer surgery among older adults.*

Methods. *We identified 2,797 older adults who underwent 1 of 7 types of major thoracic or abdominopelvic cancer surgery within a large multihospital system from 2003 to 2012. Multivariate logistic regression analyses were conducted to identify predictors of 30- and 90-day readmission controlling for covariates.*

Results. *Overall 30- and 90-day readmission rates were 16% and 24% with the majority of readmissions occurring within 15-days of discharge. Principal diagnoses of 30-day readmissions included gastrointestinal, pulmonary, and infections complications. The 30-day readmissions were associated with >2 comorbid conditions and ≥2 postoperative complications. Readmissions varied significantly according to cancer surgery type and across treating hospitals. Readmissions did not vary by increasing age. Factors associated with 90-day readmission were comparable to those observed at 30 days.*

Conclusion. *In this large, multihospital study of older adults, multiple morbidities, procedure type, greater number of complications, and the treating hospital predicted 30- and 90-day readmissions. These findings point toward the potential impact of hospital-level factors behind readmission. Our results also heighten the importance of assessing the influence of readmission on other important cancer care metrics, namely, patient-reported outcomes and the completion of adjuvant systemic therapies. (Surgery 2015;158:428-37.)*

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In response to the 2010 Patient Protection and Affordable Care Act, hospital readmission reductions have been prioritized as among the foremost targets in health care reform to curtail Medicare spending while improving quality of care.[1-5] Recently, the Medicare Payment Advisory Commission found that 18% of index hospital admissions were associated with a future readmission within 30 days of discharge.[3,6] The Medicare Hospital Readmission Reduction Program (HRRP) was then instituted as part of the Affordable Care Act in an attempt to lower readmission rates by penalizing hospitals who have higher than benchmark readmission rates.[1] As a result, several publications have investigated causes leading to readmissions after hospitalization of chronic medical conditions and certain operative procedures.[1,2,6] Moving forward, the interphase of hospital readmission is now believed to be multifactorial to encompass a host of patient-, condition-, and hospital-level factors. However, concerns have surfaced recently about readmissions, as a quality benchmark in surgery given these issues: (1) applicability of the HRRP to surgical readmissions that are inherently different from readmissions for chronic medical conditions, (2) lack of adjustment (in the HRRP model) for vulnerable populations (eg, low

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socioeconomic status, racial/ethnic minorities), thus positioning hospitals who serve these vulnerable populations at a financial disadvantage as a result of the readmission-imposed penalties, and (3) questionable validity of using "readmission" as a metric of overall quality of care.[1,6]

To date, there remains a paucity of data on readmission after major cancer surgery in older adults.[1,2,6,7] Understanding operative outcomes after major cancer surgery in older adults, defined here as ≥65 years, is becoming increasing timely and important to the stakeholders of health care. Given that the incidence of cancer increases with age, the burden of cancer falls disproportionately among elders.[8] Elders are projected to increase by 135%, and the subgroup of those >85 years of age will increase by 350% by 2050.[9] This projected expansion may have significant implications for patients, providers, hospitals, and payers because 70% of new cancers and 85% of all cancer-related deaths are expected to occur in older persons.[10] For example, cancers of the lung, liver, and gastrointestinal tract account for approximately one-half of all new operable cancer cases per year and patients diagnosed with operable stages of these cancers often require technically complex operations as a main component of their multidisciplinary care.[4,11-13] Recently, we have quantified the negative impact of older age on operative outcomes after cancer surgery.[8,11] Specifically, advancing age was associated with greater operative mortality, major complication rates, and prolonged duration of stay.[8,11]

Older adults undergoing major cancer surgery represent a unique yet vulnerable cohort of persons with a marked increased baseline risks of adverse operative events. These events not only affect patients and their caregivers, but also have societal impacts in terms of higher health care costs. Specifically, readmission, as a proxy for adverse operative outcomes, may also influence other important cancer and health outcomes and quality of care metrics including quality of life and the timely induction or completion of adjuvant therapies.[14] In this regard, we postulated that advancing age (≥65 years) predicted higher hospital readmission rates after major cancer operation. To assess patterns of, and reasons behind, readmissions among older adults, we used a diverse large multihospital health system to assess (1) trends in readmissions, (2) reasons for these readmissions, and (3) the extent to which older age predicts 30- and 90-day hospital readmission after major cancer surgery across 7 hospitals. Because of the potential extended impact of major cancer surgery on operative outcomes beyond 30 days, we expanded our analysis to also include the 90-day timepoint.

METHODS

Patients and case selection. We identified 2,797 older adults (age ≥65 years at the time of operation) who underwent major thoracic, abdominal, or pelvic cancer operation and were discharged from a large, multihospital health system from 2003 to 2012 using International Classification of Diseases, 9th edition (ICD9) diagnosis and procedure codes (Appendix 1). Five cohorts were created stratifying patients by age (ages 65–69, 70–74, 75–79, and >80 years). The hospital system included 7 general acute care hospitals within the greater Washington, DC, and Baltimore, Maryland, areas. Our institutional review board approved the study.

Selected variables. Variables included in the analysis were age, admission year, gender, race/ethnicity, insurance type, comorbidities, cancer surgery type, complications, and treating hospital. Unadjusted readmission patterns were compared by advancing age groups (65–69, 70–74, 75–79, and >80 years) and cancer surgery type (colorectal, esophageal, hepatobiliary, lung, pancreatic, and gastric). Our definition of major oncologic cancer surgery is in line with our previous work of older adults undergoing major cancer surgery, because they reflect a wide spectrum of common or costly oncologic resections.[8,15] We created a list of relevant comorbidities and postoperative complications and defined each complication with ICD9 diagnosis and procedure codes (Appendix 1). To identify reasons for 30-day readmission, we used the ICD9 codes documented at first readmission after discharge.

Outcome (dependent) variable. The primary outcome variables were 30- and 90-day readmission, which we defined as readmission to an acute care, short-stay hospital within 30 days or 90 days of discharge from the index operative procedure to the same treating hospital.

Statistical methods. We calculated the principle diagnoses for readmission, readmission timing and stratified reasons for readmission. For unadjusted readmission patterns, we compared 30- and 90-day readmissions by advancing age groups (65–69, 70–74, 75–79, and >80 years) and cancer operation type (lung, esophageal, gastric, hepatobiliary, pancreatic, and colorectal). We also tabulated the most common reasons for 30-day readmission. Furthermore, we tabulated 30- and 90-day readmission trends. Comorbidities and complications