Association for Academic Surgery

Defining payments associated with the treatment of colorectal cancer

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ABSTRACT

Background: While bundled payments aim to reduce variations in health care spending across the continuum of care, data reporting on variations in payments for privately insured patients undergoing treatment for colon cancer (CC) are lacking. The current study sought to characterize variations in payments received for the treatment of CC using a cohort of commercially insured patients.

Methods: Patients who underwent a colectomy for CC were identified using the MarketScan Database for 2010-2014. Multivariable regression analysis was used to calculate and compare risk-adjusted payments between patients.

Results: A total of 18,337 patients were identified who met inclusion criteria. The median risk-adjusted payment for surgery was $26,408 (IQR: $19,193-$38,037) ranging from $19,762 (IQR: $15,595-$25,636) among patients in the lowest quartile of payments to $33,809 (IQR: $24,783-$48,254) for patients in the highest ($+ \triangle$ 71.1%). The median risk-adjusted payment for chemotherapy was $70,090 (IQR: $57,813-$83,216); compared with patients in the lowest quartile of payments, payments associated with chemotherapy were 40.4% higher among patients in the highest quartile of payments (Q1 *versus* Q4: $56,827 [IQR: 49,173-65,353] *versus* $79,801 [IQR: 67,270-90,999]). When stratified by treatment type, patients in the highest two quartiles of risk-adjusted payments accounted for a total of 58.5% of all payments, whereas patients in the lower two quartiles of risk-adjusted payments accounted for only 41.5% of all payments. A younger patient age, increasing patient comorbidity and undergoing an open operation were associated with higher overall payments.

Conclusions: Wide variations in payments exist for the treatment for colon cancer. Episode-based bundle payments for surgery and chemotherapy may differentially impact reimbursement for CC.

Introduction

Colorectal cancer (CRC) represents the third leading cause of cancer and cancer-related death in the United States.[1] Approximately, 134,490 new cases of CRC are diagnosed annually, with an estimated 49,190 patients dying each year due to CRC.[1] Although improvements in screening protocols and treatment options have resulted in a reduction in cancer-related death, it is expected that the costs associated with CRC care will continue to rise.[2-4] To this point, in a recent analysis of Medicare claims from patients diagnosed with CRC, Yabroff et al. demonstrated that costs associated with CRC care are expected to increase by 89% to an estimated cost of $17 billion by the year 2020.[2] This projected increase in cost is largely due to the aging patient population coupled with increasing costs associated with treatment options for CRC that may include surgery, chemotherapy, and radiation therapy.[2]

In an effort to curtail the rising costs associated with cancer care, the Centers for Medicare and Medicaid and private insurers have focused efforts on implementing bundled payment strategies.[5] In contrast to traditional fee-for-service payment models that reimburse each provider for each service delivered/rendered, bundled payment models aim to reduce costs via payment for a single episode of care, delivered across the continuum of care by acute and post-acute care providers.[5] Despite demonstrating cost savings for select conditions, the widespread uptake of bundled payment models has been limited due to methodological and operational challenges.[6-8] In particular, there is disagreement as to what services should be bundled together to ensure that a drive toward cost efficiency does not hinder patient care.[8] This is especially true among patients receiving care for CRC in which the costs associated with services provided within the first year of diagnosis have been reported to be approximately 10 times higher than subsequent years.[9] Due to the multimodality nature of CRC treatment, care for patients and therefore payments have to be appropriately coordinated among providers as well as across the continuum of care. Potential savings that can be obtained via episode-based payments for the treatment of CRC remain largely unexplored among younger, privately insured patients. Given this, the present study sought to define variations in payments for the multimodality treatment of CRC among privately insured patients. Specifically, we sought to characterize variations in payments associated with the receipt of surgery and chemotherapy among patients with colon cancer who have private insurance.

Methods

Data sources and patient population

A cross-sectional study was performed using data from the Truven Health MarketScan Commercial Claims and Encounters Database from 2010-2014. The MarketScan database is a nationally representative, administrative claims-based database including information for active employees, Consolidated Omnibus Budget Reconciliation Act continuers and dependents insured by employer-sponsored health care plans.[10] Health care for these individuals is provided under a variety of health plans, including preferred and exclusive provider organizations, point of service plans, indemnity plans, health maintenance organizations (HMOs), and consumer-directed health plans. The database collects data from employers and health care plans and extracts relevant information related to clinical utilization and expenditures across inpatient, outpatient, and prescription drug services from over 138 million unique patients aged less than 65 y enrolled in an employer-sponsored plan.[10] Specifically, in addition to baseline patient characteristics including age, sex, and the relationship with the primary enrollee, the database includes up to 15 diagnosis codes for each patient record coded using the International Classification of Disease, Ninth Edition, Clinical Modification (ICD-9-CM) lexicon as well as up to 15 ICD-9-CM procedure codes. Finally, the MarketScan reports financial data including payments, which represent the total gross payment to all providers associated with each service rendered in the inpatient and/or outpatient setting. To ensure reliability and accuracy, data included in each year of the MarketScan databases are collected when nearly 100% of claims have been paid therefore eliminating the need for adjusting for completion factors. Given that the data set contains only deidentified data, patient consent was waived and this study was approved by the Johns Hopkins University Institutional Review Board.

Patients who underwent a colectomy between 2010 and 2014 were identified using relevant ICD-9-CM procedure codes (Supplemental Table 1). To ensure the homogeneity of the patient cohort, only adult patients undergoing a colectomy with a primary diagnosis of colon cancer were included in the final analytic cohort (Supplemental Table 2). To minimize any potential length-time bias, the final analysis was limited to only claims for services rendered within the first 6 months following surgery, and patients with at least 6 months of insurance coverage following surgery were included in the final analysis. Preoperative patient comorbidity was classified according to the Charlson Comorbidity Index (CCI), and patients were categorized according to their CCI score (CCI = 2, CCI = 3-5, and CCI ≥ 6).[11] Use of minimally invasive surgery (robotic and/or laparoscopic surgery) was identified using relevant ICD-9-CM procedure codes (Supplemental Table 1). Patients who were converted from a minimally invasive to an open surgery were categorized as having undergone an open surgery.

For each patient identified, the use of chemotherapy was identified using the relevant ICD-9-CM codes (Supplemental Table 3). As the MarketScan database collects data for all claims rendered regardless of the location, administrative claims for chemotherapy were recorded for patients who received chemotherapy at index as well as nonindex hospitals. To ensure comparability of patient groups, patients who received radiation therapy (concurrent or alone) were excluded from further analysis. Patients were then grouped into one of two groups based on adjunct therapies received: surgery plus chemotherapy and surgery alone. Incidence of postoperative complications was determined using previously