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Clinical Study

Insurance status and reportable quality metrics in the cervical spine fusion population

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Abstract

BACKGROUND CONTEXT: The incidence of adverse care quality events among patients undergoing cervical fusion surgery is unknown using the definition of care quality employed by the Centers for Medicare and Medicaid Services (CMS). The effect of insurance status on the incidence of these adverse quality events is also unknown.

PURPOSE: This study determined the incidence of hospital-acquired conditions (HAC) and patient safety indicators (PSI) in patients with cervical spine fusion and analyzed the association between primary payer status and these adverse events.

STUDY DESIGN: This is a retrospective cohort design.

PATIENT SAMPLE: All patients in the Nationwide Inpatient Sample (NIS) aged 18 and older who underwent cervical spine fusion from 1998 to 2011 were included.

OUTCOME MEASURES: Incidence of HAC and PSI from 1998 to 2011 served as outcome variables.

METHODS: We queried the NIS for all hospitalizations that included a cervical fusion during the inpatient episode from 1998 to 2011. All comparisons were made between privately insured patients and Medicaid or self-pay patients because Medicare enrollment is confounded with age. Incidence of nontraumatic HAC and PSI was determined using publicly available lists of International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis codes. We built logistic regression models to determine the effect of primary payer status on PSI and nontraumatic HAC.

RESULTS: We identified 419,424 hospitalizations with cervical fusion performed during an inpatient episode. The estimated national incidences of nontraumatic HAC and PSI were 0.35% and 1.6%, respectively. After adjusting for patient demographics and hospital characteristics, Medicaid or self-pay patients had significantly greater odds of experiencing one or more HAC (odds ratio [OR] 1.51 95% conflict of interest [CI] 1.23–1.84) or PSI (OR 1.52 95% CI 1.37–1.70) than the privately insured cohort.

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The disclosure key can be found on the Table of Contents and at www.TheSpineJournalOnline.com.

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CONCLUSIONS: Among patients undergoing inpatient cervical fusion, primary payer status predicts PSI and HAC (both indicators of adverse health-care quality used to determine hospital reimbursement by CMS). As the US health-care system transitions to a value-based payment model, the cause of these disparities must be studied to improve the quality of care delivered to vulnerable patient populations.

Keywords: Cervical fusion; NIS; Insurance status; Hospital-acquired condition; Patient safety indicator; Affordable Care Act

Introduction

Socioeconomic inequality drives disparities in access to health care, treatment decisions, and patient outcomes in the United States [1–11]. Gaining access to health insurance may ameliorate these disparities [12–14]. However, studies that adjusted for patient-level covariates observed that Medicaid patients suffer inferior outcomes relative to Medicare patients following craniotomy for brain tumor [9], endovascular aneurysm treatment [15], and lumbar spinal stenosis surgery [6]. The Oregon Medicaid Expansion and the MetroHealth Care Plus experiments demonstrated that expanding access to insurance does not guarantee improved outcomes across all patient populations because improved health-care access does not ensure the delivery of high-quality care [12,16]. The Patient Protection and Affordable Care Act attempts to rectify this disconnect by tying health-care reimbursement to health-care quality as part of the Hospital Value-Based Purchasing Program administered by the Centers for Medicare and Medicaid Services (CMS) [17,18].

Under this program, CMS withholds 1% of Medicare reimbursements to incentivize hospitals toward improving health-care quality. Toward this goal, health-care quality is partially determined by the annual incidence of a list of hospital-acquired conditions (HAC) published by CMS, including surgical site infection following spinal fusion and deep vein thrombosis [18]. Beyond the incidence of HAC, health-care quality is also measured using patient safety indicators (PSI) developed by the Agency for Healthcare Research and Quality (AHRQ) [19,20]. Patient safety indicators are used by the AHRQ to report the annual incidence of adverse health-care quality events such as postsurgical hematoma and iatrogenic pneumothorax at the provider, hospital, and regional health-care market levels.

A dearth of large investigations exists describing the incidence of HAC and PSI in patients undergoing inpatient cervical spinal fusion. Determining the association between health-care quality and insurance status among patients with cervical spinal fusion may help identify patient populations most at risk for adverse outcomes. Initiatives designed to reduce these disparities can benefit patients, physicians, purchasers, and insurers. This study uses a nationally representative, all-payer database to determine the association of insurance status with adverse quality outcomes in patients undergoing cervical spine fusion. Based on the results of prior studies in other patient populations [10,21,22], we hypothesize that the incidence of HAC and PSI will be significantly higher among Medicaid or self-pay patients undergoing cervical fusion than the incidence in patients with private insurance.

Methods

Data collection

This study used Nationwide Inpatient Sample (NIS) data from 1998 to 2011. Data were obtained for any inpatient episode listing the International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) procedure code for index or revision cervical fusion (81.01, 81.02, 81.03, 81.31, 81.32, 81.33) [23–25].

The NIS was established by the AHRQ and is the largest all-payer health-care database in the United States [26]. Nationwide Inpatient Sample data are compiled annually, beginning in 1988, and are composed of a 20% stratified sample of all hospital discharges. Entries in the database correspond to a single inpatient episode. National estimates may be generated using NIS data, as sampling weights are provided for each hospital discharge. The NIS includes data on patient demographics, comorbidities, diagnoses, procedures performed, outcomes (eg length of hospital stay [LOS], hospital charges, mortality), complications, and hospital characteristics (eg hospital size, geographic location, hospital teaching status) [26]. The NIS classifies admission diagnoses, procedures, and in-hospital complications using ICD-9 codes.

In 1998, the AHRQ modified the NIS sampling strategy; as such, the present study included data only from 1998 onward [25]. Furthermore, in this year, the NIS began recording Elixhauser comorbidity data [27,28]. The Elixhauser comorbidity index is an amalgamation of 30 comorbidities associated with in-hospital mortality, including acute and chronic conditions. This index permits standardized risk adjustment in administrative databases; the NIS (an administrative database) includes 29 of the AHRQ comorbidities originally discussed by Elixhauser et al. [27].

In addition to the Elixhauser comorbidity index, the following data were obtained: demographic data (patient age, gender, race), primary insurance type (Medicare, Medicaid, private insurance, self-payment, no charge), and hospital characteristics (academic hospital setting, admission source [emergency, urgent, or elective], weekend admission, hospital bed size, and hospital region). The presence of specific PSI and HAC within each hospitalization record was