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Peri-operative emergency department utilization in inpatient and outpatient Medicare laparoscopic cholecystectomy

Susan M. Nedza [a, b], Donald E. Fry [a, c, d, *], Michael Pine [a], Agnes M. Reband [a], Pan Chen [a], Gregory Pine [a]

[a] MPA Healthcare Solutions, Chicago, IL, USA
[b] Department of Emergency Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL, USA
[c] Departments of Surgery, Northwestern University Feinberg School of Medicine, Chicago, IL, USA
[d] University of New Mexico School of Medicine, Albuquerque, NM, USA

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ABSTRACT

Background: Preoperative emergency department (ED) visits may reflect the patient's biliary disease, or may signal unstable comorbid conditions that have relevance following inpatient laparoscopic cholecystectomy (ILC) and outpatient laparoscopic cholecystectomy (OLC) in Medicare patients.
Methods: We used the Medicare inpatient and outpatient Limited Datasets to identify elective laparoscopic cholecystectomy patients from 2011 to 2014. ED visits for 30-days before the surgical event were identified and correlated with the probability of patients returning to the ED in the 30-days following the procedure.
Results: A total of 129,377 inpatient and 235,339 outpatient LCs were identified. A total of 20,021 (15.5%) of ILCs and 52,025 (22.1%) of OLCs had 30-day preoperative ED visits. ILCs with any 30-day ED visit preoperatively had an Odds Ratio (OR) that predicted a post-discharge ED visit of 1.85 (95% CI = 1.78 −1.92; P < 0.0001). OLCs with any 30-day ED visit preoperatively had an OR for post-discharge ED visit of 1.50 (95% CI = 1.46−1.54; P < 0.0001).
Conclusion: Preoperative ED visits predict postdischarge ED visits for laparoscopic cholecystectomy in Medicare patients.

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Laparoscopic cholecystectomy is a procedure commonly performed on the Medicare population with over 76,000 procedures being performed in the inpatient setting in 2014 and over 73,000 procedures being performed in the outpatient setting in 2013.[1] Most efforts to study post-discharge events have examined mortality and readmission rates after inpatient surgery. The move toward alternative payment models has resulted in efforts to identify additional indicators of the quality of care and potential cost savings following operations including laparoscopic cholecystectomy. Emergency department (ED) utilization in the post-operative surgical period is one area for focus.[2]

Payers are increasingly interested in preventing emergency department visits post-hospital discharge in bundled payment programs. In the case of the Centers for Medicare and Medicaid Services (CMS) Comprehensive Joint Replacement program (CJR), we identified that 15.6% of patients undergoing elective hip replacement and 16.2% of patients undergoing total knee replacement had ED visits within 90 days of discharge and identified pre-existing conditions or complications that might be targeted through quality improvement efforts to avoid ED visits in a bundle-eligible population.[3] Additionally, CMS has developed a cost metric for cholecystectomy and common bile duct exploration that sweeps in post-discharge costs in its Merit Based Incentive Payment System (MIPS) that is used to calculate physician payments.[4]

In the current study, we have examined peri-operative ED utilization in a Medicare population of discharges following elective laparoscopic cholecystectomy in the ILC or OLC setting to evaluate whether a pre-operative visit in the 30 days prior to surgery might predict a 30-day post-operative ED visit.

* Corresponding author. MPA Healthcare Solutions, 1 East Wacker Dr., #1210, Chicago, IL 60601, USA.
E-mail address: dfry@consultmpa.com (D.E. Fry).

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1. Methods

The CMS Inpatient Limited Dataset and the CMS 100% Outpatient Standard Analytic File for 2011–2014 were used to identify patients for inclusion in the study. ILC cases were identified as having inpatient claims that were coded with the International Classification of Diseases 9th Revision-Clinical Modification (ICD-9) procedure codes of 51.23 and performed in those patients with a principal ICD-9 code of 574.0, 574.01, 574.10, 574.20, 574.21, 574.3, 574.31, 574.4, 574.41, 574.5, 574.51, 574.6, 574.61, 574.7, 574.71, 574.8, 574.81,574.9, 574.91, 5750, 5710–12, 575.2–6, 575.8, 575.9. Outpatient claims coded with a CPT Code of 47562–47564 and the same ICD-9 diagnoses codes were identified for inclusion in the study. In all cases, Medicare eligibility for 30 days prior to the index surgery and 30 days post-surgery was required. Only cases where inpatient surgery was performed on day 0, 1, or 2 were included because of higher complication rates in cases with inpatient delays.[5] Preoperative prolonged hospitalization is a risk factor in ILC for higher complication and readmission rates.[6] Case exclusions from the dataset were patients less than 65 years of age, those without a hospital or patient identifier, absence of an admission or discharge date, transfers to-or-from another acute care hospital and those discharged against medical advice.

All procedure discharges were then evaluated to determine if an ED visit had occurred within the 30- days prior to admission or 30 days post-discharge. The facility/institution claim was identified by using the MEDPAR file to capture Medicare beneficiaries admitted from the ED or the outpatient file to identify Medicare beneficiaries discharged home or to settings other than the acute care hospital. ED visits resulting in the index ILC were excluded to insure that cases entered into this study were elective procedures. The first ICD9-CM coded on each ED claim was identified and aggregated into Major Diagnostic Categories (MDC). Odds ratios were calculated to determine if pre-operative ED visits predicted post-procedural ED visits.

All analysis in this study used SAS software (Version 9.4, SAS Institute, Cary, North Carolina).

2. Results

A total of 129,377 ILCs and 235,339 OLCs were identified. 20,021 patients (15.5%) who underwent ILC had 24,193 ED visits in the 30-days pre-operatively and 7259 of these patients were admitted to the hospital, but discharged before the index ILC (Table 1). There were 19,927 (15.4%) patients seen one or more times in the ED postoperatively of which 10,697 (53.7%) were readmitted. Of total preoperative ED patients, 4631 were seen in the ED postoperatively, of which 1836 had been 30-day preoperative inpatients.

For OLCs, 52,025 patients (22.1%) were seen for 60,735 visits, of which 9984 preoperative ED patients were hospitalized and discharged before the OLC (Table 1). There were 28,862 patients (12.3%) seen one or more times in the ED postoperatively. Of all patients with a preoperative ED visit, 8290 were seen in the ED postoperatively, of which 1507 were hospitalized.

Patients with any ED visit prior to ILC had an Odds Ratio (OR) of a post-discharge ED visit of 1.85 (95% CI = 1.78–1.92; P < 0.0001); 30-day preoperative ED visit and hospitalization but discharge before the index admission for ILC was associated with an OR = 2.11 (95% CI = 2.00–2.23; P < 0.0001) for a post-discharge ED visit. A 30-day preoperative visit without hospitalization had an OR = 1.71 (95% CI = 1.63–1.79; P < 0.0001) of a 30-day post-discharge ED visit. OLC patients with any 30-day ED visit preoperatively had an OR for post-discharge ED visit of 1.50 (95% CI = 1.46–1.54; P < 0.0001); a 30-day preoperative ED visit with hospitalization but discharge before the index procedure an OR = 1.41 (95% CI = 1.33–1.49; P < 0.0001); and 30-day preoperative visit without hospitalization an OR = 1.52 (95% CI = 1.48–1.57; P < 0.0001).

In patients who underwent ILC, 7510 (30.4% of all cases) post-operative ED visits were for digestive system (N = 6358) and hepatobiliary related complaints (N = 1152). In OLC patients who had a post-surgical ED visit, 12,841 (46% of all cases) were for hepatobiliary/pancreas (n = 6696) or other digestive system complaints (n = 6145). Postoperative ED patients commonly had visits for conditions in the MDCs of kidney/urinary tract, respiratory system, and injuries/drug toxicity (P < 0.01) when compared to preoperative visits regardless of ILC or OLC as detailed in Fig. 1.

3. Discussion

The search continues to identify risk factors that can enhance prediction of adverse outcomes that will facilitate better post-operative management. Historically models predicting mortality have been widely accepted as valid; however, the overall mortality rate for many operations such as laparoscopic cholecystectomy is low. We have reported inpatient death rate of 0.6–0.7% for this operation.[6,7] Post-discharge death rates are higher within 90 days of discharge, but may be influenced by post-discharge management issues and patient compliance that may not reflect the quality of inpatient care that has been provided. However, as perioperative mortality continues to decline due to advances in surgical technique, better processes of care, and shorter inpatient lengths of stay, the value of the metric declines as very large sample sizes are needed to objectively evaluate performance. The measurement of inpatient complications has also become problematic because of inaccurate coding as well as reduced inpatient lengths of stay. The shift to OLC makes tracking of complications difficult when 80% of cases in a commercial population are being done in the outpatient setting.[8] This trend to OLC is continuing in the Medicare population.

The measurement of post-surgical readmissions has become accepted by both payers and providers as a useful metric of

Table 1
Preoperative and postoperative Emergency Department utilization for patients undergoing inpatient and outpatient elective laparoscopic cholecystectomy.

	Inpatient	Outpatient
Total # laparoscopic cholecystectomy visits	**129,377**	**235,339**
A.Patients with pre-operative ED visit	**20,021 (15.5%)**	**52,025 (22.1%)**
A.1. Admitted to hospital	7259	9984
A.1.a. *With subsequent post-discharge ED visit*	*1856*	*1507*
A.2. Not admitted	12,762	42,041
A.1.b. *With subsequent post-discharge ED visit*	*2775*	*6783*
B.Patients with post-operative ED visit	**19,927 (15.4%)**	**28,862 (12.3%)**
B.1. Admitted to hospital	10,697	6908
C.Patients with both pre-operative and post-operative ED visit (Sum of A.1.a and A.1.b.)	**4631 (3.6%)**	**8290 (3.5%)**
D.Patients with no pre-operative or post-operative ED visit	**93,960 (72.6%)**	**162,742 (69.2%)**

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