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Characteristics and timing of interhospital transfers of emergency general surgery patients



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ARTICLE INFO

Article history:

Received 12 February 2018

Received in revised form

1 June 2018

Accepted 1 June 2018

Available online xxx

Keywords:

Emergency general surgery

Acute care surgery

Interhospital transfers

ABSTRACT

Background: Transferred emergency general surgery (EGS) patients have increased morbidity, mortality, and costs, yet little is known about the characteristics of such transfers. Increasing specialization and a decreasing general surgery workforce have led to concerns about access to care, which may lead to increased transfers. We sought to evaluate the reasons for and timing of transfers for EGS diagnoses.

Methods: We performed a retrospective medical record review of patients transferred to a tertiary academic medical center between January 4, 2014 and March 31, 2016 who had an EGS diagnosis (bowel obstruction, appendicitis, cholecystitis/cholangitis/choledocholithiasis, diverticulitis, mesenteric ischemia, perforated viscus, or postoperative surgical complication).

Results: Three hundred thirty-four patients were transferred from 70 hospitals. Transfer reasons varied with the majority due to the need for specialized services (44.3%) or a surgeon (26.6%). Imaging was performed in 95.8% and 35.3% had surgeon contact before transfer. The percentage of patients who underwent procedures at referring facilities was 7.5% ($n = 25$), while 60.6% ($n = 83$) underwent procedures following transfer. Mean time between transfer request and arrival at the accepting hospital was lower for patients who subsequently underwent a procedure at the accepting hospital compared to those who did not for patients originating in emergency departments (2.6 versus 3.4 h, $P < 0.05$) and inpatient units (6.9 versus 14.3 h, $P < 0.05$).

Conclusions: Interhospital transfers for EGS conditions are frequently motivated by a need for a higher level of care or specialized services as well as a need for a general surgeon. Understanding reasons for transfers can inform decisions regarding the allocation and provision of care for this vulnerable population.

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Meeting Presentation: Presented at the American College of Surgeons Clinical Congress, San Diego, CA, October 2017.

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<https://doi.org/10.1016/j.jss.2018.06.017>

Introduction

The provision of health care for emergency general surgery (EGS) conditions, such as diverticulitis or bowel obstructions, has been identified as a “looming catastrophe” in public health.¹ Over three million patients are admitted to the US hospitals for EGS conditions annually.² While the number of EGS patients has risen, the number of surgeons available to provide care has decreased in the majority of states.³⁻⁶ For example, between 2006 and 2011, the state of Wisconsin lost 6.5% of its general surgeon workforce; three counties lost all general surgeons, and 12 counties had no general surgeons despite having a hospital that offered emergency services.⁷ These reductions in the surgeon workforce, coupled with surgical trainees pursuing more specialized careers⁸ and the regionalization of care for medically complex patients to larger hospitals⁹⁻¹² have contributed to an increase in interhospital transfers of EGS patients.¹³

Previous studies have documented delays in transfer for nontrauma surgical emergencies¹⁴ and have associated interhospital transfer with increased time to operative intervention,¹⁵ increased lengths of stay,^{13,15-17} and increased morbidity and mortality.^{13,16,17} Despite these inefficiencies and poor outcomes, the interhospital transfer system for EGS patients is informal, unregulated, and understudied. There are little data to identify overutilization and underutilization of transfer in these patients. The goal of interhospital transfers is, in part, to ensure that the patient receives timely, appropriate care by providers able to meet the patient’s needs. Although the literature on interhospital transfers of EGS patients is growing,¹⁸⁻²⁰ we lack an understanding of the transfer process, including the characteristics of referring hospitals and what care is delivered before a transfer as well as how providers describe their reasons for transferring to a tertiary center. This is a critical knowledge gap given that this assessment is necessary to elucidate, quantify, and improve failures and inefficiencies in the transfer process. To meet this need, we performed a comprehensive review and analysis of the records of patients diagnosed with an EGS condition, who were transferred to a large, Midwestern, tertiary care center. We included transfers of patients with seven diagnoses which correspond to the seven EGS procedures that account for most admissions, deaths, complications, and inpatient costs in the United States.²¹ Identifying areas for performance improvement will provide a foundation for the development of interventions to enhance the conduct of patient transfers.

Methods

Study population

At the University of Wisconsin (UW) Hospital, all interhospital transfers are coordinated through the UW Access Center. Patients are triaged to the appropriate admitting service and a level of care at the UW Hospital by the accepting physician. The UW Access Center is staffed 24 h a day, 7 d a week by trained nurses and maintains a database of all transferred patients.

From the UW Access Center database, we retrospectively identified patients transferred to the UW Hospital for evaluation in the emergency department (ED) or admission to the EGS service from April 1, 2014 to March 31, 2016 ($n = 768$). [Figure 1](#) represents a flow diagram for patient inclusion and exclusion. Patients who did not arrive at the UW Hospital or whose transfer requests were canceled were not included in the analysis ($n = 58$). Patients readmitted to general surgery subspecialty services due to complications or ongoing care following an elective surgical procedure (e.g., elective colon resection or whipple) were excluded ($n = 43$) because care and transfers in this patient population are related to elective surgical procedures and they are typically cared for by non-EGS, subspecialty surgeons at our institution. Seven EGS procedures (i.e., partial colectomy, small bowel resection, cholecystectomy, operative management of peptic ulcer disease, removal of peritoneal adhesions, appendectomy, and laparotomy) account for the most admissions, deaths, complications, and inpatient costs in the United States.²¹ We selected patients with diagnoses (according to the accepting provider) of appendicitis, cholecystitis/cholangitis/choledocholithiasis (gallbladder pathology), diverticulitis, bowel obstruction, perforated viscus, mesenteric ischemia, or postoperative surgical complication for data abstraction ($n = 334$). These conditions were selected because they represent diagnoses that commonly precede (appendicitis → appendectomy; gallbladder pathology → cholecystectomy; diverticulitis → partial colectomy; bowel obstruction → laparotomy with or without bowel resection; perforated viscus → laparotomy with possible bowel resection; mesenteric ischemia → laparotomy and bowel resection) or follow (as in the case of postoperative surgical complications) the seven EGS procedures that account for the highest burden of care provided by EGS physicians in the United States as detailed previously.^{21,22} Postoperative surgical complications included bile duct injury, bile leak, and anastomotic leak.

Study variables

Data were extracted from four sources and merged: (1) the UW Access Center database; (2) the electronic medical record (EMR) (contains summaries of Access Center calls as documented by Access Center nurses); (3) the documentation provided by the referring hospital and scanned into the patient record; and (4) the 2013 American Hospital Association Annual Survey Database.

A standardized abstraction tool was developed specifically for this study with guidance from the literature and input from physicians with clinical and research efforts focused on interhospital transfers and care transitions (C.C.G. and A.M.I.). Data were abstracted by two trained researchers (J.L.P. and M.C.S.). During the initial training, abstractions were reviewed by the senior author or first author (J.L.P.) to ensure accuracy and consistency. Subsequently, any questions regarding abstraction were discussed at regular research meetings, and abstractions were reviewed by the senior author or first author (J.L.P.). Before data analysis, ~5% of charts were selected at random and reviewed for accuracy and quality control.

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