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Transfer of acute care surgery patients in a rural state: a concerning trend

Brittany Misercola, MD, Kristen Sihler, MD, FACS, Molly Douglas, MD, Stephen Ranney, BS, and Jonathan Dreifus, MD, FACS*

Department of Surgery, Maine Medical Center, Portland, Maine

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ABSTRACT

Background: Regionalized care of complex patients to larger hospitals is an increasingly common practice as the population ages and the physician shortage evolves. The Acute Care Surgery model is new, and there are limited data on the patients being transferred through this system. We hypothesized transfer patients would be older, more complex, and require additional resources.

Materials and methods: Retrospective chart review of Acute Care Surgery patients admitted to a single tertiary facility. Patient demographics, clinical presentation, and outcomes were obtained.

Results: We found that our 161 transferred patients (TPs) were older (61.2 *versus* 54.7 y [$P < 0.001$]), had more comorbidities (Charlson Comorbidity Index 4 *versus* 3.1 [$P < 0.001$]), and required more resources than 611 local patients (LP; length of stay 8.2 *versus* 3.4 [$P < 0.001$], intensive care unit admission 24% *versus* 6% of patients [$P < 0.001$]). Admission diagnosis was similar, with pancreaticobiliary (TP 29% *versus* LP 30%) and small bowel (TP 25% *versus* LP 23%) complaints most common. Most common intervention was laparoscopic cholecystectomy for both (29% *versus* 25%). Subspecialty interventions were similar (IR, advanced endoscopy) at TP 10% and LP 8%. TPs were more likely to not require a procedure (31% *versus* 23%). Insurance provider differed between groups, particularly for Medicare (55% *versus* 34%) and privately insured (26% *versus* 45%).

Conclusions: Although this study confirms transfer patients need the resources for which they were referred to a tertiary center, we unexpectedly found nearly half of transfer patients undergo basic surgical procedures or do not require intervention. This points to a concerning lack of general surgery resources in the community.

Introduction

Acute Care Surgery (ACS) is a new paradigm for management of patients needing nontrauma-related emergency surgery. Developed in the early 2000s, ACS was in part a response to heavy call burden for trauma and general surgeons. This system designates an acute care surgeon to care for patients free from other activities, such as clinic, administrative, and academic pursuits for a finite amount of time. This surgeon is responsible for caring for general surgical emergencies such as cholecystitis, appendicitis, hernias, and diverticulitis as they present, with many positive impacts so far.[1-7]

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* *Corresponding author*. Department of Surgery, Maine Medical Center, 22 Bramhall St, Portland, ME 04102. Tel.: 1-315-405-1222; fax: 1-207-662-6389.

E-mail address: bmisercola@mmc.org (B. Misercola).

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At the same time as the ACS paradigm has developed, rural areas are suffering worsening shortages of physicians, especially specialists such as surgeons.[8-10] Another change has been regionalization of sick, complex, and resource intensive patients to larger hospitals with more specialized care.[11-15] However, no one has yet examined the effect of an ACS service in a predominately rural area given these changes in health care.

We sought to examine these changes in the context of an ACS service in a rural state by comparing patients transferred in to a large tertiary referral center with those admitted through the emergency department (ED). We hypothesized that transfer patients would have more comorbidities, require more resources, and have a longer length of stay (LOS) than those admitted through the ED.

Materials and methods

Data source and study population

Our institution is a tertiary referral center with a wide and rural catchment area and the largest hospital in the state. Study subjects included adult (>18 y) patients admitted to our acute care surgical service during a 12-mo period (January 1-December 31, 2014). Elective surgical patients and trauma patients were excluded. Transfer patients were defined as those presenting from outside hospital EDs or acute care facilities, as well as from inpatient units from other hospitals. Local patients were defined as those admitted from our ED or emergently from outpatient clinics. Patients presenting directly from long-term care facilities in the area were considered local patients. The study was approved by our institutional review board.

The patient population was initially defined by all patients admitted to any of the surgeons taking ACS call. Data were obtained retrospectively by chart review. We recorded admission source (ED, transfers from surrounding community and rural health centers, and local clinics). For transfer patients, we recorded facility of origin, distance of travel (calculated using online mapping resources), and disposition at arrival (arrival to ED or direct admission to the floor or intensive care unit [ICU]).

Primary measures

For all patients, we recorded preadmission characteristics (age, insurance status, and Charlson Comorbidity Index [CCI]). Diagnosis at admission was coded in six categories: colon (large bowel such as diverticulitis, colon cancer, ischemic colitis), small bowel/upper gastrointestinal (GI; small bowel obstruction, mesenteric ischemia, and includes upper GI such as hiatal hernia and peptic ulcer disease with or without perforation), appendix (appendicitis and the sequelae from treatment), pancreaticobiliary (including but not limited to cholangitis, choledocholithiasis, cholecystitis, gallstone pancreatitis), hernia (inguinal, femoral, abdominal wall, umbilical), and other. The operations performed were coded into these same categories. We recorded nonsurgical interventions such as those involving advanced endoscopy and interventional radiology, as well as patients who did not require any intervention during their admission. Resource use measures included admission to ICU, disposition at discharge, and LOS.

Statistical analysis

We used descriptive statistics to summarize the data. Continuous data are shown as mean (standard deviation) or median (range), as appropriate, and categorical data are shown as number (percent). Differences between subgroups were evaluated by *t*-test or Mann–Whitney *U* test (continuous variables) or by chi square test or Fisher's exact test (categorical data), as appropriate. Analyses were performed using SPSS statistical software (IBM SPSS, Inc, Armonk, NY). Not all possible comparisons were tested to avoid a familywise error rate.

Results

Patient characteristics

After applying inclusion and exclusion criteria, the study group included 611 local patients and 161 transfer patients. Patients were excluded if they were preadmitted for elective procedures, falsely admitted under the attending of record, or if they were admitted due to trauma (Fig. 1). Transfer patients represented nearly every county in Maine and even some neighboring states, and traveled a mean distance of 67 miles (range 5.3-315 miles) to reach our facility (Fig. 2). Wednesday was the most frequent day of arrival ($n = 31$, 19%); however, there was no statistical difference in transfer volume between the days of the week.

We received transfer patients from 29 different institutions, and most patients were accepted from affiliated hospitals ($n = 116$, 72%). There were 29 patients (18%) accepted in transfer from 8 of the 16 critical access hospitals (CAHs) in the state.

Most transfer patients, 59% ($n = 95$), were directly admitted to the floor, and 81% ($n = 130$) were new patients, having never been evaluated by a surgeon at our institution. Transferred patients (TPs) were significantly older than local patients (61.2 *versus* 54.7 y, $P < 0.001$) and had a higher CCI (4.0 *versus* 3.1, $P < 0.001$).

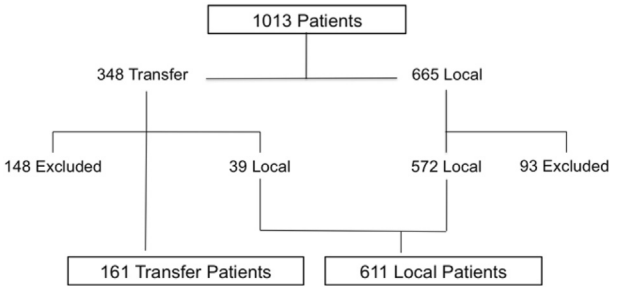

Fig. 1 – Total patients identified and final breakdown after retrospective chart review.