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Complexity of Transferred Geriatric Adults Requiring Emergency General Surgery: A Rural Tertiary Center Experience

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ABSTRACT

Introduction: As the American population ages, the number of geriatric adults requiring emergency general surgery (EGS) care is increasing. EGS regionalization could significantly affect the pattern of care for rural older adults. The aim of this study was to determine the current pattern of care for geriatric EGS patients at our rural academic center, with a focus on transfer status.

Materials and methods: We performed a retrospective chart review of patients aged ≥65 undergoing EGS procedures within 48 h of admission from 2014 to 2019 at our rural academic medical center. We collected demographic, admission, operative, and outcomes data. The primary outcomes of interest were mortality and nonhome discharge. Univariate and multivariate analyses were performed.

Results: Over the 5-y study period, 674 patients underwent EGS procedures, with 407 (60%) transferred to our facility. Transfer patients (TPs) had higher American Society of Anesthesiology (ASA) scores ($P < 0.001$), higher rates of open abdomen (13% *versus* 5.6%, $P = 0.001$), and multiple operations (24 *versus* 11%, $P < 0.001$) than direct admit patients. However, after adjustment there was no difference in mortality (OR 1.64; 95% CI, 0.82-3.38) or nonhome discharge (OR 1.49; 95% CI, 0.95-2.36).

Conclusions: At our institution, the majority of rural geriatric EGS patients were transferred from another hospital for care. These patients had higher medical and operative complexity than patients presenting directly to our facility for care. After adjustment, transfer status was not independently associated with in-hospital mortality or nonhome discharge. These patients were appropriately transferred given their level of complexity.

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Introduction

The US Census Bureau projects that the geriatric population (aged 65 and older) in the U.S. will increase from 49.2 million in 2016 (15% of the population) to 94.7 million in 2060 (23% of the population).[1] As the population ages, the rates of geriatric emergency general surgery (EGS) and its burden on the health care system is expected to increase. The increased morbidity and mortality of EGS is well established in the general population[2-4] and has been shown to contribute more to the cost of emergency hospitalization in the United States than injuries, acute myocardial infarction, and diabetes.[5] Increased age has been shown to be a predictor of poor EGS outcomes including increased mortality, major complications, postoperative morbidity, and unplanned readmission.[6-8] Specifically, frail geriatric EGS patients have an increased risk of 1-y mortality and fewer days at home.[9,10] Thus, this increased demand for geriatric EGS predicted in the future portends higher mortality and extreme financial burden. Due to the increased age and expansion of the U.S. population, predictions suggest that by 2060, the national cost of EGS hospitalizations will increase by 45%.[5]

With nearly 20% of older adults living in rural areas, prior studies have aimed to evaluate EGS outcomes in this population. One study suggested that EGS patients at rural hospitals have a higher risk of in-hospital mortality and higher cost of hospitalization, while another demonstrated similar mortality in rural and urban patients (excluding all transfer patients [TPs]).[11,12] Another study looking at rural EGS patients found that compared to local admissions or emergency department (ED) transfers, rural inpatient TP experienced longer median length of stay (LOS), higher direct costs, and a higher case mix. Rural TPs were on average older, and their hospitalizations were more likely to be complicated by a greater number of comorbidities and higher mortality rate.[13] These findings mimic the overall trends showing higher unadjusted mortality in all TPs.[14,15] TPs account for approximately 2% of patients with EGS diagnoses nationally and are more commonly transferred from low-volume and rural hospitals.[14,16-18] The factors affecting poorer outcomes in rural patients, as well as TPs, warrant further investigation. Accordingly, there is increased discussion on regionalization of EGS care, similar to the successful regionalization of trauma care, focusing on patient- and hospital-level characteristics associated with the transfer of high acuity patients to higher-volume and lower-mortality hospitals. This type of restructuring would have a large impact on rural geriatric EGS patients, who have been shown to have worse postoperative outcomes, when receiving EGS from low-volume surgeons or hospitals with a low proportion of geriatric EGS patients.[19,20]

The aim of this study was to look at the current pattern of care for rural geriatric EGS patients at our rural academic tertiary hospital in New Hampshire (NH), particularly focusing on patients transferred to our institution. Nearly 20% of the population of our traditional catchment area of NH and Vermont (VT) is over 65, with a substantial percentage of these older adults living in rural areas (VT 65%, NH 43%).[21] We hypothesized that we would see increased mortality and nonhome discharge of TPs compared to local admissions.

Material and Methods

This was a retrospective cohort study of patients admitted to Dartmouth–Hitchcock Medical Center, a rural tertiary care center, from 2014 to 2019. The study was reviewed and deemed exempt (no consent required) as secondary research by our institutional review board (Study 02,000,982). Patients age 65 y and older who had surgery performed by a general surgeon within 48 h of admission were included in the study. Patients were excluded if their admission was traumatic or if they lived in urban areas or in states outside of NH and VT. Individual records were reviewed to ensure that the operative intervention was EGS- related, given that at our institution nonacute care surgery surgeons cover EGS calls on certain weekend days and holidays.

We collected demographic, admission, operative, and outcome data through electronic health record review. Demographic data included age, sex, race, ethnicity, and zip code. Home zip codes were converted to rural-urban commuting area (RUCA) codes to classify patient origin as urban, large rural, small rural, or isolated rural.[22] RUCA codes use measures of population density, urbanization, and daily commuting to classify zip codes as metropolitan (which we designated as urban), micropolitan with a population of 10,000-49,999 (large rural), small town with a population of 2500-9999 (small rural), or rural without primary flow to an urbanized area or cluster (isolated rural). Admission data collected included transfer status, transfer hospital, steroids, or anticoagulation as home medication, American Society of Anesthesiology (ASA) score, and comorbidity data elements required to calculate Charlson comorbidity index (CCI).[23,24] TPs included both patients transferred from inpatient services and ED at other hospitals. Patients who had already undergone an operative intervention at another facility prior to transfer were also included in the study. Operative data included operations performed, whether the procedure was entirely laparoscopic, multiple operations during hospital stay, open abdomen during hospital stay, and whether a feeding tube or tracheostomy was required during hospital stay. Operations were double counted if an index operative procedure required two major interventions in separate categories (e.g., separate small bowel resection and large bowel resections) but not if the second intervention was inherent to the procedure (e.g., repair of an umbilical hernia during a laparoscopic procedure would not be counted separately). Subsequent operative interventions were noted in the 'multiple operation' category but not further classified by procedure type. The primary outcome of interest was mortality, while secondary outcomes of interest were LOS and discharge disposition.

We analyzed the characteristics of the hospitals that transferred patients to our medical center, including county, zip code, RUCA designation, distance (miles) from our

Table 1 – Patient characteristics by transfer status.

Characteristic	Overall N = 674*	ED admit N = 267	Transfer N = 407	P-value†
Median age (IQR)	74 (69, 80)	73 (69, 80)	74 (69, 80)	0.8
Age group				0.6
(65, 70)	189 (28%)	81 (30%)	108 (27%)	
(70, 75)	176 (26%)	70 (26%)	106 (26%)	
(75, 80)	136 (20%)	45 (17%)	91 (22%)	
(80, 85)	83 (12%)	34 (13%)	49 (12%)	
(85, 90)	66 (9.8%)	26 (9.7%)	40 (9.8%)	
(90, 99)	24 (3.6%)	11 (4.1%)	13 (3.2%)	
Sex				>0.9
Female	350 (52%)	139 (52%)	211 (52%)	
Male	324 (48%)	128 (48%)	196 (48%)	
RUCA category				<0.001
Isolated	300 (45%)	117 (44%)	183 (45%)	
Large rural	199 (30%)	120 (45%)	79 (19%)	
Small rural	175 (26%)	30 (11%)	145 (36%)	
Anticoagulation	111 (16%)	39 (15%)	72 (18%)	0.3
Steroids	67 (9.9%)	23 (8.6%)	44 (11%)	0.4
Aspirin/Plavix	360 (53%)	138 (52%)	222 (55%)	0.5
ASA score				<0.001
1	5 (0.7%)	5 (1.9%)	0 (0%)	
2	115 (17%)	58 (22%)	57 (14%)	
3	370 (55%)	153 (57%)	217 (53%)	
4	163 (24%)	46 (17%)	117 (29%)	
5	21 (3.1%)	5 (1.9%)	16 (3.9%)	
CCI				0.5
Median (IQR)	2.00 (0.00, 3.00)	2.00 (0.00, 3.00)	2.00 (1.00, 3.00)	
Range	0.00, 13.00	0.00, 13.00	0.00, 10.00	
CCI groups				0.2
0	174 (26%)	79 (30%)	95 (23%)	
1	130 (19%)	43 (16%)	87 (21%)	
2	144 (21%)	55 (21%)	89 (22%)	
3+	226 (34%)	90 (34%)	136 (33%)	

IQR = interquartile range; RUCA = rural-urban commuting area; ASA Score = American Society of Anesthesia Score; CCI = Charlson comorbidity index.

* Median (IQR); *n* (%); c ("Median (IQR)", "Range").

† Wilcoxon rank sum test; Pearson's chi-squared test; Fisher's exact test.

institution by driving route, and number of transfers (inpatient and ED) in this study. Hospitals were only included if they transferred rural patients to our institution.

Comparative analyses were performed based on transfer status. Categorical variables were analyzed using chi-squared tests, and continuous variables were analyzed using Wilcoxon rank sum tests. Multivariable logistic regression models were adjusted for the following variables: age group, sex, CCI, LOS, ASA score, multiple operations, RUCA category, transfer status, and home anticoagulation or steroid use. Statistical analysis was performed using R and R Studio.

Results

There were 674 rural geriatric patients who underwent EGS procedures at our medical center during the 5-y study period (Table 1). The median age was 74 (IQR 69-80) and the majority were female (52%). The largest percentage of patients lived in isolated rural areas (45%), while 26% hailed from small rural and 30% from large rural areas. The majority had an ASA score of 3 (55%), though 24% were ASA.[4] The median CCI score was 2 with a range of 0-13. The majority of patients (407 patients,

Table 2 – Patient index operations by transfer status.

Patient index operation	Overall N = 674*	ED admit N = 267*	Transfer N = 407*	P-value†
Intervention				
Appendectomy	57 (8.5%)	25 (9.4%)	32 (7.9%)	0.5
Cholecystectomy	137 (20%)	68 (25%)	69 (17%)	0.007
Small bowel resection	85 (13%)	29 (11%)	56 (14%)	0.3
Colectomy	128 (19%)	41 (15%)	87 (21%)	0.05
Lysis of adhesions	46 (6.8%)	22 (8.2%)	24 (5.9%)	0.2
Ulcer operation	48 (7.1%)	9 (3.4%)	39 (9.6%)	0.002
Hernia	71 (11%)	33 (12%)	38 (9.3%)	0.2
Skin/Soft tissue infection	59 (8.8%)	26 (9.7%)	33 (8.1%)	0.5
Other laparotomy	96 (14%)	34 (13%)	62 (15%)	0.4
Operative approach				
Entirely laparoscopic	129 (19%)	67 (25%)	62 (15%)	0.001
Open abdomen	69 (10%)	15 (5.6%)	54 (13%)	0.001

Patients can be represented in multiple categories based upon events during the index procedure; therefore, percentages can exceed 100%.
* n (%).
† Pearson's chi-squared test.

60%) were transferred to our facility (TPs), while 267 were directly admitted through our ED (ED Admissions [EDA]). Patients were transferred from 29 different hospitals in NH and VT, the majority (69%) of which were critical access hospitals. The hospitals ranged from 4.4 to 124 miles driving distance from our institution, with a median distance of 67.7 miles.

There was no significant difference in age or sex between TPs and EDA patients (Table 1). TPs were more likely to live in small rural areas (36% *versus* 11%, $P < 0.001$) and less likely to live in large rural areas (19% *versus* 45%) than EDA. Compared to EDA patients, TPs had higher ASA scores (ASA 4: 29 *versus* 17%, ASA 5: 3.9 *versus* 1.9%, $P < 0.001$). There was no significant difference in CCI between groups.

Overall, the most common operations were cholecystectomy (20%), colectomy (19%), other laparotomy (14%), and small bowel resection (13%) (Tables 2 and 3). Nineteen percent of operations were entirely laparoscopic, while 10% required an open abdomen. For patients requiring open abdomen, the primary indication for surgery was most often ischemic bowel (68.1%), perforation typically secondary to ulcer or diverticulitis (15.9%), or abdominal infection (5.8%). During the operation, the surgeon most often opted for open abdomen due to ischemic bowel requiring a second look (44.9%) and/or hemodynamic instability during the procedure (56.5%). Five patients required open abdomen during their second procedure or later, four due to complications requiring take back and open abdomen. During their hospital stay, 18% of patients required multiple operations, 7.1% required a feeding tube, and 1.9% required a tracheostomy. Patients requiring multiple operations most commonly had an open abdomen requiring serial take backs and ultimate closure (46.0%) or skin/soft tissue infection requiring multiple debridements (31.5%). The rates of major operative procedures was similar between EDA patients and TPs with the exception of cholecystectomy where rates were higher in the EDA patients (25% *versus* 17%, $P = 0.007$) and ulcer operations where rates were higher in TPs (9.6% *versus* 3.4%, $P = 0.002$) (Tables 2 and 3). EDA patients were more likely to have an entirely laparoscopic procedure (25% *versus* 15%, $P = 0.001$). In contrast, TPs were more likely to require multiple operations (23% *versus* 11%, $P < 0.001$), an open abdomen (13% *versus* 5.6%, $P = 0.001$), a feeding tube (9.8% *versus* 3.0%, $P < 0.001$), or a tracheostomy (2.9% *versus* 0.4%, $P = 0.02$).

In the whole geriatric cohort, the median LOS was 7 d (4, 11) (Table 4). When looking at discharge disposition, 31% of patients were discharged home without services, 31% were discharged home with services, and 26% were discharged to a facility. The mortality rate was 9.6%. When looking at differences between TPs and EDA patients, TPs had a median LOS of 8 d, compared to 5 d for EDA patients ($P < 0.001$), as well as a higher unadjusted mortality (12% *versus* 6.0%, $P = 0.01$). TP also had a different discharge disposition ($P < 0.001$) with higher

Table 3 – Patients requiring additional operative procedures by transfer status.

Additional procedures	Overall N = 674*	ED admit N = 267*	Transfer N = 407*	P-value†
Multiple operations during hospital course	124 (18%)	30 (11%)	94 (23%)	<0.001
Subsequent feeding tube placement	48 (7.1%)	8 (3.0%)	40 (9.8%)	<0.001
Subsequent tracheostomy placement	13 (1.9%)	1 (0.4%)	12 (2.9%)	0.02

* n (%).
† Pearson's chi-squared test.

Table 4 – Patient outcomes by transfer status.

Characteristic	Overall N = 674[*]	ED admit N = 267[*]	Transfer N = 407[*]	P-value[†]
LOS	7 (4, 11)	5 (3, 8)	8 (4, 14)	<0.001
Mortality	65 (9.6%)	16 (6.0%)	49 (12%)	0.01
Disposition				<0.001
Home	210 (31%)	112 (42%)	98 (24%)	
Home with services	208 (31%)	84 (31%)	124 (30%)	
Facility	174 (26%)	51 (19%)	123 (30%)	
Death	65 (9.6%)	16 (6.0%)	49 (12%)	
Hospice	9 (1.3%)	3 (1.1%)	6 (1.5%)	
Other	8 (1.2%)	1 (0.4%)	7 (1.7%)	

LOS = length of stay.
[*] Median (Interquartile Range); *n* (%).
[†] Wilcoxon rank sum test; Pearson's chi-squared test; Fisher's exact test.

Table 5 – Odds of in-hospital mortality.

Characteristic	Unadjusted			Adjusted		
	OR	95% CI	P-value	OR	95% CI	P-value
Age group						
[65, 70]	1	—		1	—	
[70, 75]	3.07	1.37, 7.54	0.01	2.61	1.08, 6.86	0.04
[75, 80]	2.19	0.88, 5.74	0.1	2.21	0.83, 6.22	0.12
[80, 85]	3.82	1.52, 10.1	0.01	2.96	1.07, 8.57	0.04
[85, 90]	3.12	1.10, 8.84	0.03	3.19	1.01, 10.1	0.05
[90, 99]	4.52	1.13, 15.8	0.02	7.24	1.61, 29.1	0.01
Sex						
Female	1	—		1	—	
Male	0.75	0.44, 1.25	0.27	0.63	0.34, 1.12	0.12
CCI groups						
0	1	—		1	—	
1	2.59	0.96, 7.69	0.07	1.81	0.61, 5.77	0.3
2	4.26	1.74, 12.0	0.003	2.14	0.78, 6.51	0.2
3+	4.12	1.79, 11.2	0.002	2.13	0.81, 6.33	0.14
LOS	1.01	0.98, 1.02	0.57	0.97	0.94, 0.99	0.04
ASA score group						
1-3	1	—		1	—	
4-5	8.26	4.76, 14.9	<0.001	6.34	3.40, 12.2	<0.001
Multiple operations	3.75	2.17, 6.41	<0.001	3.86	1.90, 7.86	<0.001
RUCA category						
Isolated	1	—		1	—	
Large rural	0.79	0.41, 1.47	0.46	0.9	0.42, 1.87	0.8
Small rural	1.1	0.59, 2.00	0.77	0.92	0.45, 1.82	0.8
Transfer status						
ED admit	1	—		1	—	
Transfer	2.15	1.22, 3.97	0.01	1.65	0.83, 3.40	0.2
Anticoagulation	0.91	0.43, 1.78	0.8	0.61	0.26, 1.30	0.2
Steroids	1.76	0.81, 3.51	0.13	1.34	0.56, 2.98	0.5
Aspirin/Plavix	0.95	0.57, 1.59	0.85	0.83	0.46, 1.49	0.5

RUCA = Rural-Urban Commuting Area; ASA Score = American Society of Anesthesia Score; OR = odds ratio, CI = confidence interval. CCI = Charlson comorbidity index.

Table 6 – Odds of nonhome discharge.

Characteristic	Unadjusted			Adjusted		
	OR	95% CI	P-value	OR	95% CI	P-value
Age group						
[65, 70]	1	—		1	—	
[70, 75]	1.89	1.21, 2.95	0.01	1.81	1.01, 3.27	0.05
[75, 80]	1.61	1.00, 2.60	0.05	1.95	1.05, 3.65	0.03
[80, 85]	1.62	0.93, 2.81	0.09	1.68	0.84, 3.35	0.14
[85, 90]	4.4	2.45, 8.02	<0.001	6.89	3.35, 14.5	<0.001
[90, 99]	8.57	3.38, 24.8	<0.001	17.2	6.09, 54.8	<0.001
Sex						
Female	1	—		1	—	
Male	0.95	0.69, 1.30	0.74	0.77	0.50, 1.16	0.2
CCI groups						
0	1	—		1	—	
1	2.39	1.45, 3.96	<0.001	1.56	0.81, 3.01	0.2
2	2.63	1.62, 4.31	<0.001	1.69	0.89, 3.22	0.11
3+	3.11	2.00, 4.89	<0.001	1.26	0.68, 2.34	0.5
LOS	1.17	1.13, 1.21	<0.001	1.15	1.11, 1.20	<0.001
ASA score group						
1-3	1	—		1	—	
4-5	5.05	3.53, 7.30	<0.001	3.87	2.45, 6.18	<0.001
Multiple operations	5.3	3.49, 8.19	<0.001	1.63	0.91, 2.89	0.10
RUCA category						
Isolated	1	—		1	—	
Large rural	1.63	1.13, 2.37	0.01	2.19	1.33, 3.63	0.002
Small rural	1.72	1.17, 2.53	0.01	1.67	1.00, 2.77	0.05
Transfer status						
ED admit	1	—		1	—	
Transfer	2.3	1.65, 3.23	<0.001	1.50	0.95, 2.37	0.08
Anticoagulation	1.69	1.12, 2.55	0.01	1.19	0.70, 2.01	0.5
Steroids	2.5	1.50, 4.22	<0.001	2.19	1.14, 4.22	0.02
Aspirin/Plavix	1.11	0.82, 1.52	0.5	0.87	0.57, 1.33	0.5

RUCA = Rural-Urban Commuting Area; ASA Score = American Society of Anesthesia Score; OR = odds ratio, CI = confidence interval. CCI = Charlson comorbidity index; LOS = length of stay.

rates of facility care (30% *versus* 19%) and lower rates of home discharge without services (24% *versus* 42%).

In multivariate analysis, the factors associated with mortality were increased age starting at age 80 (OR 2.96; 95% CI 1.07, 8.57, $P = 0.04$) and rising with each age increment, ASA score of 4/5 (OR 6.34; 95% CI 3.40, 12.2, $P < 0.001$), and multiple operations (OR 3.86; 95% CI 1.90, 7.86, $P < 0.001$) (Table 5). The adjusted model was not significant for CCI, RUCA category, or transfer status. When looking at nonhome discharge, associated factors included increased age particularly above age 85 y (OR 6.89; 95% CI 3.35, 14.5, $P < 0.001$), LOS (OR 1.15; 95% CI 1.11, 1.20, $P < 0.001$), large rural location (OR 2.19; 95% CI 1.33, 3.63, $P = 0.002$), and steroids as home medication (OR 2.19; 95% CI 1.14, 4.22, $P = 0.02$) (Table 6). After adjustment, nonhome discharge was not associated with increased CCI or transfer status.

Discussion

In this study, focused on rural geriatric EGS patients at our rural tertiary center, we determined that the majority of patients in this age group are transferred from other institutions and have indicators of higher medical and operative complexity. Although previous literature looking at all-age EGS patients found a much lower nationwide transfer percentage, a similar study looking at transferred EGS patients at a rural tertiary center found a transfer percentage of 65.8%, similar to ours at 60%.[13]

TPs on average had higher acuity (increased ASA scores) and required more complex procedures, with higher rates of open abdomen, multiple operations, and other markers of postoperative complexity including need for feeding tube placement and tracheostomy during their longer hospital courses. These factors likely explain the poorer unadjusted outcomes seen in this population, with longer LOS, higher in-hospital mortality, and higher rates of nonhome discharge. These outcomes are consistent with prior research showing increased LOS and higher mortality in all-age EGS TPs.[14,15,18]

Interestingly however, after adjusting for patient and disease-related factors, transfer status was not independently associated with either in-hospital mortality or nonhome discharge. This suggests that although the TPs are more complex, they receive as effective care as similarly complex local patients. Castillo-Angeles *et al*. similarly found that for all-age EGS patients, transfer status was a significant but very mild predictor of overall mortality (OR 1.01).[15] However, more detailed analysis on potentially important aspects of transfer status (time from onset of symptoms to definitive therapy, time spent at referring facility, and transfer time) were not able to be accounted for in this study, all of which could potentially influence outcomes.

In recent years, there has been increased focus on the EGS population transferred to tertiary facilities, with prior studies demonstrating that major factors contributing to transfer are often related to hospital and surgeon factors at the referring facility.[25,26] The variation in EGS outcomes related to hospital and surgeon volume has also prompted discussion of regionalization of EGS care not only in the overall population but also in the geriatric population in particular. In order to discuss the implications of such discussions, it is important to understand the existing patterns of care particularly in rural areas like that surrounding our institution. Despite the relatively smaller geographic area in NH and VT, our patient population was referred from 29 different institutions across our two states, up to 125 miles away. Further analysis of the patterns of care in specific rural areas is merited to determine the burden of geriatric EGS care, the operative complexity of this population, and their outcomes in order to understand the implications of regionalization on hospital transport systems as well as tertiary centers in those areas.

There are multiple limitations to this study, including the fact that it is a single-center study from a rural academic institution, limiting generalizability to a broader populace. However, our experience is illustrative of the EGS practices in rural areas. Another limitation is the lack of racial and ethnic diversity in our population, with the overwhelming majority of our patient population being White. Socioeconomic and education status was not available in this retrospective dataset, both of which could also be contributing factors to outcomes. We were not able to analyze the reasons for transfer (surgeon availability, operative capacity, etc.) in this work, but this merits future study to evaluate which patients had the potential for remaining at the initial facility versus which required transfer due to lack of operative capacity. We only included operatively managed patients in this study, excluding a significant population of nonoperative EGS patients which account for many TPs in previously published work from other investigators. Further investigation is required to evaluate the frequency of transfers for nonoperative management and also to determine what percentage of these patients are discharged without any operative intervention. For this study, we did not look at complications or complication rescue, which is an important factor in geriatric EGS mortality and requires further investigation.[27]

At our rural academic center, the majority of geriatric patients requiring EGS operations are transferred from other facilities for their care and have higher rates of mortality and nonhome discharge which appear related to their medical and operative complexity. Further investigation is required to evaluate both the reasons for transfer as well as additional transfer characteristics (time to transfer, etc.) to understand whether there are modifiable risk factors that could affect outcomes in this vulnerable population.

Conclusions

At our institution, a majority of rural geriatric EGS patients were transferred for care. TPs had higher ASA class and operative complexity, but similar comorbidity profiles compared to local EDA patients. They had significantly longer LOS, higher mortality rate, and higher rates of nonhome discharge. Despite this, transfer status was not independently associated with mortality or nonhome discharge. Additional studies are warranted to evaluate the transfer process for these at-risk adults.

Study Type

Retrospective, single center.

Level of Evidence

Level IV.

Author Contributions

Study design AB CB LEB; Data collection AB LKB; Data Analysis LKB CB LEB AB; Manuscript Writing and Revision LKB CB LEB AB.

Disclosure

Alexandra Briggs is an American College of Surgeons Associate Fellow Scholar in Geriatric Surgery.

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Meeting Presentation

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