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Geriatric Small Bowel Obstruction: An Analysis of Treatment and Outcomes Compared to a Younger Cohort

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Abstract

Background—Small bowel obstruction (SBO) is a common condition, but little is known about its presentation, management, and outcomes in geriatric patients.

Methods—A retrospective review was performed comparing geriatric (≥ 65 years of age) and non-geriatric patients admitted with SBO. Admission characteristics, treatment, and outcomes were compared. Data analysis included Student's *t* test and chi-square test or Fisher exact test.

Results—Among 80 geriatric and 136 non-geriatric patients no difference was observed between admission characteristics, treatment, time to or type of surgery, length of post-op stay, or overall complications. Cardiac complications (15% vs 0%, $p=0.0082$) and sub-acute care facility discharge (29% vs 5%, $p<0.001$) were more common for geriatric patients.

Conclusions—Compared to younger adults, elderly patients with SBO have similar presentations and overall outcomes with the exception of cardiac morbidity and discharge disposition. Pre-operative attention to cardiac risk profile and discharge disposition discussion should be encouraged.

Summary—This study analyzes geriatric patients presenting with small bowel obstruction when cared for by an Acute Care Surgery service. Compared to younger adults, the presentation, treatment response, and outcomes are similar with the exception of cardiac complications and discharge destination.

Keywords

Elderly; Geriatric; Small bowel obstruction; Acute Care Surgery; Outcomes

Background

As the population of Americans ages, the number of elderly patients requiring acute medical care and emergency general surgical procedures is likewise increasing.^{1,2} It is believed that elderly patients present with higher levels of acuity of illness, greater co-morbid diseases, and an overall decreased physiologic reserve ultimately impacting outcomes and consumption of healthcare resources.¹⁻³ However, little is known about many surgical disease processes and outcomes as they relate specifically to geriatric patients. In order to

improve outcomes, it is important to study specific emergency general surgical disease processes and outcomes for this special population of adults.

Compared to elective surgery, emergency surgery is associated with increased morbidity and mortality, and this increased risk is most evident in geriatric patients.^{2,4,5} Emergency abdominal surgery to treat a small bowel obstruction (SBO) is a common reason for hospital admission and emergency surgery for adults of all ages. Intestinal obstruction accounts for approximately 15% of all emergency department visits for acute abdominal pain and SBO accounts for 20% of all acute surgical admissions.⁶ SBO is caused by a variety of pathologic processes including postoperative adhesions, malignancy, and hernias.^{7,8} Strangulated obstructions are surgical emergencies, and if not treated quickly lead to bowel ischemia and further morbidity and mortality.⁸⁻¹⁰ Surgery for complete obstructions without known strangulation is controversial, but if medical therapy fails surgery is absolutely necessary.⁷ Though management principles have not changed dramatically over the past decade, the population of patients continues to evolve, and thus the disease process must be reviewed to understand whether elderly patients have similar presentations, management, and outcomes as younger adults.

Surgical outcomes for SBO in the general population are good if they are performed in a timely manner after diagnosis.^{1,8-11} If surgery is performed within 36 hours of presentation, the mortality rate has been reported to be 8%.⁸ Infections such as wound infection are common complications of SBO surgery in the elderly.³ Other factors such as co-morbid diseases, late presentation, delay in treatment, decreased physiologic reserve have all been implicated in poor outcomes in the elderly.¹¹⁻¹⁵

Acute Care Surgery has developed to meet the needs of emergency general surgery patients.¹⁶ The acute care surgery model highlights the challenges in taking care of acutely ill patients with a high level of acuity and illness, but others have demonstrated good outcomes with elderly patients undergoing emergency abdominal surgery.¹⁷ Many patients present with previously untreated disease processes and with poor preventive medicine history.¹⁷ The rapid increase in the elderly population has led to an increased awareness of the differences in presentation and outcomes for many acute surgical illnesses in this special population. The acute care surgeon needs to develop a better understanding of the patient population that is being served and develop better practices for managing emergency general surgery disease processes through risk reduction and early discussions regarding expected outcomes.

Methods

A retrospective chart review was performed comparing two historic cohorts admitted to an urban academic institution between June 1, 2009 and July 1, 2011. We reviewed the electronic medical records of all adult geriatric (≥ 65 years of age) and non-geriatric (18 to 64 years of age) patients diagnosed with an acute small bowel obstruction admitted by or receiving consultation from an Acute Care Surgery (ACS) providing all emergency general surgery coverage for the hospital. The patients were identified for inclusion using a prospectively collected patient dataset of all patients encountered by the ACS service. Only

patients with a diagnosis of small bowel obstruction on admission or initial consultation were included. The diagnosis of mechanical SBO was made clinically and with plain abdominal X-rays as a minimum of radiographic evidence. Other imaging studies such as CT scan and contrast studies were used selectively at physician discretion. We compared the outcomes of the two groups after examining the chart data and recording patient information.

Patent data recorded and analyzed included age, sex, admitting service, previous abdominal operations, preoperative radiological investigations, pre-existing cardiac diseases, time interval between hospital admission and operation, type of surgery if required, length of post-op stay, complications, and discharge disposition. Each admission was entered as a separate “episode” in the database.

Univariate analysis was performed using the Student’s *t* test or the Mann–Whitney *U* test for continuous variables, and by chi-square test or Fisher exact test for categorical variables. $P < 0.05$ was considered statistically significant.

Results

Initial review of the dataset identified 288 patients encountered in the study time period with a diagnosis of small bowel obstruction during hospital admission. Patients who developed an early post operative SBO while hospitalized for another surgical problem or who were eventually determined to not have an SBO were excluded. Patients with incomplete histories were also excluded from our study. Two hundred sixteen patients were ultimately included for this analysis including 80 geriatric and 136 non-geriatric patients. Both groups had similar admitting characteristics, which are presented in Table I. The only significant difference seen between the two cohorts was the presence of pre-existing cardiac disease, with geriatric patients much more likely to have a comorbid cardiac disease (26.3% vs 12.5% $p=0.0104$).

Treatment Characteristics

The measured treatment characteristics were also similar between the geriatric group and younger cohort. These results are summarized in Table II. Geriatric patients had a similar rate of requirement for surgical exploration compared to younger patients (41.3% vs 36.8% $p=0.5128$). Importantly, geriatric patients experienced a similar time interval to surgery (1.96 days vs 1.92 days $p=0.934$) and requirement for small bowel resection (36.4% vs 32.8% $p=0.4942$).

Outcome Measures

Outcome measures are shown in Table III. Medically managed geriatric and younger patients had similar lengths of hospital stay (4.09 days vs 4.11 days $p=0.9679$). Geriatric patients requiring operations had similar overall complication rates to younger patients (42.42% vs 34% $p=0.4374$) and post-op length of stay (8.83 days vs 9.09 days $p=0.8766$). The requirement for bowel resection in the two populations was similar and underlying reason for that bowel resection was similar (Table IV). However, differences were seen in the type of complications. The geriatric cohort was more likely to have post-op cardiac

complications (15.15% vs 0% $p=0.0082$), which included atrial fibrillation and cardiac arrest. Though not statistically significant, the younger cohort was more likely to develop a prolonged post-op ileus (14% vs 3.03% $p=0.1491$), which was defined as lasting longer than 3 days. Finally, geriatric surgery patients had a greater mortality rate than their younger cohort, although again not achieving statistical significance (9.1% vs 0% $p=0.0594$). The causes of death included two cases of septic shock, aspiration pneumonia, and cardiogenic shock with multi-organ failure.

For all patients admitted for SBO there was a significant difference seen in the discharge destination between the two groups ($p<0.001$). Non-geriatric patients were more likely to be discharged to their homes (home or self-care, home health care, hospice in home) and the geriatric patients significantly more likely be released to another rehab or nursing facility for additional care (skilled nursing facility, rehabilitation facility/unit, long term care facility, intermediate care facility, against medical advice). Other discharge destinations included federal hospital, psychiatric hospital, law enforcement, expired, and unknown.

Discussion

This study sought to characterize and understand differences in the presentation, treatment and outcomes of geriatric and younger adults presenting with SBO to an academic urban medical center. The goal was to determine whether significant differences currently exist and whether treatment could then be optimized to improve future outcomes. Previous studies have characterized SBO and abdominal surgery in the elderly, but no studies have directly compared the elderly to a younger cohort to better understand the inherent differences in the two populations.¹⁻³

Interestingly, this study found no significant differences in the demographics and presentation of the two populations. Consistent with other studies, males and females presented with similar prevalence, and both groups had similar histories of at least one previous abdominal surgery and previous SBO.^{1,3,11} It was found that geriatric patients were more likely to have pre-existing cardiovascular disease. This is consistent with studies showing that age is an independent risk factor for cardiovascular disease.^{18,19} Overall this data demonstrated that for the measures reviewed the populations were similar except for presence of comorbid cardiovascular disease.

There is a motto among surgeons of historic nature that “The sun should never rise or set on a small bowel obstruction.”^{13,20} However, that tactic has softened over the past twenty years, and now the current approach relies on medical management for most patients. The modern strategy involves evaluating for completeness of the obstruction and to identifying patients with an urgent need for surgery, such as those with bowel compromise, hernia incarceration, sepsis, or peritonitis. Of those patients with no urgent indications for surgery and a non-complete obstruction medical management using intravenous fluid resuscitation, nasogastric decompression, and temporary elimination of oral nourishment is instituted.²¹ If the patient has no observable improvement over 24-48 hours then surgery is indicated.¹⁵ However, questions have been raised whether geriatric patients respond to medical therapy similar to

younger patients and whether the decision to operate should be influenced by the age of the patient.

This study found no significant difference in treatment characteristics between the two groups. Both groups had a similar majority of patients admitted to a surgical service which is has been linked to improved outcomes in SBO management.¹¹ Geriatric patients responded to medical therapy in a similar manner to younger patients. The overall medical response rate is consistent with other studies falling within the range of 20% to 62% percent.²² Similar to other studies, this study would support not using age alone as a determinant of whether medical or surgical management should be recommended.^{2,3}

For patients ultimately requiring surgical exploration, time to surgery is critical, and delay has been linked to higher rates of bowel resection, complication rates and increased mortality.^{7,12,13,15,20} Our study found no difference between the two groups in type of surgery required and in time to surgery with average times similar to recently published overall population data.¹⁵ Therefore, delay to surgical treatment is an unlikely cause of any increase in geriatric morbidity or mortality.

In terms of post-surgical complications this study found that there was no difference in the percent of patients with at least one complication between the groups; however, there was a difference in the type of complications encountered. First of all, younger patients were more likely to experience a prolonged post-operative ileus. Post-operative ileus is expected in patients undergoing an abdominal surgery; however, prolonged ileus results in discomfort, longer hospital stay, and increased costs.^{23,24} Of importance to the outcomes of our study, we defined as an ileus as lasting longer than 3 days.²⁵ However, it has been suggested that an ileus should not be classified as “prolonged” unless it lasts greater than 6 days.²⁵ Using this definition would have reduced the overall complication rate of the younger cohort.

This study did find that elderly patients experienced a greater number of post surgical cardiac complications and were more likely to expire in the hospital though this did not reach statistical significance. As discussed earlier geriatric patients were more likely to have pre-existing cardiac disease, which is likely related to their greater post-op cardiac complication rate. The overall operative mortality was 3.4%, which is on the lower end of the range reported in other recent studies.^{2,3,7,12,13,26} The geriatric patients in our study had an increased mortality relative to the younger cohort, however this was not statistically significant likely due to an underpowered study. Surgical mortality for abdominal surgery in the elderly has been shown to be due a number of factors including increased number of comorbid diseases, malignant disease, and severity of surgical condition.² Importantly, our study demonstrates that complications were not due to differences in surgical approach but appear to be due to comorbid disease and age. Therefore, our study would support an aggressive evaluation for comorbid disease and cardiac risk reduction.

Finally, somewhat surprisingly this study demonstrated that hospital length of stay was similar for both groups. More expectedly, however, there was a significant difference in the discharge destination between the two groups. Geriatric patients were nearly 10 times as likely to be discharged to another healthcare facility, indicating that the elderly patients

experienced more functional decline perhaps due to deconditioning or prolonged recovery. Given the limitations of a retrospective study it was difficult to determine the living arrangements of the patients upon presentation to the hospital. However, other studies of geriatric populations have demonstrated higher rates of discharge to skilled nursing facilities in the post-operative or post injury period regardless of pre-hospitalization functional status and living arrangements.²⁷ Overall although, both groups were discharged after the same amount of time the geriatric group was less independent and required more healthcare resources.

Limitations to this study include its retrospective nature, size of the study population, single institution, and lack of a protocol for SBO management. If more patients were included, perhaps greater differences would be noted in morbidity and mortality. Long-term outcomes, particularly 30 or 90 day mortality were not able to be studied and would be important outcome measures. Improvement in outcomes for the geriatric population may ultimately prove difficult; however, from this current study, it is suggested that evaluation and management of cardiac disease and early discussion regarding discharge destination could make a substantial impact on quality and satisfaction of care.

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Table I

Comparative Results of Admitting Characteristics of Patients Treated for SBO

Admitting Characteristics	All Geriatric Patients (n=80)	All Younger Patients (n=136)	P-value
Male	37 (46.3%)	57 (41.9%)	0.5345
Female	43 (53.8%)	79 (58.1%)	0.5345
Previous Surgery	67 (83.8%)	114 (83.8%)	0.9887
History of SBO	28 (35%)	49 (36%)	0.8787
Cardiac Disease	21 (26.3%)	17 (12.5%)	0.0104
<i>Admitting Service</i>			
Surgery	55 (68.8%)	98 (72.1%)	0.6053
Medicine/other	25 (31.3%)	38 (27.9%)	0.6053

Table II

Comparative Results of Treatment Characteristics of Patients Treated for SBO

<u>Treatment Characteristics</u>	<u>All Geriatric Patients (n=80)</u>	<u>All Younger Patients (n=136)</u>	<u>P-value</u>
Surgically Treated	33 (41.3%)	50 (36.8%)	0.5128
Time to Surgery (days)	1.96	1.92	0.9340
<i>Type Procedure</i>			
Lysis of Adhesions	20 (61.1%) *	32 (64%)	0.8071
Small Bowel Resection	12 (36.4%)	16 (32%)	0.4942
Hernia Repair	3 (9.1%)	8 (16%)	0.75

* As a percentage of surgically managed patients. Totals greater than total number of surgically managed patients due to some patients needing two procedures (i.e. LOA and hernia repair)

Table III

Comparative Results of Outcomes of Patients Treated for SBO

Outcome Measures	<u>Surgically Managed Geriatric (n=33)</u>	<u>Surgically Managed Younger (n=50)</u>	<u>P-value</u>
Overall Complication	14 (42.4%)	17 (34%)	0.4374
<i>Type of Complication</i>			
Prolonged Ileus	1 (3%)	7 (14%)	0.1491
Anastomotic Leak	0 (0%)	3 (6%)	0.2727
Sepsis	1 (3%)	1 (2%)	1.00
Recurrent SBO	2 (6.1%)	2 (4%)	0.6132
Wound Infection	0 (0%)	2 (4%)	0.5372
Cardiac complication	5 (15.2%)	0 (0%)	0.0082
Pulmonary complication	1 (3%)	2 (4%)	1.00
UTI/ Urinary Retention	4 (12.1%)	4 (8%)	0.7069
PNA	1 (3%)	2 (4%)	1.00
Other	2 (6.1%)	1 (2%)	0.56
Death	3 (9.1%)	0 (0%)	0.0594
Post-op Stay (days)	8.83	9.09	0.8766
	<u>Medically Managed Geriatric (n=47)</u>	<u>Medically Managed Younger (n=86)</u>	
Length of Stay (days)	4.09	4.11	0.9679
	<u>All Geriatric Patients (n=80)</u>	<u>All Younger Patients (n=136)</u>	
<i>Discharge Destination</i>			<0.001
Home	57 (71.3%)	129 (94.9%)	
Healthcare Facility	16 (20%)	3 (2.2%)	
Expired In House	4 (5%)	0 (0%)	
Other	3 (3.8%)	4 (2.9%)	

Table IV

Reasons for Bowel Resection

<u>Reason for resection</u>	<u>Geriatric Resections (n=12)</u>	<u>Younger Resections (n=16)</u>	<u>P-value=</u>
Ischemic bowel	9 (75%)	5 (31.3%)	0.07554
Tumor	1 (8.3%)	0	Using Fisher test
Extensive strictures	1 (8.3%)	6 (37.5%)	
Intussusception	1 (8.3%)	1 (6.3%)	
Perforation	0	2 (12.6%)	
Ulcer related to	0	1 (6.3%)	
Crohns			
Extensive fistulas	0	1 (6.3%)	