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## Involvement of a Surgical Service Improves Patient Satisfaction in Patients Admitted with Small Bowel Obstruction

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### Abstract

**Background**—For patients with small bowel obstruction (SBO), surgical care has been associated with improved outcomes; however it remains unknown how it impacts satisfaction.

**Methods**—Patients admitted for SBO who completed the hospital satisfaction survey were eligible. Only those with adhesions or hernias were included. Chart review extracted structural characteristics and outcomes.

**Results**—47 patients were included; 74% (n=35) were admitted to a surgical service. 26% (n=12) were admitted to medicine, and 50% of those (n=6) had surgical consultation. Patients with surgical involvement as the consulting or primary service (SURG) had higher satisfaction with the hospital than those cared for by the medical service (80% SURG; 33% MED, p=0.015). SURG patients also had higher satisfaction with physicians (74% SURG; 44% MED; p=0.015).

**Conclusions**—Surgical involvement during SBO admissions is associated with increased patient satisfaction, and adds further weight to the recommendation that these patients be cared for by surgeons.

### Keywords

Small bowel obstruction; Patient satisfaction; HCAHPS; Surgery service; Medical service

### Introduction

Small bowel obstruction (SBO) is a common problem, accounting for 12%–16% of admissions to the surgical service in patients with acute abdominal conditions.<sup>1</sup> More than 300,000 operative procedures for SBO are performed annually in the United States, costing 2.3 billion dollars per year.<sup>2</sup> Of all patients admitted for SBO, a relatively small fraction (18–24%) requires operative intervention with the remaining patients treated successfully

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with supportive care.<sup>3,4</sup> As a result, these patients are currently managed by a variety of inpatient providers, including surgeons, internists, hospitalists, and family medicine providers. Although the fraction of patients managed by non-surgical care providers depends on local institutional practice and structure, it is estimated that 40% of all patients with SBO are cared for on medical services.<sup>5,6</sup>

Although most patients with SBO improve without surgery, operative exploration is recommended for patients without resolution of the obstruction within 3–5 days.<sup>7,8</sup> The determination of the need for and timing of surgery is therefore critical to clinical decision making. Several series have previously examined patient outcomes as a function of admitting service.<sup>6,9,10</sup> These data suggest that for most patients, admission to a surgical service is associated with a shorter length of stay, lower hospital charges, and lower mortality when compared with admission to a medical service.<sup>6,9,10</sup> As a result, modern consensus guidelines recommend that most patients with SBO be admitted to a surgical service.<sup>7</sup>

In addition to these practice guidelines, the institution of the Affordable Care Act adds new and unique pressures that may soon influence patient management. Specifically, Hospital Value-Based Purchasing (VBP) links Medicare and Medicaid reimbursement to patient satisfaction scores, as measured by the Hospital Consumer Assessment of Healthcare Services (HCAHPS) survey.<sup>11</sup> Despite the emphasis on and impending financial implications of patient experience scores, relatively little is known about the clinical and structural determinants of care that impact patient satisfaction. Specifically, it is currently unknown how inpatient management practices impact satisfaction for patients admitted with SBO. The aim of this study was therefore to examine the effect of admitting service on HCAHPS scores for patients with SBO, with the ultimate goal of identifying structural processes that could be targeted for improvement efforts.

## Materials and Methods

### Patients

Patients who were admitted to the University of Wisconsin Hospital and Clinics between 2009–2012 were identified using ICD-9 codes for SBO. Of those, the subgroup that completed the HCAHPS survey was identified. Standard HCAHPS exclusion criteria applied and include age <18, admissions for psychiatric diagnosis and patients discharged to a skilled nursing facility. Charts from eligible patients were identified, and a detailed retrospective chart review abstracted relevant demographic and clinical variables. Because of the wide clinical range of etiologies in patients with ICD-9 codes for small bowel obstruction, we reviewed the physician notes and images for each patient to ascertain the proximate cause of the obstruction (e.g. malignant, related to inflammatory bowel disease, adhesive, hernia-related, and other causes). Since we aimed to evaluate the satisfaction of patients most likely to need surgical intervention, we included only patients with SBO due to adhesions or hernias in the analysis. For analysis, patients were divided into groups that had surgical contact, meaning either admission to a surgical service or admission to a medical service with a surgical consult, and those with care by a medical service only. The Institutional Review Board approved this study prior to its inception.

## Survey

The HCAHPS survey consists of 32 questions<sup>12</sup> used to measure patient perceptions of hospital care. Satisfaction with physician communication was determined using the following domain-specific HCAHPS questions: “During this hospital stay, how often did doctors treat you with courtesy and respect?”, “During this hospital stay, how often did doctors listen carefully to you?”, and “During this hospital stay, how often did doctors explain things in a way you could understand?”. All of these questions have the following possible choices: never, sometimes, usually, and always, with always being referred to as the topbox response. The physician communication composite measure was constructed using these three questions by first determining the percentage of patients that rated each question as topbox. The composite was then calculated by taking the average of the topbox percentage for each of the three individual questions to determine the overall composite score. Overall hospital satisfaction was determined using the summative HCAHPS question “Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?”. Responses of 9 or 10 were considered topbox according to HCAHPS standard prescription.<sup>12</sup> In addition, as a control for other factors that could have influenced the differences between those that had surgical involvement and those that did not, we examined the responses of the other HCAHPS domains. The composites examined were: communication with nurses (2 questions), pain management (2 questions), discharge information (2 questions), medication communication (2 questions) and single questions addressing cleanliness and quietness of the hospital environment. These composite domains were calculated as described above.

## Statistical Analysis

Univariate analyses were performed to assess the relationships between HCAHPS patient satisfaction domains and patient/system level variables, and statistical analysis was performed using SPSS statistical software (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). T-tests were used for continuous variables and chi square tests for categorical variables as appropriate. Calculation of the p-value for the physician composite domain was performed using a t-test for the percentage topbox response for each of the three questions for each group.

## Results

A total of 92 patients with complete HCAHPS data and ICD-9 codes for small bowel obstruction were identified. After identification of the etiology of the bowel obstruction by thorough chart review, a total of 47 patients with SBO due to adhesions or hernias were identified. As expected, nearly all (96%) had prior abdominal surgery. Of these patients, 52% were female. The mean age was  $63 \pm 17$  years and BMI was  $27 \pm 7$ . The mean Charlson Comorbidity Score<sup>13</sup> was  $1.2 \pm 1.3$ . Average length of stay for the total population was  $6 \pm 5$  days.

Of the 47 patients, 74% (n=35) were admitted to a surgical service (Figure 1). Of those admitted to the medical service, 50% had surgical consultation at some point during the

hospital stay. Of patients admitted to medical services, a variety of models of care were included (e.g. general medicine, family medicine, and hospitalist services are represented). A total of 40% of patients underwent surgical exploration, and this figure was similar for those admitted to medicine and surgery (25% vs 46% respectively). We then compared demographic data for those patients in each of the three groups – medical care only, medical care with surgical consultation, and surgical care. There were no significant differences between the groups in terms of age, gender, race or severity of comorbidity (data not shown). We then combined the latter two groups (medical care with surgical consultation and surgical care) as a way to compare those with surgical involvement (SURG) to those without (MED). There were no significant differences between these groups in age, gender, race, comorbidities or BMI (Table 1). Further, there was no significant difference between groups with respect to duration of nasogastric decompression ( $3.0 \pm 2.3$  days MED,  $3.6 \pm 2.4$  days SURG,  $p=NS$ ). As would be expected, the mean length of hospital stay was slightly higher in patients with surgical involvement given that nearly half of them underwent operative exploration, although this did not reach statistical significance ( $3.7 \pm 2.0$  days MED,  $6.4 \pm 2.4$  days SURG,  $p=NS$ ).

The surgical outcomes were then examined only for those patients who had contact with the surgical service. Patients admitted to medicine with a surgical consultation were compared to those on the surgical service (Table 2). A significant difference was seen between groups in the time delay between admission and operation with patients admitted to the surgical service having a significantly shorter delay ( $6.0 \pm 3.0$  days vs  $0.7 \pm 1.0$ ,  $p < 0.001$ ). No other significant differences were seen, but there was a trend towards higher rates of bowel resection and longer postoperative lengths of stay in the medical patients, and a higher rate of readmission in the surgical patients.

When examining patient-reported satisfaction with physician communication, patients with surgical contact had significantly higher composite scores (topbox score: 74% SURG; 44% MED,  $p = 0.015$ ; Table 3). This trend was consistent in each of the individual communication domain components. Finally, when examining overall hospital satisfaction, patients with surgical involvement again had significantly higher satisfaction than medical patients (topbox score: 80% SURG; 33% MED,  $p=0.015$ ).

When we examined the other HCAHPS responses that were used as control measures we found that there were no significant differences between five of the major HCAHPS domains: pain management ( $p=0.095$ ), discharge information ( $p=0.368$ ), medication communication ( $p=0.598$ ) or quietness ( $p=0.479$ ) and cleanliness ( $p=0.391$ ) of the environment. There was a difference in nurse communication between the groups (topbox composite score: 83% SURG; 56% MED,  $p=0.022$ ), but this is not unexpected as this is closely related to and likely dependent on physician communication.

## Discussion

We have demonstrated that surgical involvement in the care of patients admitted for small bowel obstruction is associated with increased patient satisfaction both with the hospital overall and with physician communication. To our knowledge, this is the first report of how

admitting service impacts patient satisfaction for patients admitted with SBO. Previous consensus guidelines have suggested that patients admitted for SBO should be treated primarily by a surgical service.<sup>7</sup> This study offers an additional piece of evidence supporting that recommendation.

In this study, 26% of patients with small bowel obstructions related to adhesions or hernias were admitted to the medical service. This is in keeping with previous reports that demonstrate that up to 40% of patients with SBO are admitted to a medical service.<sup>5,6</sup> Because we examined only the subset of patients with SBO most likely to need operative intervention and excluded those who may be best served by medical providers (e.g. malignant obstructions and those related to inflammatory bowel disease), this difference is not surprising.<sup>5</sup> This also likely explains the slightly higher fraction of patients in our series undergoing operative exploration (40%), compared to rates of 18–24% found in the literature for all patients with SBO.<sup>3,4</sup>

Previously, it has been demonstrated that admission to a surgical service is associated with a shorter length of stay than admission to a medical service.<sup>9,10</sup> This is in keeping with our finding of a trend towards shorter lengths of postoperative stay in patients on the surgical service. Similarly, we and others found that the time from diagnosis to surgical exploration is shorter for patients on the surgical service.<sup>6</sup> Although the role of patient selection may play a prominent role in these findings (e.g. with those patients who need urgent operation admitted to the surgical service), it seems unlikely to be the only explanation for the large difference we found between groups. It has previously been shown that a longer length of time from SBO diagnosis to exploration increases the risk of bowel resection, a finding that is also consistent with our data.<sup>14,15</sup>

The novel finding in this study is the higher level of patient satisfaction seen in patients admitted with SBO who had contact with the surgical service. Although we cannot discern the reasons for this finding from the current study, there are a number of possible explanations to consider. Because nearly all of our patients had undergone a previous surgical procedure, there may be a previous trusting relationship established with surgical providers. Alternatively, this finding might relate to differences not in patient perceptions of care provided, but rather in structural differences in the way care for patients with SBO is delivered (e.g. nasogastric tube management, content and frequency of discussions about possible operative intervention) by medical and surgical providers. Although surgical patients have moderately higher satisfaction ratings compared to medical patients, this subset of patients is dissimilar from the usual surgical population in that they presented with acute (or subacute) problems rather than elective surgical procedures. To understand these differences in satisfaction further, secondary studies of a qualitative nature are needed.

This study is limited primarily by small sample size. Although many more patients with SBO were admitted over the study period, we limited our analysis to patients who had completed the HCAHPS survey so that differences in satisfaction could be examined. Potential for response bias exists, but is mitigated here in that the response rates are similar to both hospital and national norms. Unfortunately, we cannot compare the responders and nonresponders to the survey in terms of demographics and outcomes as our data source only

includes those who returned the HCAHPS survey. Despite this limitation in the sample size, we were able to demonstrate statistically significant differences in overall hospital and physician communication satisfaction scores. The differences found here are emphasized further when compared to national HCAHPS norms. Examination of data from the hospital compare website<sup>16</sup> demonstrates that during the study years, 80.5% of patients nationally rated physician communication as topbox. This is similar to the 74% in the surgical group, but clearly different from the 44% in the medical care only group. Similarly, hospital rating nationally was 68.3%, which is similar to the 80% favorable in the surgical group, but strikingly different from the 33% in the medical care group. Given the known rightward skew in HCAHPS data and the national norms, the differences seen in scores in our study are quite marked and likely to represent an important clinical difference in care.<sup>17,18</sup>

Additionally, this study may also be limited in its generalizability to other hospital settings, as there may be additional institution specific factors that impact satisfaction in these patients. For example, the structural delivery of clinical care on the specific medicine service may influence these results, although the variety of services included here likely mitigates those types of effects. Further, because there were no differences in the structural HCAHPS domains (pain management, discharge-information, medication communication, quietness or cleanliness), our results suggest that the differences in satisfaction with communication are not reflective of larger differences between units but instead are related to the issues specific to this patient subset. Further, because of the number of events in outcomes measures, multivariable analysis was not carried out. A final limitation relates to the fact that it is difficult to ascertain if any of the operative explorations were performed in a semi-elective manner for more chronic symptoms with acute exacerbations. This might influence the timing of operative intervention and shorten the time to operative intervention.

## Conclusions

In conclusion, involvement of a surgical service during admission for SBO is associated with increased patient reported satisfaction. These findings have implications for a hospital system's efforts to improve HCAHPS scores, and offer an area for targeted intervention. In conjunction with previous treatment guidelines, this suggests patients should at the least have involvement of a surgical service when hospitalized for bowel obstructions related to adhesions or hernias. More generally, evaluation of patient satisfaction scores for specific patient subgroups, when linked to their clinical characteristics, is likely to be beneficial and lead to the identification of different structural processes of care with a hospital system that can be targeted for improvement efforts.

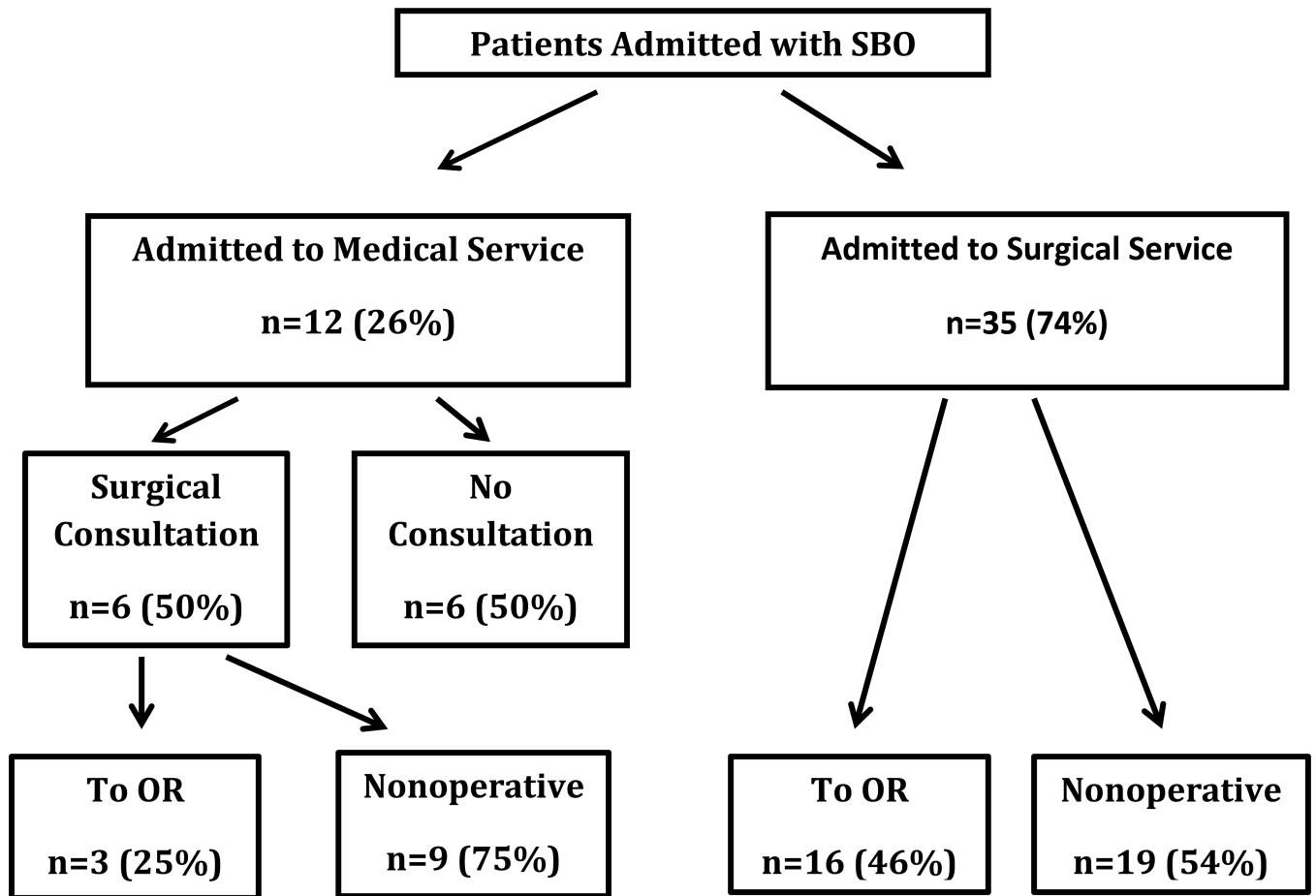
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**Figure 1.**  
Description of the Patient Population



**Table 1**

## Univariate Analysis of Group Characteristics

Variable	Medical Care Only (n=6)	Surgery Contact* (n=41)	p-value
Age (mean $\pm$ SD) †	65.2 $\pm$ 17.1	63.3 $\pm$ 17.4	NS †
Female (%)	50.0%	51.2%	NS †
Caucasian (%)	83.3%	90.2%	NS †
Previous Abdominal Surgery	100%	95.1%	NS †
Charlson Comorbidity Index (mean $\pm$ SD) †	1.0 $\pm$ 1.5	1.3 $\pm$ 1.3	NS †
BMI † (mean $\pm$ SD) †	34 $\pm$ 11	26 $\pm$ 6	NS †
Nasogastric tube days	3.0 $\pm$ 2.3	3.6 $\pm$ 2.4	NS †
Hospital length of stay (days)	3.7 $\pm$ 2.0	6.4 $\pm$ 5.0	NS †
30-Day Readmission Rate (%)	0%	17%	NS †

\* Surgical contact includes patients on the surgical service and those with surgical consults

† SD, Standard deviation; BMI, Body mass index; NS, Not significant

**Table 2**

## Surgical Outcomes by Admitting Service

Variable	Medicine With Surgery Consult (n=6)	Surgery Service (n=35)	p-value*
30-Day Readmission Rate (%)	0%	20.0%	NS <sup>†</sup>
Surgical management (%)	50.0%	45.7%	NS <sup>†</sup>
Time to OR (days mean ± SD) <sup>†</sup>	6.0±3.0	0.7±1.0	<0.001
Bowel Resection (% of those with an operation)	33.3%	37.5%	NS <sup>†</sup>
Postoperative Length of Stay (days mean ± SD) <sup>†</sup>	11.7±3.8	7.4±4.8	NS <sup>†</sup>

\* Comparing Primary Surgical Service versus Medicine with Surgery Consult

<sup>†</sup>SD, Standard deviation; NS, Not significant

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**Table 3**

Patient Satisfaction with Physician Communication and Hospital Experience

Patient Satisfaction	Medical Care Only (n=6)	Surgery Contact* (n=41)	p-value*
Composite of Physician Communication (% Topbox)	44%	74%	0.015
Treated you with courtesy and respect	50%	78%	
Listened carefully to you	50%	80%	
Explained things in a way you could understand	33%	65%	
Overall Hospital Satisfaction (% Topbox)	33%	80%	0.015

\* Comparing Primary Surgical Service versus Medicine with Surgery Consult

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