

Optimizing Hospital Resource Utilization in Bariatric Readmission

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ABSTRACT

Background and Objectives: The prevalence of patients with a history of bariatric surgery is climbing. Medical and surgical questions arising in this patient population may prompt them to present to the nearest emergency department (ED), irrespective of that facility's experience with bariatric surgery. The emergency physician is the first to evaluate patients with a history of bariatric surgery who present with abdominal symptoms. As a quality improvement project aimed at reducing resource utilization, we sought to determine which patients presenting to the ED could be treated in an outpatient setting in lieu of hospital admission.

Methods: We conducted a retrospective review of bariatric patients admitted from our ED with abdominal symptoms, including abdominal pain, nausea, vomiting, dysphagia, obstruction, and hematemesis. We collected the following variables: type of bariatric operation, admission and discharge diagnoses, and all interventions performed during admission.

Results: One hundred sixty-nine patients (76.1%) had a history of laparoscopic Roux-en-Y gastric bypass. The time from bariatric operation to presentation averaged 42 ± 4.63 (SD) months. The most common symptom was abdominal pain (80.2%). Ninety-four percent of patients underwent invasive management via upper endoscopy, laparoscopy, or laparotomy. The most common postprocedural diagnoses were stricture, bowel obstruction, inflammatory findings, and cholecystitis.

Conclusion: Most patient encounters resulted in invasive management (204/282; 72.3%). The subset of these patients requiring endoscopic evaluation or therapy (37.7%)

may be suitable for outpatient management if appropriate measures are available for rapid follow-up and procedural scheduling.

Key Words: Abdominal pain, Bariatric surgery, Endoscopy, Gastrointestinal, Quality improvement.

INTRODUCTION

Over the past 60 years, the increased safety profile of bariatric surgery and increased availability of bariatric programs has led to an increase in the number of patients with a history of bariatric surgery (bariatric patients) within the community.¹⁻⁴ Even in the absence of a local bariatric surgical program, patients are willing to travel for surgical care, both domestically and abroad. In addition, patients are not geographically anchored and may move throughout the country and world in the years after their bariatric operations. Managing the bariatric patient, a role that may have been once relegated to the bariatric surgeon, is no longer exclusively in the purview of that subspecialty. Familiarity with foregut anatomy after bariatric surgery and the complications that can ensue is essential for every specialty from primary care, through emergency medicine and general surgery. Many bariatric patients will seek care at the nearest hospital, irrespective of the potential diagnosis, or the receiving center's experience and ability to care for problems related to bariatric surgery. Many of these presentations are for abdominal complaints, the workup and management of which can be challenging in the bariatric patient population.

Often, the first provider to evaluate these patients is the emergency physician. Depending on where in the nation, this could be a physician trained in emergency, internal, or family medicine. Regardless of their specialty training, emergency providers must be capable of rapidly triaging patients requiring urgent intervention from those who can be safely observed in the hospital and identifying those suitable for outpatient management. Before discharge, the patient must maintain oral intake, have pain controlled and, if necessary, coordinate ongoing outpatient care.⁵ The objective of this study was to better understand the

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Disclosure: none reported

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DOI: 10.4293/JSLS.2017.00096

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practices within our own institution, with the goal to improve the quality of care of bariatric patients presenting to our ED with abdominal complaints while optimizing resource utilization.

METHODS

A retrospective review was performed after institutional review board approval. Inclusion criteria consisted of all patients presenting to our ED with a history of bariatric surgery and reporting abdominal pain, who were admitted for workup or management by the bariatric surgery service. Patients were included irrespective of the type of bariatric procedure performed, time since the procedure, or institution at which the original bariatric operation was performed. This study excluded patients managed as outpatients, as they had already been triaged by history, physical examination, and imaging adjuncts, and a primary diagnosis had already been determined. An additional exclusion criterion was patient transfers to the bariatric surgical service, as these patients did not use our ED for workup of their symptoms. The medical record of patients meeting the study criteria above were reviewed for patient demographics including sex, age, and type of primary bariatric operation. Other criteria included the time from procedure to ED presentation, weight loss from operation to time of presentation (months), admitting diagnosis defined as the diagnosis assigned during admission from the ER, method of management of the admitting diagnosis (invasive or noninvasive), method of invasive management (laparotomy, laparoscopy, or endoscopic therapies), and the diagnosis as noted in the discharge diagnosis or identified by procedural findings at the time of intervention.

Our institution is an academic medical center with training programs in bariatric surgery, general surgery, and emergency medicine. Data were analyzed with STATA 13 (Stata Corp., College Station, Texas, USA). Values of $P < .05$ were statistically significant.

RESULTS

Two hundred twenty-two patients met the inclusion criteria, resulting in a total of 282 unique admissions, with 36 patients requiring multiple hospital admissions (range, 2–8). Seventy percent of patients were women, with an average age of 47 ± 12 (SD) years and an average weight loss of 34.5 kg (27.7% total weight loss) from time of operation to time of ER presentation. One hundred sixty-nine (76.1%) patients had undergone laparoscopic Roux-en-Y bypass graft (LRYGB). The time from primary pro-

cedure to ER presentation ranged from 2 days to 19 years (mean, 42 ± 4.63 [SD] months). The most common symptom was abdominal pain (80%), followed by nausea and vomiting (12.4%). Other patients reported dysphagia and hematemesis (**Table 1**).

Invasive interventions included diagnostic or therapeutic upper endoscopy, diagnostic laparoscopy, exploratory laparotomy, adhesiolysis, reduction and repair of internal hernia, or revision of gastro-jejunostomy with repair of hernia. Of all the patients admitted, 94% (204/282) underwent a procedural intervention. The most common diagnoses at the time of intervention was a stricture, 15.2% (31/204); bowel obstruction, 36.8% (74/204); cholecystitis, 6.7% (17/204); inflammatory findings, 15.2% (31/204); and other hernia including abdominal wall, diaphragmatic, and hiatal hernias. Patients who underwent endoscopic interventions ($n = 94$) were an average of 30 months from their primary operation, whereas patients requiring surgi-

Table 1.
Demographics and Patient Characteristics

Variable	Patients
Mean age, years (SD)	47 (12.0)
Sex, n	
Male	56 (25.2)
Female	166 (74.8)
Mean time from index surgery, months (SD)	42 (4.6)
Mean weight at presentation to ED, kg (SD)	98 (1.84)
Mean weight loss, kg (SD)	34.5 (1.74)
Type of bariatric procedure, n (%)	
LRYGB, n (%)	169 (76.1)
Open RYGB, n (%)	14 (6.3)
Laparoscopic band to RYGB, n (%)	13 (5.9)
Sleeve gastrectomy, n (%)	9 (4)
Laparoscopic ban, n (%) d	9 (4)
Vertical banded gastroplasty, n (%)	3 (1.4)
Other, n (%)	5 (2.3)
Present symptom	
Abdominal pain, n (%)	178 (80.2)
Nausea/vomiting, n (%)	28 (12.6)
Dysphagia, n (%)	13 (5.9)
Hematemesis, n (%)	11 (5)
Wound-related complications, n (%)	6 (2.7)

$n = 222$. Unless otherwise noted, data are number of patients (percentage of entire group).

cal intervention (n = 119 open or laparoscopic) were further from their index operation, 62 months, on average (P = .0006). A total of 21 patients (all from our institution) were admitted within 30 days from the index operation. No procedure was required in 14 of the 282 hospital encounters (7.14%). Of these 14 patients, 3 ultimately underwent repeat admission with a subsequent procedure (one endoscopic intervention, two surgical interventions). Method of management (endoscopic versus surgical) did not demonstrate any significant relationship to either the degree of postprocedural weight loss or the weight at time of emergency presentation (P = .20 and .18, respectively). There was no mortality in this series. Of the endoscopically identified causes of patient complaints, 71 (34.8%) would have been able to be addressed in an outpatient setting: normal endoscopy, stricture, mucosal inflammation (gastritis/esophagitis/duodenitis), and ulcer without perforation (Table 2).

DISCUSSION

Hospital admission after discharge is often considered a surrogate marker for the quality of patient care.⁶ Though prompt attention by trained medical personnel is always in the patient's best interest, competing forces in the form of limited institutional resources and third party quality metrics have brought focus on opportunities for improvement. Compared to other general surgery procedures, readmission rates after bariatric surgery are relatively low. The 30-day readmission rate after a colectomy is quoted as 11.1%, gastrectomy as 16.6%, esophagectomy as 18.4%, and pancreatic resection as 18.7%.⁷ The 30-day readmission rate following bariatric surgery ranges from 0.6 to 11.3%.^{8,9} Recent studies have demonstrated that the 30-day readmission rate is a poor indicator of quality for bariatric patients. A review by Telem et al.⁵ found that, in over 22,000 patients who had bariatric surgery in the state of New York from 2006 through 2008, one in every 4 bariatric patients were admitted to the hospital within 2 years of their index bariatric procedure. Only 5% were admitted during the 30-day perioperative period, whereas most were admitted after the 30-day period.

Our results were similar to those observed by Telem et al. In our study population, the average time from operation to presentation at the ED was 42 months (3.5 years). The potential for longer-term complications such as dehydration, intolerance of oral intake and various procedure-specific complications is a consequence of the anatomic and physiologic alterations after bariatric surgery. Therefore, the 30-day readmission rate likely underestimates the

Table 2.
Endoscopic/Procedural Findings

Characteristics of Patients Undergoing Procedures	Patients Affected (n = 204; 94%)
Inflammatory findings	31 (15.2)
Ulcer without perforation	22 (71)
Ulcer with perforation	6 (19)
Mucosal inflammation	3 (10)
Stricture	31 (15.2)
With ulcer history	16 (52)
Without history	14 (45)
Other—radiation ischemia	1 (3)
Obstruction	75 (36.8)
Adhesions alone	26 (35)
Internal hernia	35 (47)
Intussusception	2 (3)
Intraluminal obstruction	8 (11)
Other—hernia*	4 (5)
Organ resection	19 (9.3)
Cholecystectomy	17 (89)
Appendectomy	2 (11)
Fistula	3 (1.5)
Anastomotic leak	4 (2.0)
Gastric band removal	4 (2.0)
Fascial dehiscence	1 (0.5)
Other	21 (10.3)
Normal finding	15 (7.4)

n = 204. Data are number of patients affected (percentage of entire population or subgroup). *Abdominal wall, diaphragmatic and hiatal hernias.

true hospital utilization of this patient population as many complications arise months to years after the index operation.⁵

Another of the challenges in the care of bariatric patients is that it may not be centered at their home bariatric program. Bariatric patients commonly present to the nearest hospital, irrespective of the availability of a bariatric surgeon at that hospital. In many instances, bariatric complications can be true surgical emergencies. As such, it is imperative that the first provider to evaluate these patients be familiar with the more ominous presentations and potential diagnoses. In addition to the morbidity associated with their index operations, these patients have altered anatomy that may affect the presentation of other

surgical complications. It is therefore incumbent upon the physician who evaluates and admits a patient to be familiar with the potential sequelae of bariatric operations and the possible diagnoses in this special population, should they present at their institution.

We recognize that the retrospective nature of this study limits the generalizability of the results. As mentioned above, hospital admission through our ED was the primary criterion for inclusion. Because of this limitation of our study methodology, we were unable to capture all patients with a history of bariatric surgery (eg, patients evaluated in the ED and ultimately discharged home). The study was conceived and conducted in the context of a bariatric emergency quality improvement initiative; thus, by design it did not capture information on patients who were discharged home from the ED or patients that were transferred from outside hospitals. As encounter information was derived from billing data, we had no means of assessing the total number of patients with a history of bariatric surgery who presented with abdominal pain.

As a consequence, we were unable to calculate the burden of care after bariatric surgery at our institution from the current study. Workup and management protocols for bariatric patients may differ between hospitals, with and without bariatric surgical specialists or based on the availability of endoscopists and their experience with bariatric surgical anatomy. As a result, our findings may not be generalizable. Despite these limitations, our study serves to identify potential areas for clinical improvement and as a guide to direct future research.

CONCLUSION

In this series, most patients who were admitted (94%) underwent a procedure to diagnose or treat potential complications related to their bariatric surgery. Our study demonstrated a significant proportion of bariatric patients admitted from the ED require endoscopic evaluation and

management. Of the 204 admissions that required endoscopic or surgical intervention, 34.8% could have been managed with outpatient endoscopy. Further investigation of signs and symptoms most likely to predict pathology amenable to endoscopy may lead to the creation of decision-support tools to assist in patient triage and facilitate outpatient management of this subset of patients.

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