

Original article

Impact of accreditation in bariatric surgery

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Abstract

Background: Several studies have shown improved outcomes associated with accredited bariatric centers. The aim of our study was to examine the outcomes of bariatric surgery performed at accredited versus nonaccredited centers using a nationally representative database. Additionally, we aimed to determine if the presence of bariatric surgery accreditation could lead to improved outcomes for morbidly obese patients undergoing other general laparoscopic operations.

Methods: Using the Nationwide Inpatient Sample database, for data between 2008 and 2010, clinical data of morbidly obese patients who underwent bariatric surgery, laparoscopic antireflux surgery, cholecystectomy, and colectomy were analyzed according to the hospital's bariatric accreditation status.

Results: A total of 277,068 bariatric operations were performed during the 3-year period, with 88.4% of cases performed at accredited centers. In-hospital mortality was significantly lower at accredited compared to nonaccredited centers (.08% versus .19%, respectively). Multivariate analysis showed that nonaccredited centers had higher risk-adjusted mortality for bariatric procedures compared to accredited centers (odds ratio [OR] 3.1, $P < .01$). Post hoc analysis showed improved mortality for patients who underwent gastric bypass and sleeve gastrectomy at accredited centers compared to nonaccredited centers (.09% versus .27%, respectively, $P < .01$). Patients with a high severity of illness who underwent bariatric surgery also had lower mortality rates when the surgery was performed at accredited versus nonaccredited centers (.17% versus .45%, respectively, $P < .01$). Multivariate analysis showed that morbidly obese patients who underwent laparoscopic cholecystectomy (OR 2.4, $P < .05$) and antireflux surgery (OR 2.03, $P < .01$) at nonaccredited centers had higher rates of serious complications.

Conclusion: Accreditation in bariatric surgery was associated with more than a 3-fold reduction in risk-adjusted in-hospital mortality. Resources established for bariatric surgery accreditation may have the secondary benefit of improving outcomes for morbidly obese patients undergoing general laparoscopic operations. (Surg Obes Relat Dis 2014;10:767–773.) © 2014 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords:

Bariatric accreditation; Center of excellence; CMS national coverage determination

In 2006, the Centers for Medicare & Medicaid Services (CMS) limited coverage of bariatric surgery to centers accredited by the American College of Surgeons or by the

American Society for Metabolic and Bariatric Surgery. These 2 accreditation programs were unified in 2012 to create the Metabolic Bariatric Surgery Accreditation and Quality Improvement Program. The criteria for certification now includes 50 bariatric stapling procedures annually, experienced surgeons, staff members trained in metabolic and bariatric surgery, and availability of appropriate equipment to

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accommodate morbidly obese patients [1]. Recently, CMS removed the facility certification requirement for bariatric surgery. This action will allow any hospital to perform bariatric surgery on Medicare patients. This decision was made despite the fact that studies have shown that accreditation leads to lower mortality and complication rates [2–6]. However, the CMS states that the evidence is sufficient to conclude that continuing the requirement for certification of bariatric surgery facilities will not improve health outcomes for Medicare beneficiaries [7–10]. Furthermore, the CMS argues that since 2006, bariatric surgery has experienced a trend toward less invasive procedures and lower mortality and complication rates, and that bariatric surgery standards have been well established [11].

In 2012, Nguyen et al. [3] previously reported the outcomes of bariatric surgery performed at accredited versus nonaccredited centers using the University HealthSystem Consortium database of academic centers. The authors found that the rate of in-hospital mortality was significantly lower at accredited centers than at nonaccredited centers (.06% versus .21%, respectively) [3]. A major limitation of that study was that the analysis was performed only at academic centers. Therefore, the results may not be representative of national bariatric practices. The aim of the present study was to examine the outcomes of bariatric surgery performed between 2008 and 2010 at accredited versus nonaccredited centers using a more representative national inpatient database. Additionally, we hypothesize that the structure and processes established for bariatric surgery accreditation may also lead to improved outcomes for morbidly obese patients undergoing other general laparoscopic operations.

Methods

Database

The Nationwide Inpatient Sample (NIS) is the largest all-payer inpatient care database and provides a 20% stratified representative sample of U.S. community hospitals. Using hospital discharge abstracts, the NIS collects inpatient data, such as patient and hospital demographic characteristics, length of stay, morbidity, in-hospital mortality, and hospital charges. The NIS uses an All Patient Refined Diagnosis Related Group classification system to assign patients to severity of illness categories (minor, moderate, major, or extreme), using a combination of principal diagnosis, procedures, co-morbidities, gender, and age. The use of NIS data was approved by the Institutional Review Board of the University of California, Irvine and the NIS.

Data analysis and outcomes

Utilizing the NIS database from 2008–2010, clinical data of morbidly obese patients undergoing elective bariatric surgery were analyzed using designated International Classification of Diseases, 9th Revision, Clinical Modification

(ICD-9-CM) diagnosis and procedural codes. The principal ICD-9-CM diagnosis codes for obesity and morbid obesity (278.0, 278.00, 278.01) were used. Bariatric surgery procedural codes included 44.31 and 44.39 (open Roux-en-Y gastric bypass), 44.38 (laparoscopic Roux-en-Y gastric bypass), 44.95 (laparoscopic gastric banding), 44.68 and 43.82 (laparoscopic sleeve gastrectomy).

Patient demographic characteristics, hospital location (urban versus rural), hospital type (teaching versus non-teaching), procedural type, severity of illness, and perioperative outcomes of patients undergoing bariatric surgery were compared based on hospital accreditation status—accredited (AC) versus nonaccredited (NAC) centers. Accredited centers were identified in January 2013 from the CMS website (www.cms.gov) based on each institution's unique Medicare provider number. Primary outcome measures were rates of in-hospital mortality and serious morbidity. In-hospital mortality was defined as a death occurring within the index surgical admission. Serious morbidity was defined as anastomotic leak, sepsis, pulmonary empyema/abscess, acute renal failure, acute respiratory failure, cardiac complications, cerebrovascular accident, deep venous thrombosis, and wound complications. Secondary outcomes included length of stay, total hospital charges, and specific postoperative complications.

Clinical data of morbidly obese patients undergoing common laparoscopic general surgery operations (antireflux surgery, cholecystectomy, and colectomy) were also analyzed according to accreditation status. The principal ICD-9 diagnosis codes used for antireflux surgery included esophagitis (530.1, 530.10, 530.11, 530.12, 530.19), esophageal reflux/Barrett's (530.81, 530.85), and diaphragmatic hernia (553.3). The principal diagnosis used for colectomy was neoplasm of the colon (562.10, 562.11, 562.12, 562.13, 562.1). The principal diagnosis used for cholecystectomy was calculus of the gallbladder (574.1, 574.10, 574.11, 574.2, 574.20). The secondary diagnosis codes applied were obesity and morbid obesity (278.0, 278.00, 278.01). The procedural codes for laparoscopic general surgeries included 44.67 and 53.71 for antireflux surgery, 17.36, 17.35, 17.39, 17.34, 17.33, 17.32, 45.81 for colectomy, and 51.23 for cholecystectomy. The primary outcome measure was rate of serious in-hospital morbidity. Secondary outcomes included length of stay, in-hospital mortality, and specific in-hospital morbidity.

Statistical analysis

Patient demographic characteristics, hospital type, preoperative co-morbidities, and perioperative outcomes were analyzed by accreditation status. Continuous outcomes were compared using 2-sample *t* tests with unequal variance, and binary outcomes were compared using χ^2 tests with Yates correction. Multivariate logistic regression analysis was performed for in-hospital mortality and serious complications

to compare outcomes of bariatric surgery performed at AC versus NAC centers. Outcomes were controlled for demographic characteristics, procedure type, and Elixhauser-Van Walraven co-morbidity score. Holm's method was used to account for multiple comparisons between adjusted *P* values. In the post hoc analysis, data were stratified by procedure complexity (laparoscopic gastric banding versus gastric bypass/sleeve gastrectomy) and severity of illness (minor versus moderate/major).

A separate analysis was performed to compare the serious morbidity of general laparoscopic operations in morbidly obese patients according to accreditation status using multivariate logistic regression analyses to control for demographic characteristics, procedure type, and co-morbidity score. Comparisons were considered statistically significant if the adjusted *P* value was < .05. All statistical analyses were performed using SAS version 9.3 (Cary, NC) and the R statistical environment.

Results

Patient characteristics

Accredited versus nonaccredited centers in bariatric surgery. Between 2008 and 2010, an estimated 277,068 patients underwent bariatric surgery for the treatment of morbid obesity; 88.4% of these procedures were performed at AC centers (Table 1). The proportion of gastric bypass procedures was higher at AC than NAC centers (72.4% versus 67.5%, respectively, *P* < .05). Patients who underwent bariatric surgery at AC (compared to NAC) centers had significantly more moderate and severe All Patient Refined Diagnosis Related Group severity of illness scores (46.3% versus 42.9%, respectively, *P* < .05). Similarly, there were higher rates of preoperative co-morbidities (i.e., congestive heart failure, chronic pulmonary disease, coagulopathy, diabetes, hypertension, hypothyroidism, renal failure, and smoking) in patients who underwent bariatric surgery at AC than at NAC centers.

Accredited versus nonaccredited centers in general surgery. Between 2008 and 2010, an estimated 25,222 morbidly obese patients underwent laparoscopic antireflux surgery, cholecystectomy, and colectomy. The majority of these operations were performed at AC centers (76.4%). Of the 16,615 morbidly obese patients who underwent antireflux surgery, 84% were performed at AC centers. Of the 3,209 morbidly obese patients who underwent cholecystectomy, 77% were performed at AC centers. Of the 5,398 morbidly obese patients who underwent colectomy, 52% were performed at AC centers.

Perioperative outcomes

Accredited versus nonaccredited centers for bariatric surgery. Table 2 reports the perioperative outcomes of patients who underwent bariatric surgery at AC versus

Table 1

Demographic characteristics and co-morbidities of patients undergoing bariatric procedures at accredited versus nonaccredited centers, 2008–2010

	Accredited (n = 244,142)	Nonaccredited (n = 32,926)
Number of centers	313	161
Mean number of cases per center per yr	260	68
Mean age (yr.)	45 ± 12	44 ± 12*
Female sex (%)	78.9	78.4
Race or ethnicity (%)		
White	63.3	65.4*
Black	11.5	12.1
Hispanic	5.3	7.5*
Asian or Pacific Islander	.6	.2*
Native American	.4	.4
Other	3.3	3.3
Missing	15.6	11.1
Hospital type (%)		
Nonteaching	42.0	52.7*
Teaching	57.2	47.3*
Hospital location (%)		
Urban	93.3	88.4*
Rural	5.8	11.7*
Procedure (%)		
Laparoscopic gastric band	26.5	28.5*
Overall gastric bypass	72.4	67.5*
Laparoscopic gastric bypass	65.1	59.8*
Open gastric bypass	7.3	7.7
Laparoscopic sleeve gastrectomy	1.1	4.1*
Severity of illness class (%)		
Minor	53.7	57.1*
Moderate/Severe	46.3	42.9*
Co-morbidities (%)		
Deficiency anemia	4.4	4.3
Rheumatoid arthritis	1.5	1.2
Congestive heart failure	1.7	.8*
Chronic pulmonary disease	19.3	15.2*
Coagulopathy	.6	.3*
Diabetes	34.8	31.4*
Hypertension	59.1	53.7*
Hypothyroidism	12.8	11.3*
Peripheral vascular disorders	.6	.5
Renal failure	1.4	.7*
Smoking	14.7	11.4*

**P* value < .05, compared to accredited centers.

NAC centers. The overall in-hospital mortality was significantly lower at AC than at NAC centers (.08% versus .19%, respectively, *P* < .05) but the serious morbidity rate was significantly higher at AC than NAC centers (5.3% versus 4.5%, *P* < .05). Table 2 also reports perioperative outcomes between AC versus NAC centers analyzed according to procedural type (gastric banding procedures and gastric bypass/sleeve gastrectomy). Table 3 lists the risk-adjusted outcomes for bariatric surgery performed at AC versus NAC centers. Compared to AC, NAC centers were associated with a higher rate of in-hospital mortality (odds ratio [OR] 3.1; 95% CI, 1.6–6.2; adjusted *P* value < .001). There was no significant difference in risk-adjusted serious morbidity rate between AC versus NAC centers (OR .91; 95% CI, .80–1.04; *P* = .2).

Table 2

Perioperative outcomes for a) all patients who underwent bariatric surgery, b) patients who underwent laparoscopic gastric banding, and c) patients who underwent gastric bypass/sleeve gastrectomy at accredited versus nonaccredited centers

Outcomes	a) Overall Bariatric Procedures		b) Laparoscopic Gastric Banding		c) Gastric Bypass/Sleeve Gastrectomy	
	Accredited (n = 244,142)	Nonaccredited (n = 32,926)	Accredited (n = 64,980)	Nonaccredited (n = 9,411)	Accredited (n = 179,612)	Nonaccredited (n = 23,515)
Total charge (\$)	38,516 ± 31,020	38,389 ± 30,476	30,917 ± 17,135	29,646 ± 18,648*	41,250 ± 34,681	41,691 ± 34,056
Length of stay (d)	2.5 ± 2.6	2.4 ± 1.4	1 ± 1	1 ± 1	3 ± 3	3 ± 4
In-hospital mortality (%)	.08	.19*	.06	0	.09	.27*
Serious morbidity (%)	5.3	4.5*	1.76	1.84*	6.5	5.6*
Anastomotic leak (%)	1.7	1.6	.39	.42	2.2	2.1
Intra-abdominal abscess (%)	.11	.04	.02	0	.15	.06
Sepsis (%)	.28	.22	.03	.05	.36	.29
Wound complications (%)	.43	.42	.06	.05*	.56	.56
Ileus (%)	.92	1.3*	.17	.21	1.2	1.7*
Bowel obstruction (%)	.12	.15	.02	0	.15	.21
Pneumonia (%)	.36	.45	.08	.11*	.46	.59
Acute renal failure (%)	1.4	1.1*	.65	.63	1.73	1.32*
Cardiac complications (%)	.69	.60	.35	.37	.81	.69
Deep venous thrombosis (%)	.05	.06	.04	.05	.05	.06
Hemorrhage (%)	1.3	.06*	.24	.42	1.62	1.26

*P value < .05, comparing accredited and nonaccredited in each procedural category.

Accredited versus nonaccredited centers for laparoscopic general surgery. Hospital accreditation was associated with lower serious complications in 2 out of the 3 laparoscopic general procedures analyzed. Univariate analysis showed higher in-hospital mortality for antireflux procedures at NAC versus AC (.38% versus 0%, respectively, $P < .05$), as well as higher serious morbidity (10.3% versus 5.5%, respectively, $P < .05$). Patients undergoing antireflux surgery at NAC, compared to AC centers, had a significantly higher incidence of postoperative ileus (2.1% versus .9%, respectively), pneumonia (2.1% versus .3%, respectively), and deep venous thrombosis (.38% versus 0%, respectively). Univariate analysis also showed significantly higher

serious morbidity after cholecystectomy at NAC compared to AC (13.6% versus 5.9%, respectively, $P < .05$). Table 3 lists the risk-adjusted outcomes for laparoscopic general surgical operations performed at AC versus NAC centers. Compared to AC, NAC centers were associated with higher rates of serious complications for antireflux surgery (OR 2.0; 95% CI, 1.4–2.9; adjusted $P < .01$) and for cholecystectomy (OR 2.4; 95% CI, 1.2–4.7; adjusted $P < .05$). In-hospital mortality and serious morbidity were not significantly different for morbidly obese patients undergoing colectomy at AC versus NAC centers.

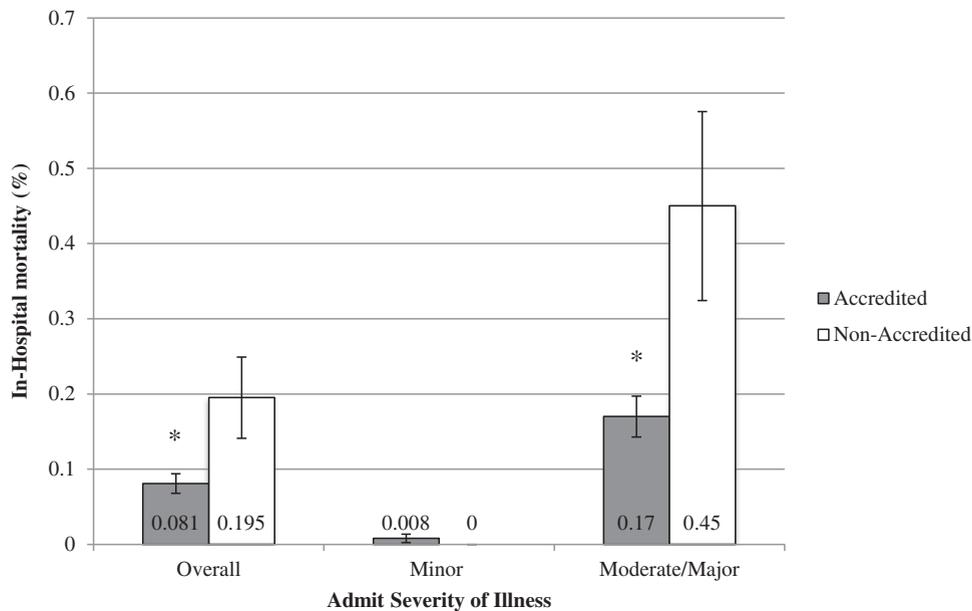
Post hoc analysis according to procedure type and severity of illness. Perioperative outcomes at AC versus

Table 3

Risk-adjusted outcomes of laparoscopic bariatric procedures and general surgery procedures performed at nonaccredited centers versus accredited centers (reference).

Variable	Adjusted OR (95% CI)	Naive P value	Adjusted P value
Overall bariatric procedures			
In-hospital mortality	3.14 (1.6, 6.2)	.0010	.0020
Serious complications	.91 (.8, 1.0)	.1715	.1715
Complex bariatric procedures			
In-hospital mortality	3.73 (1.8, 7.6)	.0003	.0012
Serious complications	.87 (.8, 1.0)	.0512	.1536
Gastric banding			
In-hospital mortality	.00 (.0, 3.9)	.6076	.9413
Serious complications	1.16 (.8, 1.7)	.4707	.9413
Morbidly obese patient undergoing antireflux surgery			
Serious complications	2.03 (1.4, 2.9)	.0000	.0001
Morbidly obese patient undergoing cholecystectomy			
Serious complications	2.36 (1.2, 4.7)	.0157	.0314
Morbidly obese patient undergoing colectomy			
Serious complications	1.11 (.8, 1.6)	.5626	.5626

CI = confidence interval; OR = odds ratio.



*p-value <0.05, compared to non-accredited centers.

Fig. 1. Observed in-hospital mortality for bariatric procedures performed at accredited versus nonaccredited centers according to severity of illness. Overall: mortality of the entire cohort of patients; minor: mortality for patients with minor severity of illness; moderate and major: mortality for patients with moderate and major severity of illness.

NAC centers were analyzed according to procedural type (Table 2). The in-hospital mortality was significantly lower at AC compared to NAC centers for gastric bypass/sleeve gastrectomy procedures (.09% versus .27%, respectively, $P < .05$). Compared to AC, NAC centers was associated with a higher rate of in-hospital mortality in patients who underwent complex bariatric procedures (OR 3.7; 95% CI, 1.8–7.6; adjusted P value < .001), Table 3. There was no significant difference in the risk adjusted in-hospital mortality for laparoscopic gastric banding procedures.

Fig. 1 shows the observed in-hospital mortality rates according to admission severity of illness. Patients with moderate to major severity of illness had significantly lower in-hospital mortality at AC versus NAC centers (.17% versus .45%, respectively, $P < .001$).

Discussion

The CMS recently removed the requirement for facility certification in bariatric surgery, citing the lack of sufficient evidence documenting improvements in patient outcomes. In their internal technology assessment, 9 papers were reviewed (Table 4) [2–10]. Five papers supported accreditation [2–6] and 4 papers opposed it [7–10]. Of the 5 publications supporting accreditation, 2 of the papers directly analyzed outcomes of patients who underwent bariatric surgery at accredited versus nonaccredited centers [3,4], while 3 of the papers compared outcomes of Medicare beneficiaries who underwent bariatric surgery before versus after initiation of the 2006 Medicare bariatric surgery

national coverage determination (NCD) [2,5,6]. Of the 4 papers that did not find any improved outcomes associated with accreditation, 3 papers compared outcomes of accredited versus nonaccredited centers [7–9], whereas 1 paper compared outcomes of Medicare beneficiaries before versus after initiation of the Medicare bariatric surgery NCD (Table 4) [10]. Studies that analyzed the outcome of Medicare beneficiaries who underwent bariatric surgery before versus after the 2006 NCD consistently showed improvements in outcomes after the NCD [2,5,6]; however, there are several possible confounding explanations for this improvement, including an increase in utilization of laparoscopy, increased utilization of less invasive procedure (laparoscopic adjustable gastric banding), initiation of accreditation in bariatric surgery, or a combination thereof. Therefore, a direct comparative study between accredited and nonaccredited centers after 2006, when the Centers of Excellence (COE) process is well established, may eliminate some of the above confounding variables. Five of the 9 studies to date have examined the outcomes of bariatric surgery between accredited versus nonaccredited centers [3,4,7–9]. Two of these 5 studies examined data on or before 2006, at which time the accreditation process was still evolving [7,9]. In a study examining hospital complication rates of 15,275 patients who underwent bariatric surgery in Michigan, Birkmeyer et al. [8] found that hospital and surgeon procedure volume was associated with lower serious complications, but unrelated to the COE accreditation. In their study, only 6 of 25 hospitals were nonaccredited centers [8]. Therefore, their study had

Table 4
Studies examining the role of accreditation in bariatric surgery

Authors (yr)	Support or oppose accreditation	Methodology	Findings
Livingston EH (2009)	Oppose	2005 NIS database—comparison between accredited versus nonaccredited centers	No differences in outcome
Kohn GP (2010)	Oppose	1998–2006 NIS database—comparison between accredited versus nonaccredited centers	COE status had minimal independent association with outcomes
Nguyen NT (2010)	Support	2004–2007 UHC database—comparison between pre NCD versus after NCD	Bariatric surgery NCD resulted in improved outcomes for Medicare beneficiaries without limiting access to care
Birkmeyer NJO (2010)	Oppose	2006–2009 Michigan Bariatric Surgery Collaborative—comparison between accredited versus nonaccredited centers	Rates of serious complications are inversely associated with hospital and surgeon procedure volume, but unrelated to COE accreditation
Flum DR (2011)	Support	2004–2008 nationwide Medicare data—comparison between pre-NCD versus after NCD	NCD was associated with a significant decrease in the risk of death, complications, and readmissions
Nguyen NT (2012)	Support	2007–2009 UHC database—comparison between accredited versus nonaccredited centers	Accreditation status was associated with lower in-hospital mortality
Dimick JB (2013)	Oppose	2004–2009 state inpatient database—comparison between pre NCD versus after NCD	No significant difference in the rates of complications and reoperation before versus after the CMS policy
Jafari (2013)	Support	2006–2010 NIS database—comparison between accredited versus nonaccredited centers	Accreditation status was associated with lower in-hospital mortality
Kwon S (2013)	Support	2003–2009 MarketScan Commercial Claims and Encounter database—comparison between pre-NCD versus after NCD	Accreditation-based NCD in bariatric surgery was associated with lower rates of reoperations and complication

COE = Center of Excellence; NCD = Medicare national coverage determination; NIS = Nationwide Inpatient Sample; UHC = University HealthSystem Consortium.

suboptimal statistical power for detecting differences in risk. In a study examining outcomes for centers performing high volume (> 50 stapling cases per yr) versus low volume (< 50 cases), Jafari et al. [4] found significantly lower in-hospital mortality for high volume centers. In a subset analysis within high volume centers, they reported significantly lower in-hospital mortality for accredited compared to nonaccredited centers (.06% versus .22%, respectively) [4]. The study by Nguyen et al. [3] comparing outcomes of accredited versus nonaccredited centers found lower in-hospital mortality associated with accredited centers; however, it was limited to academic centers and the findings may not be generalizable to community practices.

The aim of the present study was to analyze the outcomes of patients who underwent bariatric surgery at accredited versus nonaccredited centers utilizing a nationally representative data set from a time period when accreditation has been well established (2008–2010). Additionally, we hypothesized that the resources established for bariatric surgery accreditation may lead to improvement in outcomes even for morbidly obese patients undergoing other common general laparoscopic operations. In this study, we found that 88.4% of all bariatric operations were performed within accredited centers. Accredited centers were associated with more than a 3-fold reduction in the risk of in-hospital mortality compared with nonaccredited centers. In a subset analyses according to procedural type and admission severity of illness, compared to nonaccredited centers, accredited

centers had significantly lower in-hospital mortality for patients who underwent complex bariatric operations (gastric bypass and sleeve gastrectomy) and for sicker patients (higher severity of illness). A secondary benefit of bariatric surgery accreditation was the improvement in outcomes in morbidly obese patients undergoing other general laparoscopic operations.

The findings from the present study are in alignment with our previous study examining outcomes of bariatric surgery at accredited versus nonaccredited centers within academic centers [3]. In the aforementioned paper, the in-hospital mortality was .06% for accredited centers compared to .21% for nonaccredited centers. In our present study, in-hospital mortality was .08% at accredited centers and .19% at nonaccredited centers. This study also similarly found that outcomes were improved specifically for patients with a higher severity of illness and for complex operations, such as gastric bypass or sleeve gastrectomy, when performed at accredited centers. The in-hospital mortality rate for patients who underwent bariatric surgery with higher severity of illness was .45% at nonaccredited centers compared to .17% at accredited centers. This finding is particularly relevant for Medicare patients, who have been shown to be at higher risk for morbidity and mortality than the general population [10,12,13]. Similar results utilizing 2 different data sets would further strengthen the evidence supporting facility certification.

No studies to date have investigated the effects of accreditation beyond the context of bariatric surgery. Our

study found lower serious morbidity for morbidly obese patients who underwent laparoscopic antireflux surgery and cholecystectomy within accredited centers. We speculate that the presence of appropriate resources, trained staff, and experienced surgeons to care for the morbidly obese within accredited bariatric centers may be responsible for the observed findings of improved outcomes for morbidly obese patients undergoing other laparoscopic general operations. No differences in outcome were observed for morbidly obese patients who underwent colectomy at accredited versus nonaccredited centers. The reason for this finding may be related to the fact that resources and experience in bariatric surgery are not transferable to colon surgery.

This study does have some limitations. The NIS database is limited to in-hospital outcomes. Complications or deaths occurring after discharge are not captured. Therefore, the reported in-hospital mortality may be lower than that of the “true” 90-day mortality. Accreditation status was based on the current CMS listing of accreditation and applied throughout the study period. The exact date of accreditation for each individual hospital is unknown and was not taken into account. Therefore, a current accredited center may not have been accredited at some point during the study period and similarly a nonaccredited center may have been accredited at some point during the study period. However, since the number of accredited center nationwide has been stable since 2008, we presumed that these scenarios are uncommon. Despite these limitations, this study provided a large, nationally representative sample of morbidly obese patients undergoing bariatric surgery for evaluation of outcomes within accredited and nonaccredited centers.

Conclusion

Centers with accreditation in bariatric surgery were associated with significantly lower in-hospital mortality compared to nonaccredited centers, particularly in patients who had a higher severity of illness and those undergoing complex procedures. Our finding is important to CMS because Medicare patients have been shown to be sicker than the

general patient population. Lastly, resources established for accreditation may have secondary benefits that lead to improved outcomes for morbidly obese patients undergoing other general laparoscopic operations.

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