Feasibility and Impact of an Evidence-Based Program for Gastric Bypass Surgery

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BACKGROUND: Health care in the United States is expensive and quality is variable. The aim of this study was to investigate whether our integrated health system, composed of academic hospitals, a practice plan, and a managed care payer, could reliably implement an evidence-based program for gastric bypass surgery. A secondary aim was to evaluate the impact of the program on clinical outcomes.

STUDY DESIGN: A standardized program for delivery of clinical best-practice elements for patients undergoing initial open or laparoscopic Roux-en-Y gastric bypass was implemented in 2008. Best-practice elements were embedded into the workflow. The best-practice elements were refined after reviewing failures observed during the early implementation period. The study period was divided into 3 groups: group α = year preceding program implementation (control), group β = first year of implementation (unreliable), and group Ω = 2nd to 4th years of implementation (reliable). Outcomes data were collected for all patients who had undergone Roux-en-Y gastric bypass between May 2008 and April 2012 and were compared with a control group from the preceding year using multiple logistic regression analysis.

RESULTS: Two thousand and sixty-one patients were studied, with no significant demographic differences between study groups. Best-practice elements delivery was 40% in group β, but was >90% for group Ω ($p < 0.001$). Length of stay for group α was 3.5 days and improved to 2.2 days ($p < 0.001$) for group Ω. Complications and readmission rates improved considerably with reliable delivery of best-practice elements.

CONCLUSIONS: Standardization of evidence-based care delivery for Roux-en-Y gastric bypass was feasible and reliable delivery of this pathway improved clinical outcomes. (J Am Coll Surg 2015;220: 855–862. © 2015 by the American College of Surgeons)

It is projected that US health care expenditures will consume 34% of the gross domestic product by 2040, with Medicare and Medicaid spending nearly 15% of the gross domestic product.[1] Despite the high cost, US health care does not always deliver quality. As a country, the United States ranks no better than 10th in the world for life expectancy, age-adjusted mortality, and infant mortality.[2] Patients in the United States receive little more than half of all the care recommended by their providers,[3] and poor clinical outcomes increase costs and, paradoxically, payer reimbursement to health care providers.

Our system is an integrated health service organization consisting of provider facilities, a physician practice group, and managed care companies. Strategic priorities during the past decade have focused on value re-engineering centered on quality and innovation in health care delivery. One of the touchstones of these transformational initiatives has been ProvenCare for Acute Episodic Care. This experience was first reported with ProvenCare CABG in 2007.[4] ProvenCare CABG is a provider-driven pay-for-performance program for acute episodic cardiac surgical care. The program aims to align clinical best practices with clinician compensation and third-party payer

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Abbreviations and Acronyms

BPE = best-practice element
EMR = electronic medical record
LOS = length of stay
LRYGB = laparoscopic Roux-en-Y gastric bypass
OR = odds ratio
ORYGB = open Roux-en-Y gastric bypass
RYGB = Roux-en-Y gastric bypass

reimbursement. It effectively eliminates additional billing from health care providers for 90 days after surgery, accepting a single-payment regardless of outcomes or expenses.

The bariatric surgery program was an appealing target for the second wave of ProvenCare programs. The program was already highly integrated with gastrointestinal nutrition medical specialists. The bariatric program was a high-volume and high financial—reward platform for the health system, with the potential to provide the health plan with a return on investment.[5] ProvenCare Bariatric was developed around the following core principles: create a culture that expects and insists on elimination of unwarranted variation as a patient-safety issue; clearly describe the organizational outcomes goals; set process expectations at a minimum >90% level of reliability; variation in protocols is to be driven by patients rather than individual providers; require clinicians to communicate and document exceptions; and provide resources to measure the outcomes and reasons for noncompliance.

The primary aim of this study was to investigate whether an integrated health care delivery system could successfully implement a multidisciplinary evidence-based program for gastric bypass surgery. A secondary aim was to evaluate the impact of the evidence-based program on clinical outcomes.

METHODS

ProvenCare Bariatric for gastric bypass (Roux-en-Y bypass) surgery

Representatives from bariatric surgery, bariatric medicine, and administration met in 2006 to create evidence-based clinical best-practice guidelines. Primary source evidence was obtained from OVID Medline literature searches, as well as guidelines from the American Society for Metabolic and Bariatric Surgery, the Society of American Gastrointestinal and Endoscopic Surgeons, and the Betsy Lehman Center.[6-8] Clinical specialists were enlisted to aid in the development of the guidelines that incorporated 34 best-practice elements (BPEs) for the care of patient undergoing initial Roux-en-Y gastric bypass (RYGB; laparoscopic [LRYGB] or open [ORYGB]). The working group was supported by clinical-effectiveness specialists, statisticians, and information-technology specialists who developed electronic medical record (EMR) workflows to facilitate compliance and reporting. Best-practice elements were designed to be both actionable and measurable (Table 1).

All patients undergoing initial RYGB within the health system were automatically included in the ProvenCare Bariatric clinical pathway (implemented in May 2008). To evaluate the impact of the program, IRB approval was obtained to evaluate selected clinical outcomes from the year before implementation to several years after implementation (May 2007 to April 2012). Reliability was defined as the percentage of patients who received 100% of the BPEs during a selected period of time. The study period was divided into 3 groups: group α = year preceding program implementation (control), group β = first year of implementation (unreliable, <90% reliability), and group Ω = 2nd to 4th years of implementation (reliable, >90% reliability). Demographic and outcomes data were collected for all patients in the ProvenCare Bariatric clinical pathway. The outcomes included mean length of stay (LOS) and percent with an extended LOS (ie, >2 days), readmission within 30 days, reoperation within 30 days, use of ICU within 30 days of surgery, and complications. Readmission rates were defined as all patients readmitted within 30 days of discharge, including 23-hour stays. Any patient returning to the operating room within 30 days of surgery was included in reoperations except those undergoing an endoscopy only. Any patient using the ICU within 30 days of surgery for initial admission or readmission was included as an ICU admission. Complications were classified by Clavien score.[10] Grades I and II were classified as minor and grades III, IV, and V were classisfied as major.

Statistical analysis

Analyses were conducted using SAS software (version 9.3, SAS Institute). All statistical tests were 2-sided with a type I error of 5%. Student's *t*-test and chi-square tests were used to compare demographics and reliability across the study groups.

The first set of analyses was conducted to evaluate the effectiveness of the ProvenCare Bariatric program (ie, determine if the use of the program resulted in improved clinical outcomes). The unadjusted outcomes data of each study group were compared against group α (the historical controls) using Student's *t*-test (LOS) and chi-square tests (categorical outcomes). This