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A perioperative care map improves outcomes in patients with morbid obesity undergoing major surgery

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ABSTRACT

Background. The surgical management of patients with morbid obesity (BMI ≥ 40) is notable for a relatively high risk of complications. To address this problem, a perioperative care map was developed using precautions and best practices commonly employed in bariatric surgery. It requires additional medical assessments, sleep apnea surveillance, more stringent guidelines for anesthetic management, and readily available bariatric operating room equipment, among other items. This care map was implemented in 2013 at four major urban teaching hospitals for use in patients undergoing all types of non-ambulatory surgery with a BMI greater than 40 kg/m². The impact on patient outcomes was evaluated.

Methods. The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database was used to compare 30-day outcomes of morbidly obese patients before (2013) and after (2015) care map implementation. In addition, trends in 30-day outcomes for morbidly obese patients were compared to those for non-obese patients.

Results. Morbidly obese patients, between 2013 and 2015, saw an adjusted decrease in the rate of unplanned return to the operating room (OR = 0.49; P = .039), unplanned readmission (OR = 0.57; P = .006), total length of stay (LOS) (-0.87 days; P = .009), and postoperative LOS (-0.69 days; P = .007). Of these, total LOS (-0.86 days; P = .015), and postoperative LOS (-0.69 days; P = .012) improved significantly more for morbidly obese patients than for non-morbidly obese patients.

Conclusion. Outcomes in morbidly obese patients improved from 2013 to 2015. Implementation of a perioperative care map may have contributed to these improvements. The care map should be further investigated and considered for more widespread use.

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Introduction

The prevalence of obesity in the United States has been steadily increasing, with recent estimates that one in every three adults is obese (BMI ≥ 30) and one in every 20 adults is morbidly obese (BMI ≥ 40).^{1,2} This national trend is reflected in the health care system as well, with an increase in obesity-related hospital stays³ and bariatric surgeries performed⁴ over the past several decades.

Obesity is a complex, multisystem, prothrombotic and proinflammatory disorder that puts patients at an increased risk for developing cardiovascular disease, hypertension, diabetes

mellitus, and certain cancers.⁵ But there is much debate in the literature regarding obesity as a risk factor for morbidity and mortality following major surgery.⁶⁻¹⁰ Evidence has suggested an association between obesity and the risk of postoperative wound infections,^{8,11-13} respiratory complications,^{12,14,15} and atrial arrhythmia¹⁶; although some studies dispute these conclusions¹⁷⁻¹⁹ and some have even shown that moderate obesity is protective against postoperative mortality ("obesity paradox").^{8,20-22} However, there is agreement that morbidly obese patients experience a greater incidence of postoperative morbidity and mortality than patients of normal weight categories.^{6,8,20,22,23} Obesity also complicates perioperative management²⁴ and is associated with a longer average hospital length of stay (LOS)^{25,26} and an increased likelihood of unplanned readmission.²⁷⁻²⁹

Given these concerns, many guidelines have been developed regarding the safe management of obese patients in the perioperative period. However, most of these specifically focus on the management

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Best Practices for the Obese Surgical Patient (Triggers at BMI ≥ 40)

Preoperative

1. Preop evaluation must include a checklist (the checklist ideally is completed in a preop clinic, but in any case must be on the patient's chart prior to surgery) with the following:
 - Supplemental informed consent document for obese patients
 - Preop medical assessment form (POMAF)
 - Anesthesia assessment completed by an anesthesia provider (attending, resident, CRNA) that includes sleep apnea assessment and a plan for intraop and postop anesthesia management **Auditing:** Chart
 - For patients on CPAP:
 - The patient has brought the machine to the hospital
 - There is a hospital CPAP machine available
 - There is a note in the pre-op medical evaluation stating that it is not needed
2. Consider discharge planning needs to facilitate discharge (see discharge requirements) **Auditing:** None
3. Nursing admission assessment:
 - Document BMI
 - Triggers nutritional assessment to initiate education on healthy eating habits either during the postop hospital stay or after discharge **Auditing:** Chart
 - Includes patient-specific mobility abilities
 - Skin care assessment
4. Before incision:
 - Antibiotic administration consistent with SCIP protocols with appropriate dose based on patient's weight **Auditing:** Chart
 - DVT prophylaxis:
 - Sequential compression stockings (extra-large) or foot pad
 - Chemo prophylaxis with appropriate dose and frequency
 - Document rationale for not providing prophylaxis

Intraoperative

1. One attending and one other experienced anesthesia provider (attending, an anesthesia resident with floor intubation credentialing, or CRNA) required for intubation **Auditing:** Chart
2. Anesthesia staffing for extubation to be determined by intubating attending depending on ease of intubation and consideration of intraop events **Auditing:** None
3. Readily available difficult airway cart and/or advanced airway technology **Auditing:** CMO Certification
4. Appropriate size:
 - OR tables (incl. foot plates, padding)
 - Gurneys
 - Large B/P cuffs
 - Long instruments, trochars available if needed**Auditing:** CMO Certification
5. Yearly nursing in-service on peri-op care of the obese patient to include precautions for development of paresthesias and pressure sores **Auditing:** CNO Certification

Fig. Perioperative care map for obese patients undergoing inpatient surgery.

of obese patients undergoing bariatric surgical procedures,³⁰⁻³³ with very few that focus on non-bariatric procedures.^{34,35} To address this gap, a committee comprised of bariatric and general surgeons, anesthesiologists, pulmonologists, and nursing representatives designed a perioperative care map with the goal of expanding best practices and precautions already provided to bariatric patients to morbidly obese patients undergoing all types of major surgery. In short, the care map calls for a supplemental informed consent form, various perioperative medical assessments including nutritional and

mobility assessments, more stringent guidelines for anesthetic care, the availability of bariatric medical equipment, weight-based antibiotic dosing, and evaluation for anticoagulation. The full perioperative care map is listed in Fig. The care map is triggered electronically at these institutions when a patient is weighed at or above a BMI of 40 kg/m² on admission. The items are subsequently carried out by nurses, surgeons, and anesthesiologists among other providers, and random audits are performed to ensure compliance.

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