

Best Practice Updates for Nursing Care in Weight Loss Surgery

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The objective of this study is to update evidence-based best practice guidelines for nursing in weight loss surgery (WLS). We performed a systematic search of English-language literature on WLS and perioperative nursing, postoperative, anesthesia, and discharge published between April 2004 and May 2007 in MEDLINE, CINAHL and the Cochrane Library. Key words were used to narrow the search for a selective review of abstracts, retrieval of full articles, and grading of evidence according to systems used in established evidence-based models. From these, we developed evidence-based best practice recommendations from the most recent literature on nursing in WLS. We identified >54 papers; the most relevant were reviewed in detail. Regular updates of evidence-based recommendations for best practices in WLS nursing are required to address advances in surgery and anesthesiology, as well as changes in the demographics and levels of obesity in WLS patients. Key factors in patient safety include staff education, comprehensive admission assessment, patient education, careful preoperative surveillance and postoperative care, and long-term discharge follow-up.

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INTRODUCTION

Evidence-based best practice guidelines for nursing in weight loss surgery (WLS) have been previously described (1). Earlier guidelines focused on staff education; preoperative, perioperative, and postoperative care; postanesthesia care; discharge and follow-up (2). This report covers key updates relating to WLS nursing.

WLS patients are a high-risk population for morbidity and mortality, with a hazard ratio that increases with BMI. Surgical and anesthetic advances, combined with changes in the demographics and obesity levels of patients, have increased the need for effective and vigilant nursing care. The latest studies show an increase in the number of procedures performed, with more WLS in adolescents; decreases in length of stay; advances in the use of clinical pathways; and development of ergonomic technology. This report updates best practice guidelines with a focus on long-term outcomes and patient safety.

METHODS AND PROCEDURES

We searched PubMed, MEDLINE, and the Cochrane Library for articles published on WLS and perioperative nursing, preoperative, perioperative, postoperative, anesthesia, and discharge follow-up published between April 2004 and May 2007. The system used to grade the quality of the evidence has already been described (2). We identified >54 papers; the 46 most relevant were reviewed in detail. These included a randomized controlled trial, prospective and retrospective

cohort studies, meta-analyses, case reports, prior systematic reviews, and expert opinion. The focus of the recommendations and the process used to develop them are reported elsewhere (2).

RESULTS

Planning and communication

The WLS nurse is responsible for assessment, documentation, and communication with all members of the health care team. The nurse assesses all data, formulates a care plan, and determines nursing diagnoses and interventions for each patient. Planning is initiated at the first patient contact with the WLS program. Communication with the patient during each phase of care allows for adjustments in the plan. The nurse promotes multidisciplinary team collaboration by developing and implementing education programs related to the care of the WLS patient. This collaboration promotes awareness of evidence-based practices and sensitivity to the needs of extremely obese patients (3).

Effective communication between all members of the health care team is essential for quality care. Certain practices may lead to decreased adverse events, prompt diagnosis and treatment, and better outcomes. These include: allowing sufficient time to listen to, and collect information from patients; use of time out; site verification in the operating room; concise and timely reporting of symptoms; and the repeating back of information (hear back method) between team members.

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The American College of Surgeons Closed Claims Study highlighted the importance and impact of effective communication to protect patient safety and reduce provider liability (4).

Recommendations

- Continued development of clinical pathways (category D).
- An Advanced Practice Nurse or Clinical Bariatric Nurse Specialist on staff in WLS programs (category D).
- Development and fostering of good communication skills between patients and practitioners and between members of the health care team (category D).
- Promotion of collaboration between nurses, physical therapists, discharge planners, social workers, nutritionists, and facilitators of support groups (category D).

Perioperative management

Preoperative nursing care includes assessment and identification of individual patient requirements. The nurse assures that the necessary equipment is in place and the patient is triaged to the most appropriate postoperative unit (5).

Use of the American Society of Anesthesiologists Practice Guidelines for the Perioperative Management of Patients with Obstructive Sleep Apnea can improve care and decrease adverse outcomes. The guidelines provide recommendations, including the positioning of patients, use of continuous positive airway pressure, and administration of analgesia (6). Certain patients require blood pressure monitoring by arterial line due to severe cardiopulmonary disease or poor blood pressure cuff fit; these patients also require a monitored setting (7).

The Association of Perioperative Registered Nurses Bariatric Surgery Guideline helps practitioners and facilities develop safe environments and practices. It describes the nursing process, preoperative assessment, patient positioning in the operating room, and postoperative management (8).

Recommendations

- Unit-specific triage based on individual comorbidities to promote patient safety (category D).
- Use of the Association of Perioperative Registered Nurses Bariatric Surgery Guideline (category D).
- Use of Practice Guidelines for Perioperative Management of Patients with Obstructive Sleep Apnea from the American Society of Anesthesiologists (category C).
- Use (preferably) of a dedicated operative team of nurses and surgical technicians that regularly assists in WLS procedures (category D).

Preventing complications

Vascular. The risk of venous thromboembolic events after gastric bypass is significant and linked to several factors: obesity, immobility, venous stasis, and impairment of the coagulation mechanism (9). At-risk patients should be identified and appropriate prophylaxis administered, including sequential alternating compression devices and low molecular weight heparin as ordered by the physician. Protocols have been developed to improve outcomes and reduce the number of venous thromboembolic

events. Keeling *et al.* (10) recommend preoperative placement of a vena cava filter for patients with previous pulmonary embolism, prior deep vein thrombosis, evidence of venous stasis, or hypercoagulable state. Early ambulation is the key to prevention of vascular and pulmonary complications; the patient should ambulate the day of surgery.

Other postoperative complications. Postoperative monitoring of fluid balance is important. To reduce the incidence of postoperative pulmonary complications, McGlinch *et al.* (11) recommend administration of intravenous fluids based on ideal body weight rather than actual weight. Schuster *et al.* (12) found a decrease in postoperative nausea and vomiting with the administration of larger volumes of intravenous fluids. Obese patients are at higher risk for hypoxemia. Deep breathing, coughing, incentive spirometry, head of bed elevation to 45°, and continuous positive airway pressure are indicated (5,7,8,13,14). Nurses need to be vigilant for signs of anastomotic leak; tachycardia is a cardinal sign of this adverse event (11,12). If a leak is suspected, nurses should anticipate a computed tomography scan or imaging study using Gastrografin.

Skin risk assessment (i.e., Braden score) should be done at admission, with continued monitoring throughout hospitalization and follow-up care for signs of irritation, infection, ulceration in skinfolds, and atypical and pressure ulcers. WLS beds with pressure relief mattress should be provided.

Peripheral nerve injury, resulting in ulnar neuropathy, can be caused by abduction or inadequate support of the arms, and prolonged elbow flexion. These injuries are more common in hospitalized WLS patients, pointing to the need for specialized beds (11).

Complications may occur after discharge, necessitating evaluation in the emergency department. The emergency department staff must be knowledgeable about early and late complications related to WLS surgery. Particular attention must be paid to tachycardia, as this can be a sign of anastomotic leak or dehydration (15,16).

Recommendations

- Ambulation on the day of surgery, and deep breathing/coughing (category D).
- Careful positioning to decrease risk of peripheral nerve injury (categories C and D).
- Education of emergency department staff on early and late complications in WLS patients (category D).

Perianesthesia

Obese patients present with distinct respiratory care considerations that require increased vigilance in monitoring for complications (11). Perianesthesia nurses must be knowledgeable in the pathophysiology of obesity (5,7). Decreased chest wall compliance, increased respiratory resistance, decreased lung volumes, reduced functional residual capacity, and increased oxygen consumption place obese patients at risk for rapid oxygen-hemoglobin desaturation. Increased postoperative pulmonary complications are associated with obstructive sleep apnea (7).

The perianesthesia nurse should be prepared to assist in positioning the patient for optimal tracheal intubation. Patients should be monitored closely after extubation for signs of respiratory depression.

Recommendations

- Referencing by facilities of the Association of Perioperative Registered Nurses Bariatric Surgery Guideline (category D).
- Staff education on pulmonary pathophysiology in obese patients (category D).

Postoperative analgesia

The goal of postoperative pain management is to promote the patient's ability to participate in activities, ambulation, incentive spirometry, deep breathing, and coughing. (17). Patients should be monitored frequently for level of pain and sedation. Patients should be taught to request analgesics prior to severe pain using the 1–10 scale. Patient-controlled analgesia is used in the first 24–48 h postsurgery. Nonsteroidal anti-inflammatory drugs may be effective alternatives to decrease the risk of respiratory complications (13,18). Marley *et al.* (7) suggest that nonpharmacological options be explored. Conversion of postoperative analgesia from intravenous to oral agents warrants the assistance of a pharmacist to ensure equianalgesic agents and doses (5,11,19,20).

Recommendations

- Consultation with a pharmacist on equianalgesic agents and dosing (category D).
- Use of multimodal, opioid-sparing strategies to keep patients comfortable (category D).

Patient and staff safety

Rising rates of obesity bring increasing numbers of obese patients into the health care system. In that they move through many areas of the hospital for tests and procedures, facilities need to adapt beyond a dedicated WLS unit or patient care room. Hospitals should review each area and its equipment to ensure that the obese patient can attain access safely. Weight capacity should be clearly marked on tables, beds, stretchers, and wheelchairs. Patient care rooms should be designed to accommodate not only the patient, caregiver, and visitors, but additional equipment that may be moved in and out of the room (e.g., lifts, wide wheelchairs, and stretchers) (21). A Canadian survey found that a minority of nurses reported accurate knowledge of the weight limits of patient care equipment (22).

Inadequate lifting and positioning equipment can expose the patient to stress injuries of the joints and limbs, falls that can result in head injuries or fractures, pressure sores from infrequent repositioning, and skin shear from linen friction (23). Legislation is in place in Texas, and has been introduced in a number of other states, including Massachusetts (HB 2052), to mandate safe patient handling programs in health care facilities. The Massachusetts proposal includes credits to offset the cost of equipment (23–25).

“Difficult airway carts” contain airway management equipment for patients who may be anatomically difficult to intubate. This equipment should be available in the postanesthesia care unit, along with C-PAP and Bi-PAP equipment, for patients with obstructive sleep apnea (7).

Bureau of Labor statistics show that nurses have one of the highest incidences of back injuries of any profession. Obese patients in need of acute care, combined with a nursing shortage, increasingly expose nurses and other direct care personnel to ever-higher risks of injury (21). For this reason, organizations need to support safe practices in patient care. Training in “body mechanics” and lifting techniques has not been effective in significantly reducing patient handling injuries (21,26).

On units where specialized lifting equipment is in place, staff should be educated in its safe and regular use, and a policy should be in place for its maintenance and repair. Equipment is more likely to be accepted and used if caregivers are involved in its selection and purchase. A peer Back Injury Resource Nurse can be designated to coordinate staff and patient education, promote safety, and record reported injuries. Most musculoskeletal work injuries are the result of cumulative stress. Short-term data indicate that multifaceted ergonomic programs are cost-effective, but long-term data are needed (26,27).

Recommendations

- Clearly marked weight capacity of tables, beds, stretchers, and wheelchairs (categories C and D).
- Use of a comprehensive ergonomics program, including lifting and transferring equipment, to prevent patient handling injuries (category B).
- A designated nurse, or back injury resource nurse, to coordinate equipment selection, maintenance, staff training, and reporting (category D).

Outpatient postoperative nursing follow-up

Outpatient monitoring of the WLS patient extends from immediate postdischarge to ≥ 5 years.

Early monitoring. As in the first Lehman Center report (2), we recommend a phone call to postoperative patients within 48 h of discharge to assess pain management, activity level, respiratory status, wound condition, bowel function, urinary output, diet tolerance, and ability to comply with medication and supplement regimens. The patient's emotional status and social support should also be evaluated (2). In the early discharge phase, dehydration, pulmonary embolism, and anastomotic leak are the serious conditions most likely to occur (15).

Because hospital stays are shorter, and patients receive a large amount of information in a short period of time, written discharge instructions should be reviewed during the initial contact after discharge. In a survey, patients cited complication recognition, activity guidelines, diet, wound care, and bowel function as the discharge areas of greatest concern (28). At the initial postoperative clinic visit, these issues should be reassessed and appropriate referral made to multidisciplinary team members or to the patient's primary care provider, if indicated.

To prevent adverse drug events (29) or reduced efficacy due to decreased absorption, nutritional supplements and medications should be reviewed with patients during each visit. Patients should take their medications in a crushed, powder or liquid form; Roux-en-Y gastric bypass patients should substitute immediate-release for extended-release and enteric-coated preparations (17,30). Patients may find certain medications unpalatable, or consider them unnecessary after surgery, and omit taking them. The patient should be encouraged to have early discharge followed by regular monitoring with their primary care provider to assess preexisting and new medical conditions (e.g., hypertension, diabetes, and hyperlipidemia). As body weight decreases and the clinical picture improves, medication should be adjusted as indicated.

Patients should be questioned about the use of nonsteroidal anti-inflammatory drugs and daily aspirin therapy; they should discuss the risks vs. benefits of preventative aspirin therapy with their physician. Alternatives for analgesia should be recommended. Patients being treated for osteopenia or osteoporosis with oral bisphosphonates may be at risk for gastric irritation and reflux. They should be encouraged to discuss alternatives (e.g., raloxifene or other therapy) with their physician (17). Compliance to ursodiol, if prescribed to prevent gallstone formation, should also be encouraged (31).

Later complications. While patients and caregivers are aware of, and vigilant about, complications during the early postoperative period, nurses engaged in the ongoing care of the WLS patient must be alert to possible late complications (31).

Hyperinsulinemic hypoglycemia. While not common, hyperinsulinemic hypoglycemia occurs more frequently in individuals who have undergone gastric bypass surgery than in the general population. Symptoms most typically arise 1–2 years postsurgery. Patients who report postprandial hypoglycemic symptoms should be referred to their primary care provider for evaluation and referral to an endocrinologist, if indicated. The nurse should be certain that the patient and family know the symptoms of hypoglycemia and how to immediately treat it; they should support the WLS nutritionist's recommendations for low glycemic dietary management (32,33).

Metabolic bone disease. Metabolic bone disease is most common in menopausal women, but men and women who have undergone rapid and significant weight loss are at increased risk for changes in bone density. Roux-en-Y gastric bypass patients may be at even greater risk because of decreased calcium absorption in the duodenum (28,31,34). The nurse should be aware of factors that add to the risk, such as excessive soda, caffeine, or alcohol intake, smoking, inactivity, and certain medications, such as methotrexate and steroids. Patients at risk might benefit from a baseline bone mineral density test arranged through their primary care provider (17,34).

Redundant skin. Excess skin following significant weight loss may produce infections (5), back pain, and body image dissatisfaction

(35). Nurses should assist patients in developing a regimen of skin care, and encourage them to report signs of infection to their physician. They should be made aware that reconstructive surgery should not be attempted until 18–24 months postsurgery, when weight has stabilized. Patients may request early consultation with a plastic surgeon to gain an understanding of the types of procedures that might be performed, and their relative costs. The nurse can assist the patient in insurance matters by providing documentation of medical necessity (36).

Nutritional deficiencies. Risk of nutritional deficiencies is particularly high during the first year post-Roux-en-Y gastric bypass. Iron deficiency anemia and microcytic anemia are the most common deficiencies; adolescents and women of childbearing age are the most susceptible. Calcium, vitamin D, B12, and thiamine deficiencies may occur due to reduced absorption of nutrients in the duodenum and proximal jejunum (15). Central and peripheral neuropathies have been noted secondary to B12 and thiamine deficiency. WLS patients are also at risk of protein deficits (15). Supplements should be reviewed and lab work taken at regular intervals. Nurses should collaborate with the WLS physician and dietitian in recommending and prescribing appropriate supplementation (17,30).

Suboptimal weight loss. Suboptimal weight loss is possible in a minority of patients (19). Attempts should be made to determine if the cause is related to eating patterns, alcohol use, psychological issues, medications, or possible surgical complications. The nurse should question the patient about activity level (30). Adjustable band patients should be encouraged to have frequent follow-up for support (5), dietary counseling, and satiety assessment (37).

The American Society for Metabolic and Bariatric Surgery recommends that WLS patients be followed for 5 years postsurgery. Nurses may be instrumental in meeting this challenge (35) by developing outreach programs to keep patients involved in their long-term care.

Psychosocial adjustment. Psychosocial issues improve for most patients following significant weight loss, especially during the first 2 postoperative years. However, some patients may experience depression or anxiety from altered body image, changed social relationships and eating patterns, as well as preexisting mental health conditions (35). Nurses should determine compliance to prescribed psychotropic medications (e.g., antianxiety or antidepressant medications), and make appropriate referral to a mental health professional if mood disturbance, binge eating, or substance abuse is suspected (31).

Our prior report recommended that patients participate in a WLS support group (1). The Internet now offers additional information and support resources (30). Madan *et al.* (38) demonstrated that a high percentage of WLS patients have Internet access and obtain WLS information through this medium. Nurses should stay up-to-date on WLS websites, and caution patients to use care in following suggestions about medical treatment or conditions, and to discuss these

issues with their primary care provider (28). Nichols and Oermann, using the Health Information Technology Institute Criteria (39), did a systematic evaluation of WLS websites. The American Obesity Association website has patient information in Spanish (19,28).

Pregnancy. Weight loss changes hormone levels in ways that regulate menses cycles and increase fertility. Women should wait 18–24 months postsurgery before becoming pregnant; adequate contraception is important. The efficacy of oral contraceptives is questionable for Roux-en-Y gastric bypass patients due to possible malabsorption. The contraceptive patch may be an option for patients weighing <200 lb, but it has not been highly effective in preventing pregnancy in obese women. The barrier method, intrauterine device, or IM Depo-Provera may be alternatives (40).

Hormone-based contraceptives are discontinued prior to surgery, and for 2 months after, to prevent vascular events. Nurses should encourage women to explore contraceptive options with their physician and partner prior to surgery.

Other complications. Outpatient nurses should be alert to gallstone formation, band slippage, ulceration, stomal stricture, adhesions, and incisional hernia. They should report symptoms to the patient's physician and surgeon (31).

Recommendations

- Review of medications and vitamin supplements at each postoperative outpatient visit (categories C and D).
- Knowledge of possible late complications, how to support patients, and how to make referrals to appropriate caregivers (category D).
- Encouragement of patients to continue treatment through ongoing WLS support groups and networks (categories A and D).

Credentialing of systems and practitioners

The American Society for Metabolic and Bariatric Surgery has developed national certification criteria for Clinical Bariatric Nurse Specialists. Applicants must be registered nurses, registered in the United States, and involved for a minimum of 24 months in the nursing care of extremely obese and WLS patients. Certification requires a passing grade on a comprehensive exam prepared and administered by a national testing agency. Certification is valid for 4 years.

Recertification can be achieved by completing 80 h of continuing education credits, or 40 credits plus one published article in a periodical or peer-reviewed journal. An alternate method for recertification is to retake an updated examination (3).

The content of examinations is based on a nationwide survey to determine the competencies and knowledge appropriate for a Clinical Bariatric Nurse Specialist. The first exam was administered in June 2007 (ref. 3).

Content closely conforms to the “spheres of influence” described by the National Association of Clinical Nurse Specialists (41). Another development in WLS nursing is the formation of the

National Association of Bariatric Nurses, an organization dedicated to improving health and care for obese patients, and promoting best practices in nursing for WLS patients. Membership is open to nurses and allied health professionals.

Recommendation

- Certification in Bariatric Nursing (category D).

DISCUSSION

The last 3 years have seen developments that impact WLS nurse-specialists in every phase of treatment, from preoperative screening and assessment to long-term outpatient follow-up. The development of clinical pathways has standardized and streamlined care and shortened length of stay, potentially enhancing patient safety and reducing errors. The effect of nursing on short- and long-term outcomes is a relatively new area of study. Nurses may be instrumental in enhancing long-term surgical follow-up and procuring outcome data. The designation of Certified Bariatric Nurse may open doors to new research avenues.

New technology in patient care equipment and ergonomics will allow nurses to deliver high quality care in ways that protect their health and that of their patients. Education of patients is essential for prevention of potentially serious adverse events; it provides the foundation for meeting patient-oriented goals. Clinical trials that evaluate patient understanding and retention of pre- and postoperative instruction need to be developed (42). There is increasing evidence that WLS surgery is a safe and effective treatment for childhood and adolescent obesity (43,44,46). We found little nursing literature in this area. Pediatric WLS nurses should play a key role within the multidisciplinary team, working closely with the patient and his/her family throughout the treatment process.

To date, the WLS community has not conducted adequately powered randomized prospective trials. Recommendations are, therefore, largely based on cohort studies, nonrandomized clinical trials, case series or reports (categories B and C), and expert opinion (category D). WLS is a high-risk procedure in vulnerable patients. Specialized nursing care is required to not only rule out unsuitable candidates, but to also ensure optimal outcomes in those who undergo WLS.

Recommendations for future research (all category D)

- Clinical pathways for WLS, including emergency departments.
- Comprehensive ergonomics programs.
- Teach-to-goal educational methods for pre- and postoperative education.
- Program retention tools and outcome measures.

SUPPLEMENTARY MATERIAL

To review task group appendices, go to www.mass.gov/dph and search “Weight Loss Surgery.”

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DISCLOSURE

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REFERENCES

- Commonwealth of Massachusetts. Betsy Lehman Center for Patient Safety and Medical Error Reduction. Expert Panel on Weight Loss Surgery: executive report. *Obes Res* 2005;13:206–226.
- Mulligan A, Young LS, Randall S *et al*. Best practices for perioperative nursing care for weight loss surgery patients. *Obes Res* 2005;13:267–273.
- American Society for Metabolic and Bariatric Surgery. *Certified Bariatric Nurse (CBN) Examination Candidate Handbook*. American Society for Metabolic and Bariatric Surgery (ASMBS), Gainesville, FL, 2007.
- Griffen FD. American College of Surgeons closed claims study reveals critical failures to communicate. *Bull Am Coll Surg* 2007;92:11–16.
- Barth MM, Jenson CE. Postoperative nursing care of gastric bypass patients. *Am J Crit Care* 2006;15:378–387.
- Gross JB, Bachenberg KL, Benumof JL *et al*. Practice guidelines for the perioperative management of patients with obstructive sleep apnea: a report by the American Society of Anesthesiologists Task Force on Perioperative Management of patients with obstructive sleep apnea. *Anesthesiology* 2006;104:1081–1093.
- Marley RA, Hoyle B, Ries C. Perianesthesia respiratory care of the bariatric patient. *J Perianesth Nurs* 2005;20:404–431.
- Association of periOperative Registered Nurses. AORN bariatric surgery guideline. *AORN J* 2004;79:1026–1040, 1043–1044, 1047–1052.
- Heffline MS. Preventing vascular complications after gastric bypass. *J Vasc Nurs* 2006;24:50–54.
- Keeling WB, Haines K, Stone PA *et al*. Current indications for perioperative inferior vena cava filter insertion in patients undergoing surgery for morbid obesity. *Obes Surg* 2005;15:1009–1012.
- McGlinch BP, Que FG, Nelson JL *et al*. Perioperative care of patients undergoing bariatric surgery. *Mayo Clin Proc* 2006;81(Suppl 10):S25–S33.
- Schuster R, Alami RS, Curet MJ *et al*. Intra-operative fluid volume influences postoperative nausea and vomiting after laparoscopic gastric bypass surgery. *Obes Surg* 2006;16:848–851.
- Grindel ME, Grindel CG. Nursing care of the person having bariatric surgery. *Medsurg Nurs* 2006;15:129–145.
- Gallagher-Camden S. Nursing care of the bariatric patient. *Bariatr Nurs Surg Patient Care* 2006;1:21–30.
- Eisenhart A. Emergency department presentations following weight loss surgery. *Osteopath Emerg Med Q* 2006;31:1,8–12.
- Roundtable Discussion. Urgent and Emergent Management of Postoperative Bariatric Surgery Patients. *Bariatr Nurs Surg Patient Care* 2006;1:5–14.
- Miller AD, Smith KM. Medication and nutrient administration considerations after bariatric surgery. *Am J Health Syst Pharm* 2006;63:1852–1857.
- Deutzer J. Potential Complications of obstructive sleep apnea in patients undergoing gastric bypass surgery. *Crit Care Nurs Q* 2005;28:293–299.
- Harrington L. Postoperative care of patients undergoing bariatric surgery. *Medsurg Nurs* 2006;15:357–363.
- Blackwood HS. Help your patient downsize with bariatric surgery. *Nurs Manage* 2005;Suppl:4–9.
- Wilson K. Ergonomics and the bariatric patient. *Bariatr Nurs Surg Patient Care* 2006;1:173–178.
- Singh N, Arthur HM, Worster A, Iacobellis G, Sharma AM. Emergency department equipment for obese patients: perceptions of adequacy. *J Adv Nurs* 2007;59:140–145.
- Massachusetts Nurses Association Position Statement. Safe patient handling. MNA Publications <http://www.massnurses.org/health/articles/osha1106_1.htm> (2006). Accessed 15 June 2007.
- Dubose J. The benefits of safe patient handling. Massachusetts Nurse Newsletter <http://www.massnurses.org/health/articles/osha1106_1.htm> (2006). Accessed 15 June 2007.
- Massachusetts House Bill 2052 (HB 2052), Chapter 111, 91C. An Act Providing for Safe Patient Handling. Massachusetts House of Representatives. Sponsor: Representative Jennifer Callahan <<http://www.massnurses.org/leg/bill-safe-patient-handling.pdf>> (2007).
- Nelson A, Matz M, Chen F *et al*. Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks. *Int J Nurs Stud* 2006;43:717–733.
- Morgan A, Chow S. The economic impact of implementing an ergonomic plan. *Nurs Econ* 2007;25:150–156.
- Pieper B, Sieggreen M, Nordstrom C *et al*. Bariatric surgery: patient incision care and discharge concerns. *Ostomy Wound Manage* 2006;52:48–52, 54, 56 passim.
- Forster AJ. Can you prevent adverse drug events after hospital discharge? *CMAJ* 2006;174:921–922.
- Sheipe M. Breaking through obesity with gastric bypass surgery. *Nurse Pract* 2006;31:12–14, 17, 18, 21; quiz 22–23.
- Doolen J, Miller SK. Primary care management of patients following bariatric surgery. *J Am Acad Nurse Pract* 2005;17:446–450.
- Goldfine AB, Mun E, Patti ME. Hyperinsulinemic hypoglycemia following gastric bypass surgery for obesity. *Curr Opin Endocrinol Diabetes Obes* 2006;13:319–424.
- Service GJ, Thompson GB, Service FJ *et al*. Hyperinsulinemic hypoglycemia with nesidioblastosis after gastric-bypass surgery. *N Engl J Med* 2005;353:249–254.
- Hogan SL. The effects of weight loss on calcium and bone. *Crit Care Nurs Q* 2005;28:269–275.
- Sarwer DB, Wadden TA, Fabricatore AN. Psychosocial and behavioral aspects of bariatric surgery. *Obes Res* 2005;13:639–648.
- Gallagher S. Panniculectomy: more than a tummy tuck. *Nursing* 2004;34:48–50.
- Shen R, Dugay G, Rajaram K *et al*. Impact of patient follow-up on weight loss after bariatric surgery. *Obes Surg* 2004;14:514–519.
- Madan AK, Tichansky DS, Speck KE, Turman KA. Internet use in the bariatric surgery patient population. *Obes Surg* 2005;15:1144–1147.
- Nichols C, Oermann MH. An evaluation of bariatric Web sites for patient education and guidance. *Gastroent Nurs* 2005;28:112–117.
- Raymond RH. Hormonal status, fertility, and pregnancy before and after bariatric surgery. *Crit Care Nurs Q* 2005;28:263–268.
- Morissette J. Clinical nurse specialist as leader of a bariatric program. *Nurs Leadersh Forum* 2004;9:75–79.
- Sudore RL, Landefeld CS, Williams BA *et al*. Use of a modified consent process among vulnerable patients: a descriptive study. *J Gen Intern Med* 2006;21:867–873.
- Warman JL. The application of laparoscopic bariatric surgery for treatment of severe obesity in adolescents using a multidisciplinary adolescent bariatric program. *Crit Care Nurs Q* 2005;28:276–287.
- Henry L. Childhood obesity: what can be done to help today's youth? *Pediatr Nurs* 2005;31:13–16.
- Barlow SE. Bariatric surgery in adolescents: for treatment failures, or health care system failures? *Pediatrics* 2004;114:252–253.
- Haynes B. Creation of a bariatric surgery program for adolescents at a major teaching hospital. *Pediatr Nurs* 2005;31:21–22, 59.