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Managing obese patients in the OR

As obesity rates continue to soar, all perioperative nurses must understand the health and safety needs of obese patients who present to the OR.

By Lisa Rowen, DNSc, RN, FAAN, David Hunt MSN, RN, and Karen L. Johnson, PhD, RN

Currently, approximately one-third of all Americans are categorized as obese.[1] On a global level, the World Health Organization estimates that there were approximately 400 million obese adults in 2008, with this number projected to rise to 700 million by 2015.[2] Accordingly, it has been noted that the number of bariatric surgical procedures increased from 16,200 in the early 1990s to more than 171,000 in 2005, and an estimated 220,000 procedures performed in 2008.[3] Although bariatric surgical procedures are the fastest-growing type of procedure, obesity—in particular, morbid and superobesity—affects the care of all surgical patients, not just those undergoing a weight loss procedure. These patients pose a special set of safety and care challenges for nurses in the OR.

Excellence in perioperative nursing means ensuring safe and optimal outcomes for patients undergoing operative and other invasive procedures. Perioperative nurses who care for obese patients must be aware of practice standards related to patient handling and transfers, proper positioning, correct use of appropriate equipment, ensuring adequate body temperature, maintaining skin integrity, and providing an environment of respect and sensitivity.

BRIAN STAUFFER

Patient handling

In adults, obesity is determined using height and weight to calculate body mass index (BMI). An adult with a BMI of 30 or greater is considered obese. Grade III morbid obesity is defined as a BMI greater than 40 and Grade IV super obesity is defined as a BMI greater than 50.[4] Children are considered obese if their BMI is above the 95th percentile for children of the same age and gender.[5]

A systems approach to understanding OR equipment requirements for weight, girth, and width limitations is essential for correct patient positioning. Perioperative care teams also need specific training that addresses the physical, mental, and psychosocial needs of a morbidly obese surgical patient. Safe positioning requires preplanning, teamwork, and a methodology that promotes dignity and respect. Without this approach, care may lead to embarrassment and frustration, and pose safety risks to both the perioperative staff and patients.

Staff training and standardization of policies and procedures have been used successfully in injury-prevention programs. Algorithms can help staff gather equipment and supplies that are often not readily available in the OR. The Department of Veterans Affairs has published algorithms that can assist healthcare workers in planning the safe handling and movement of obese patients.[6] Algorithms include bariatric lateral transfer to and from bed to stretcher, repositioning in bed (side to side), and transportation via stretcher (see *Bariatric lateral transfer to and from: Bed/stretcher)*.

The National Association of Bariatric Nurses Recommendations include developing safe-lifting policies, emphasizing interdisciplinary teamwork and effective communication, offering focused education programs, and using applicable assistive equipment.[7,8] The Association of periOperative Registered Nurses (AORN) guidelines also identify safety considerations for patients with morbid obesity which include: safety equipment to minimize risk to patients and perioperative staff, proactive procedural planning of equipment and supplies, careful maintenance of specialty equipment, the importance of correct body mechanics, safe transportation, teamwork and communication, and an emphasis on tracking clinical outcomes of these high-risk patients.[9]

Maintaining skin integrity

The skin is particularly vulnerable to tissue damage related to obesity, and effectively managing wounds is crucial for perioperative nurses. Preoperative evaluation should include an overall assessment of general skin condition and an assessment of all skin folds. Areas of increased moisture should be identified.[10] Skin surfaces should be assessed for rashes, redness, and discoloration, as well as areas of ulcerations. Evaluation of perioperative bed design should occur prior to patient arrival to the OR. Gel overlays have been shown to be very effective in protecting bony prominences.[11]

In addition to preventing skin breakdown and promoting wound healing, OR nurses are also confronted with an additional set of challenges when maintaining skin integrity for the obese patient. Blood vessels that supply adipose tissue are vasoconstricted, which significantly impairs perfusion to subcutaneous tissue.[12,13] Wound and tissue hypoxia are common in obese patients in the perioperative period and most pronounced intraoperatively. Obese patients are more at risk for increased cardiac workload and decreased oxygen supply from insufficient lung ventilation, and diffusion of oxygen creates an imbalance of oxygen supply and demand at the tissue level. Even with supplemental oxygen administration, oxygen tension at the tissue level in patients with obesity can be reduced substantially, which places the patient at risk for infection.[14] Furthermore, diminished blood supply can lead to tissue ischemia and necrosis, and the development of pressure ulcers.

Pressure, shear, and friction are the three main causes of skin breakdown, particularly in the treatment and care of the obese surgical patient. External pressure above 32 mm Hg can cause capillary occlusion and decrease oxygen available to the distal tissues.[15] Perioperative nurses should be vigilant to evaluate joint and skin pressure points where there may be concern that skin pressure exceeds this amount, as it could be damaging even for short periods of time. The use of heating blankets may increase pressures to approximately 44 mm Hg.[15] Patients with obesity are at further risk than those of normal BMIs, as their body mass alone can exert increased pressure on dependent tissues. In the OR, the weight of a patient's limp extremity can cause enough pressure to produce muscle ischemia.[16]

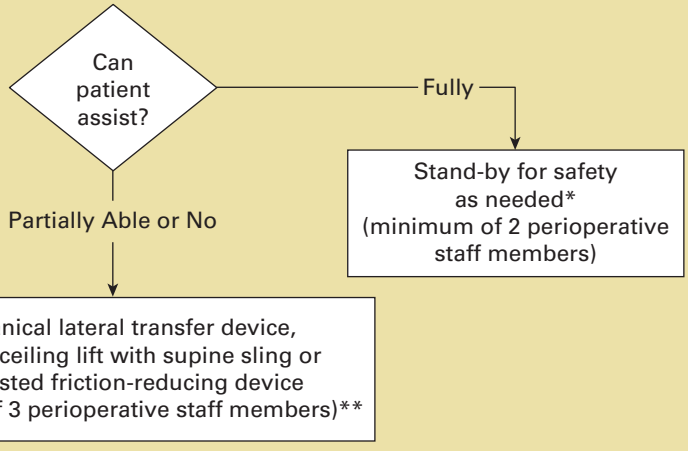
Shearing is a mechanical force that is parallel to an area, has an effect on deep tissues, and occurs when the tissues attached to the bone are pulled in one

direction because of body weight, while the surface tissues adhere to surfaces and remain stationary.[17] As the skeletal bones slide downward inside the skin, blood vessels can become obstructed, torn, or stretched as patients are dragged along surfaces for positioning. Shearing forces may cause triangular-shaped sacral ulcers and areas of tunneling beneath sacral ulcers.[15] To avoid shearing for obese patients, the OR table should be placed at no more than a 30-degree angle, except for short periods.

Proper positioning

The goals of safe positioning include providing optimal access to the surgical site, maintaining normal

Bariatric lateral transfer to and from: Bed/stretcher



- The destination surface should be about 1/2" lower for all lateral patient moves.
- Avoid shearing force.
- Make sure bed is the correct width to avoid excessive reaching.
- Lateral transfers shouldn't be used with specialty beds that interfere with the transfer. In this case, use a bariatric ceiling lift with supine sling.
- Ensure bed or stretcher doesn't move with the weight of the patient transferring.

** Use a bariatric stretcher or trolley if patient exceeds weight capacity of traditional equipment.

* "Stand-by for safety." In most cases, if a bariatric patient is about to fall, there's very little that the perioperative staff can do to prevent it. The staff should be prepared to move any items out of the way that could cause injury, try to protect the patient's head from striking any objects or the floor, and seek assistance as needed once the person has fallen.
* Assure equipment used meets weight requirements. Standard equipment is generally limited to 250-350 lbs. Facilities should apply a sticker to all bariatric equipment with "EC"(for expanded capacity) and a space for the manufacturer's rated weight capacity for that particular equipment model.

- If the patient has partial weight-bearing capability, transfer toward the stronger side.
- Consider using an abdominal binder if the patient's abdomen impairs a patient handling task.
- Identify a leader when performing tasks with multiple staff members. This will ensure that the task is synchronized for increased safety of the healthcare provider and the patient.
- If any staff member is required to lift more than 35 lbs of a patient's weight during any patient transferring task, then the patient should be considered fully dependent and assistive devices should be used for the transfer.

Source: www.orosha.org/grants/resident_handling/docs/VeteransAffairsDocuments/SPHMovementAlgorithms.pdf

physiologic function, maintaining body alignment, and most important, preventing injury. Positioning complications include potential nerve damage and compartment syndrome, as well as pressure, shear, and friction injury to the skin. Knowledge of safe-positioning techniques and aids in conjunction with pressure-relieving interventions and devices is paramount to proper positioning.

Safe body mechanics include positioning the perioperative nurse's body as close to the patient as possible. This can be challenging in the OR, as a result of catheters, I.V. infusion pumps, poles, and other patient-care equipment. The perioperative nurse should ensure that adequate staff and appropriate equipment are in place and readily available prior to initiating any position change. Analysis of healthcare worker back injuries suggest that these often occur as a result of failing to summon enough assistance before attempting to position the patient.[18] There's strong evidence that demonstrates lift assisting devices reduce occupational injuries. Front-line staff should actively participate in the process to identify, choose, and use lifting equipment. Hospitals spend significant capital funds to purchase lift devices, only to find them placed in storage or rarely used.[19]

A typical OR table has a weight limit of 500 lbs and an average width of 20 in. (see *OR table weight restrictions*). Morbidly obese patients are at high risk for falling during positioning due to weight load shifts. Table manufacturers produce heavy-duty models capable of supporting patients who weigh up to 1,000 lbs. Weight limits should be clearly visible on all OR equipment. Newer tables may have side extensions for support; in addition, width extensions, arm boards, and stirrups should be used when necessary to align a patient adequately and safely, and allow for appropriate positioning. For safety, ensure the patient has straps securing them to the OR table. Place one strap across the patient's thighs and the second across the lower legs.[20] During patient positioning, the table should be leveled to approximately the height of the elbow of the perioperative staff to minimize overreaching and bending.

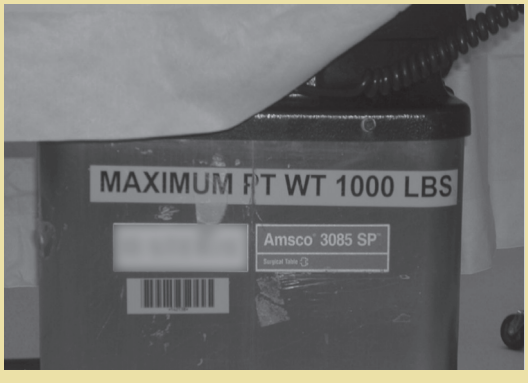
Positioning limbs may be particularly difficult due to the patient's body habitus (side attachments may be used with the OR table to account for the patient's girth). Extremity pulses must be regularly assessed. Arms should be extended on the sides of the table; however, special care must be taken to avoid hyperextension, which can cause brachial plexus injury. Ulnar and brachial nerve pads can be used to protect arms and elbows. Additional arm boards can be added to the lower end of the table to support the lower extremities. External rotation of the hip and pressure on the lateral aspect of lower extremities should be avoided.[21] A footboard can be used to reduce peroneal and tibial nerve damage otherwise associated with foot and ankle plantar flexion. Sequential compression devices are typically indicated and should be applied to lower legs only, and regular assessments of circulation to the lower extremities should be performed.

Using pressure-point cushioning is essential. Pillows and wedges can be used to ensure ankles and knees are adequately separated. Padding and positioning devices should maintain the normal cap-

OR table weight restrictions

Figure 2a: Ensure that OR table weight restrictions aren't obvious to the patient.

Figure 2b: Ensure that OR table weight restrictions are obvious to staff.



illary interface pressure of less than 32 mm Hg to minimize the development of pressure ulcers. Pads made from viscoelastic polymers can be used to minimize pressure and provide support. Foam products, towels, and blankets are not as effective because they compress and at maximal loading provide little or no support.

Securing devices should be used to maintain the patient's correct body alignment and support the patient's extremities and joints to decrease the

Physiologic effects of OR positioning for the patient with morbid obesity

Supine position	The enlarged abdominal contents may compress the vena cava and aorta, impeding normal blood flow as well as impairing diaphragmatic movement and reducing functional residual lung capacity. Positional relief of intra-abdominal pressure during supine positioning will improve oxygenation. For morbidly obese patients, the supine position is associated with increased physiologic risk. The cardiopulmonary decompensation is well-documented and has been termed, "Obesity Supine Death Syndrome".
Trendelenburg position	Usually not as well-tolerated as the supine position. Abdominal weight compresses the vena cava and aorta, impeding normal blood flow. The added weight of the abdominal contents resting on the diaphragm may quickly lead to atelectasis and hypoxemia.
Prone position	Particularly problematic for the patient with morbid obesity and will require additional support and monitoring of both the patient and the pressure on the abdomen. The abdominal pressure may constrict the inferior vena cava as well as the aorta (as in the supine and Trendelenburg positions) and will compress the diaphragm, making ventilation markedly more difficult.
Lateral position	Usually well-tolerated by patients with obesity. Correct sizing and placement of the axillary support is important. Be certain that a large pendulous abdomen doesn't hang over the side of the OR table. This could ultimately pull the patient off the table. Standard safety straps are often too short. The use of 3-in. silk or adhesive tape has been suggested to maximize stability and safely keep the patient properly positioned on the OR table.
Head-up position	Most safe for a patient with morbid obesity who is awake. Head-up positions may include a reverse Trendelenburg position or a semi-recumbent (upper body elevated) position. The head-up position is associated with unloading the weight of the abdominal contents from the diaphragm. It's important that a well-padded footboard be used to prevent the patient from sliding down the OR table. The circulating nurse must regularly check and document the position of the feet and be vigilant to concerns of circulatory and nerve damage. Anesthetic induction in the head-up position appears to have favorable outcomes as pulmonary function is improved, allowing an increased length of time before hemoglobin desaturation. For teams uncomfortable accessing the patient's airway in a head-up position, pre-induction oxygenation produces a longer period of safety prior to eventual desaturation.

From: Hunt, DG. Evaluating equipment and techniques for safe perioperative positioning of the morbidly obese patient. *Bariatric Nursing and Surgical Patient Care*. 2007;2(1):60. Reprinted with permission.

potential for injury. These devices are important to patient safety; however, they should be used with caution because they can cause excessive pressure on the skin and can compress nerves. To safely secure the patient's arms at his or her sides, the palms should be facing toward the thighs, elbows and hands should be protected and padded, and hands and wrists should be in anatomical alignment. Care should be taken to prevent pressure-related injury from straps and supports, as well as to minimize the risk of surgical team members leaning against any tissue extending from the margin of the OR table.[22] When patients are placed in the lateral or prone position, breast tissue can become compressed so it's important to make regular assessments of dependent breast tissue in both male and female patients (see *Physiologic effects of OR positioning for the patient with morbid obesity*).

Appropriate equipment and usage

Air-assisted lateral transfer aids use an air-filled mattress placed under a patient in the same manner as a transfer board. As air flows through the mattress, staff can more easily slide the patient on a cushioned surface film of air, greatly reducing the transfer workload. Friction-reducing lateral sliding aids may also be useful. These are usually simple, low-cost devices made of smooth fabric. Properly designed handles reduce horizontal reach, which compromises staff ergonomics when moving and lifting the obese patient. Motorized lateral transfer aids that use a hand or motorized crank to slide the patient on and off a stretcher allow adjustable height settings and eliminate the need to slide the patient manually. Simple slide-and-roll boards can also be used (see *Slide board*). As with all of these lateral transfer aids, height and width limits must be considered, and the risks associated with lateral transfer are so great that often a conscious decision is made to move the patient with morbid obesity from the OR table directly to the bed/frame on which they will be cared for during the rest of their hospital recovery. When used correctly, these devices reduce the risk to both perioperative staff and patient, and transfer boards are safe when used by a well-practiced and coordinated team(see *Staff education*).

Ensuring access to appropriate equipment before beginning procedures reduces procedural delay. Extra large retractors and BP cuffs, double arm boards, and elongated instruments should be available before the patient enters the OR.[23] Appropriately sized equipment should be ready before the patient arrives in the room.

Slide board

A slide-and-roll board can be used for lateral transfers.

Team consensus is key

Preoperative preparation and a perioperative timeout should include a discussion of the patient's BMI. When known BMI exceeds 35, the team should discuss safety-related issues, including quality of positioning, airway maintenance, cardiovascular risk, body temperature maintenance, and potential for skin breakdown.

A sufficient number of staff is necessary to ensure the safety of the patient as well as the staff. Prior to entering the OR, the team should confirm the preferred position for the surgical procedure, discuss positioning maneuvers with the anesthesia provider, evaluate the need for an OR table mattress (such as a gel overlay), and secure additional positioning aids and table pieces.[24] Table weight limits must be confirmed prior to patient arrival.

After the patient has been moved, the OR team should agree that patient positioning is final, and documentation of the process should be accurate and complete. Essential documentation for positioning includes types of tape used, and the use of padding, axillary roll, chest roll, and footboard used. Include the names of staff who participated in the positioning procedure and that a consensus was achieved.

Staff education

Education and training that integrate concepts of safe care for people with obesity must be provided to perioperative nurses and staff. When developing an educational plan for OR staff, the following elements may be appropriate: rationale, target audience, course description, course objectives, evaluation strategy, participant prerequisites, facilitator prerequisites, and proposed outcomes of the training.[35]

The best way to evaluate the success of an educational program on caring for the patient with obesity in the perioperative environment is to observe nursing staff who have participated in the training as they care for these patients. Have they integrated the educational concepts into their practice, communication, and care? What are the specific practice outcomes that were expected from the education and are they evident in a consistent fashion by all participants? If nursing practice hasn't changed in a significant and consistent way, the planners of the education may need to provide follow-up education. Shifting the approach to excellent nursing care of patients with obesity will take time, conversation, and education, and will require a commitment for each individual to be accountable to new performance standards.

Educational content for care of the obese perioperative patient

- A definition of obesity and its associated healthcare risks
- A review of obesity as a disease as well as the comorbid conditions that often accompany it, such as certain cancers, female urinary stress incontinence, gallbladder disease, and gastroesophageal reflux as well as the surgical procedures related to these diseases
- A review of common bariatric procedures including the Roux-en-Y gastric bypass, laparoscopic assisted gastric bypass procedure, vertical banded gastroplasty, and biliopancreatic diversion with duodenal switch
- Any current and relevant AORN bariatric surgery guidelines
- Risks and complications of both bariatric surgery as well as any surgical procedure for a patient with obesity
- Initial evaluation and assessment of patients with obesity
- Preoperative assessment of patients having bariatric surgery
- Safe mobilization for patients and staff
- Proper positioning
- Appropriate use of equipment
- Maintaining skin integrity
- Preventing complications, such as hypothermia, anastomotic leak, intra-abdominal injury, retained foreign body, unsecured airway and postoperative infection
- Preparing for transfer to the postanesthesia care unit
- Proper handoffs
- Respect and sensitivity.

Ensuring adequate body temperature

Morbid obesity increases metabolic, oxygen, and cardiac workload demands. It's also understood that hypothermia further increases each of these workload demands, placing the patient at substantial further risk. Prevention of hypothermia has a clear benefit for the patient in terms of reduced mortality and morbidity. Upper body temperature-regulating devices are more successful in warming an obese patient's core than lower-body devices.[25] Both may, however, be indicated.

Forced-air warming systems are safe and cost-effective mechanisms to minimize undesirable consequences of hypothermia in morbidly obese patients undergoing Roux-en-Y gastric bypass.[26] The circulating nurse must ensure that the OR room is warm and that the patient remains covered until the procedure is underway. Blood and I.V. warmers can minimize the risk of hypothermia.

Environment of respect and sensitivity

Obesity is often referred to as the last safe bastion for socially acceptable discrimination.[27] Rather than viewing obesity as the most common, chronic, complex disease process in healthcare, there's a public intolerance and lack of social acceptance where many outwardly or covertly ridicule and display intolerance for people with obesity.[28–30]

Intolerance and bias attitudes toward obese patients is well documented among clinical providers, and bias offers a particular challenge when nurses, physicians, dietitians, social workers, physical therapists, and psychologists work with people with morbid obesity.[31] One study showed that people with obesity reported they were always or usually treated with disrespect by healthcare professionals.[32]

Perioperative nurses must ensure equitable, compassionate, and optimal care of all patients, and they must be particularly vigilant about complex and high-risk patients who may be misunderstood or discriminated against. It's critical for nurses to recognize obesity as a chronic and multifactorial disease to ensure that best care practices are standard in the OR. Patients with obesity may be reluctant or uncomfortable to ask for assistance or education, as many might assume the nurse will focus on their weight and the increased challenges they pose for the nurse. Perioperative nurses can best serve patients if through their actions, patients are reminded that nurses protect their physical, emotional, cognitive, and spiritual needs in a caring, sensitive manner and environment.[33]

The RESPECT Model was developed to provide a framework for establishing and maintaining successful professional relationships with the obese population.[34] This model can be used in all settings, including the perioperative environment:

R–Rapport: establishing connection, empathy, and understanding to gain trust

E–Environment/Equipment: feeling comfortable and safe is critical to enhance patient participation, mobility, and independence

S–Safety: promotes the development of a therapeutic relationship and trust

P–Privacy: must be upheld and protected

E–Encouragement: fosters a positive attitude and positively affects patient motivation

C–Caring/Compassion: shows genuine concern and interest

T–Tact: paramount to establishing trust

In the perioperative setting, the RESPECT Model promotes a thoughtful consideration of the environment, circumstances, feelings, and values of patients with obesity. Perioperative nurses are natural advocates for their patients; it's important to realize patients with obesity may require a greater level of advocacy to create an environment of respect and sensitivity.

Conclusion

Perioperative practice settings and patient needs are constantly evolving and becoming increasingly complex. It's critical for nurses in the perioperative environment to provide expert care to patients with obesity that is consistently safe. Nurses are educated about obesity and its effect on general health, but the education tends to be accomplished in a piecemeal fashion, whether in nursing schools or in acute care settings.[36–38] Perioperative patients who are obese require an integrated approach to their care, one that adheres to evidence-based practice. As the obesity epidemic continues to grow, it will become increasingly necessary for perioperative nurses to keep their nursing skills current to promote the best care for their patients with obesity. **OR**

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Lisa Rowen is chief nursing officer and senior vice president of nursing and patient-care services at the University of Maryland Medical Center in Baltimore, MD.

David Hunt is the director of nursing, cardiac care, and radiology at the University of Maryland Medical Center in Baltimore, MD.

Karen L. Johnson is the former director of nursing, research, and evidence-based practice at the University of Maryland Medical Center in Baltimore, MD.

The authors and planners have disclosed that they have no financial relationships related to this article.

DOI-10.1097/01.ORN.0000412324.97287.aa

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