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Perspectives

Recovery Strategies from the OR to Home

In This Issue

Excess body weight is a threat to health, because it is associated with an increase of cardiovascular disease, type 2 diabetes, hypertension, infertility, stroke, hyperlipidemia, degenerative joint disease, gallstones, and some types of cancers. When hospitalized, very overweight patients are at risk for certain hazards of immobility that contribute to pulmonary complications, such as atelectasis, pneumonia, and delayed or traumatic intubation, and exacerbate pre-existing conditions, such as overweight hypoventilation syndrome or sleep apnea. In her article, Dr. Gallagher, an expert in the field of bariatrics, points out patient-care activities, such as care planning, repositioning, airway management, and other tasks can become more complex because of obesity.

Nurses often care for patients with tracheostomy tubes in critical care settings and other patient care units. The need for a tracheostomy may extend to several months and some patients may require a permanent tracheostomy. As a result, many patients are discharged from hospital to home before they are ready to be decannulated. When a patient requires a tracheostomy tube for an extended length of time, good home care management is essential. Ms. Dixon identifies three key phases of a program to facilitate the transition from acute care to home care: management, prevention and wellness.

Obesity, the Lungs, and Airway Management

CONTINUING EDUCATION FOR NURSING

By Susan Gallagher, RN, MSN, CNS, PhD

Obesity is emerging as a major public health concern. Well-documented evidence suggests that it is the second-leading cause of preventable, premature death – second only to cigarette smoking. More than 400,000 people in the USA die as the result of weight-related issues each year.[1]

Obesity is most simply considered as a condition of excess energy stores in the form of fat. In reality, it is a very complex phenomenon with a number of complex etiologies. The American Society of Bariatric Surgery (ASBS) describes obesity as a lifelong, progressive, life-threatening, genetic-related, multifactorial disease of excess fat storage with multiple comorbidities.[2] The word obesity originates from the Latin language and refers simply to the state of becoming "fattened by eating."

Bariatrics is a term derived from the Greek word *baros*, and it is used today to refer to the practice of health-care relating to the treatment of obesity and associated conditions. The specialty of bariatrics is becoming more important, as the number of obese Americans is increasing. The implication for healthcare providers is that patient-care activities, such as care planning, repositioning, airway management, and other tasks can become more complex because of obesity.

Overweight and obesity are common health conditions, and their prevalence is increasing nationally and globally. Recent estimates suggest that over 67% of U.S. adults are overweight, as indicated by a body mass index (BMI) greater than 25.[2] Of all Americans between the ages of 26 and 75, from 10% to 25% are obese – a rise of greater than 25% over the past 3 decades.[2] This increase has occurred regardless of age, gender, ethnicity, socioeconomic status or race.

What is obesity?

To understand fully the meaning of these statistics, it is important to know how overweight and obesity are defined and measured. The value of standardized measurement and definition is that all stakeholders can speak the same language. Policy makers, insurance carriers, institutions, administrators, and clinicians who use standardized measurement and definition can use universal criteria to make changes and develop policies.

Overweight, by definition, refers to an excess of body weight as compared to set standards. The excess weight may come from muscle, bone, fat, and/or water. Obesity refers specifically to the abnormal proportion of body fat. One can be overweight without being obese. For example, the body builder or other athlete may have a greater than average muscle mass. However, many overweight people are also obese.

Body mass index (BMI) is the most common and widely acceptable method of measuring overweight and obesity. BMI describes relative weight to height and makes an accurate correlation to total body fat content. Although appropriate for most adults, the accuracy of BMI among certain groups is not guaranteed. For example, calculating BMI in a child, patient with edema or ascites, pregnant women, or people who are highly muscular may

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Tracheostomy: Easing the Transition from Hospital to Home

by Lois Dixon MSN, RN

Nurses often care for patients with tracheostomy tubes in critical care settings and other patient care units. The need for a tracheostomy may extend to several months or even years; some patients may require a permanent tracheostomy. As a result, many are discharged from hospital to home before they are ready to be decannulated.

When a patient requires a tracheostomy tube for an extended length of time, home care management is a reasonable goal. Fritton[1] identifies three key phases of a program to facilitate the transition from acute care to home care: management, prevention, and wellness. This article outlines the nursing care of patients with a long-term tracheostomy within this framework.

Management

The nurse plays an important role in assuring the continuity of care to patients after hospital discharge. The nurse reinforces the patient's previous learning about care and other aspects of airway maintenance, based on the assessed needs and level of family functioning.[2]

Respiratory assessment

Decision-making and the development of assessment skills are the primary focus of education, once the patient and family master the necessary technical skills. Because many home-care patients and their families are the primary caregivers, they must be able to evaluate the patient's respiratory status and know how to act in response.

The patient and family should become familiar with the patient's normal respiratory pattern, so they can promptly and safely intervene to prevent or manage a problem.[1] The more that patients listen to their respirations, the more able they are to determine changes from normal respiratory patterns. Encouraging other caregivers to spend time with the patient while still hospitalized will help to develop these assessment skills.[6] Problem solving is fostered by the active participation of both patient and family.[3]

Table 1 Indications for Suctioning

- Noisy or moist-sounding respirations
- Increased pulse rate
- Increased or labored respirations
- Nonproductive coughing
- Crackles or wheezes
- Patient requests suctioning
- Tube changes

Suctioning

In addition to learning the suctioning technique, it is imperative that both patient and family recognize the indications for suctioning (Table 1). The nurse teaches them how to suction the airway, based on the assessment of the patient's pulmonary needs. The frequency of suctioning varies for each patient. The nurse evaluates the patient's ability to suction the tracheostomy and clean the inner cannula and reinforces the teaching, when necessary.

The purpose of changing the tracheostomy tube is to minimize infection and granulation tissue formation.[1] The frequency of changes varies but is usually at least once monthly.[4] In most cases, patients can change the tracheostomy tube at home, once they are proficient and confident in their ability.

The nurse involves the patient and family in this process, offering encouragement and support, until they are able to change the tracheostomy tube and tracheostomy ties independently. Emphasis is placed on properly securing the tube to avoid accidental decannulation. While the use of twill tracheostomy ties is widespread, a Velcro® tracheostomy tube holder would be easier for the patient to manipulate independently.

Humidification

Adequate humidification of the trachea is very important. Inspired air which bypasses the nose and enters directly through the tracheostomy is deprived of all natural moisturizing benefits of the upper airway passages. The importance of humidification in reducing the thickness of secretions and build-up of crusty formations is discussed with the patient.[4] Symptoms of insufficient humidity include[5]:

- increased, unproductive coughing
- a change of mucus from thin to a thick, sticky consistency and from clear to pale yellow
- shortness of breath from a mucus-plug obstruction
- blood-streaked mucous
- noisy, labored respirations

For patients who are very young or bedridden, a tracheostomy collar with a warm humidification system is effective.[1] In other situations, the use of a room humidifier or vaporizer may be useful.[2,6] Adequate fluid intake (2000-2500 ml/day) will help moisten the tracheal tissues and thin secretions.[6]

Nutrition

The patient should be evaluated for nutritional well-being and wound healing. The nurse stresses the relationship between good nutrition, meticulous skin care, and the prevention of wound infection.[4] The patient with a tracheostomy is at risk of nutritional deficiency, because of altered anatomy and less taste and smell sensations.[4] To counter these problems, the patient is encouraged to maintain good oral hygiene and eat high-calorie snacks, if not medically contraindicated. Maintenance of weight is one objective measure of nutritional adequacy.

Activities of daily living

Most patients may resume usual activities within four to six weeks after hospital discharge.[7] It is important that the patient understands any limitations of activity.[8]

Because of structural changes that occur with a tracheostomy, the airway is largely unprotected from natural elements, e.g., water, dust. The nurse explains the importance of protecting the tracheostomy stoma from the aspiration of fluids or other irritating substances. Particular care must be taken during bathing and showering. The use of a shower shield or tracheostomy cap prevents the accidental entry of water into the trachea during bathing.

The patient with a tracheostomy is very vulnerable to respiratory infection, because of the loss of filtration of inspired air through the nasal passages. The patient should be instructed to avoid powders, aerosols, and talcums. These substances may be accidentally inhaled through the trachea and cause tracheal damage, leading to infection.[9] A specially designed latex-free tracheostomy holder

(Dale Medical Products) can prevent patient reaction to latex hypersensitivity. (Fig. 1)

Prevention

Emergency care

The training of patients and primary caregivers in emergency procedures is an essential component of successful home management. Knowledge of resuscitation techniques is necessary in case of occluded tracheostomy tube, accidental decannulation, immersion in water, massive bleeding from the tracheostomy, or aspiration.[1] The basics of cardiopulmonary resuscitation (CPR) are universal to all protocols for emergency care: airway management, reduced breathing, and circulatory support.

The modification of skills for tracheostomy CPR involve airway management, the use and maintenance of tracheostomy tubes, and the comfortable use of respiratory support equipment.[10] Often, teaching CPR to families of patient with tracheostomies is based on the adaptation of basic life-support standards by individual CPR instructors.[10] The major adaptation is learning the mouth-to-stoma breathing technique.

Equipment for tracheostomy emergencies should always be accessible. A portable oxygen source, suction unit, manual resuscitation bag, extra tracheostomy tubes, and obturator are necessary. The family is encouraged to keep a list of emergency numbers by the telephone.

Infection control

Although the sterile technique is used in acute-care settings, a clean technique that emphasizes good hand-washing and appropriate cleaning of respiratory equipment is recommended for home care.[1] The patient and family are instructed to change tracheostomy dressings that are soiled or moist. These dressings can harbor bacteria, which contribute to skin breakdown and infection at the tracheal stoma. Careful daily assessment of the stoma for the cardinal signs of infection, such as redness, drainage, swelling, and pain, will alert the patient to early signs of infection and prompt treatment.

The patient with a tracheostomy is also at risk for infection of the pulmonary tree. Bronchopulmonary infections occur, because the tracheostomy bypasses the protective upper airway mechanisms, e.g., filtering, warming, and humidifying the inhaled air. Retained secretions due to decreased mucociliary action and an ineffective or absent cough reflex provide an excellent medium for bacterial growth. Careful suctioning reduces mucosal trauma, which may lead to tracheal infection,

Fig. 1. latex-free tracheostomy holder

and prevents the introduction of bacteria into the trachea.

The patient's neck is another common site of skin breakdown and potential infection, as related to the tracheostomy-securing device – most often, twill ties. Tissue damage occurs under the ties, which act as a constricting band that puts greater pressure on neck tissues. This pressure decreases the capillary blood supply (ischemia) and may eventually lead to tissue ulceration.[6] An alternative to traditional twill ties is the Velcro™ neckband, which secures the tracheostomy tube. Because of its design, i.e., wide neck band and elastic insert to allow for movement or cough, this device helps to prevent skin breakdown by reducing the amount of pressure on neck tissues.

Wellness

Educational needs

Learning self-care is important for patients with long-term tracheostomies, because it provides a sense of self-control and reduces their dependency on others. However, significant partners or family members must be able to provide all aspects of tracheostomy care and other facets of airway management in emergency situations or when the patient is not able to participate in self-care for a variety of reasons, such as age or lack of dexterity.

Education begins well before hospital discharge to provide sufficient time for the patient and other caregivers to learn these procedures. Because of the large volume of information to be learned, the patient and family are often anxious about home management. When the family assumes the role of primary caregiver, nurses must emphasize the emotional aspects of this role in addition to skill development. Careful education and preparation for home management before discharge reduces this anxiety.

Stressors and supports

To promote successful home management, the nurse needs to be knowledgeable about current home-care trends. The nurse should continually update knowledge about home equipment, community resources, and nursing skills in preparation for acting as a resource for patients and their families.

Once the patient is home, the community or home-health nurse is involved in monitoring and evaluating how well the patient and family are adapting to home care. The nurse addresses any adaptation problems that the patient or family may experience. The nurse listens to the patient's anxieties and frustrations and offers appropriate support and encouragement.

The patient and family may view the illness and tracheostomy as a loss and may need help to grieve this loss.[11] Grieving is a developmental task that the patient and family may need to address before they can psychologically cope with home-care education. The variety of emotions provoked by the patient with the tracheostomy tube influences all levels of family relationships.[11] The nurse plays a key role in helping the patient and family to explore their feelings, reassuring them, when necessary, and making appropriate referrals for support, when needed.

Support services for the patient and family can often be identified before hospital discharge. Help in locating vendors of medical supplies, respite services, or home-care nurses is important to offer to the patient and family. Early identification of alternative caregivers is important to assure that instruction of all aspects of tracheostomy care is given before the family assumes care of the patient. Providing this support often alleviates much of the family's anxiety about caring for the patient at home.

Conclusion

Caring for a patient with a tracheostomy in the home setting requires both patient and family to acquire many new skills. The nurse helps them to integrate these new skills into their daily lives. In this way, the patient and family learn the necessary skills and achieve a level of confidence that eases the transition to home care.

Author's note:

Aaron's Tracheostomy Page, an award-winning Web site maintained by a registered nurse, is a comprehensive Web resource for the patient and family dealing with tracheostomy home care. Primarily aimed at families with children, much information crosses all age groups. It contains practical advice for oft-encountered problems as well as online resources for many tracheostomy-related links, message boards, chat rooms, and product information. The site can be accessed at http:www.tracheostomy.com.

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Obesity, the Lungs, and Airway Management — Continued

not work, as an elevated BMI will not accurately reflect excess adiposity.

A normal BMI falls in the range of 18.5 to 24.9.[2] A patient with a BMI >25 is considered as overweight. Obesity is classified according to grade[2]:

- Grade I: BMI ≥30
- Grade II: BMI ≥35
- Grade III: BMI ≥40

Occasionally, the term clinically severely obese is used to describe a specific category of morbid obesity.[2]

The threat of obesity

Excess body weight is a threat to health, because it is associated with an increase of cardiovascular disease, type 2 diabetes, hypertension, infertility, stroke, hyperlipidemia, degenerative joint disease, gallstones, and some types of cancers.[2] Excess abdominal adiposity, particularly visceral fat and excess triglyceride content in the liver, skeletal, and heart tissues, is associated with hepatic and skeletal muscle insulin resistance, impaired ventricular function, and increased coronary heart disease.[3]

When hospitalized, very overweight patients are at risk for certain hazards of immobility. They include skin breakdown, cardiac deconditioning, deep vein thrombosis, muscle atrophy, urinary stasis, constipation, pain management challenges, and depression. Immobility contributes to pulmonary complications, such as atelectasis, pneumonia, and delayed or traumatic intubation, and exacerbates pre-existing conditions, such as overweight hypoventilation syndrome or sleep apnea.

The obese patient is more inclined to develop complications during lengthy hospitalization. Mobilizing the patient early and safely can reduce some immobility-related complications. A variety of strategies can promote safe, size-appropriate respiratory care, including a thorough understanding of pathophysiology, appropriate resources, equipment, and criteria-based protocols. These strategies will be discussed in this article.

Respiratory care

Issues of respiratory care continue to grow in importance as larger, heavier people access critical care. The incidence of respiratory problems has a direct relationship to BMI: the heavier the patient, the more likely respiratory problems will occur.

Obesity is associated with altered respiratory function. Excessive abdominal adiposity mechanically interferes with lung function, because the extra weight presses on the chest wall and rib cage. Obesity is also associated with obstructive sleep apnea (OSA) and obesity hypoventilation syndrome (OHS).

OSA is characterized by episodes of apnea and hypopnea during sleep. These episodes are caused by partial or complete upper airway obstruction. Episodes of oxygen desaturation cause a transient increase in pulmonary artery and pulmonary wedge pressures and myocardial perfusion defects. Subsequently, cardiac abnormalities and cardiac rhythm alterations, permanent pulmonary hypertension, right ventricular hypertrophy, and bilateral leg edema can develop.[4]

Many bariatric patients develop obesity hypoventilation syndrome (OHS), because of their weight. In fact, some authors suggest this condition occurs primarily in the severely obese over 350 pounds. The problem is that people who are obese and nap tend to fall asleep faster and sleep longer during the day. Recent studies indicate that, in an apparently vicious cycle, not only can obesity interfere with sleep, but sleep problems may actually contribute to obesity.

Sometimes referred to as Pickwickian syndrome, OHS is related to obstructive sleep apnea. When it occurs, the very obese person does not breathe a sufficient amount of oxygen during sleep or while awake. It is most likely due to elevated intra-abdominal pressure, as weight and mass from the abdominal area compresses the thoracic cavity, preventing diaphragmatic excursion and reducing lung expansion. Risk factors include gender, middle age, mild sedation, and a BMI >30. In fact, oxygenation decreases as BMI increases.

OHS is a disorder of both the brain's control over breathing and the inadequacy of chest wall musculature, i.e., muscles that are not strong enough to elevate the chest. As a result of both or either causes, an insufficient air exchange occurs. The decreased ability to oxygenate the blood and the retention of carbon dioxide leads to chronic respiratory acidosis, which is characterized by progressive symptoms of fatigue, weight gain, poor sleep quality, hypersomnolence, and depression.

Patients with OHS often exhibit signs of right-sided heart failure. The right side of the heart loses its ability to pump blood effectively. This condition is sometimes referred to as congestive heart failure; however, this broad term could refer to failure of the right, left, or both sides of the heart. Right-sided heart failure occurs in 5% of the population and subsequently leads to congestion, affecting the liver, gastrointestinal system, arms and legs, or lungs. Physical symptoms include swelling of hands and feet, fatigue, weakness, and irregular or rapid heartbeat. Any activity that places additional stress on the body can precipitate symptoms. Diagnostic tests may include electrocardiogram to assess signs of a thickened heart muscle or arrhythmias, echocardiogram to identify enlargement of the heart or other abnormalities, or chest x-ray to determine enlargement of the heart or other cardiopulmonary abnormalities.

Tests that confirm a diagnosis of OHS may include polysomnography in the sleep laboratory and arterial blood gas (ABG) analysis. Sleep centers around the country are increasingly involved with obese patients and serve as an important referral resource. ABG analysis measures the acidity, oxygen concentration, and carbon dioxide content of blood. It provides information on how well the kidneys are functioning. Patients with OHS are often found to have positive results for respiratory acidosis.

Respiratory acidosis occurs when the lungs fail to remove sufficient carbon dioxide. A discrepancy in the acid-base balance occurs. Subsequently, body fluids become excessively acidic. In OHS, a mild but chronic impairment of the lung's ability to remove carbon dioxide over a

prolonged period leads to chronic hypercapnia. Over time, the patient develops a greater dependence on hypoxic drive for ventilation, leading to respiratory failure. When the condition becomes severe, it can lead to clinical manifestations, such as confusion, irritability, or lethargy. ABG analysis can determine the extent of respiratory acidosis.

Ventilation challenges

Morbidly obese patients may develop respiratory failure from the most seemingly inconsequential insults. The increased mass of abdominal and thoracic contents alters the lung volumes. A decrease in functional residual capacity (FRC) is seen exponentially with increasing BMI. Expiratory reserve volume and total lung capacity are decreased. FRC may be reduced when the patient is in the upright position to the extent that it falls within the range of closing capacity with subsequent small airway closure, ventilation perfusion mismatch right-to-left shunting, and arterial hypoxemia. The reduction of FRC impairs the capacity of obese patient to tolerate apnea. Larger patients desaturate rapidly after induction of anesthesia despite preoxygenation due to a smaller oxygen reserve and increase in oxygen consumption. Residual volume remains normal or slightly increased due to increased air trapping and preexisting obstructive airway disease.

In regard to intervention, consider non-invasive, positive-pressure ventilation before mechanical ventilation. A clinician trained in mechanical support must be available early and electively. When treating morbidly obese patients with acute respiratory failure, mechanical ventilation should be initiated with a tidal volume in the range of 5 to 7 ml/kg, based on ideal not actual body weight. Tidal volume should then be titrated to the patient's ventilator mechanics.[5] The concern is that calculating the initial tidal volume on actual body weight can lead to high airway pressure and alveolar distension.

Commonly, the obese patient will experience fatigue of the diaphragmatic muscle. Pressure support ventilation alone or with backup allows for resting of the diaphragm, until the state of exhaustion resolves. It can aid the weaning process and proper positioning, which can be crucial in critically ill, morbidly obese patients, both to maximize lung function and to increase the likelihood of successful ventilation or weaning.

In a classic study, Suzanne Burns suggested that the 45° upright and reverse Trendelenburg positions were associated with better respiratory mechanics than were the 90° upright and supine positions.[6] Patients reportedly preferred the former positions. Researchers report that supine is probably the worst position for large patients, because it reduces pulmonary compliance and increases airway resistance.[6] Further evidence suggests that using the prone position can improve functional residual capacity, pulmonary compliance, and oxygenation.[6]

Placing morbidly obese patients in a prone position is not impossible, just difficult. Patients are often afraid of treatments and procedures. Clinician confidence in using hydraulic lifts, lateral transfer products, oversized wheelchairs, binders, tracheostomy tube holders, and other special equipment facilitates patient confidence. A positive caregiver attitude and preplanning patient care, despite size constraints, is essential.[6]

Management of the airway from a procedural perspective must be planned. Clinical skills coupled with access to specially designed equipment can smooth critical procedures. Airway management requires giving special thought to equipment, intubation, securing the airway, secretion control, and proper positioning. Take care to tailor equipment to best serve the actual needs of the patient and caregivers. Products designed to support respiratory care for the obese include Combitube® (Tyco-Kendall, Mansfield, MA), Portex tracheostomy tube, a longer tracheostomy tube holder (Dale Medical Products, Plainville, MA), wheelchair, walker, frame with support surface, trapeze, longer gloves, lateral transfer device, abdominal binder, arm board, nasogastric tube holder, gown, sequential compression device, peripherally inserted central catheter, and arterial/intravenous armboard.

Certain risk factors act as predictors for difficult airway placement. Airway placement ought to include assessment for the following risk factors: obesity, short or thick neck, facial edema, swollen or thick tongue, receding mandible, protruding/missing maxillary incisors, irregular jaw movement, mandibular size, erratic head and neck movement, or prominence of the upper incisors. Further assessment should include a measurement of the distance from the sternal notch to the tip of the chin in neutral and maximally extended position. With extension, an increase of 5 cm should occur. Intubation may prove more challenging in obese patients due difficulty in visualizing landmarks. The Combitube, an esophageal tracheal double lumen airway, is recognized by the American Heart Association and American Association of Anesthesiologists as an alternative to the endotracheal tube when obesity-related technical difficulties arise.

Fig.1. Longer tube holder (Dale Medical)

If a tracheostomy is performed, secretions must be controlled to prevent skin breakdown, odor, and threat to a patent airway. The trachea is usually close to the skin surface and easily accessible. For those patients with a thick short neck and excessive parapharyngeal fat deposits, it becomes difficult for the surgeon to perform tracheostomy surgery, as the trachea may be buried deep in the tissue. A resultant wound must be managed like any other open wound. A nonadhesive, absorbent, 1-inch foam dressing will absorb excess wound drainage, protect the wound, and prevent injury from adhesives. Tracheostomy ties should be longer to prevent trauma within skin folds. Specially designed tube holder (Dale Medical Products) incorporates stretch material, a moisture resistant lining, and anti-fungal fastener tabs. (Fig.1) An anti-disconnect device such as Dale Bridle can help prevent accidental "pop-offs" from the ventilator tubing. An extension piece ensures a proper fit for obese patients and helps to prevent pressure ulcers from occurring under the trach tie.

Many obese patients report a feeling of bias against them in all areas of their lives. Research suggests this feeling is accurate. Along with hospitalization, depression and dependency can exacerbate these feelings. When admitted, the obese patient may have pre-existing emotional concerns, which manifest as fear or reluctance to participate. Passive behaviors or perhaps anger and acting out are sometimes observed. Caregivers express reluctance to provide manual lifting and moving, because of the realistic fear of personal injury. An interdisciplinary team, comprised of psychologist, social worker, ergonomist, physical/occupational therapist, and others, may address some concerns associated with a longer length of stay.

Challenges of immobility

If turning and repositioning patients manually accomplishes the same task as specialty beds, it seems logical that the added cost of these automated products is unnecessary. However, a recent study suggests that the widely accepted standard of care that mandates repositioning

every two hours is seldom met. Of those subjects responding to the survey, the majority agree that the standard is turning every 2 hours. They believe that this standard helps to prevent the hazards of immobility. Yet, half of critical-care clinicians reported that the standard was only met 50% of the time, even in the presence of a hospital-mandated protocol.[7]

A BMI of >29 heightens the prevalence of pulmonary embolism. Deep vein thrombosis appears twice as often in obese patients as it does in their nonobese counterparts. Thromboembolic events are the most common complication of bariatric surgery with an incidence of 2.4% to 4.5%, due to prolonged immobility, venous stasis, polycythemia (which is associated with OHS), and intraabdominal pressure, which increases pressure on deep veins. To encourage earlier ambulation and to enhance pulmonary function, specially designed abdominal binders for the larger patient may be used (Fig. 2).

Pneumonia is the most common cause of death from nosocomial infection with a prevalence of 5 to 10 per 1,000 admissions. Although it can develop in any hospitalized patient, it occurs fourfold in patients receiving mechanical ventilation. In the recumbent position, tidal volume diminishes during sleep and mucociliary transport is reduced; both can result in varying degrees of atelectasis and can lead to lower respiratory tract complications. Infectious and inflammatory complications of the lower respiratory tract lead to increased mortality, morbidity, and cost in the intubated, ventilated patient who is critically ill.[8]

Most clinical experts agree that a relationship exists between skin injury, impaired wound healing, and pneumonia. Each is a hazard of immobility. Although skin injury was once thought to fall within the nursing domain, the interdisciplinary nature of today's health environment is changing this narrow way of viewing patient care. The respiratory care provider is able to understand the role of the lungs and its adverse impact on the skin, thus managing the patient holistically.

The patient most at risk for pneumonia is the immobile, institutionalized patient with multisystem involvement and a history of recurrent pneumonia. Patients with nasogastric (NG) tube feedings are at significant risk for aspiration pneumonia, especially in the presence of elevated intraabdominal pressure, as seen in morbidly obese patients. Stabilizing the NG tube will help reduce the risk of aspiration. In making a diagnosis, a chest x-ray demonstrates aspirate in the lungs and the onset and location of infiltrate. Clinically, pneumonia is characterized by elevated

Fig. 2. Abdominal binder for larger patients (Dale Medical)

temperature, chest congestion, decreased lung sounds, and the appearance of acute illness.

The stress of pneumonia threatens wound healing. Wounds will generally plateau, fail to progress, or deteriorate, until pneumonia resolves. Timely, appropriate introduction of full body lateral rotation therapy (FBLRT) may best serve the patient in reducing interface pressures, promoting pulmonary function, and providing therapeutic positioning.

Prevention of wound trauma and further skin breakdown are goals for the obese critically ill patient with pneumonia and skin injury, such as pressure ulcers. They result from pressure, friction, and shear. In addition to immobility, contributing factors include moisture, dehydration, and malnutrition. Pressure ulcers typically occur over a bony prominence and develop because of the inability to reposition the patient adequately.

Pressure ulcer staging depends on the depth of damage to underlying tissue. Obese patients can be at risk for atypical or unusual pressure ulcers, which as mentioned previously, can occur due to pressure within skin folds as a result of tubes or catheters or from an ill-fitting chair or wheelchair.

In the event that the patient has a large abdominal panniculus, it too must be repositioned to prevent pressure injury beneath the panniculus. Alert patients can physically lift the pannus off the suprapubic area, but dependent, weak, or unconscious patients can be placed in the sidelying position, so that the nurse can lift the pannus away from the underlying skin surface to allow air to flow to the regions, while relieving pressure.

Use of rotation therapy is often regarded as the standard of care for certain pulmonary situations, however, it can serve to ensure sufficient repositioning for a very large patient, who otherwise may pose a realistic challenge to frequent turning. With increasing interest in rotation therapy for purposes of preventing thromboembolic disease and pneumonia, skin injury, and caregiver injury, it becomes more important to understand fully the meaning of terminology pertaining to this therapy, its cost, and indication. Questions need to be asked to determine the actual value of this emerging, evolving therapy.

Both FBLRT and continuous lateral rotation therapy (CLRT) are designed to prevent some physical hazards of immobility and manage the difficulty in employing appropriate turning and repositioning in a cost-appropriate manner. Despite the value of rotation therapy in preventing and treating skin injury among obese patients, it is necessary to take precautions to prevent friction and shear. Correct pressure settings, fitting the patient to the appropriate-sized surface, and assessment for skin changes are some precautions.[9]

Equipment

A number of studies reveal the increasing incidence, cost, and number of back-injury claims associated with patient care.[10] More than half of strains and sprains can be attributed to manual lifting tasks while assisting dependent patients with their mobility needs. Injuries that result from manual lifting and transferring of patients are among the most frequent causes of nurse-related injuries.[11] Respiratory care becomes increasingly more dangerous as the size and weight of the population increases.

Standard hospital equipment, such as chairs or bed frames, may pose safety risks for obese patients and their caregivers. On the other hand, equipment specially designed for overweight patients can improve quality of care, reduce length of stay, and make it easier and safer for caregivers to perform care. A number of lift designs are available to position the very large patient for treatment. Providing specially designed equipment for the bariatric patient is important for reducing work-related back injuries among caregivers and lowering the risk of related patient injuries.

Healthcare facilities must have a plan in place to care for the special needs of morbidly obese patients. Rather than attempting to make a standard size fit all, patients are best served by equipment and care that is appropriate to the patient's size and needs. Preplanning with manufacturers and vendors to provide equipment for the morbidly obese patient is essential. Institutional policies and procedures to obtain equipment must be available. Criteria-based protocols for use of specially designed equipment are designed to ensure more appropriate, timely, and cost-sensitive use of equipment. Per-

formance improvement teams offer a resource to develop and implement appropriate policies and resources for bariatric equipment needs.[12]

Policy formation

BMI, actual patient width at the widest point, and factors such as pain, immobility, sedation, or lack of cooperation pose challenges to care. Therefore, when developing criteria-based protocols or preplanning based on patient needs, these factors must be considered. Preplanning best serves the goal of patient safety and caregiver injury when intervention meets the actual needs of the patient.[13]

A policy that mandates respiratory care, physical therapy, nurse experts, pharmacy, specialty equipment, or other resources based strictly on patient criteria should be developed to prevent complications and therefore improve clinical, cost, and satisfaction outcomes. For example, a patient might be provided with an extra wide bed, heavy-duty walker, lateral transfer product, respiratory care consultation, physical therapy consultation, Wound Ostomy Continence Nurse (WOCN) assessment, and clinical social worker evaluation based on a patient weight of 320 pounds, hip width of 25 inches, and shortness of breath on ambulation. The needs of each patient will vary, yet the protocol must be written in such a way as to recognize the needs of obese patients before an adverse outcome develops.

Clinical experts to involve in a task force might include a respiratory care clinician, physical or occupational therapist, bariatric surgeon, medical doctor, pediatric clinical nurse specialist, bariatric clinical nurse specialist, WOCN, pharmacist, patient representative, and/or vendor. Each healthcare organization will have a different structure for team planning; however, what is important is that the team is diverse and each member is interested in improving critical care for the obese patient.[14]

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Cross Country University is an accredited provider of continuing education in nursing by the American Nurses Credentialing Center's Commission on Accreditation.

After reading this article, the learner should be able to:

1. Identify at least three topics that are essential to home management of the patient with a tracheostomy tube.
2. Discuss two wellness issues that the nurse needs to address to assure successful adaptation to the home environment.
3. Describe how overweight and obesity are defined and measured.
4. Identify at least two types of altered respiratory function associated with obesity.
5. List three types of prevention strategies to minimize the risk of respiratory failure in the obese patient.

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1. **Approximately what percentage of Americans is considered overweight?**
   a. 10%
   b. 90%
   c. 67%
   d. 15%
2. **In the US each year, what number of premature deaths is related to obesity?**
   a. 200,000
   b. 1 million
   c. 400,000
   d. Not available
3. **More than half of strains and sprains are attributed to:**
   a. incontinence and skin care
   b. manual lifting tasks
   c. lack of patient and family motivation
   d. overweight clinicians caring for overweight patients
4. **Healthcare facilities must have a plan in place to care for the special needs of the morbidly obese patient. This plan should specifically include:**
   a. family therapy
   b. institutional policies and procedures to serve as a guide to access specially designed equipment and clinical care
   c. individualized care
   d. pain management
5. **Hospitalization can lead to:**
   a. peer pressure
   b. deep vein thrombosis, cardiac conditioning, and muscle atrophy
   c. social instability
   d. abdominal distention, calf pain, and weight gain
6. **Immobility contributes to:**
   a. atelectasis and pneumonia
   b. weakness and falls
   c. family conflict and economic concerns
   d. weight gain and depression
7. **Obesity hypoventilaion syndrome can lead to:**
   a. atelectasis
   b. sleep apnea
   c. weaknesss
   d. weight gain
8. **Obstructive sleep apnea is characterized by episodes of:**
   a. pneumonia and daytime sleepiness
   b. apnea and hypopnea during sleep
   c. spasms of the mid and upper airway
   d. coronary artery occlusion
9. **Obesity in consider the second leading cause of preventable death, second only to:**
   a. accidents among the 18–25 year-olds
   b. cigarette smoking
   c. suicide
   d. prescription and over-the-counter drug abuse
10. **The patient and family should become familiar with the patient's normal respiratory pattern so that they can:**
    a. eat a meal in a restaurant
    b. determine changes from normal
    c. prevent or manage problems
    d. be more comfortable with the tracheostomy
11. **The purpose of changing the tracheostomy tube is to:**
    a. minimize infection and granulation tissue formation
    b. decrease the amount of secretions
    c. help the patient accept altered body image
    d. maintain manual dexterity skills
12. **Symptoms of insufficient humidification of the trachea include all of the following except:**
    a. noisy labored respirations
    b. shortness of breath
    c. change in mucus consistency
    d. increased productive coughing
13. **Good oral health is important because of the risk for:**
    a. weight gain
    b. nutritional deficiency
    c. halitosis
    d. dental caries
14. **Patients with tracheostomies are vulnerable to respiratory infections because of:**
    a. loss of filtration and warming of inspired air
    b. too much moisture in inspired air
    c. tracheostomy tubes expedite secretion removal
    d. suctioning removes normal tracheal flora
15. **Self-care education for the patient with a tracheostomy begins:**
    a. within 48 hours prior to discharge
    b. the day of discharge
    c. at post-discharge outpatient classes
    d. well before hospital discharge
16. **Nursing interventions that facilitate successful home management of a patient with a tracheostomy include all the following except:**
    a. monitoring and evaluating adaptation to home care
    b. making appropriate referrals for additional emotional support
    c. locating local vendors of needed medical supplies
    d. ensuring the patient is independent in all aspects of care

Participant's Evaluation

What is the highest degree you have earned (circle one) ? 1. Diploma 2. Associate 3. Bachelor's 4. Master's 5. Doctorate

Indicate to what degree you met the objectives for this program: Using 1 = Strongly disagree to 6 = strongly agree rating scale, please circle the number that best reflects the extent of your agreement to each statement.

	Strongly Disagree					Strongly Agree
1. Identify at least three topics that are essential to home management of the patient with a tracheostomy tube.	1	2	3	4	5	6
2. Discuss two wellness issues that the nurse needs to address to assure successful adaptation to the home environment.	1	2	3	4	5	6
3. Describe how overweight and obesity are defined and measured.	1	2	3	4	5	6
4. Identify at least two types of altered respiratory function associated with obesity.	1	2	3	4	5	6
5. List three types of prevention strategies to minimize the risk of respiratory failure in the obese patient.	1	2	3	4	5	6

Name & Credentials _____
Position/Title _____
Address _____
City _____ State _____ Zip _____
Phone _____ Fax _____
email address _____
*License# _____ or SS# _____

**Florida registered nurses must supply your Fl RN Lic.#*

Mark your answers with an X in the box next to the correct answer

	A	B	C	D		A	B	C	D
1	☐	☐	☐	☐	9	☐	☐	☐	☐
2	☐	☐	☐	☐	10	☐	☐	☐	☐
3	☐	☐	☐	☐	11	☐	☐	☐	☐
4	☐	☐	☐	☐	12	☐	☐	☐	☐
5	☐	☐	☐	☐	13	☐	☐	☐	☐
6	☐	☐	☐	☐	14	☐	☐	☐	☐
7	☐	☐	☐	☐	15	☐	☐	☐	☐
8	☐	☐	☐	☐	16	☐	☐	☐	☐

How long did it take you to complete this home-study program? _____

What other areas would you like to cover through home study?

_____

_____

_____

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