Critical /Progressive Care of the Patient with Obesity

Lori Dambaugh DNP, CNS, RN, ACCNS-AG, PCCN
Critical Care Symposium-Putting New Evidence into Practice
Background

- Rochester, New York
- Rochester General Hospital (528) bed tertiary care hospital
  - 20 years of progressive/critical care experience.
- Clinical Nurse Specialist
  - Patients with pulmonary disorders
  - Development of a clinical practice guideline for nursing care of the patient with obesity
- St. John Fisher College–Wegman’s School of Nursing
  - Six Years Full-Time Faculty
• Examine the magnitude of the obesity epidemic in the United States and U.S. hospitals
• Discuss the unique care needs of patients with obesity in progressive/critical care.
• Identify evidence based practice interventions to improve care.
Magnitude of Obesity

Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2016

(Centers for Disease Control and Prevention, 2017)
Magnitude of Obesity

1/3

- 36.5% of U.S. Adults
- $147 billion annually/health care costs
- Health care expenditures of obesity exceed those of healthy weight individuals by $3,559

Magnitude of Obesity in Acute Care

• 2004-2008: 4 million morbidly obese patients hospitalized in the United States

• In intensive/progressive care units 1 of 3 patients is obese

(Kumar, et al 2013, McClave, et al 2011)
Magnitude of Obesity

- Patients with obesity have distinctive comorbidities that complicate their care
- Higher rates of resource utilization, ICU admissions, Respiratory failure

(Holsworth & Gallagher, 2007; Westerly & Dabbagh, 2011)
Obesity Paradox

• General population: chronic diseases increase risk of long term mortality when compared with normal weight patients
• Obesity Paradox: Lower mortality in the critically ill with increasing body mass index, conversely underweight individuals demonstrate the greatest risk of mortality
• Inconsistent Research surrounding subject

(Fiegel et al, 2003)
Needs of Patients with Obesity

- Obese patients admitted to the ICU have the potential for unstable clinical conditions.
- Benefit from being monitored in progressive care units before transfer to a general medical care unit.
- Multiple effects of obesity on all organ systems and possible obesity related complications require increased monitoring.

(Dambaugh & Ecklund 2016)
Needs of Patients with Obesity

- Require Interprofessional Team to Manage Care
  - Physician
  - Specialty Consults
  - Respiratory Therapy
  - Wound Ostomy
  - APRN (Nurse Practitioner/Clinical Nurse Specialist)

- Clinical Pharmacist
- Clinical Nutrition
- Social Work/Care Management
- Physical Therapy
- Occupational Therapy
- Bedside Nursing
- Unlicensed Assistive Personnel
- Hospital System
Systems Approach with Evidence Based Inter
Pulmonary
Cardiac
Skin
Nutrition
Mobility
Diagnostics
Psychological Considerations/Stigma
• Obesity may be a risk factor for difficult intubations.
  • Studies indicate that obesity is a risk factor, however a weak predictor

• **Recommendation:** Recommended method for bag mask ventilation and oxygenation prior to ventilation is position patient in a 25° semi-fowlers position or reverse Trendelenburg position

• **Recommendation:** Utilize the [Difficult Airway Algorithm](#) developed by [The American Society of Anesthesiologists](#)
  • Ensure backup emergency intubation is available on critical/progressive care units.

(Berrios, 2016; Dambaugh 2017; Fisher et al, 2016)
Pulmonary

• Mechanical Ventilation Settings:
  
  **Recommendation**: Initial tidal volumes set to approximately 8mL/kg of PBW in most morbidly obese patients or 6mL/kg of PBW in morbidly obese patients with ARDS. Utilize standard formula for PBW or IBW.

  **Recommendation**: Plateau Pressures should be maintained at less than 30 cm H₂O.

  **Recommendation**: Addition of conservative levels of Positive End Expiratory Pressure (PEEP) may help with lung function, however higher PEEP levels should be avoided due to possible hemodynamic compromise.

(Berrios, 2016; Fischer et al, 2018)
Pulmonary

• Early tracheostomy and reduction/termination of sedation may improve blood gas parameters and reduce ventilation pressures.
  • **Recommendation:** Consider early tracheostomy and weaning from sedation in obese patients

• Extubation and Weaning of obese patents may pose challenges due to co-morbid conditions
  • **Recommendation:** Early tracheostomy may improve overall weaning if patient is awake and alert and free from stress and discomfort of an endotracheal tube.
  • **Recommendation:** Utilize NIPPV to decrease the incidence of re-intubation

• Early tracheostomy may also reduce LOS in the ICU as the patient may transition to a progressive care unit.

*(Fischer, et al, 2016; Lemyze et al, 2014)*
Pulmonary conditions associated with obesity:
Obesity Hypoventilation Syndrome
Obstructive Sleep Apnea
Respiratory Failure
Increase RR, Oxygen Consumption, Work of Breathing

Recommendations:
Non-Invasive Positive Pressure Ventilation during sleeping hours, include oxygen as needed, continuous oximetry during acute phase. Assessment includes ABG analysis and Pulmonary function testing.
• Significant changes in circulatory system including:
  • Increased Blood Volume and Viscosity
  • Increased risk for early atherosclerosis
  • Increased risk for MI, Stroke, Heart Failure, Hypertension, Ventricular Hypertrophy and Dysrhythmia

**Recommendations:**
Ensure appropriate monitoring equipment is available (Including accurate size blood pressure cuffs)
During activity and mobilization, heart rate and blood pressure should be closely monitored- due to the large increase in cardiac workload
Increased risk for VTE - Every 10 unit increment in a patient’s BMI there is a 37% increase in risk.

May be more difficult to accurately complete diagnostic studies

Recommendations:
- If mechanical prophylaxis is ordered ensure appropriate fit of sequential compression devices or compression stockings.
- Early mobilization

Increased difficulty obtaining peripheral and central access.

Recommendations: Ultrasound guidance, avoid femoral placement of central catheters if possible, Utilize Central Venous Catheter Bundles.
Skin

• Obese patients may be predisposed to pressure ulcers and deep tissue injury for a variety of reasons
  • Decreased blood and oxygen supply due to increased adipose tissue
  • Increase in perspiration and moisture
  • Immobility of obese patients places them at greater risk
  • Shear and Friction Forces with manual repositioning

(Holsworth & Gallagher 2017; Dambaugh, 2016)
Skin

- Unusual pressure injury may develop
  - Skin Folds
  - Under Breasts
  - Pannus
  - Gluteal Folds
  - Posterior Neck
  - Lumbar and Mid back
Skin

• **Recommendations:**
  - Assess for pressure, including areas where skin-skin contact may cause friction
  - Local care of pressure ulcers and utilize pressure relieving mattresses
  - Vigilant hygiene for skin folds (Keep skin folds dry- utilize moisture wicking fabric, antifungal powders)
  - Provide and promote early mobility in patients using assistive devices
  - Provide adequate size commode to promote continence
  - Manually reposition patients who are unable at least Q2 hours
  - Monitor for malnutrition!!

(Holsworth & Gallagher 2017; Dambaugh, 2016)
Nutrition

• Obesity is associated with protein breakdown, increased energy expenditure, insulin resistance and rapid deterioration in muscle mass
• BMI not a good indicator of nutritional status
• Obese patients often have high calorie malnutrition, intake of calories is excessive but deficient in essential nutrients
• Malnutrition in obese patient is associated with poor outcomes and increased morbidity and mortality

• **Recommendations:**
  - Full assessment of nutritional risk should be performed on all patients admitted to the ICU using a valid/reliable assessment tool.
    - Traditional serum markers for nutrition assessment often not used in the ICU
  - If oral nutrition is not an option enteral nutrition is the first line of nutrition that should be considered. (24-48 hours)
Nutrition

• **Recommendation:**
  • High-protein, hypocaloric feeding is recommended
  • In patients where IC (Indirect calorimetry) is not used, dosing is as follows
    • BMI 30-50kg/m²: 11-14 kcal/kg actual body weight
    • BMI >50kg/m²: 22-25 kcal/kg actual body weight
    • Protein recommendations based on ideal body weight
      • 2.0g/kg/day for BMI of 30-40kg/m²
      • 2.5g/kg/day for BMI of >40kg/m²
Diagnostics

- Radiology and Imaging may be difficult to perform in the patient with obesity
- Distorted Images may limit diagnostic value
- Scanners for CT/MRI have chest/abdominal girth restrictions and weight limits
- **Recommendations**: Nurses should become familiar with limits of diagnostic equipment
- Safe transfer collaboration with radiology/imaging department is important
Mobility / Safe Patient Handling

- Benefits of progressive mobility well established in all patient populations
- Managing mobility in this patient population poses unique challenges related to staff availability, appropriate equipment, and patient issues such as dyspnea and exercise intolerance
Mobility/Safe Patient Handling

• What are the barriers:
  • Staff /Patient Fear of Injury
    • 50% of injuries among nurses are classified as skeletal muscle disorders.
  • Lack of Policies supporting safe patient handling
  • Lack of Staff
  • Lack of Appropriate Equipment
Mobility/Safe Patient Handling

• **Recommendations:**
  • Height/weight, waist circumference measured for all patients
  • Utilization of safe patient handling algorithms
  • Staff knowledge of location and appropriate use of all equipment
  • Staff Education: Hands on training with the equipment, who to notify if it malfunctions, where to obtain the equipment, weight limits of equipment
  • Collaboration with physical /occupational therapy, APRN, bedside staff for mobility plan.
  • OSHA: Max weight for manual lifting
Case Study

- 56 year old women with a BMI of 48.04 kg/m²
- Admitted with community acquired pneumonia
- PMH: MI, CAD, Hyperlipidemia, HTN, Depression, Ischemic Stroke with residual left sided weakness
- Limited mobility at home: Wheelchair to bed and commode only
Case Study

- Since hospitalization refused ambulation
- Day three of hospitalization: Temp 39.2°C, worsening pneumonia and worsening respiratory acidosis
- Received NIPPV, however continued to deteriorate and required intubation and prolonged mechanical ventilation
Case Study

- ICU stay was complicated by CAUTI, and inability to wean
- Tracheostomy placed on hospital day 10
- During her ICU stay mobilization was attempted but difficult because of her anxiety and deconditioned status
- Pressure ulcer development on right buttock.
Case Study

- Transferred to the Progressive Pulmonary Care unit for possible weaning.

- Plan of Care:
  - Clinical Nurse Specialist involvement
  - Respiratory Therapy
  - Nutrition Consult
  - Psych Consult
  - Intensive PT/OT
  - Complex discharge teaching
  - SW/Care Management Involvement
Questions?
Thank you!
Contact: ldambaugh@sjfc.edu
References


• Flegal, K., Kit, B., Orpana, H. et al. (2013) Association of all-cause mortality with overweight and obesity Using standard body mass index categories: A systematic review and meta-analysis. JAMA 309, 71-82.


• Lemyze, M., Taufour, P., Duhamel, A et al. (2014) Determinants of noninvasive ventilation success or failure in morbidly obese patients in acute respiratory failure. PublicLibrary of Science 9(5)
References