Care of the Critically Ill Bariatric Patient

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Financial Disclosures

I have no financial relationships to disclose
Objectives

• Define the classifications of obesity

• Explain the impact and costs related to obesity

• Explain the risks and considerations in caring for the patient with obesity due to their pathophysiology

• Discuss practical approaches to caring for patients with obesity
## Classifications for Obesity and BMI

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI</th>
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<tbody>
<tr>
<td>Normal Weight</td>
<td>18.5-24.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>25-29.9</td>
</tr>
<tr>
<td>Obese</td>
<td>30-34.9</td>
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<tr>
<td>Severe Obesity</td>
<td>35-39.9</td>
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<tr>
<td>Extreme Obesity</td>
<td>40 and greater</td>
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Prevalence of Obesity

Over 68% of adult Americans are overweight
34.9% are obese or morbidly obese

In 2015, adult obesity rates reached 30% in 22 states and exceeded 35% in three states (Arkansas, West Virginia and Mississippi)

High BMI in the U.S. is approximately
10% for infants and toddlers
18% for adolescents and teenagers
U.S. Rates of Obesity

- BMI ≥ 50 has increased 5 X, from 1/2000 to 1/400
- BMI ≥ 40 has increased 4X from 1/200 to 1/50
- BMI ≥ 30 has increased 2X from 1/10 to 1/5
High Cost of Obesity

- Currently, 17% of all health care dollars is spent for the treatment of obesity and its complications. Estimates range from 174 billion to 210 billion per year.

- Underdetermined costs related to hospital worker injury.
Morbid Obesity is a Metabolic Disease

As BMI increases, adipose tissue becomes metabolically active and secretes hormones

These hormones influence insulin resistance, hyperlipidemia, inflammation, thrombosis, and hypertension

The mucosa of the stomach of obese persons secretes higher levels of the hormone Ghrelin which increases appetite
The Disease of Morbid Obesity

Neuropeptides and neurotransmitters in the brain, mainly the hypothalamus, and other hormones affect satiety, appetite and weight regulation.

Interestingly, Leptin, a hormone that is secreted by adipose tissue and decreases hunger, is found in higher levels for obese persons but it is believed they are “leptin resistant.”
Prehospital Challenges

- Appropriately sized gurneys
- Extra personnel
- Airway management
- Less room in the ambulance
- Delays in transportation
Prehospital Challenges

Patients unable to fit through the doors

Removal of walls or doors may be required

Risk of injury to medical providers at the scene

Requires sturdy rescue equipment

Standard backboard: patient may not fit or support the patient’s weight
General Care Considerations

Causes of admission:
• the consequences of co-morbidities related to obesity
• Trauma

Prolonged lengths of stay can exacerbate co-morbidities and ↑ complications

Physical assessments, safe patient mobilization, pharmacology and many other aspects for care are affected

Understanding the risks associated for patients with obesity may prevent complications and be life-saving
Trauma and Motor Vehicle Accidents (MVA)

Vehicles are designed to provide safety to passengers of an average weight and height

Seat belts may not be long enough

OSA (Obstructive Sleep Apnea) is estimated common among commercial drivers and a cause of MVAs

Heart Disease

Overall increase in both morbidity and mortality

- Coronary artery disease
- Atherosclerosis and hyperlipidemia
- Hypertension
- CHF
- Sudden cardiac death
- Peripheral vascular disease
Cardiovascular Disease

- 75% of HTN attributed to increased weight

- ↑Triglycerides, ↓HDL, ↑catecholamines, ↑renin, ↑aldosterone lead to ↑ afterload
Cardiovascular System Changes

- Increased blood volume leads to increase pre-load can result in left ventricular (LV) hypertrophy
- Greater right ventricular (RV) mass and modestly lower RV ejection fraction
- Atrial fibrillation and myocardial infarctions are more common
- Diastolic dysfunction and ventricular failure can lead to death

Cardiovascular Considerations

- Appropriately sized blood pressure cuff
- Continuous ECG monitoring
- Invasive arterial pressure monitoring
- Beta-blockers should be used cautiously due to impaired ventricular contractibility as a result of decreased beta adrenergic receptors
ECG Considerations

Increased fat deposits around the heart lead to degeneration of the conduction system which causes lethal heart rhythms

Difficult landmarks for lead placement, inconsistent or decreased voltage

Prolonged QT intervals

Non-specific flat/inverted T waves in inferior leads

Pulmonary Problems

Decrease in lung volumes
Increased work of breathing

- Higher airway resistance
- Higher chest wall
- \(\downarrow\) respiratory system compliance
- Flattened diaphragms
- Altered lung volumes
- Increased energy cost of breathing

Obesity-hypoventilation syndrome: Pickwickian Syndrome

- Left and right sided heart failure common
- Hypoxemia and Hypercarbia
- ↑ soft tissue of the oropharynx
  - Obstruction of the airway
- Chronic respiratory acidosis
Sleep Apnea

If 100 pounds overweight:
- Men = 98% have sleep apnea
- Women = 93% have sleep apnea
- Studies suggest life expectancy is 20 years shorter
- Increases risk for MVA

However, 80 to 90% of individuals don’t know they have sleep apnea

Screening patients for sleep apnea and educating about them about risk is important
Encourage patients use their CPAP during hospitalization
Assessment of Airway

The Mallampati Score

CLASS I
Complete visualization of the soft palate

CLASS II
Complete visualization of the uvula

CLASS III
Visualization of only the base of the uvula

CLASS IV
Soft palate is not visible at all

Pulmonary Considerations

• Obese patients desaturate very rapidly due to decreased respiratory reserve and lung capacity.

• Assess reasons oxygen saturation levels are less than 92%.

• Immediate intervention is critical.

• The reverse trendelenberg position is the optimal position as it drops the pannus (abdominal fold) from the diaphragm.
RAMP (Rapid Airway Management Position) for Procedures

- Align the top of the ear with the sternal notch
- Ramp up or raise the occipital area using pillows or towels
- Form a trapezoid shape
- Beneath the back of the head

Figure 3 - Shows that the Set of Pillows forms a Trapezoidal Figure
Airway Management

Difficulties with intubation/seal with bag mask device

Neck Anatomy distorted due to excess tissue

Preoxygenation is critical
  • Desaturation is quicker
  • Sitting upright or semirecumbent as long as possible
  • Reduced pulmonary compliance
    • Higher ventilatory pressures

If no C-spine injury, keep the head elevated during preoxygenation

Mechanical Ventilation

The tidal volume has to be adjusted to the ideal body weight, not the measured weight.

Greater potential for atelectasis. PEEP and other ventilatory strategies need to be considered.

Supine position is harmful because of intra-abdominal pressure and can lead to reduced lung volume and hypoxia.
Pulmonary Clinical Aspects

Higher Risk for Respiratory Failure, Acute Respiratory Distress Syndrome (ARDS) and Pneumonia

Consider the following for prevention:
• Therapy with continuous pulse oximetry
• End tidal CO2 monitoring
• Prophylactic use of non-invasive ventilation post-extubation
• Longer endotrachael tubes and tracheostomy tubes
• Awake oral intubation
• Incentive spirometry and C & DB more frequently
• GlideScopes for successful intubation

Meta-analyses for prolonged mechanical ventilation are conflicting
Obesity and Links to Other Diseases

Obesity-Related Cancers:

- Breast
- Colon
- Kidney
- Liver
- Pancreas
- Prostate
- Uterine

Cancer Risk

<table>
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<tr>
<th>Normal Weight</th>
<th>Obese</th>
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<tr>
<td>3%</td>
<td>52%</td>
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Renal Impact

- Some drugs may impact the renal system in high BMI patients due to high glomerular filtration rates.

- Increased intra-abdominal pressure may lead to hypertension and insult to the kidney.

  If BMI is more than 30, nearly twice the risk for kidney failure.
  If BMI of 40 or above, seven times the risk of kidney failure.
Weight and Drugs

Caution must be used for drugs highly soluble in fat, especially with extended time duration, > 12-24 hours include:

- Opiate analgesics (Morphine, Dilaudid, etc)
- Carbamazepine (Tegretol)
- Propofol
- Fentanyl
- Midazolam (Versed)
GI Impact

Monitor for greater aspiration risk due to high:

- gastric fluid volume
- GI reflux
- incidence of Hiatal Hernia
- Intraabdominal pressure

Gastro-esophageal Reflux Disease (GERD)

Leads to:

- Bronchitis
- Asthma
- Barrett’s Esophagus (pre-cancer)
Nonalcoholic Fatty Liver

If BMI > 40, the prevalence of:

Nonalcoholic fatty liver disease (NAFLD) is more than 95%
Nonalcoholic steatohepatitis (NASH) may be as high as 25%.

Sustained liver injury leads to progressive fibrosis and cirrhosis in 10% to 25% of affected individuals.

Trauma patients may be at increased risk with enlarged livers.
Metabolic and Endocrine Effects

Type 2 Diabetes:
- Obesity-related or adult-onset
- A leading cause of death in the U.S.
- Most costly disease in America
  - $245 billion dollars spent annually
  - Estimates predict diabetes may double by 2030

Stress of critical Illness can deplete protein rather than glucose stores

Hyperinsulinemia can lead to sodium retention
High Risk for Blood Clots

Obesity is characterized by:

Chronic inflammation
Decreased immunity
Hypercoagulability

This is due to:

• Decreased antithrombin-III
• Increased tumor necrosis factor α and interleukin-6
• Impaired neutrophil function
• Increased blood volume

Early and frequent ambulation, use of Sequential Compressions Devices (SCDs) and anticoagulation medications are especially critical for post-surgical, trauma and immobilized patients

Venous Access

- Landmark vessels are not visualized or palpated
- Multiple attempts and delays in access
- Higher complication rates
  - Secondary to multiple sticks
  - Wound infections
  - Phlebitis/Thrombosis
- Standard 1.5-in needles may not be long enough for injections
- Consider intraosseous infusions for immediate fluid resuscitation
Integumentary Considerations

Impaired wound healing due to decreased vascularity of adipose tissue

Bacterial and fungal overgrowth in skin folds
• Skin irritation, pain and skin breakdown
• Surgical site infections are more common

Lymphedema

↑ risk of CAUTI and other catheter related infections

Atypical skin pressure ulceration—move tubes and catheters at least every 2 hours
Work Injury Prevention

Use appropriately sized equipment and supplies

Observe the weight capacity labels on equipment

Check the policy for ordering bariatric equipment

Follow safe patient mobilization policy and guidelines
Does this make you feel sad?
What do you think?
Weight Bias in Healthcare

In a recent study among student dietitians, only 2% had a neutral or positive attitude towards obese persons.

In one study among nurses:

- 31% “would prefer not to care for obese patients”
- 24% agree that obese patients “repulsed them”
- 12% “would prefer not to touch obese patients”

Rebecca M. Puhl, PhD and Kelly D. Brownell, PhD and the Obesity Society
Physicians and Weight Bias

In several anonymous self-report surveys, they view obese patients as: “Noncompliant, lazy, lacking self control, unsuccessful, unintelligent, and dishonest.”

In a large study, 2,449 overweight and obese women reported that 52% had been stigmatized more than once by their physician.

Overall, physicians:
- spent less time with patients
- assigned more negative symptoms
- had reluctance to perform certain screenings
Sensitivity and Caring

Patients delay seeking preventative health care

Discrimination in every social aspect leads to depression, low self esteem, and more

Fear of worker injury and extra time to mobilize patients leads to resentment, impatience, and less mobilization by providers

Patients may wait to seek healthcare until they become critically ill
Remember how we think and how we feel is reflected in our eyes.

How compassion can make a change.