Safety and Surgical Care of Patients with BMI Over 35

Clifford W. Deveney, MD
Professor of Surgery
Oregon Health & Science University
BMI (Body Mass Index) = \( \frac{\text{Wt(kg)}}{\text{Ht(m}^2)} \)

- 21-25 – Normal Weight
- 26-30 – Over-Weight
- 31-35 – Obese
- >35 – Morbidly Obese
The Size of the Problem in the US

- 32% are overweight
- 35% are obese
- 5% are morbidly obese
# Obesity Epidemiology

## Table 1. Age-adjusted* prevalence of overweight, obesity and extreme obesity among U.S. adults among U.S. adults, age 20 years and over

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight</td>
<td>33.1</td>
<td>34.0</td>
<td>35.1</td>
<td>34.1</td>
<td>32.7</td>
</tr>
<tr>
<td>(BMI greater than or equal to 25.0 and less than 30.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>22.9</td>
<td>30.5</td>
<td>30.6</td>
<td>32.2</td>
<td>34.3</td>
</tr>
<tr>
<td>(BMI greater than or equal to 30.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extremely obese</td>
<td>2.9</td>
<td>4.7</td>
<td>5.1</td>
<td>4.8</td>
<td>5.9</td>
</tr>
<tr>
<td>(BMI greater than or equal to 40.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Age-adjusted by the direct method to the year 2000 U.S. Bureau of the Census estimates using the age groups 20-39, 40-59, and 60 years and over.

**Crude estimates (not age-adjusted) for 2005-6 are 32.6% with a 25<=BMI<30, 34.7% with a BMI>=30 and 6% with a BMI>=40. Pregnant females were excluded from analyses.
Obesity Trends* Among U.S. Adults
BRFSS, 2008

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
The Patients We Will Discuss

- BMI >35
- Absolute Weight 250-800 lbs
Needs

- Mechanically – equipment, personnel
- Medically – What diseases or morbidities are these patients likely to have
Providing Care
BMI ≥35

- Starting IV’s
- Operating
- Transporting
- Diagnosing Problems
1000 lb Weight Tolerance

- OR tables
- Beds
- Wheel chairs
- Walkers (large, heavy duty)
- Toilets
Bariatric Ambulance – Regular Ambulance
Bariatric Stretcher – Regular Stretcher
Lifting

- Lifts
- Hover mats
- Lift team
Lift Team

• Available 24 hrs, 7 days a week
• For turning and repositioning patient
• 27 employees for our 400-bed hospital
Intravenous Lines

- May be difficult to find peripheral veins for IVs or drawing blood
  - Use ultrasound (site rite) for placement of internal jugular line in the OR
  - Use ultrasound for pic line placement on the ward
Comorbidities Associated with Extreme Obesity

- Obstructive sleep apnea
- Hypoventilation
- Hyperlipidemia
- Coronary artery disease, cardiomyopathy
- Diabetes
- Hypertension
- Malnutrition
Comorbidities

- **Hypertension**
  - Normal weight 18.1%
  - BMI >40 52.3%

- **Diabetes**
  - Normal weight 2.4%
  - BMI ≥40 14.2%

- **Dyslipidemia**
  - Normal weight 8.5%
  - BMI ≥40 39.2%

- **Metabolic Syndrome**
  - Normal weight 13.6%
  - BMI ≥40 39.2%
Metabolic Syndrome
3 or more of the following criteria:

- Waist >102cm for men, 88 cm for women
- Triglyceride level ≥150 mg/dL
- HDL cholesterol
  - <40 mg/dL men
  - <50 mg/dL women
- Hypertension
  - Systolic >130 mm/Hg
  - Diastolic >85 mm/Hg
  - Or taking antihypertensive meds
- Fasting glucose ≥100 mg/dL
Obstructive Sleep Apnea (OSA)

- Occurs in 40-70% of severely obese patients.

- Is associated with a number of comorbidities – congestive heart failure, coronary artery disease, cerebrovascular disease.

- Puts the patient at risk for fatal postoperative hypoxic episodes.
**OSA Pathophysiology**

- Normal Sleep $\rightarrow$ decreased sympathetic nervous system output, increased parasympathetic output
  - Decreased pulse rate
  - Decreased blood pressure
OSA Pathophysiology

- Sleep with OSA – punctuated by episodes of apnea resulting in hypoxia

- The hypoxia promotes surges in the sympathetic nervous system which elevate blood pressure and pulse, and increased peripheral resistance.

- Chronically these events will lead to systemic hypertension, pulmonary hypertension, left ventricular hypertrophy, and in some instances, CHF
OSA Diagnosis

- History – Patient gives a history of fitful sleep, drowsiness during the day
- Physical – obese
- Sleep study (polysomnography)
  - EEG → Sleep recognition
  - ECG → Arrhythmia monitoring
  - Respiration → Air flow
- AHI ≥ 15/hr
- AHI ≥ 5/hr in a patient with previous stroke or daytime drowsiness
OSA

- Should be confirmed or excluded by a sleep study
- If present, it should be treated with CPAP
Obesity Hypoventilation Syndrome (Pickwickian Syndrome)

- BMI >30 kg/m² awake arterial hypercapnia
Obesity Hypoventilation Syndrome

Symptoms

- Daytime sleepiness
- Fatigue
- Morning headaches
Obesity Hypoventilation Syndrome

Consequences

- Pulmonary hypertension and right-sided congestive heart failure.
Cardiac Evaluation
BMI >35

- These patients are at risk for:
  - Coronary artery disease
  - Congestive heart failure
  - Pulmonary hypertension
Cardiology Work-up

• ECHO
  ◦ Myocardial activity
  ◦ Ejection fraction
  ◦ Pulmonary pressure
• Stress test – Physical or chemical
• Perfusion studies
• Angiography
Diabetes

- 15-20% of these patients will have Type II diabetes.
- Elevated sugars correlate with infection.
- We like to give meth hemoglobin <7.5.
There is no conclusive evidence that extreme obesity alone predisposes one to the development of postoperative venous thrombosis.
Venous Thrombosis Prophylaxis

- Sequentially compressing anti-embolus stocking during the operation and afterward until the patient is ambulating.

- Prophylactic Lovenox postoperatively for 10-14 days
Special Requirements in the OR

• OR table must be well padded
  ◦ Myonecrosis of the dependent muscles (gluteus and paraspinous) can occur secondary to pressure

• If there is any suspicion of rhabdomyolisis, CPK should be obtained.
Anesthetic Problems

- Starting IVs
- Intubating the patient
- Fluid requirement for a given operation is usually more in the extremely obese patient
- Ventilation may be difficult
Diagnostic Modalities May Be Limited

- CT scan
- Angiography
- Various contrast studies
Emotional Needs of Extremely Obese Patients

- These patients feel trapped in a large body.
Caring for the Extremely Obese Patient

- Most procedures require extra personnel and special equipment.
- Everything, including the operation, is more difficult to perform.
- There are several comorbidities which are very prevalent in the extremely obese patient, and these comorbidities need to be worked up preoperatively.
- There are several diagnostic modalities which may not be available in these patients.
- One must always balance risk against gain when planning elective surgery.