Objectives

- Describe different distributions of body fat and the clinical implications.
- List obesity related illnesses
- Describe ways in which obesity and associated illnesses interfere with clinical management of the patient in the hospital and pre-hospital settings.
- Identify means of managing or compensating for bariatric related emergency care problems.
Stroke
Idiopathic intracranial hypertension
Pulmonary disease
Cataracts
Liver disease
Coronary heart disease
Gallbladder disease
Diabetes
Gynecologic abnormalities
Dyslipidemia
Cancer
Hypertension
Urinary stress incontinence
Osteoarthritis
Phlebitis
Gout
Kronenberg
Beyond physical problems

- Psychosocial
  - Workplace related issues
  - Social Interaction
- Medical
  - Diagnosis
  - Treatment
Diagnosis

PRE-HOSPITAL
- Examination
- Vital signs

HOSPITAL
- Examination
- CT scans
- US
- MRI
- Plain X-rays
- Blood draw
Treatment

PRE-HOSPITAL

- Extrication
- Transport
- Basic airway management
- Intubation
- Intravenous lines
- Intraosseous lines
- ...

HOSPITAL

- Surgical procedures
- Medication dosages
- Airway Management
- Intravenous management
- Physical therapy
- Occupational therapy
- Cardiac catheterization
- ...

...
• BMI Wt(kg)/BSA(m)
  – =>25 Overweight
  – =>30 Obese
  – =>40 Morbidly Obese
  – =>50 Super Obese
VISCERAL

- Most adipose tissue concentrated in peritoneum
- Peritoneal fat is metabolically active
- Endocrine issues
- More frequent in males

PERIPHERAL

- Fat distributed along extremities
- Complications more weight related
- More frequent in females
Degenerative arthritis
Hyperkinetic circulation
Increased blood volume
Disk disease
Sleep apnea syndrome
Venous stasis disease
Increased intra-abdominal pressure

Related issues
- Abdominal wall hernia
- GERD
- Restrictive lung disease
- Decreased renal blood flow
- Pseudotumor cerebri
- Obesity Hypoventilation syndrome
Leptin produced by placenta and adipocytes communicates fat stores to brain
- In obese patients the brain is resistant to leptin

Adipose tissues secrete TNF and IL-6

In obesity neutrophils have a decreased ability to migrate to inflammation sites

Immune depression and inflammation
- Changes in cellular immunity
- Hypercoagulability
- Endothelial inflammation
- Insulin resistance
Metabolic changes
Metabolic syndrome (Syndrome X)

- Substrate overload
- Lipotoxicity and glucotoxicity
  - Related to increased caloric intake, insulin, and pancreatic peptide secretion
- Diabetes Non insulin dependent
- Non Alcoholic steato hepatitis (NASH)
- Hypertension
- Hyper coagulation thromboembolism
- Immune dysfunction
- Atherosclerotic heart disease
Complications

- Hypertension
- Cardiomyopathy
- Coronary artery dx
- Pulmonary
- Sleep apnea
- Dyslipidemia
- Gall Bladder dx
- Diabetes
- Arthritis

- Cancer
  - Colon
  - Prostate
  - Endometrial
  - Breast
Airway issues

- Poor visualization of cords
  - Redundant tissues
  - Short neck
  - Difficulty with positioning
- Desaturation occurs more quickly
- Ventilation more difficult due to weight of chest wall and decreased compliance
- Larger gastric volume and increased abdominal pressure lead to increased aspiration
Airways

- Workable back-up airways
  - Combitube
  - ILMA

- Problematic
  - Transillumination
  - Field surgical procedures
  - LMA (does not protect airway – risk for aspiration)
Cardiac

- Increased blood volume
  - Increased preload
- Hypertension
- Congestive heart failure common
Asthma
Pulmonary hypertension
Sleep apnea
Hypoventilation syndrome
Difficult intubation
Increased airway resistance
Decreased compliance
Increased airway resistance
Decreased O2
Increased CO2
Clinical oximetry may be unreliable
Work of breathing increases when lying flat
Excess fat compresses thoracic cavity
Fatty infiltration of accessory muscles of breathing
Increased abdominal fat pushes up on diaphragm – chronic abdominal compartment syndrome
Decreased FEV1, FRC, TLC, ERV
- Increasing BMI from 20 to 30 decreases FRC by 66%
Pro-inflammatory mediators: c-reactive protein, TNF, IL-6 increase airway reactivity.

Leptin (produced by adipose cells) also increases airway reactivity
Pulmonary

- Normal
- Obese, awake
- Closing volume
- Obese, anesthetized

Lung volume
- Functional residual capacity
- Residual volume

Hines and Marshall
Nesthesiology
Pulmonary
Obstructive Sleep Apnea

- Excess tissues in upper airway close airway causing hypoxia
  - Decreased O2, Increased CO2, arrythmias, pulmonary hypotension
  - Snoring, snorting, AM headaches, sleep disruption, daytime sleepiness
  - CPAP or BIPAP
Decreased respiratory drive
Daytime hypersomnolence, hypoxia, and cor pulmonale
CPAP or BIPAP
Cardiac

- Congestive heart failure - CHF
- Hypertension
- Increased blood volume
- Impaired left ventricle function
  - Increased LVEDV
  - Decreased LV ejection fraction
- Fatty infiltration and fibrosis of conduction system
Interaction with health care system

- Difficulty in access
- Decreased availability of tests
  - CT scan
  - Ultrasound
  - Plain films
  - Lab draws and blood sticks
  - Poor mobility-skin breakdown, pneumonia, DVT, deconditioning
- Cultural attitudes
- Risk to healthcare providers (back injuries)
Limitation of diagnostic studies

- Plain X-rays
- CT scan limited by weight
- MRI – size limitations
- Ultrasound technically difficult
Dosage depends upon individual medication
- Fat solubility
- Body water distribution
- Underlying conditions
  - Kidney
  - Liver
Operative procedures

- Restrictive
  - Vertical banded gastroplasty –
    - Rarely performed currently due to late weight gain.
  - Lap band
    - High risk of mechanical complications but improved weight loss over VBG

- Malabsorptive
  - Roux en Y gastric bypass (Also restrictive)
  - Biliopancreatic diversion
  - Duodenal switch (variation of biliopancreatic switch)
Surgical Solutions

- Flanges that keep it locked once through buckle
- Inflatable part of band
Post op complications

- Abdominal exam is hard to perform
  - Abdominal fat masks peritonitis
- Wound infections
  - Increased risk
    - Diabetes
    - Decreased immune status
  - Delay in detection
- Pulmonary
- DVT and thromboembolism
Conclusions

- Morbid obesity presents a major disability
- Patients are more fragile than they appear
- Management is usually not easy but some adjustments can help
  - Proper lifting and moving equipment
  - Positional management
  - Understanding of physiology
  - Treatment with respect and understanding
Questions?