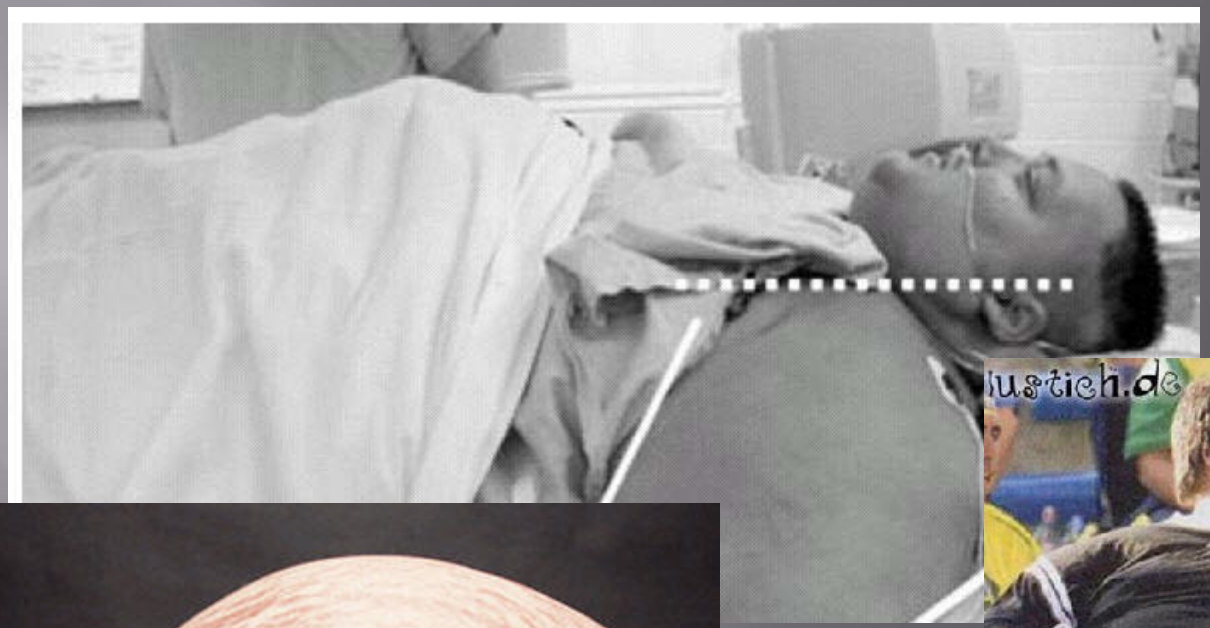
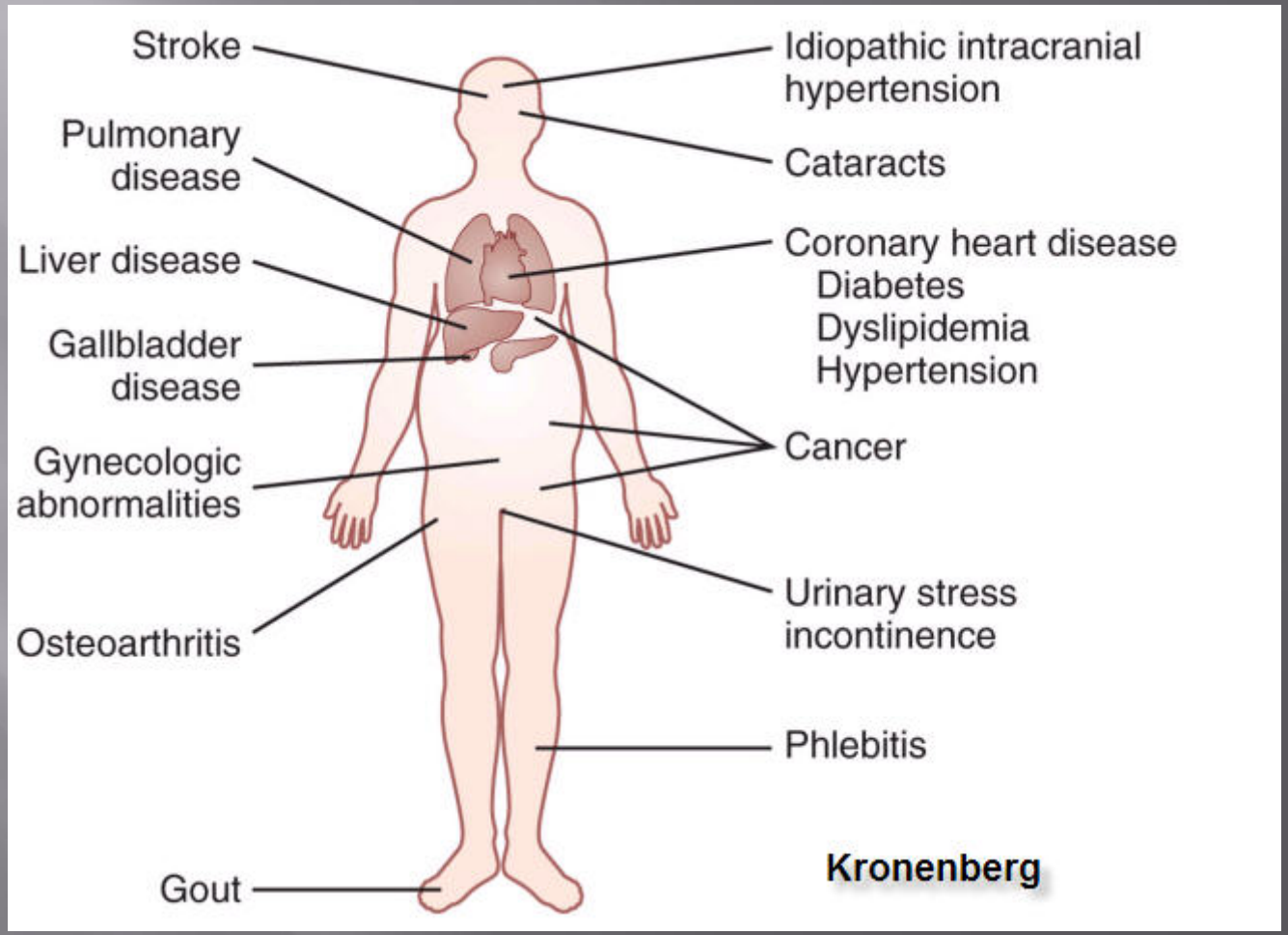
BARIATRIC PATIENTS

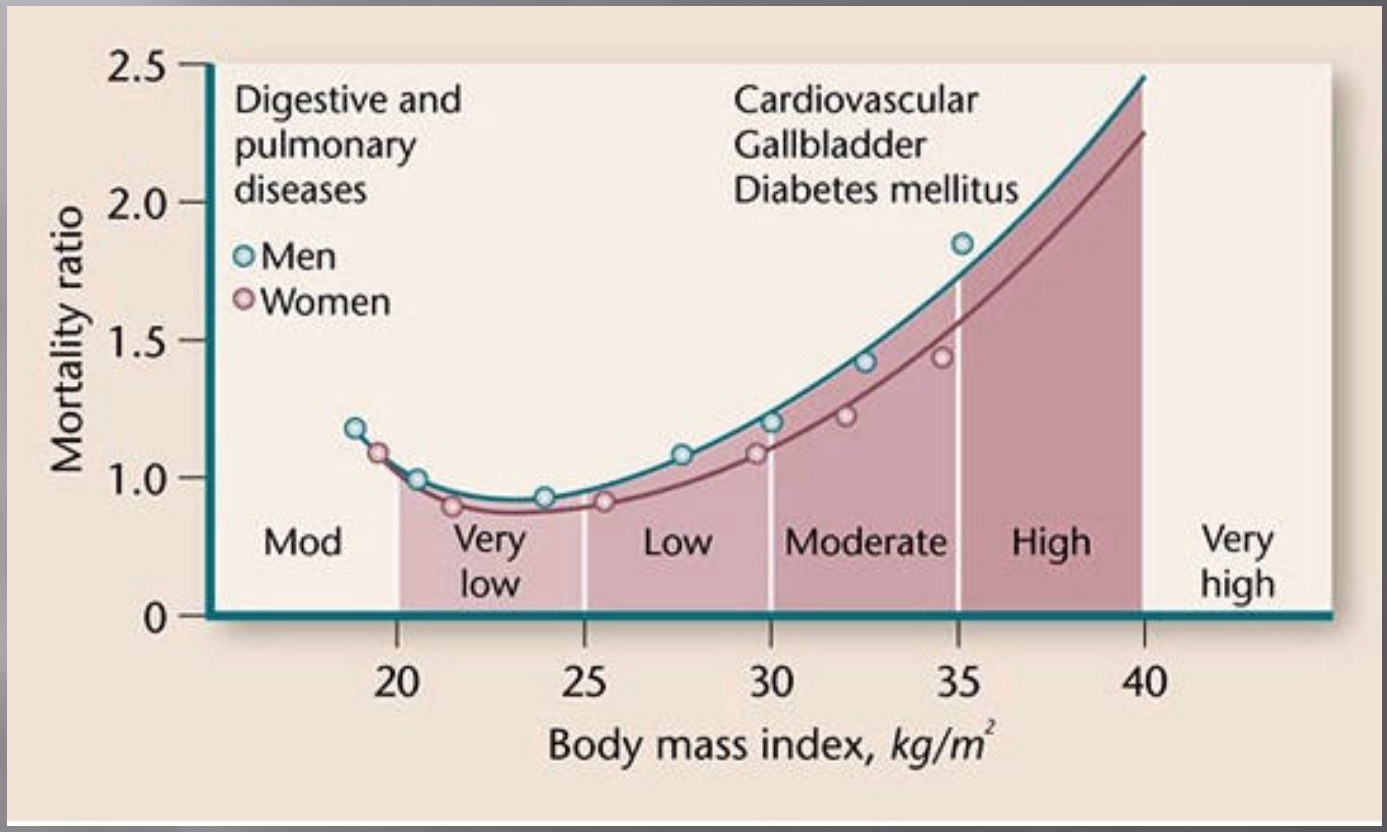
Objectives

- 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.




lustich.de


Stroke
Pulmonary disease
Liver disease
Gallbladder disease
Gynecologic abnormalities
Osteoarthritis
Gout
Idiopathic intracranial hypertension
Cataracts
Coronary heart disease
Diabetes
Dyslipidemia
Hypertension
Cancer
Urinary stress incontinence
Phlebitis
Kronenberg


2.5
2.0
1.5
1.0
0
Mortality ratio
Digestive and pulmonary diseases
Men
Women
Cardiovascular
Gallbladder
Diabetes mellitus
Mod
Very low
Low
Moderate
High
Very high
20
25
30
35
40
Body mass index, kg/m²

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

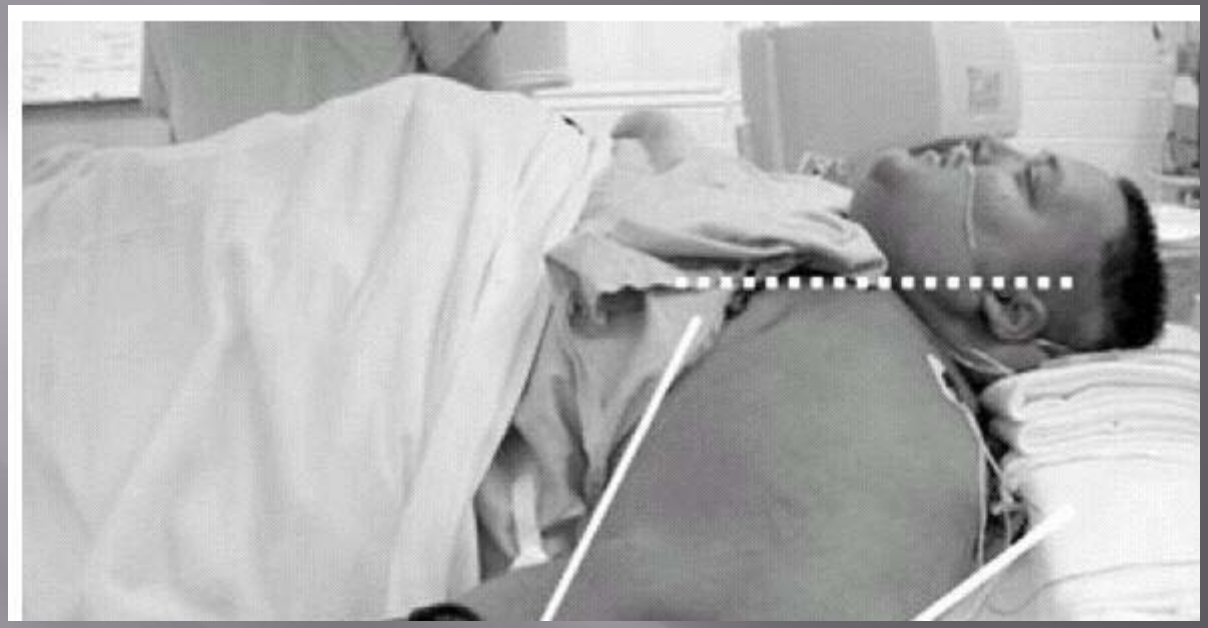
Treatment

PRE-HOSPITAL

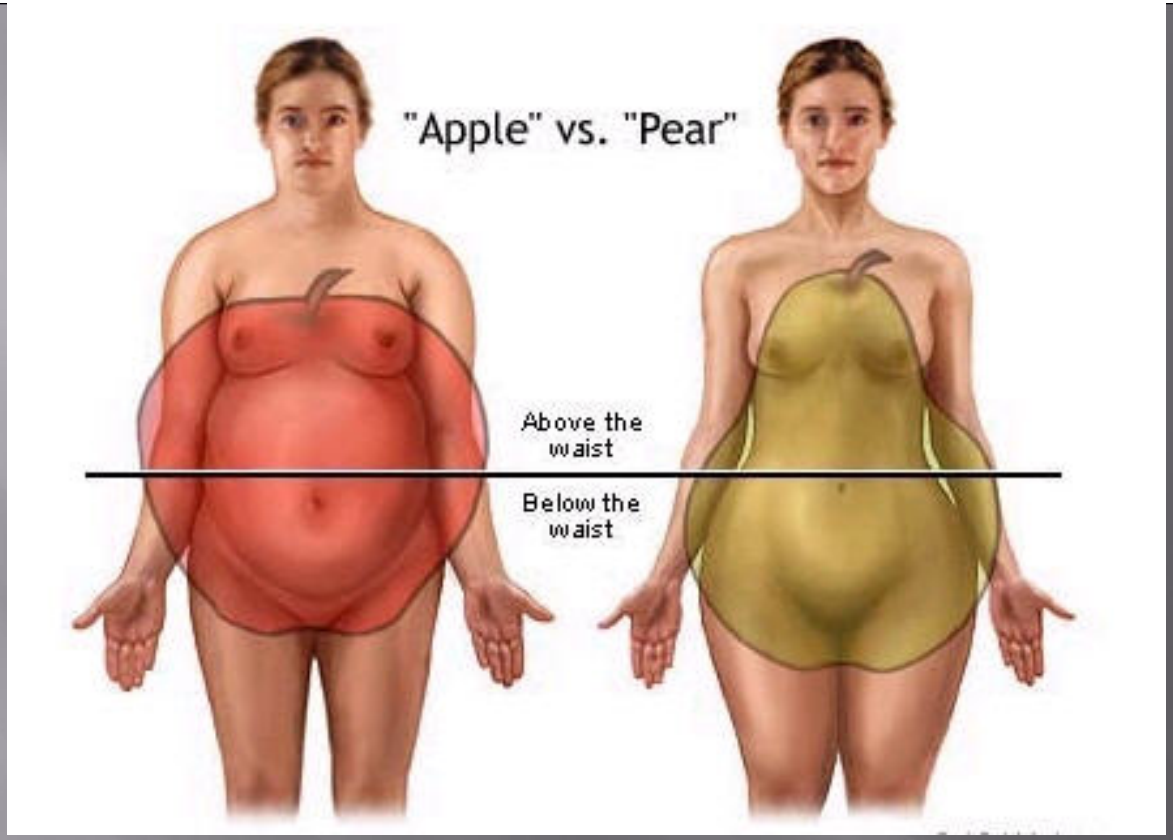
- Extrication
- Transport
- Basic airway management
- Intubation
- Intravenous lines
- Intraosseous lines
- …

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



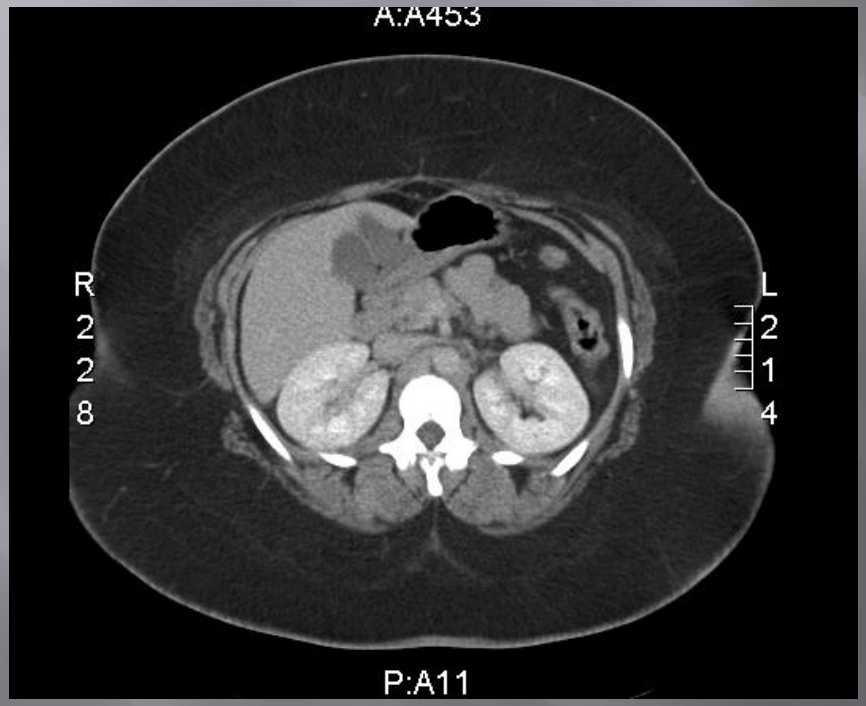
VISCERAL

- 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

PERIPHERAL



VISCERAL

Weight Pressure Related

- Degenerative arthritis
- Hyperkinetic circulation
- Increased blood volume
- Disk disease
- Sleep apnea syndrome
- Venous stasis disease

Chronic Abdominal Compartment Syndrome

- Increased intra-abdominal pressure
- Related issues
  - Abdominal wall hernia
  - GERD
  - Restrictive lung disease
  - Decreased renal blood flow
  - Pseudotumor cerebri
  - Obesity Hypoventilation syndrome

Metabolic 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

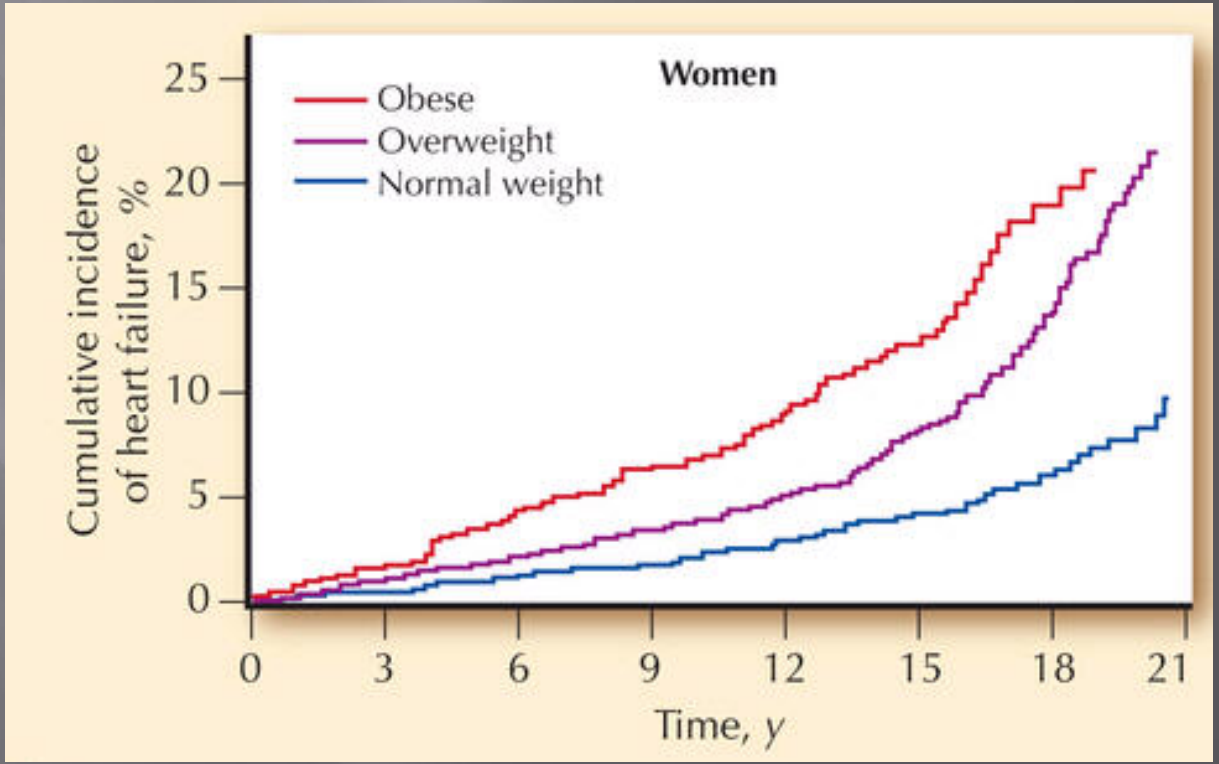
Airways

- Workable back-up airways
  - Combitube
  - ILMA
- Problematic
  - Transillumination
  - Field surgical procedures
  - LMA (does not protect airway – risk for aspiration)

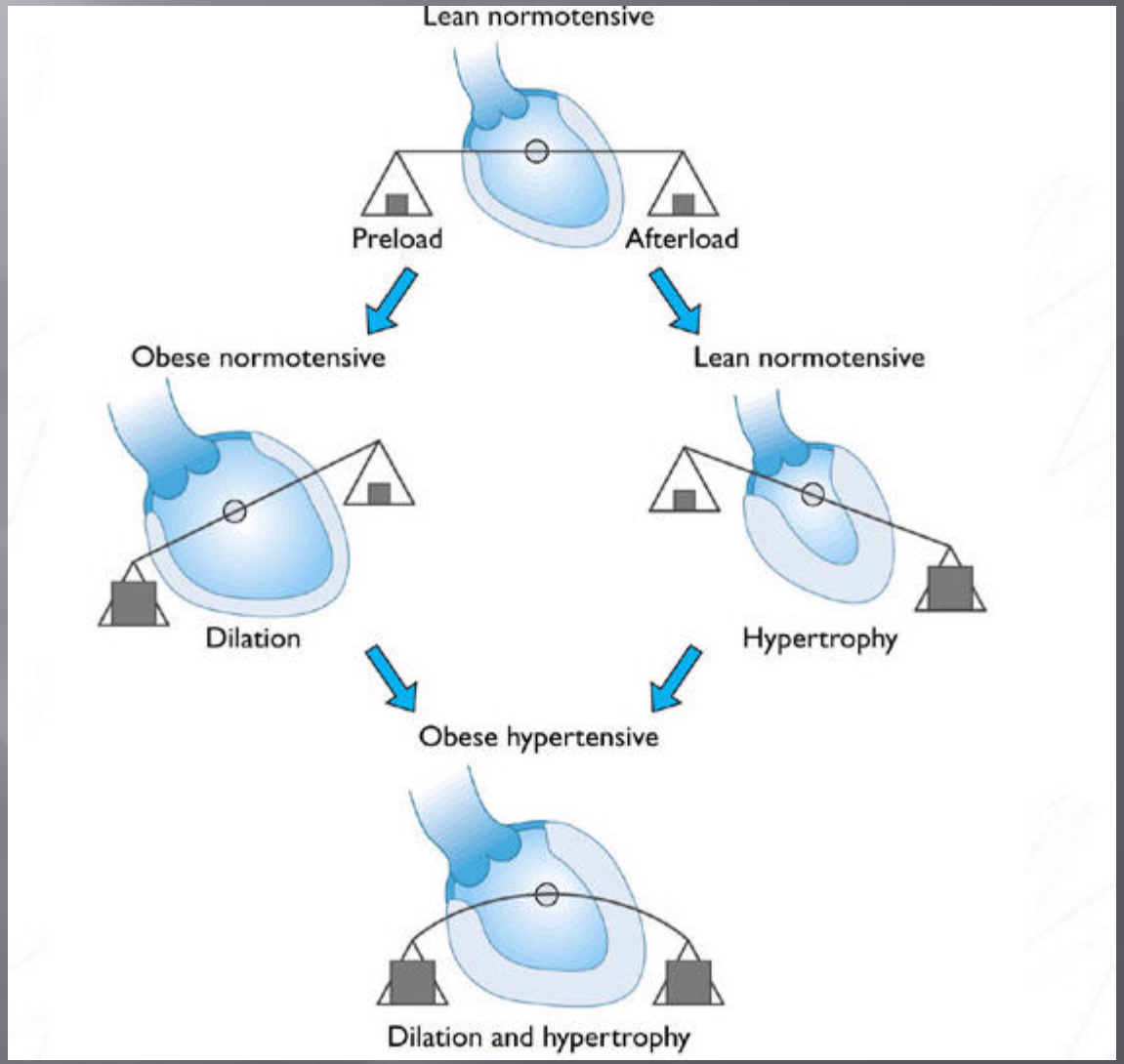

Fleischer

Cardiac

- Increased blood volume
  - Increased preload
- Hypertension
- Congestive heart failure common



Circulation



Pulmonary

- Asthma
- Pulmonary hypertension
- Sleep apnea
- Hypoventilation syndrome
- Difficult intubation
- Increased airway resistance

Breathing

- Decreased compliance
- Increased airway resistance
- Decreased O2
- Increased CO2
- Clinical oximetry may be unreliable
- Work of breathing increases when lying flat

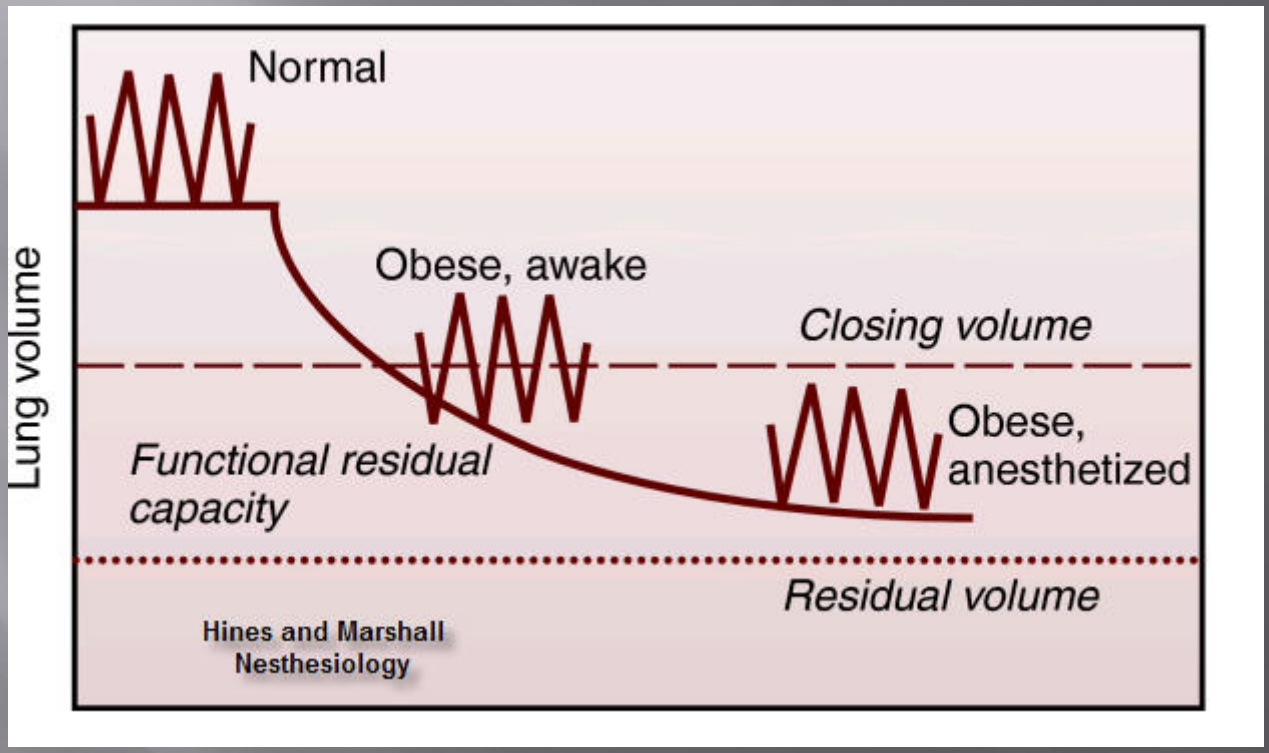
Pulmonary

- 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%

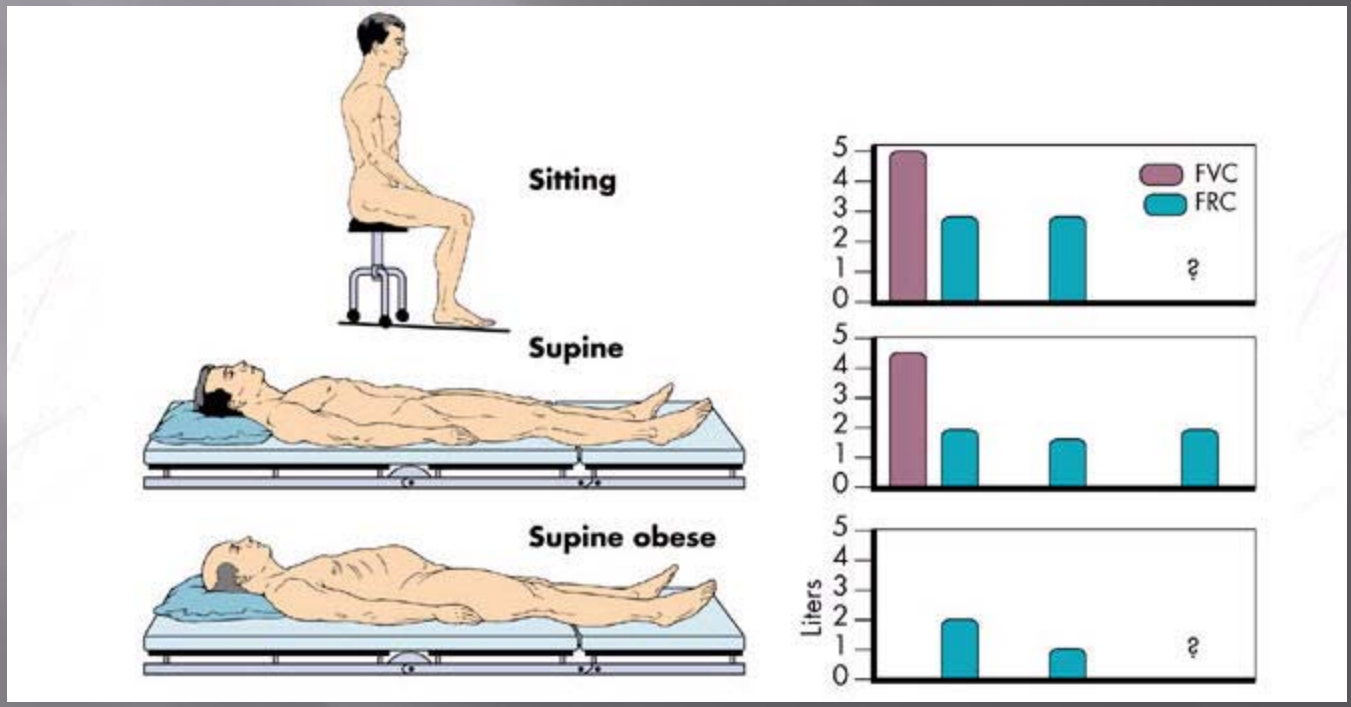
Pulmonary

- 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
Functional residual
capacity
Residual volume
Lung 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

Hypoventilation syndrome

- 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

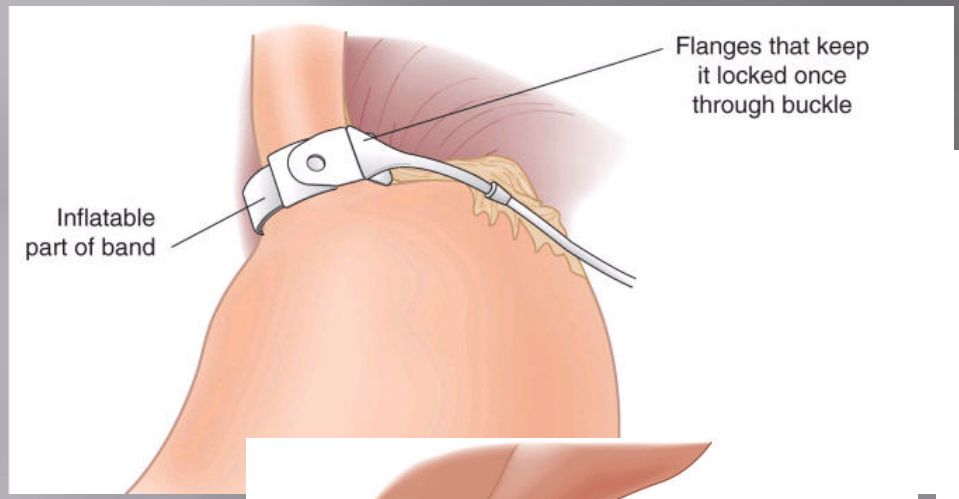
Medications

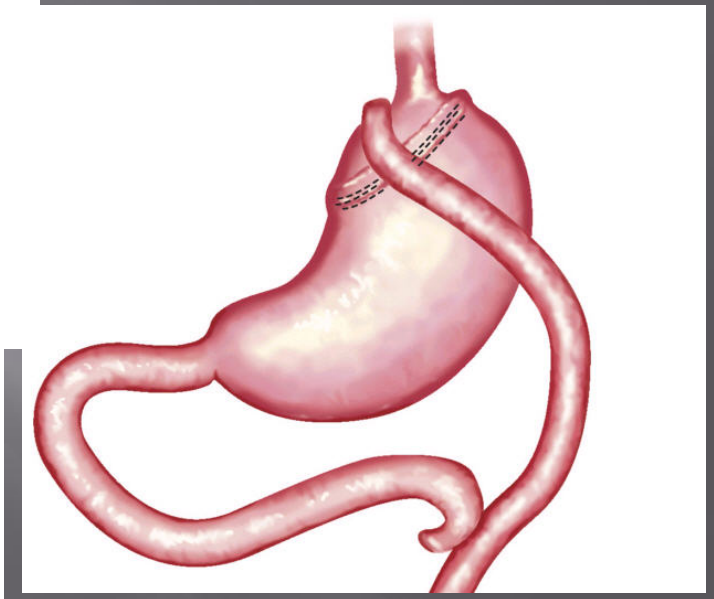
- Dosage depends upon individual medication
  - Fat solubility
  - Body water distribution
  - Underlying conditions
    - Kidney
    - Liver

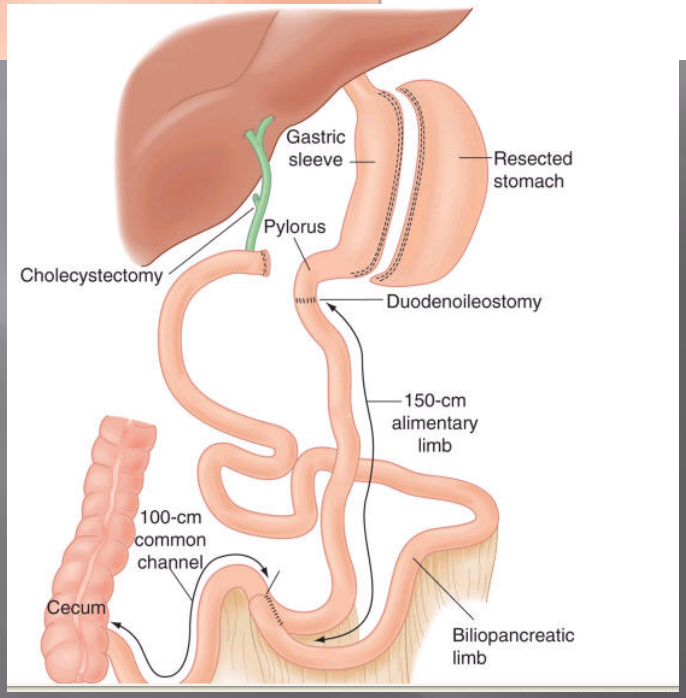
Operative procedures

- 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







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?