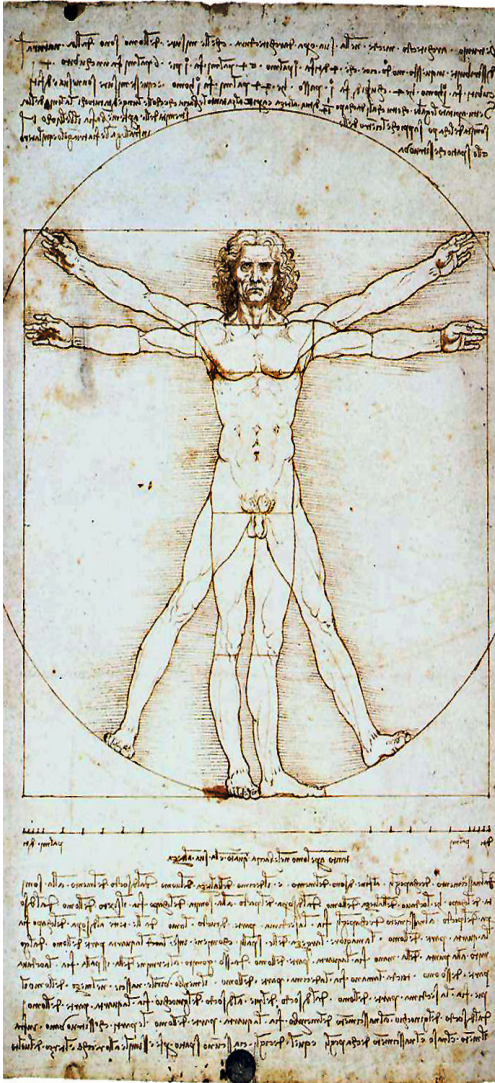


Acute Abdominal Pain

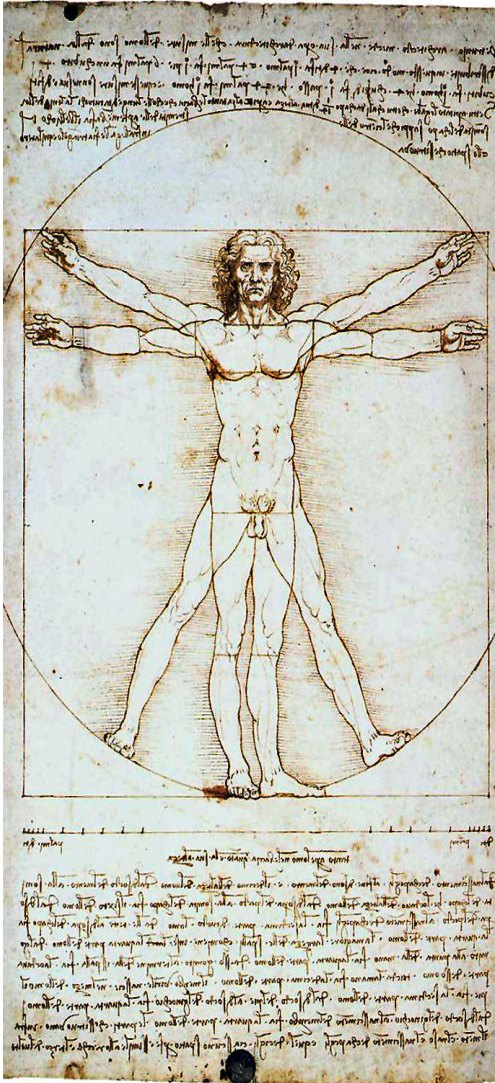
Todd A. Parker, M.D.
LCDR MC USN
EM-3.94

Obligatory Statistics



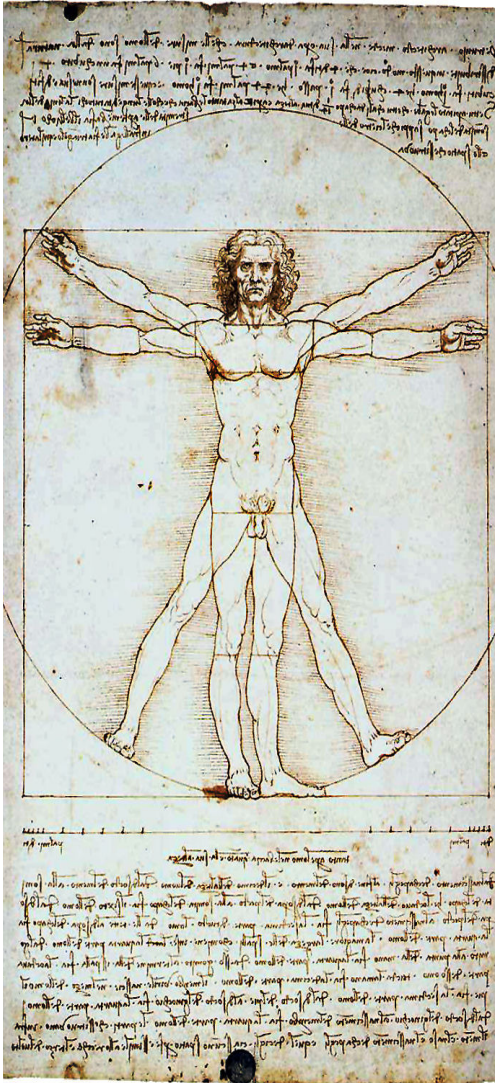
- Just in case....
- 5% of total ED visits
- Half >65 will be admitted
- One third of those surgery
- Ten percent mortality
 - Equals that of STEMI

Difficult Diagnosis



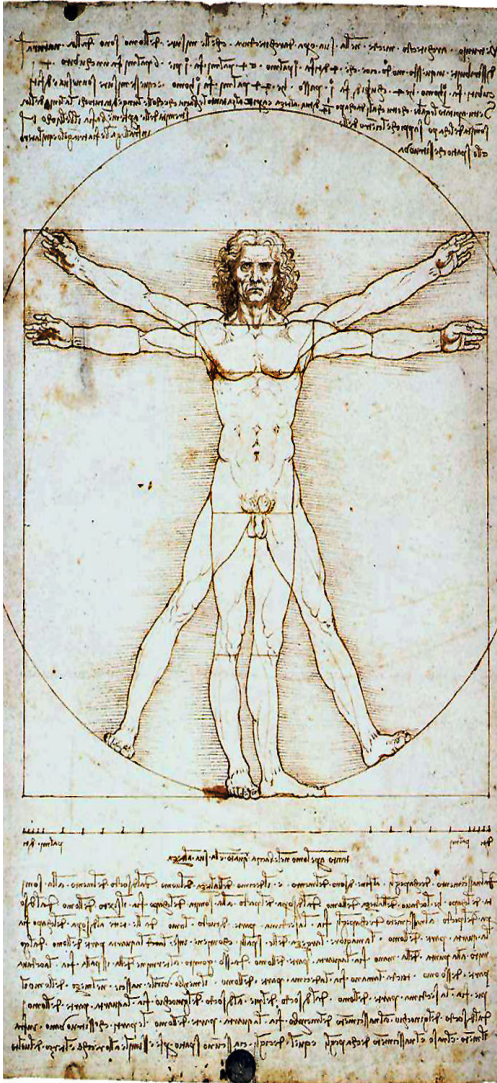
- Lots of organs/systems
- Causes – benign to life threatening
- Common – needle in haystack
- You may not make diagnosis
– Think worst first!!

Especially Difficult Diagnosis



- Elderly
 - Difficult History
 - Blunted physiologic responses
 - Fever, labs, pain
 - Confounding comorbidities
 - Medications
 - Alternate dx or interactions
- Pediatrics
 - Difficult History
 - Difficult exam

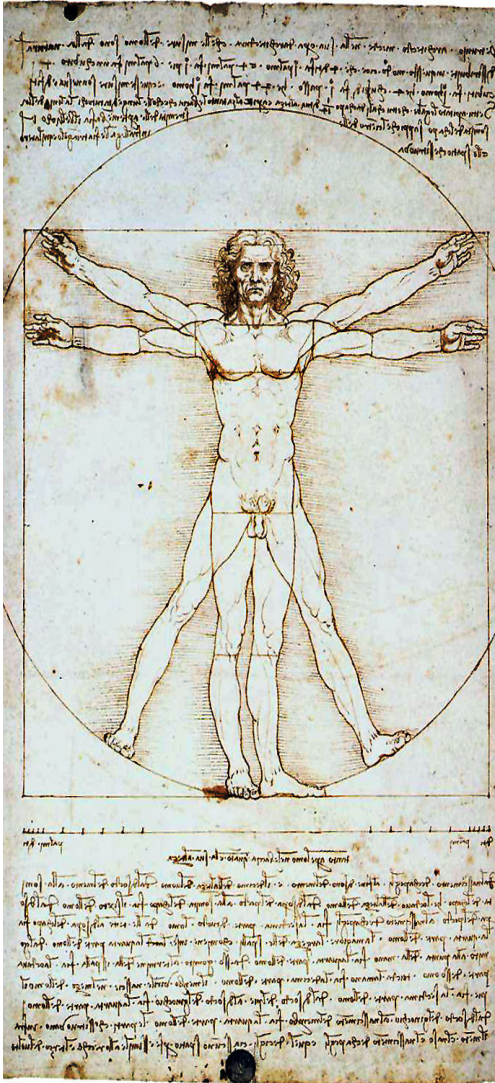
History



A doctor who cannot take a good history and a patient who cannot give one are in danger of giving and receiving bad treatment.

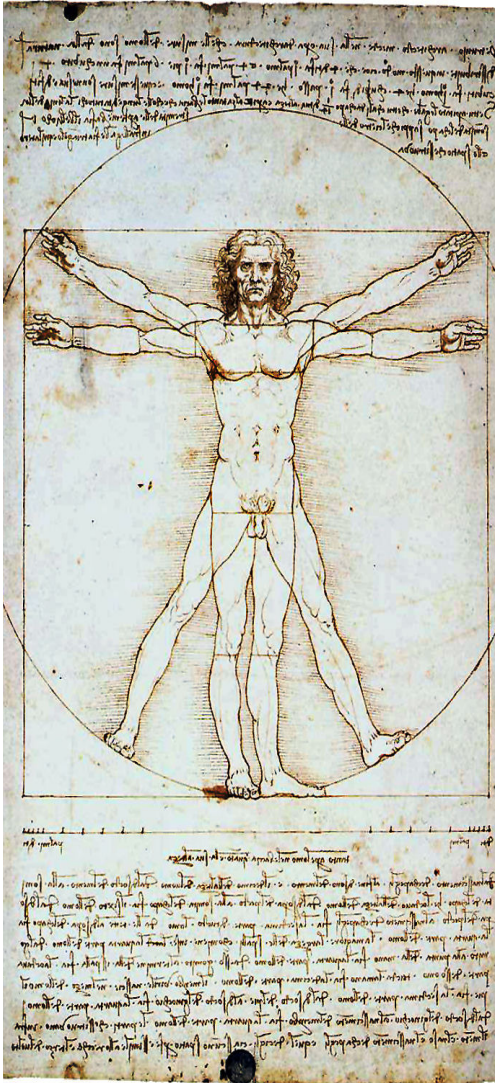
~Author Unknown

History



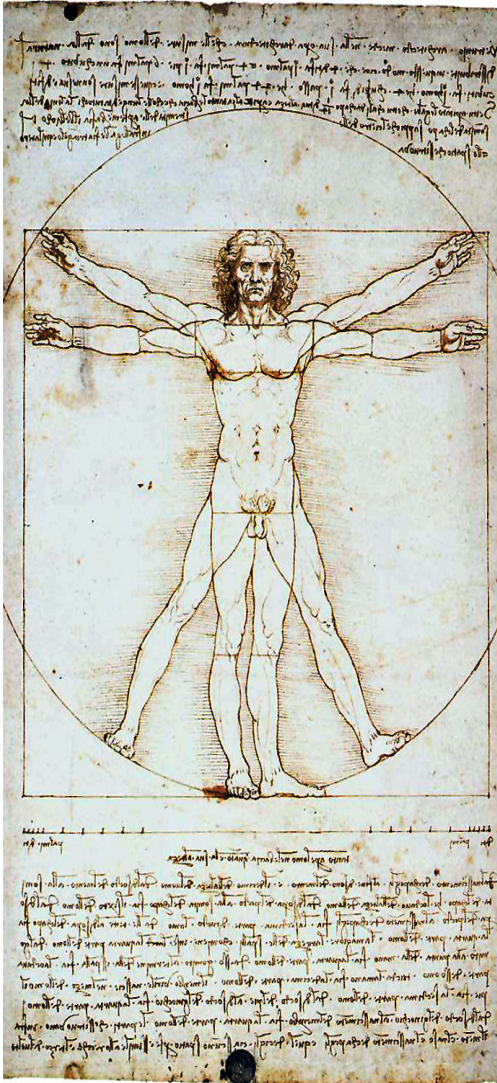
- Basic abdominal pain questions
 - Character
 - Location / radiation
 - Onset
 - Intensity
 - Duration
 - Associated sx
 - Provocation / palliation
 - Previous episodes
- “Classic” may not be!

History



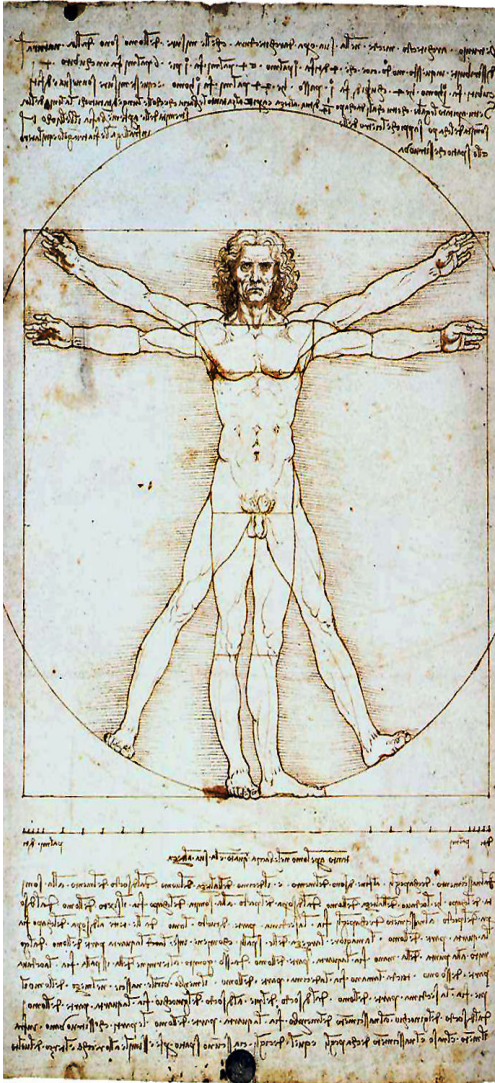
- Medication reminders:
 - NSAIDs - PUD, blunt fever
 - Steroids - PUD, ↓ pain sensation, alter WBC count
 - Anticholinergics - Urine retention, ileus
 - B-Blockers - may blunt tachycardia
 - Abx - pain / n/v/d
 - Narcotics - blunted pain response

History - Comorbidities



- “The greatest impediment to the correct diagnosis is an existing diagnosis” – author unknown
- Diabetes – blunts pain response
- Known GI malignancies
- Vascular Disease
- Arrhythmias
- Don't forget to ask/check for pregnancy!

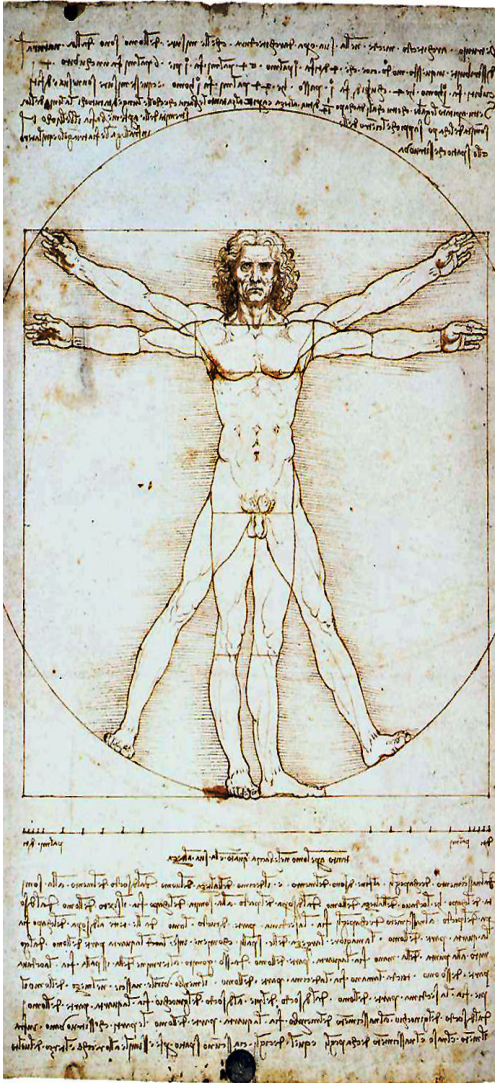
Physical Exam



- Vital Signs:
 - May be a big clue
 - Tachycardia very common
 - Peds – closely analyze tachycardia
 - Fever unreliable
 - Tachypnea – pain vs acidosis
- Elderly - Watch out!
 - Often hypothermic
 - Blunted tachycardia
 - “Normal” BP may be hypotension

Physical Exam

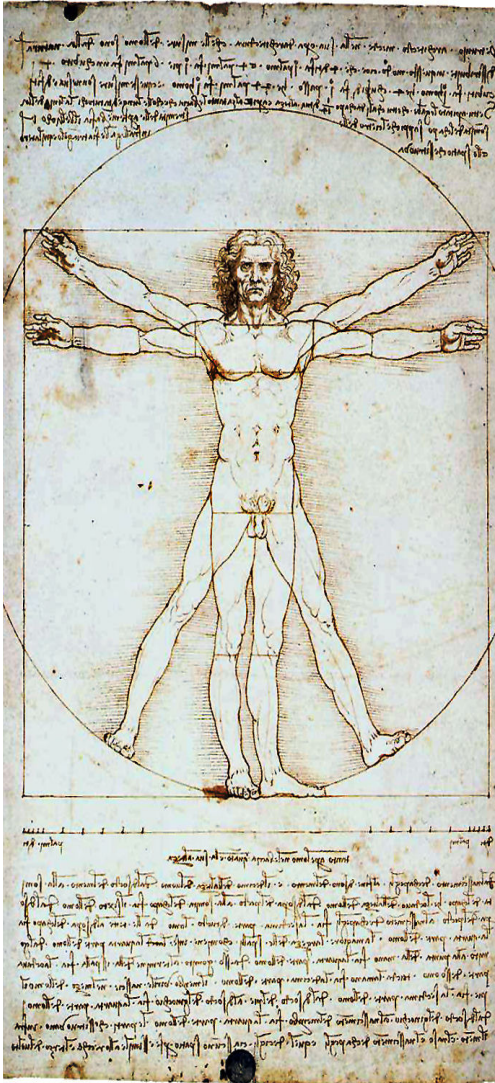
- Don't forget to look elsewhere!
 - Cardiovascular causes
 - CHF, pericarditis, ACS
 - A. Fib – risk for mesenteric ischemia
 - Pulmonary
 - Pneumonia, PE, Effusion
 - Extremities: PVD / DVT



Physical Exam - Abdomen

- Inspection

- Note scars, discoloration, distention
- Stigmata of liver disease
- Cullen's / Grey-Turner's sign



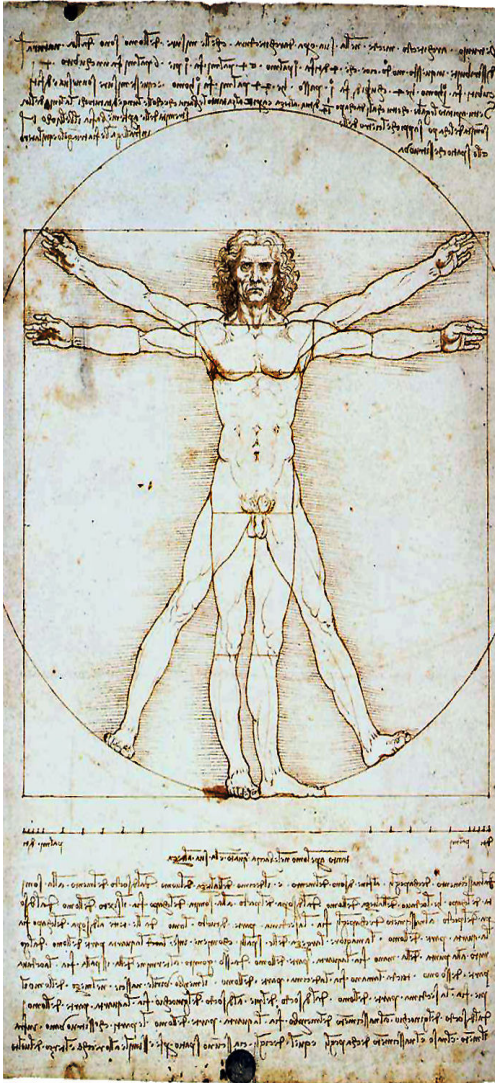
© Division of Pediatric Surgery - Brown Medical School



- Auscultation

- Bruits, bowel sounds

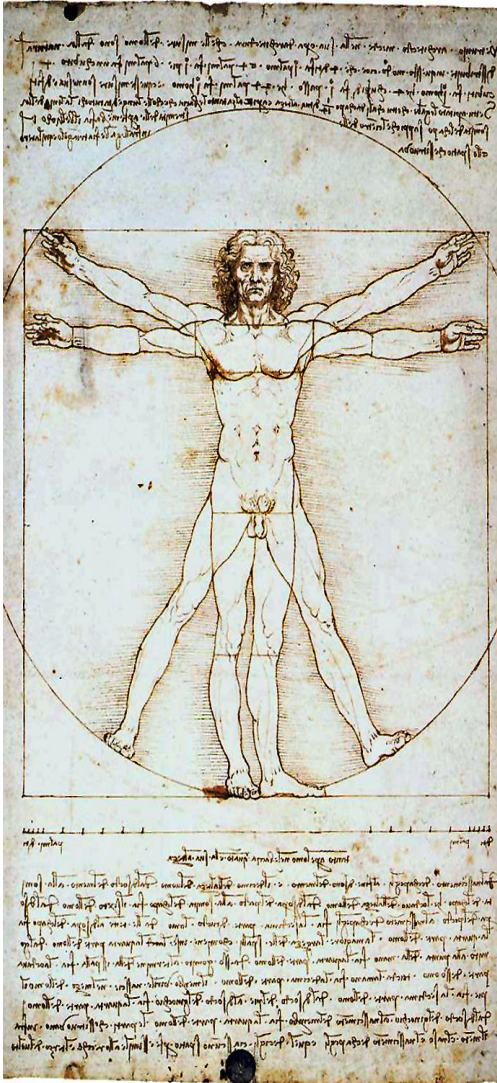
Physical Exam - Abdomen



- Palpation

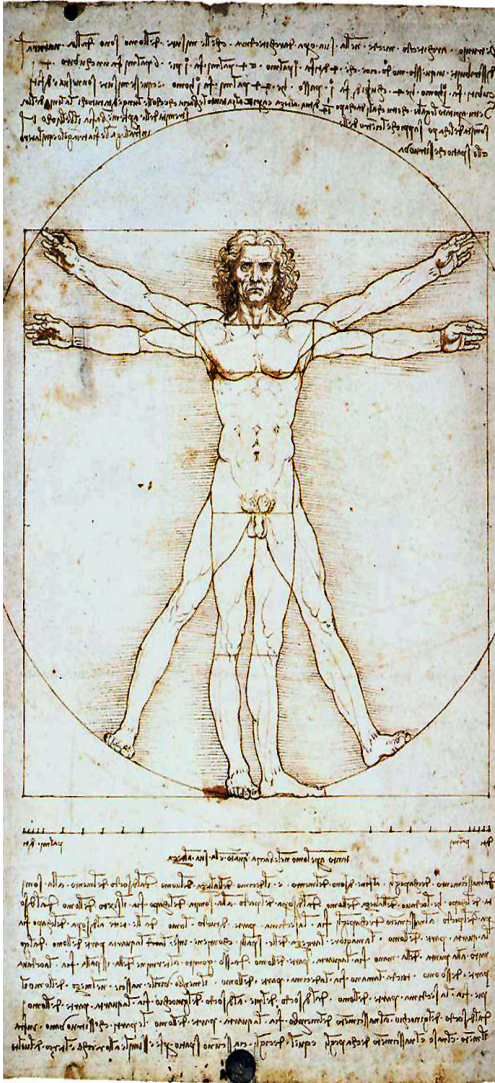
- Tenderness
- Masses (solid vs pulsating)
- Guarding / Rigidity
 - Obese - difficult
 - Thin abd musculature
 - » Common in peds and elderly
 - » Minimizes guarding and rigidity
- Search for Hernias
- Carnett's Sign

Physical Exam - Rectal



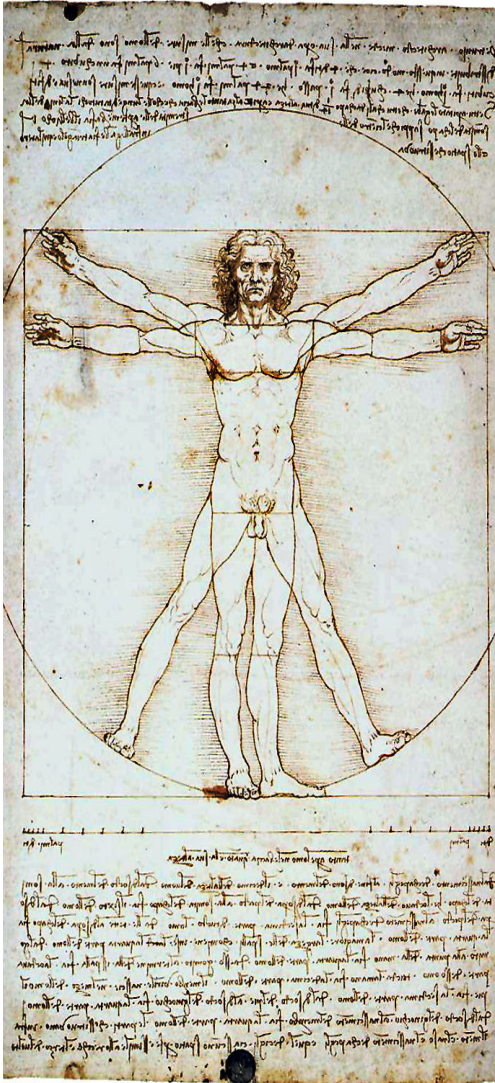
- Rectal exam is critical!
 - Blood
 - Masses
 - Quality of stool
 - Prostate

Labs / Studies



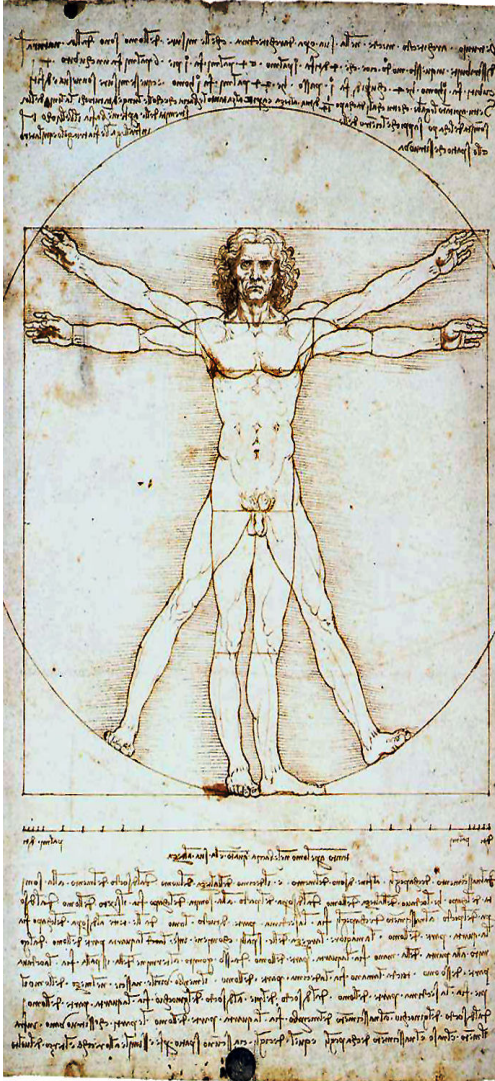
- Lower threshold to order
but
- Do not over-rely on results!
- Specific Labs
 - CBC
 - Lipase
 - Coags
 - UA
 - CMP
 - Cardiac Enzymes
 - Lactate?
 - Urine HCG
- EKG early on if at risk/Upper

Additional Studies



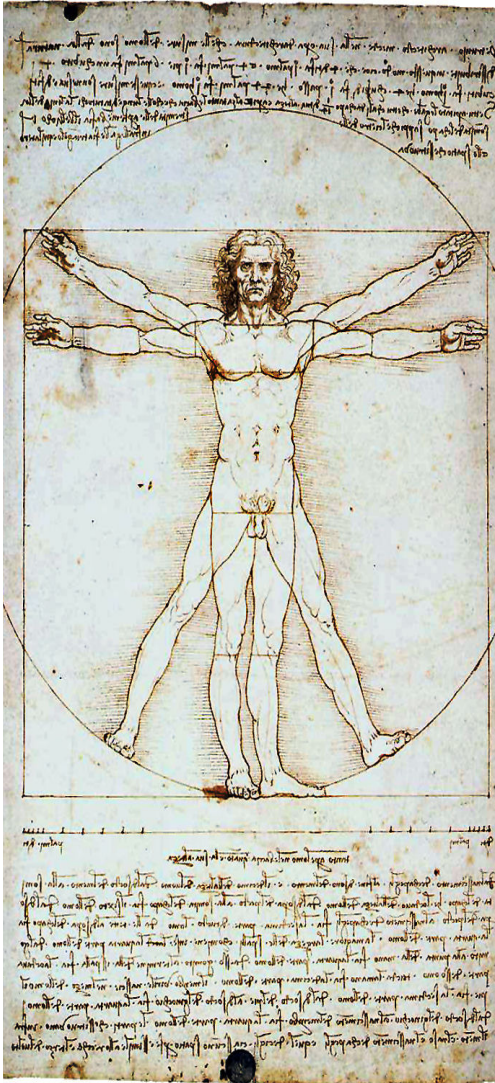
- CXR generally useful
- AAS – only if indicated
 - Concern for perforation/free air
 - Bowel Obstruction?
- CT
 - Often helpful in older patients
 - Peds/Younger Adults
 - Weigh radiation risk vs change in mgt
 - 2004 study: Altered diagnosis 45% of time!
 - Must consider renal fxn
- Angiography
 - Helpful for vascular disease
 - CT angio likely more useful

Bedside Ultrasound



- Any at risk patient!!!
 - AAA
 - Biliary Disease
 - Free fluid
 - Cardiac Function
 - Pregnant

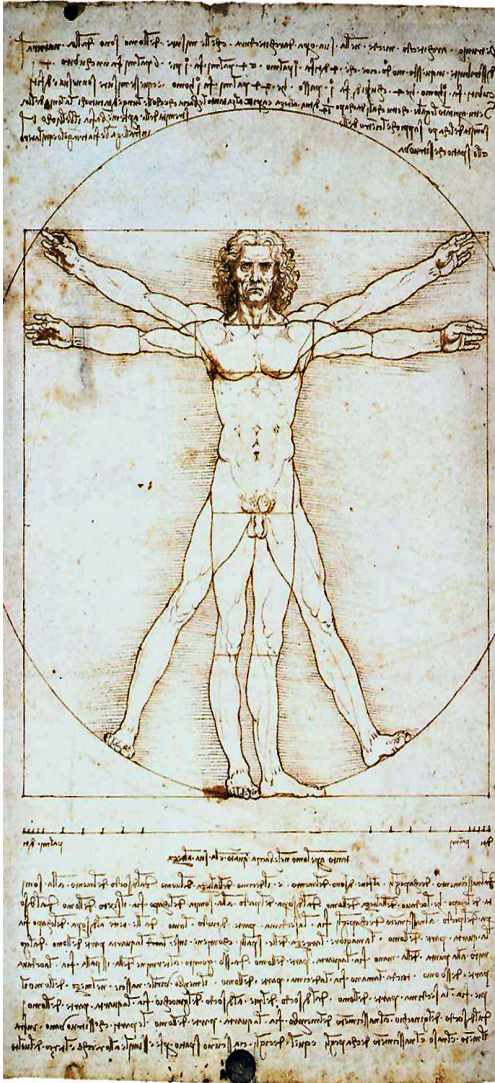
Specific Conditions



When you are called to a sick man,
be sure you know what the matter
is - if you do not know, nature can
do a great deal better than you
can by guess.

~Nicholas de Belleville

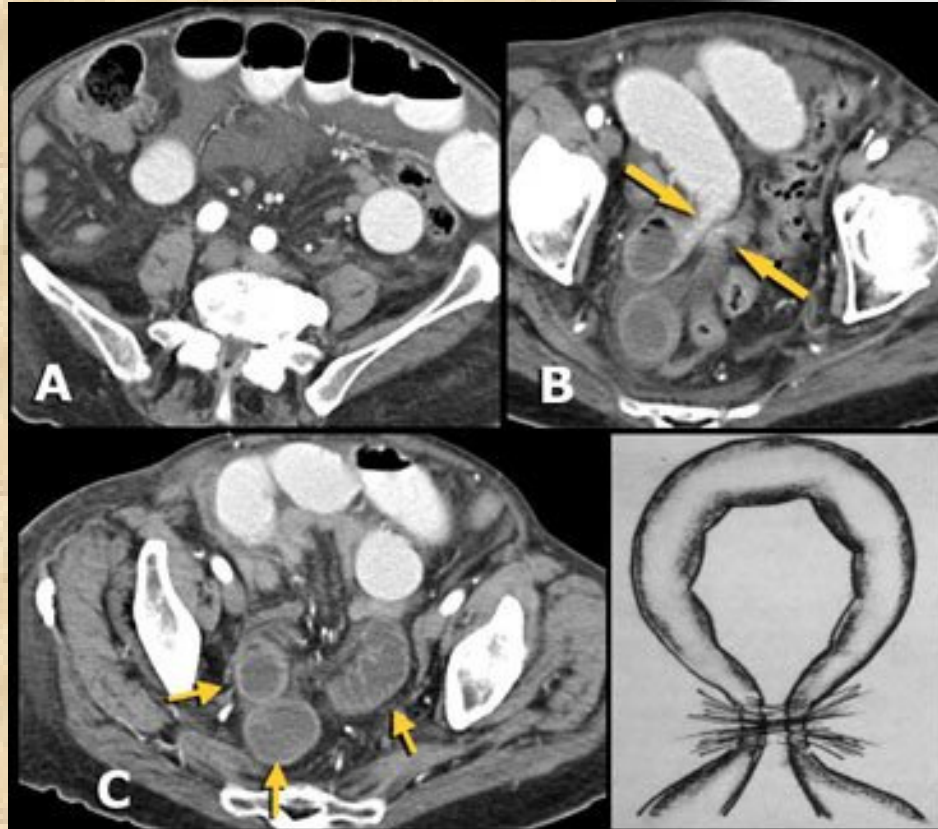
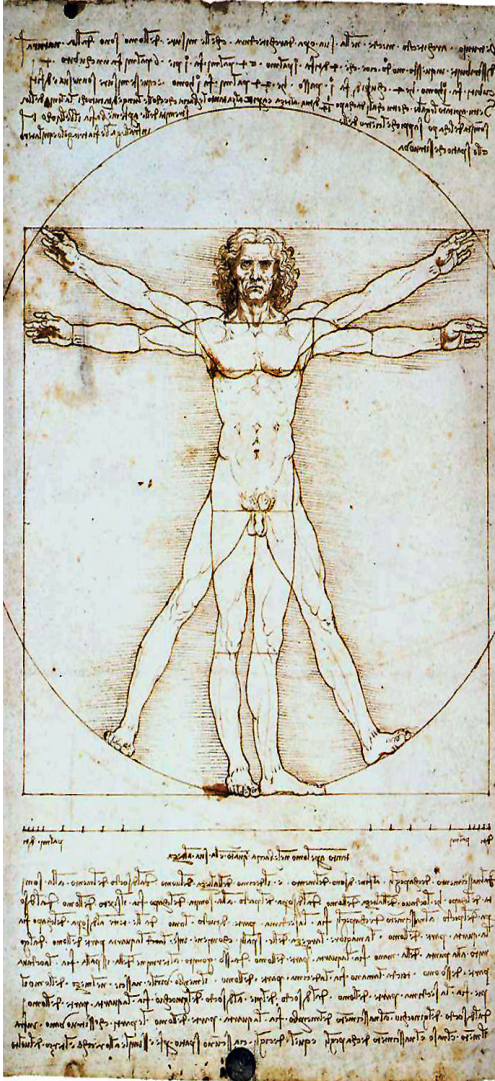
Small Bowel Obstruction



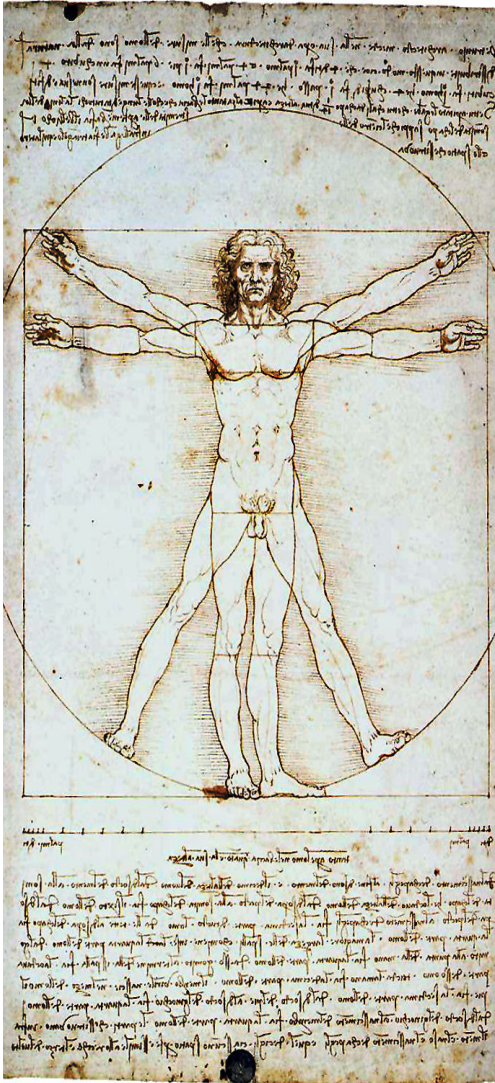
- Often an easy diagnosis
- More common in the elderly
 - Prior surgeries/adhesions
- Symptoms:
 - Abdominal Pain
 - Distention
 - Vomiting
 - Diarrhea early on
 - Guarding/RT late findings
- Plain radiographs adequate but CT best

SBO

EMBBS

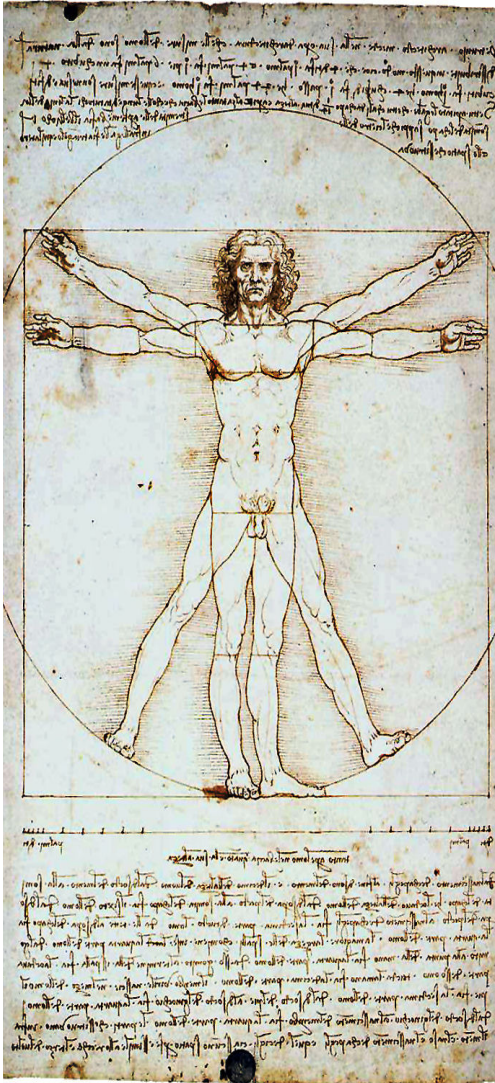


SBO - Management



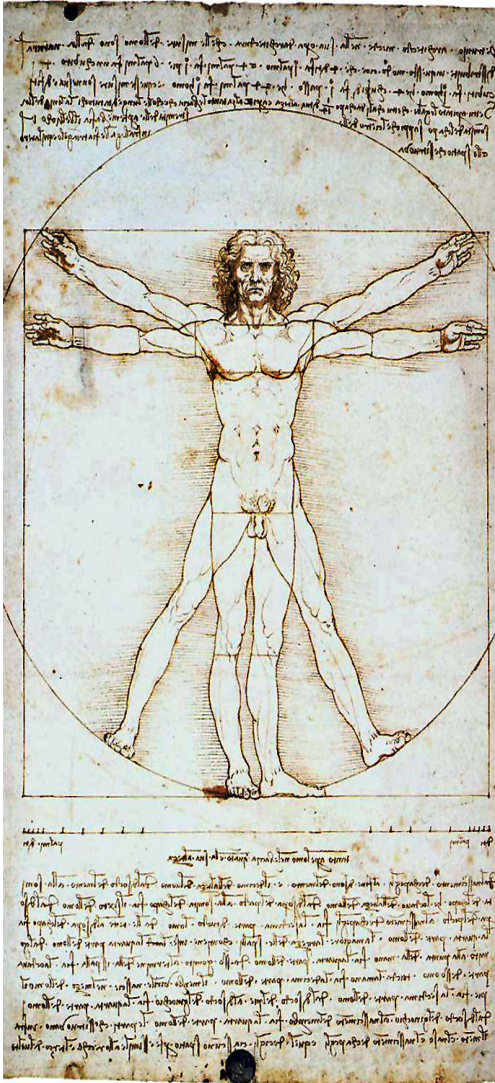
- Fluid resuscitation
 - Nasogastric decompression
 - Pain control
 - Surgical consult
 - Medical management for conservative therapy may increase M & M
- Schwab et al. Operative acute small bowel obstruction: admitting service affects outcome. Am J Surgery 2001.

Large Bowel Obstruction



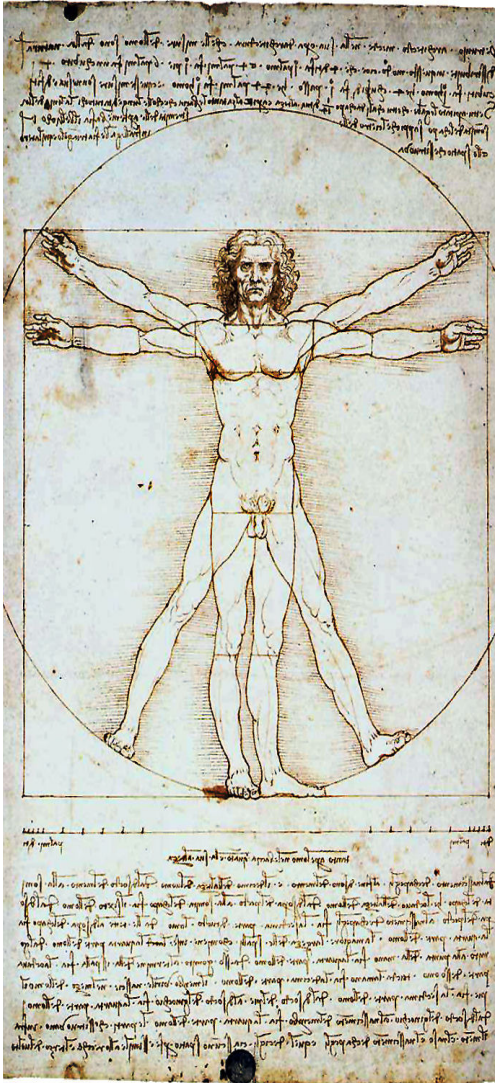
- Less common than SBO
 - High incidence in elderly
 - Mortality rate ~40%
- Difficult dx: non-specific sx
 - Pain, severe constipation, vomiting
- Cancer, diverticulitis, volvulus most common causes

Large Bowel Obstruction



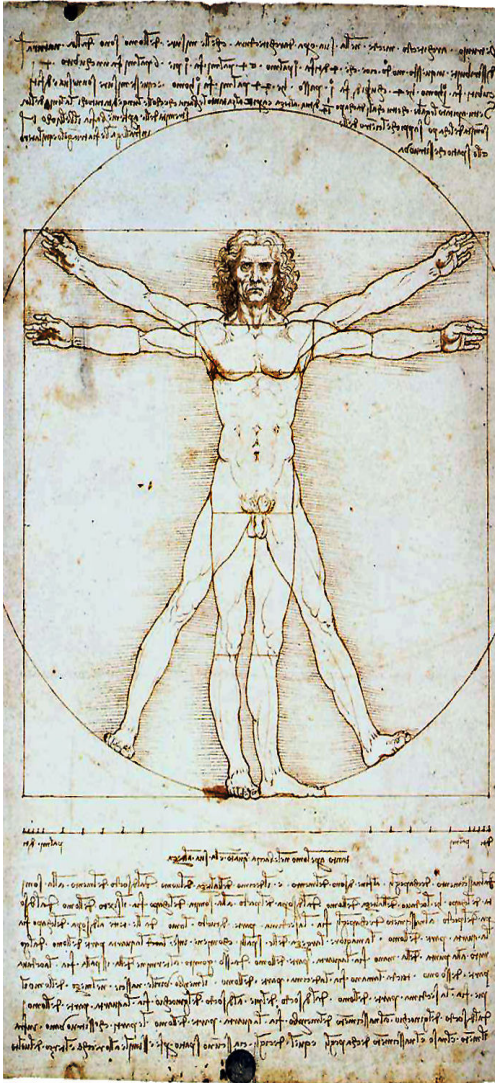
- Cancer – question about recent weight loss, progressive change in bowels, fatigue
- Volvulus – only 15% of cases
 - Most likely to need emergent surgery
 - Sigmoid volvulus – 80%
 - Generally more gradual onset of pain
 - Vomiting less common
 - May be medically managed initially
 - Cecal volvulus
 - Acute onset of pain
 - Vomiting very common
 - Emergent surgical mgt

Biliary Tract Disease



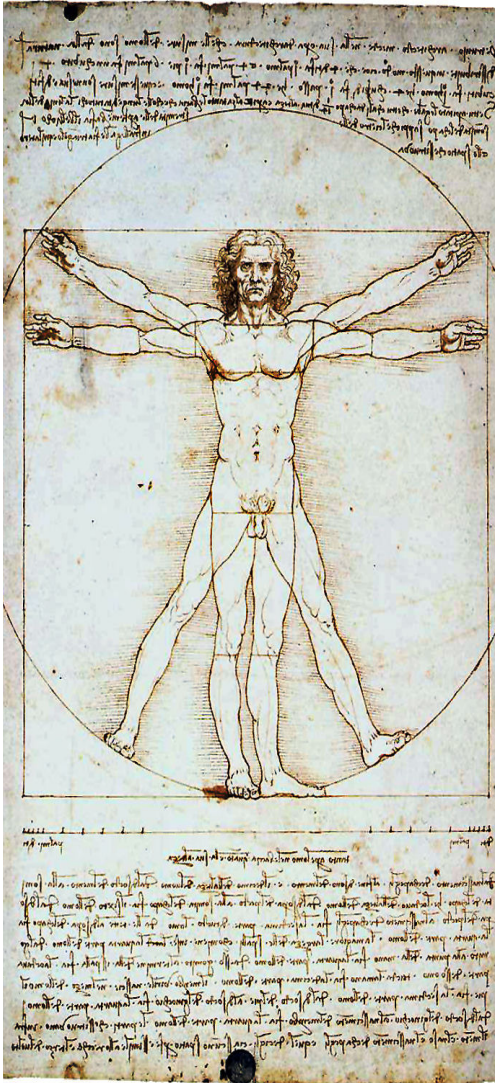
- Biliary disease #2 cause of surgery
 - ~ Most common in the elderly
- Cholelithiasis very common
 - ~ Complications increase with age
 - Perforation
 - Gangrene
 - Cholecystitis
 - Ascending cholangitis
 - Gallstone ileus
 - Choledocolithiasis
 - Gallstone pancreatitis
- Don't forget in peds!
 - ~ Incidence rising in children

Biliary Tract Disease



- Presentation:
 - RUQ/Epigastric pain only reliable sign!
 - Other common signs may be absent
 - 60% no nausea/vomiting
 - 70% elderly lack fever
 - Even with gangrene/frank perforation!
 - 40% lack leukocytosis
 - 45% normal LFTs
- Ultrasound critical
 - Elderly - Higher incidence acalculous cholecystitis
 - If negative, consider HIDA

Biliary Tract Disease

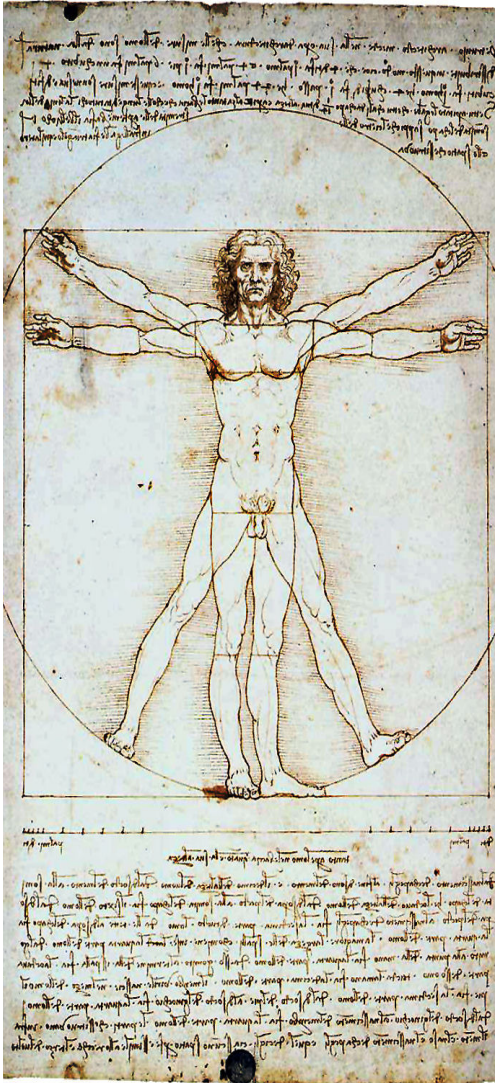


Ultrasound

HIDA Scan

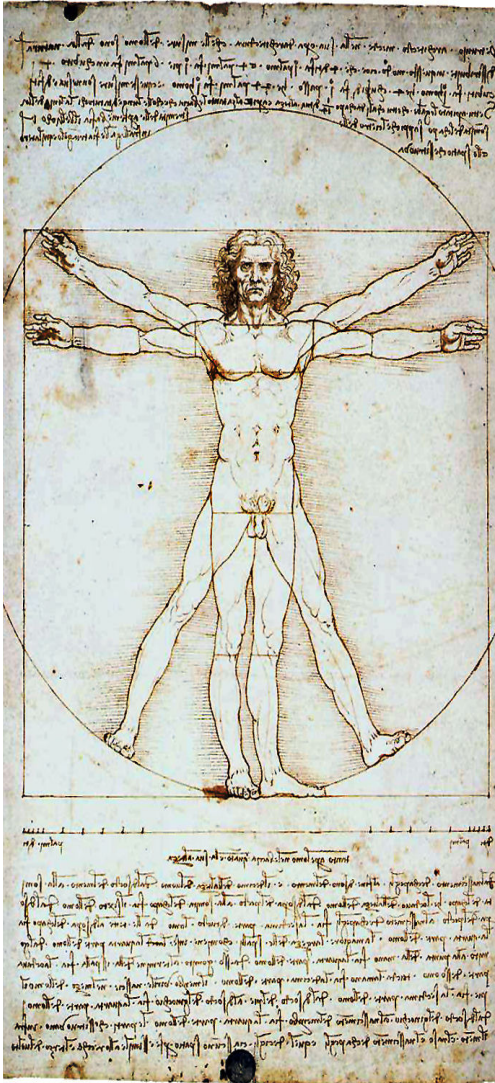


Biliary Tract Disease



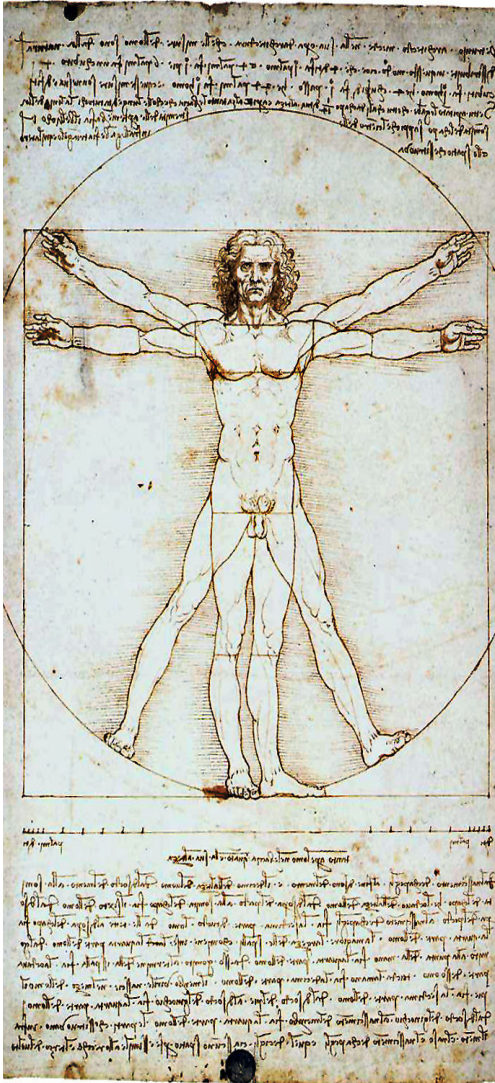
- ED Management
 - Symptomatic cholelithiasis >65 yo is indication for surgical consult
 - Even if no cholecystitis
 - 17% mortality in non-op mgt
 - If younger - outpt mgt if no other dz
 - Cholecystitis/Cholangitis
 - Start broad spectrum antibiotics
 - Gram negative and anaerobes
 - Order coags
 - DIC commonly occurs in elderly patients with choledocolithiasis and ascending cholangitis

Pancreatitis



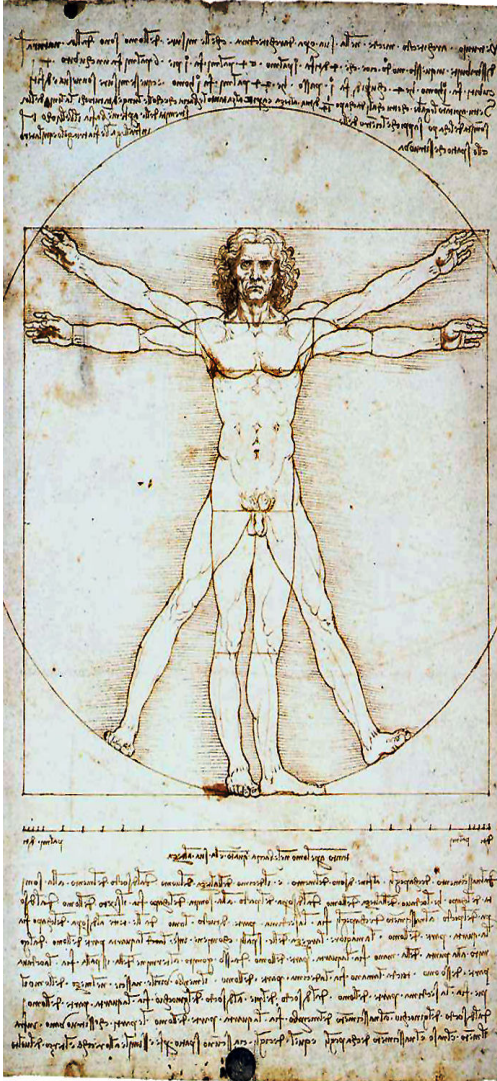
- Most common non-surgical abdominal condition in adults
 - Increases 200-fold >65 yo
 - Mortality increased ~ 40% >70 yo
- Gallstones primary etiology
 - EtOH more common in younger pts

Pancreatitis

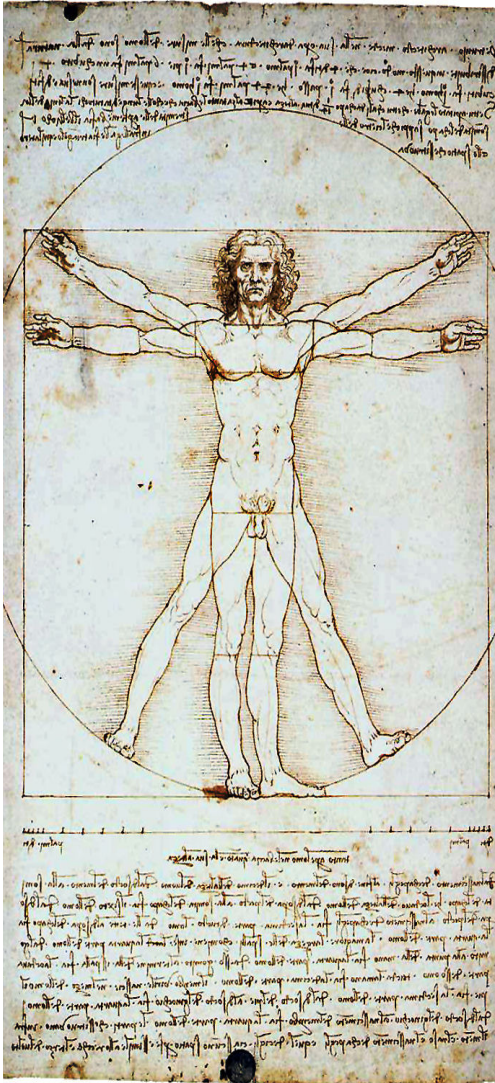


- Pain most common sign
 - Associated nausea/vomiting/dehydration
- SIRS criteria often present!
 - 10% present with shock
 - Hypotension / AMS
- If severe assoc sx ~ consider CT
 - Lipase moderately sensitive, very specific

Pancreatitis - CT

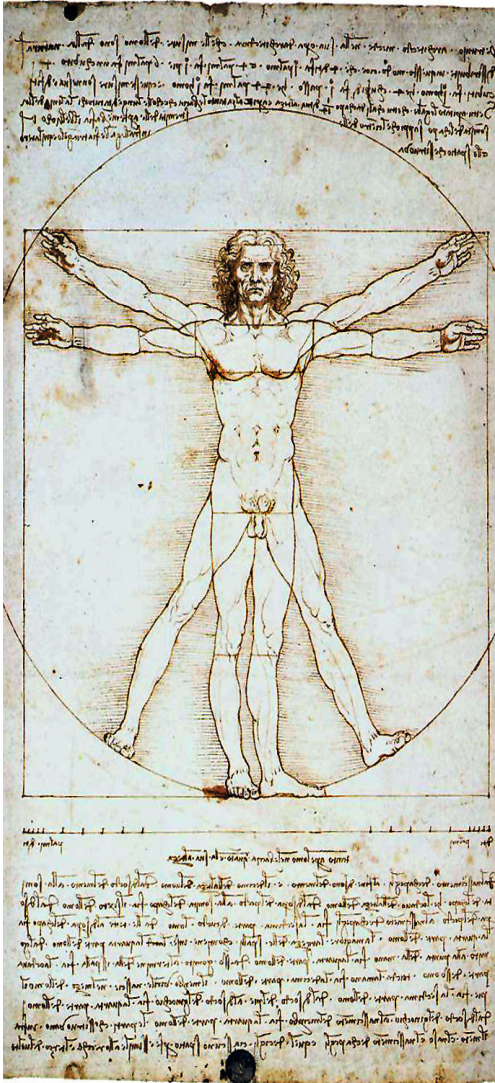


Pancreatitis – ED Mgt



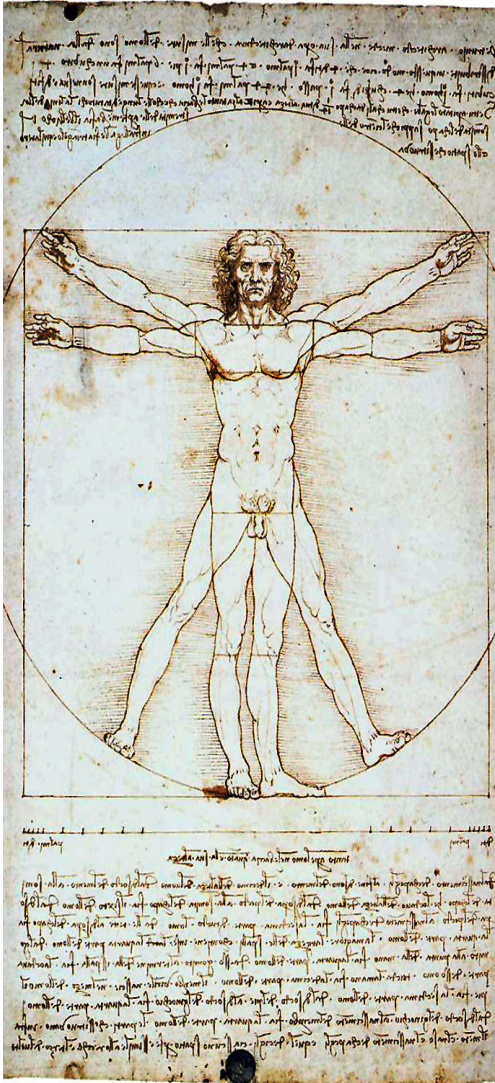
- Aggressive fluid resuscitation
- Electrolyte replacement
- Pain control
- Nasogastric decompression?
- Aggressively seek complications
 - ARDS
 - Hemorrhagic pancreatitis
- Mild cases – consider outpt mgt
 - Admit if elderly or peds

Peptic Ulcer Disease



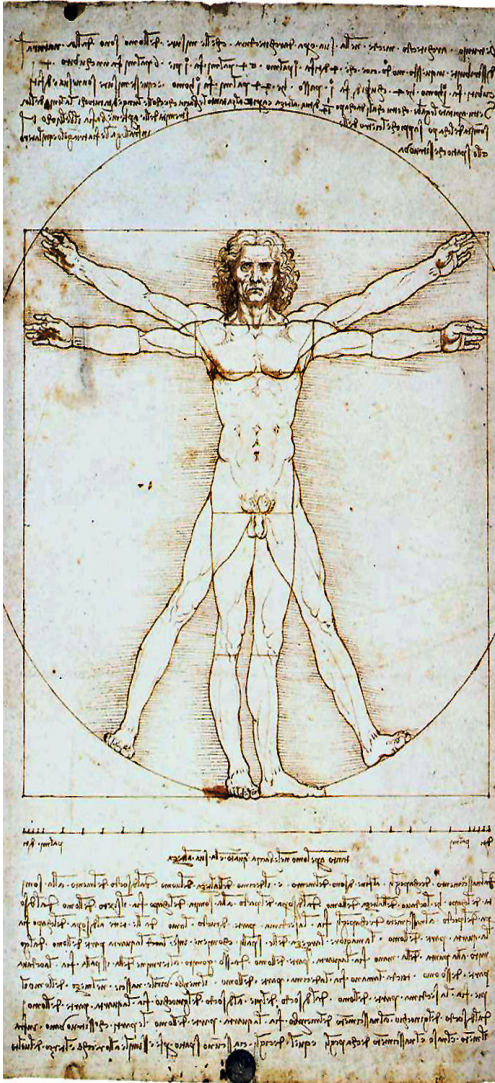
- 92% adults with epigastric pain
 - 35% > 60 yo painless!
- 50% elderly present perforated
 - Many will report no h/o PUD
 - Pain usually abrupt onset
 - Mortality 30% >65
 - Increases 8-fold if dx delayed >24 hrs

Peptic Ulcer Disease



- Bleeding from PUD
 - Do the rectal
 - More common in elderly
 - 20% report no h/o PUD
 - Clinical signs not reliable
 - Tachycardia most common
 - Often normal in elderly

Peptic Ulcer Disease



- If perforated PUD suspected:
 - AAS - free air
 - Misses 40% of perforations!
 - CT much more sensitive
- Once dx made (clinically)
 - Adults - PPI, diet modification
 - >70 yo responds poorly to conservative tx
 - Surgical consult in this group!!

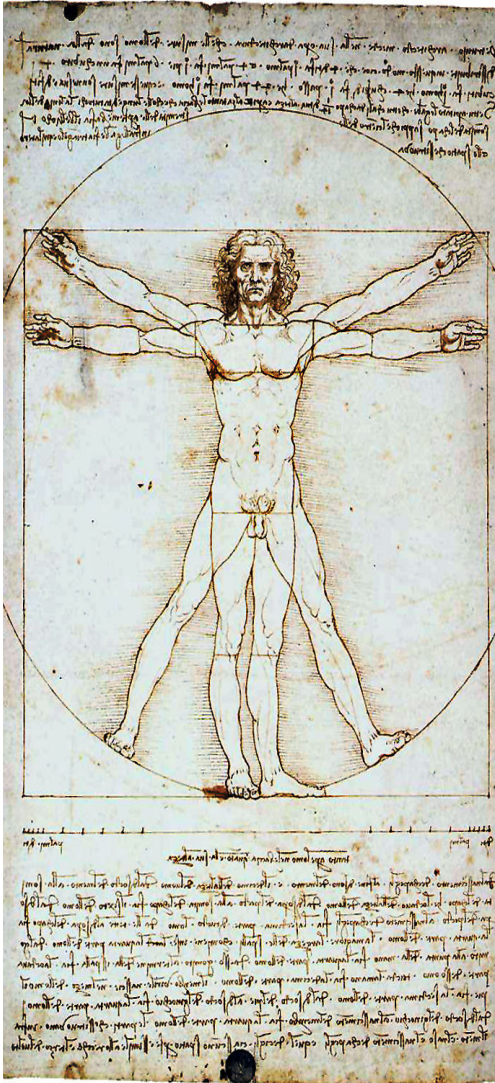
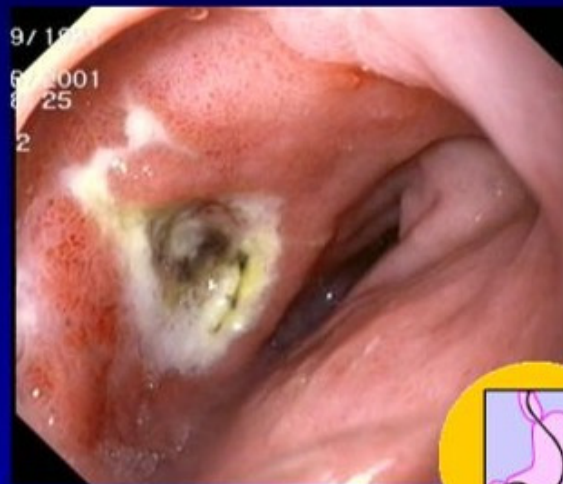
Crofts, TJ. A randomized trial of nonoperative treatment for perforated peptic ulcer. N Engl J Med 1989.

Peptic Ulcer Disease

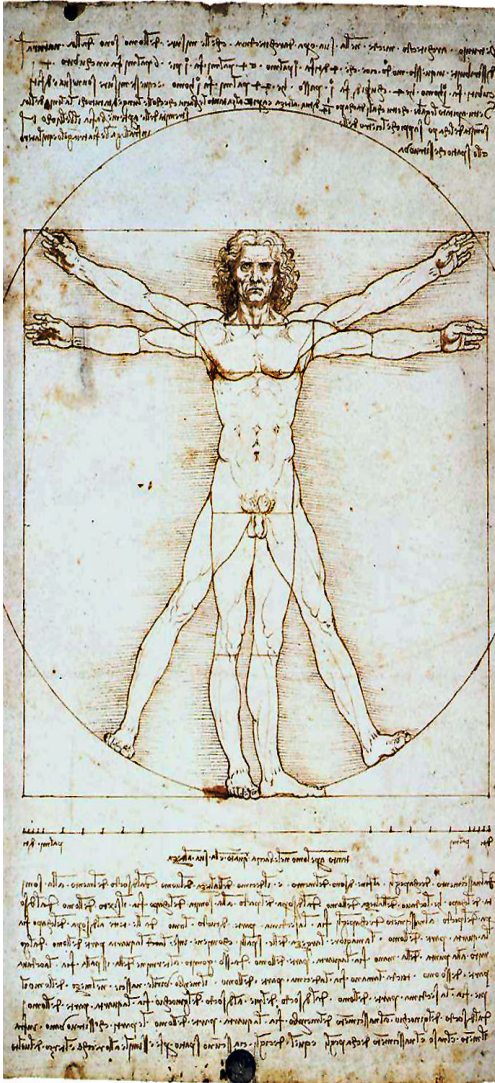
ENDOSCOPY

Duodenal Ulcer (DU)

Gastric Ulcer (GU)

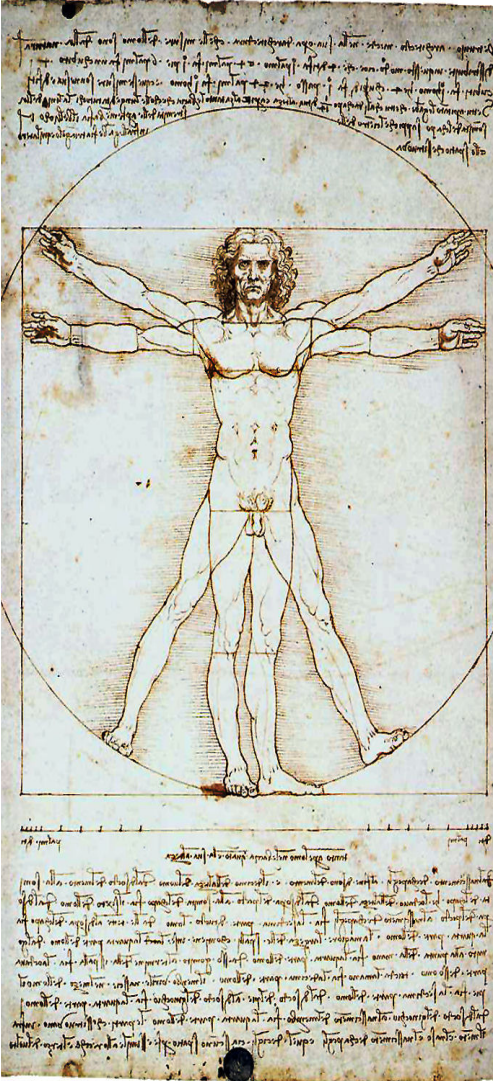


Diverticular Disease



- Incidence of diverticuli
 - Uncommon in young adults
 - 50% > 70 yo
 - 80% > 80 yo
- Diverticulosis
 - Most common cause of LGLB in at risk ages
 - 15% significant enough to require hospitalization
 - Usually resolves spontaneously
 - Up to 25% → shock or transfusion

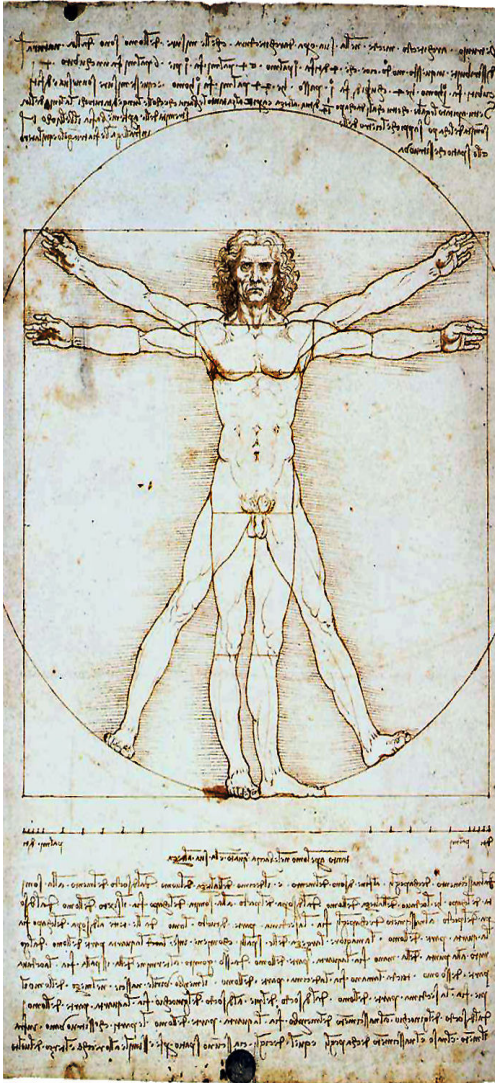
Diverticulitis



- Incidence compared to bleeding increases with age
- LLQ pain most common
- ~~Classic findings:~~
 - Nausea
 - Distention
 - Fever
 - Leukocytosis

Less than 50%!
- Pyuria/Hematuria common
 - Often misdx as UTI/Nephrolithiasis

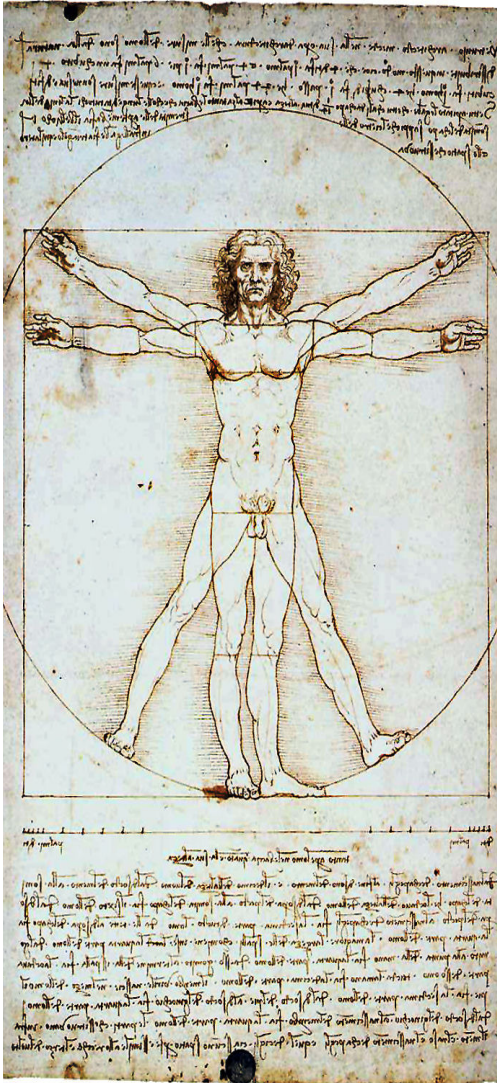
Diverticulitis ~ ED management



- Despite common practice, CT is often recommended
- Can easily be diagnosed clinically, but CT still recommended in elderly
 - High incidence of free perforation
 - Rapidly progress to gram negative sepsis

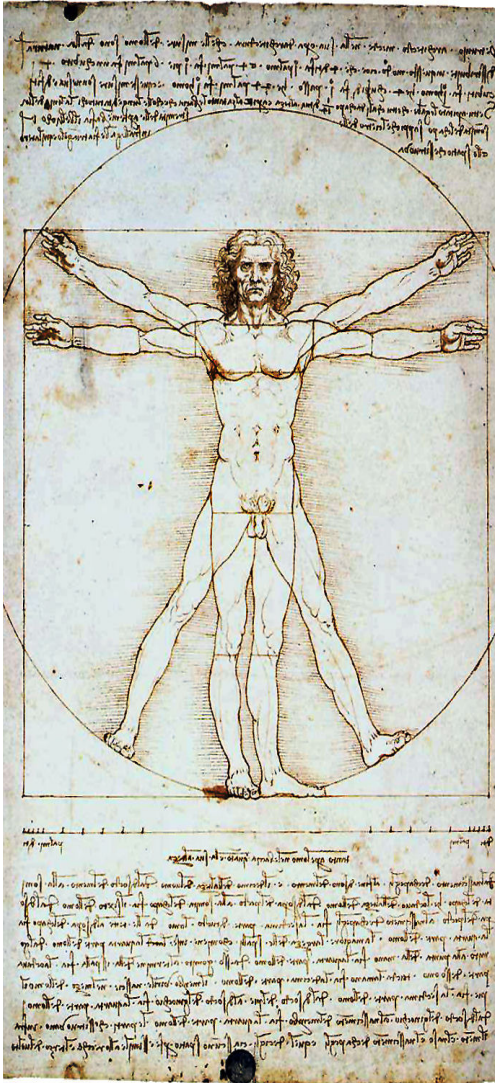


Diverticulitis ~ ED management



- If stable with good followup
 - Outpt mgt
 - PO Abs (Cipro/Flagyl)
- Abnormal vitals/Elderly/Poor Followup
 - Admit with IV Abx

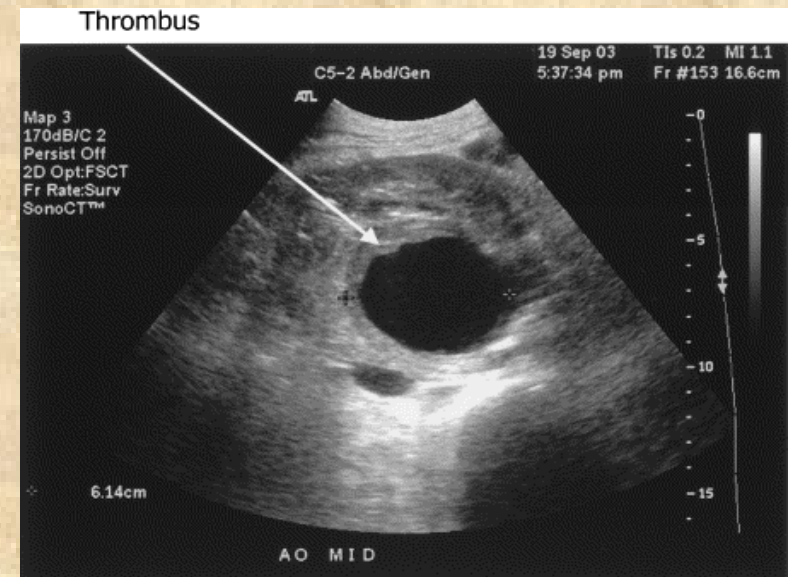
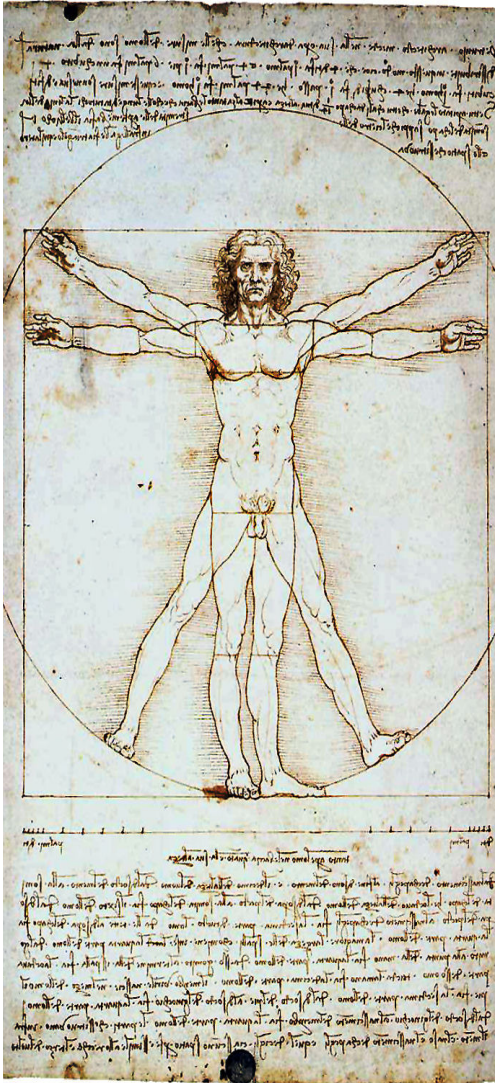
Ruptured AAA



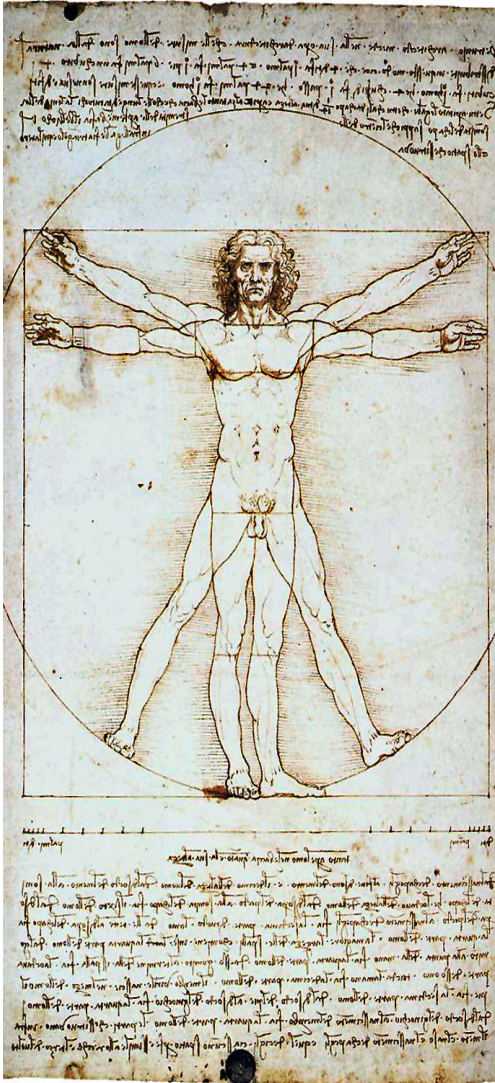
- Catastrophic
 - 70% mortality in ED patients
 - 31% misdiagnosed initially
 - Renal colic most common (hematuria)
 - 91% present with abd pain/back pain
- “Classic” presentation
 - Hypotension
 - Abdominal Pain
 - Pulsatile abdominal mass
 - Only present 35% of time!
 - If present, do not send for CT

Ruptured AAA

- Bedside Ultrasound critical
- 100% sensitive if aorta properly imaged
 - Only accurate for presence of AAA, not rupture
 - Free fluid = too late
 - Intraperitoneal rupture near 100% mortality

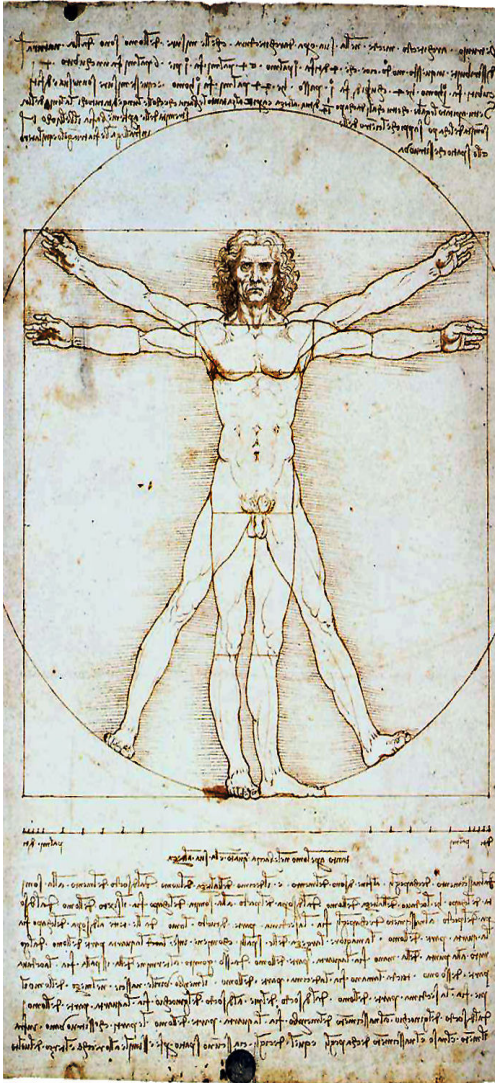


Ruptured AAA - ED mgt



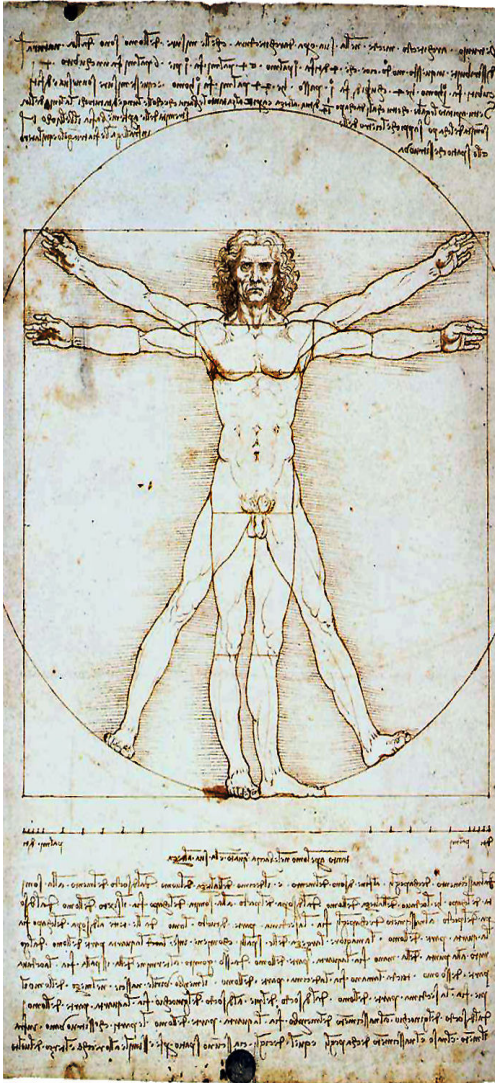
- If classic sx present
 - Emergent vascular consult/transport to OR
 - Multiple large bore IVs
 - Hold volume resuscitation if stable (why?)
 - T&C 6-10 units
- If dx uncertain, stable patient
 - CT
 - With contrast preferred
 - Without contrast acceptable
 - Manage as above depending on result

Mesenteric Ischemia



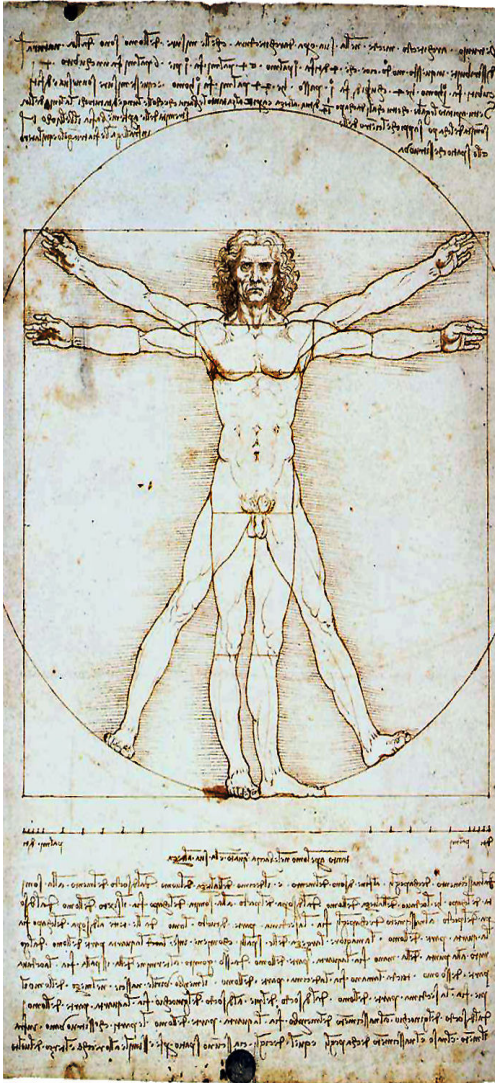
- Difficult to dx
- 4 etiologies:
 - SMA embolus (most common)
 - SMA thrombosis
 - Mesenteric venous thrombosis
 - Non-occlusive mesenteric ischemia (NOMI)

Mesenteric Ischemia



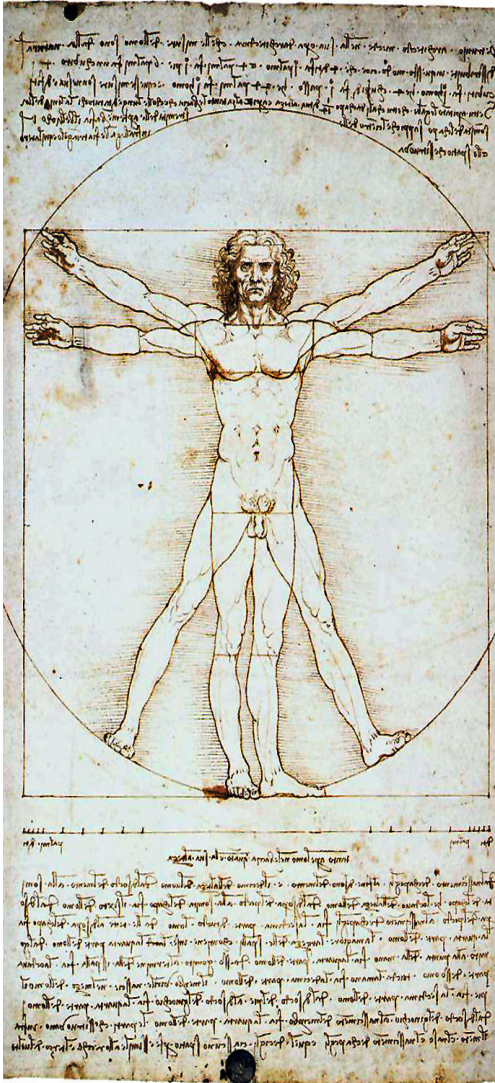
- Classically - severe abd pain out of proportion to exam
 - Vomiting / diarrhea common
- Embolic risk factors common
 - A. Fib most common
 - Still present <50%
 - Valvular disease
 - Ventricular aneurysm
 - Post-infarction ventricular thrombi

Mesenteric Ischemia



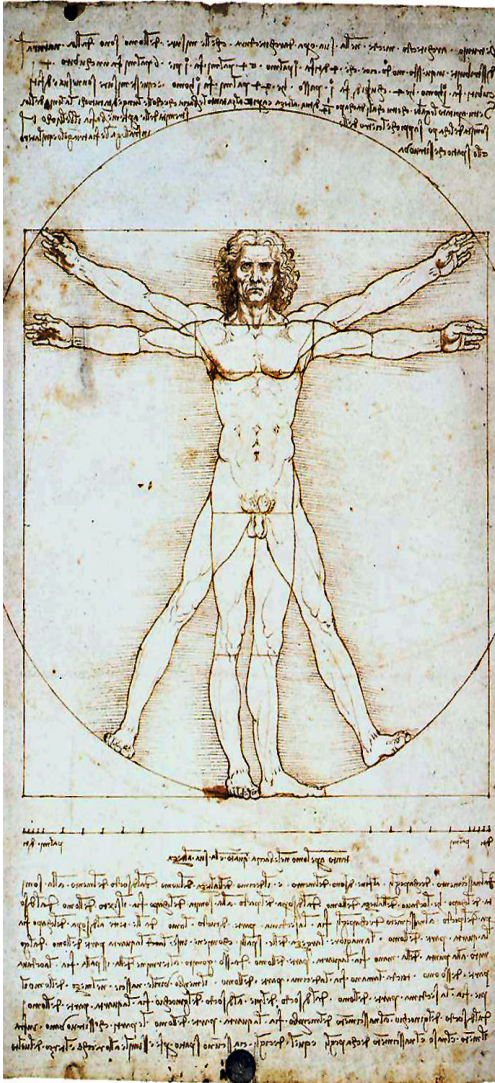
- SMA embolus
 - Acute pain
 - Acute GI emptying
 - Underlying cardiac disease
- SMA Thrombus
 - Preceding intestinal angina
 - Acute event similar to above (plaque rupture)

Mesenteric Ischemia



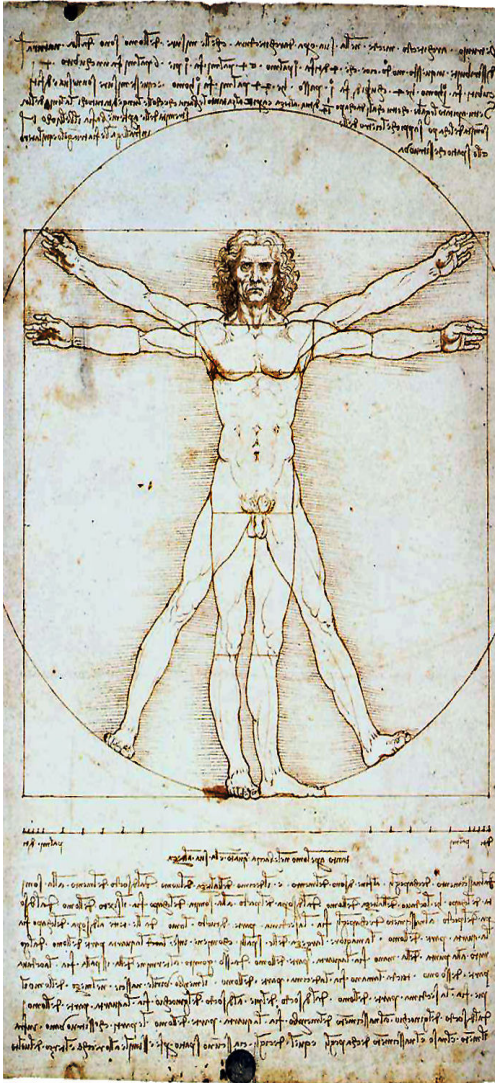
- Mesenteric Venous Thrombosis
 - H/O prior thrombosis/ coagulopathy
 - Progressive pain vice acute
- NOMI
 - Sustained decrease in cardiac output
 - CHF
 - MI
 - Cardiomyopathy
 - Valvular insufficiency
 - Sepsis
 - Medications
 - Treat underlying cause
 - Least common, but highest mortality!

Mesenteric Ischemia - Dx



- Lab values not specific, but...
 - Lactate
 - WBC
 - Metabolic acidosis
- Must have low threshold to image
 - Physical exam findings very non-specific
 - CT Angio preferred test

Mesenteric Ischemia - Dx



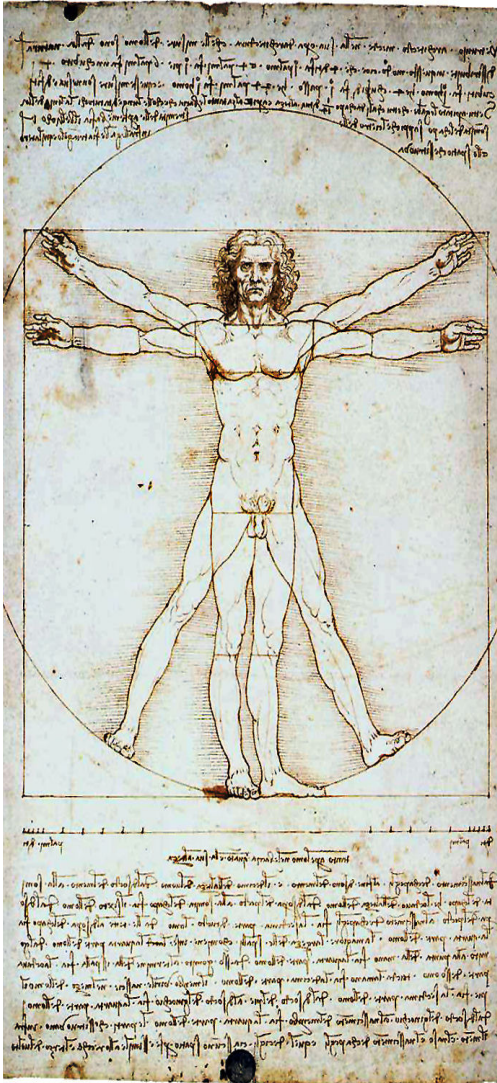
SMA Thrombus



Pneumatosis Intestinalis

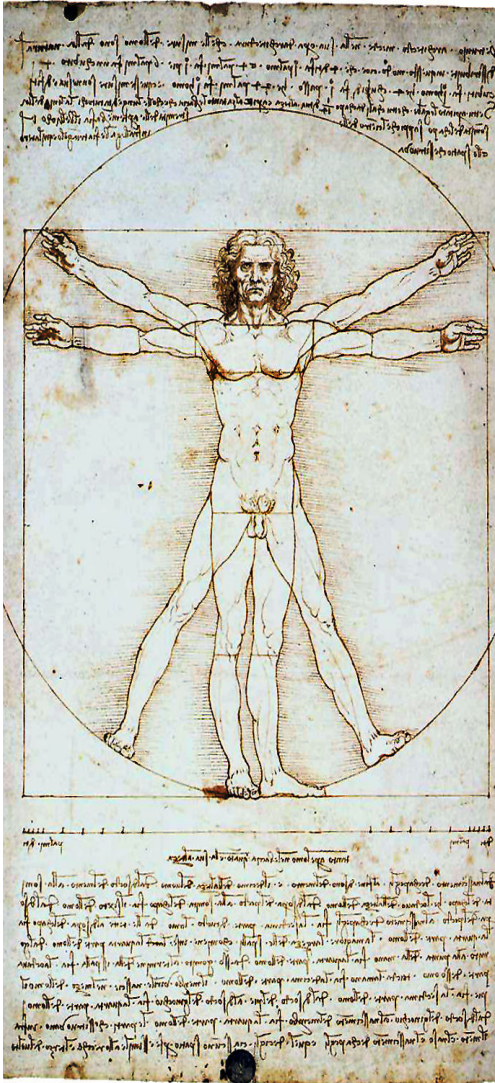


Mesenteric Ischemia - ED mgt



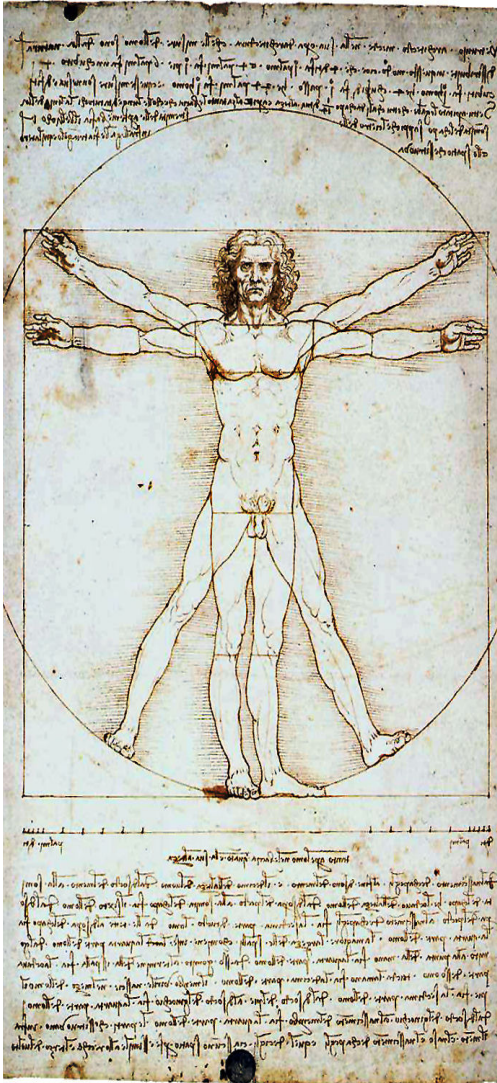
- Emergent surgical consult
- Correct underlying causes
- Fluid resusc
- Nasogastric decompression
- Broad spectrum IV Abx

Genitourinary Disease



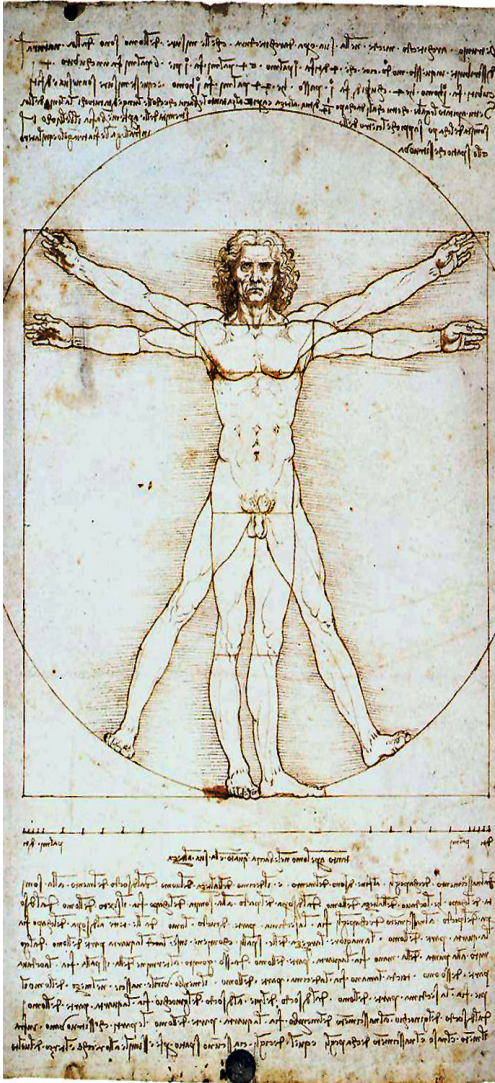
- UTI
 - Women >> men, but
 - 20% of men over 70!!
 - Obstruction secondary to BPH
- Pyelonephritis
- Ureterolithiasis/Nephrolithiasis
 - 15% of UA's neg for blood!
- Prostatitis (remember the rectal!)

Genitourinary Disease



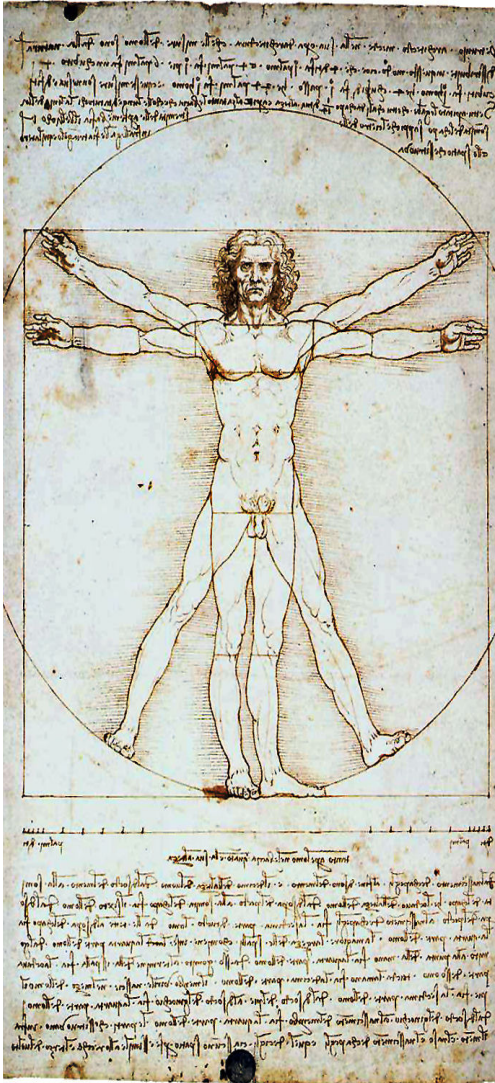
- Bladder rupture
 - Non-traumatic – can occur with obstructive uropathy
- Ovarian cancer – most common cancer in women >60
 - Commonly presents with mass, ascites, back/pelvic pain

Females



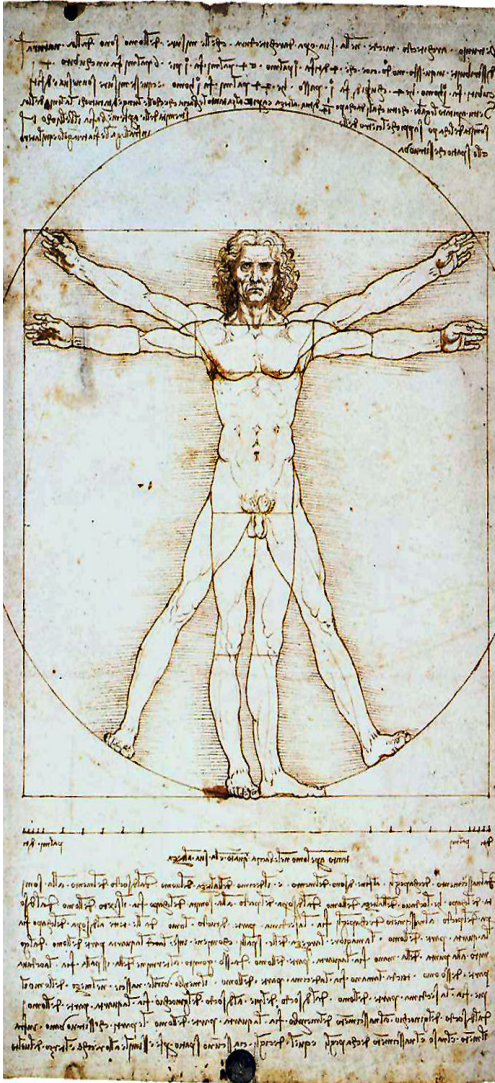
- If between puberty and menarche, check HCG!!!
- Unless diagnosis clear cut, pelvic mandatory
 - Elderly/Peds caveat

Considerations



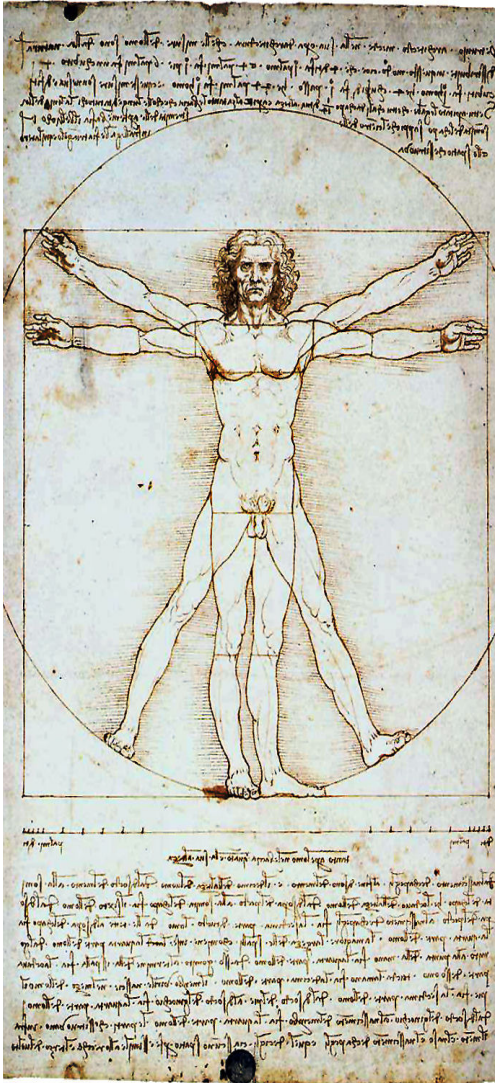
- Ectopic Pregnancy
 - Must rule out in any pregnant female with abd pain/bleeding
 - More later!
- Ovarian Torsion
- STD/Pelvic Inflammatory Disease
- Fibroids

Ovarian Torsion



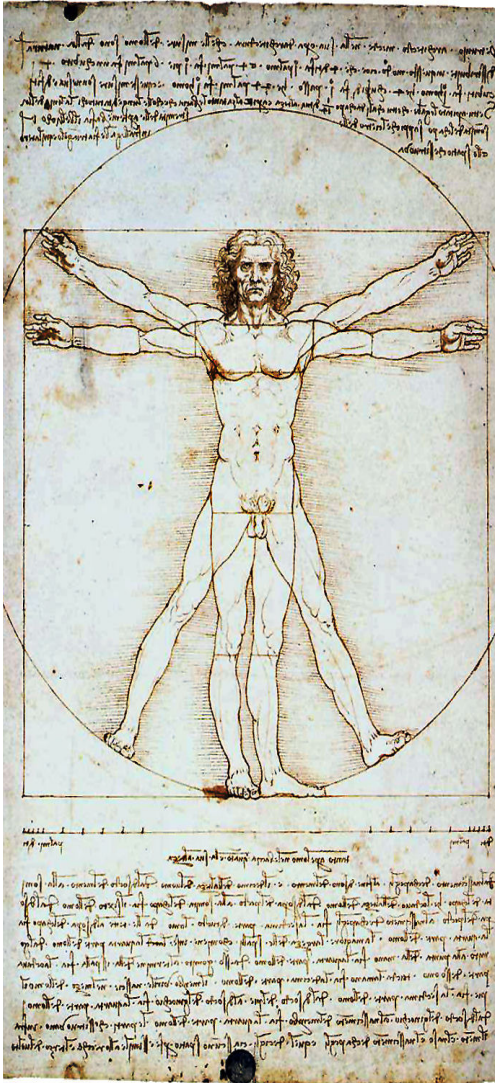
- Adolescent/young adult most common
 - Likely secondary to cyst or infection
 - Occurs in infants and toddlers too
 - Cystic teratoma
- Pain
 - Usually unilateral
 - May radiate
 - Often associated sx (n/v/fever/urinary sx)
 - Adult/older child pelvic exam
 - Younger child need ultrasound

Torsion Management



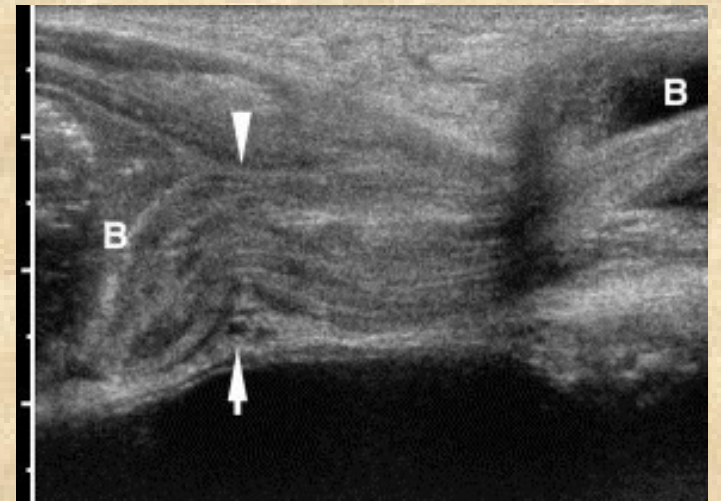
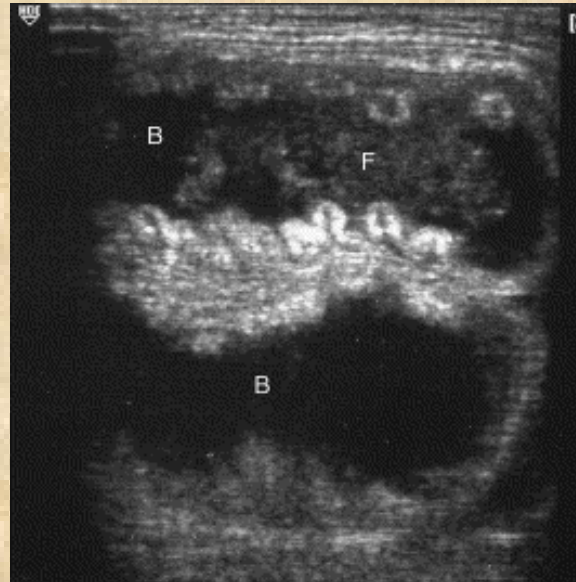
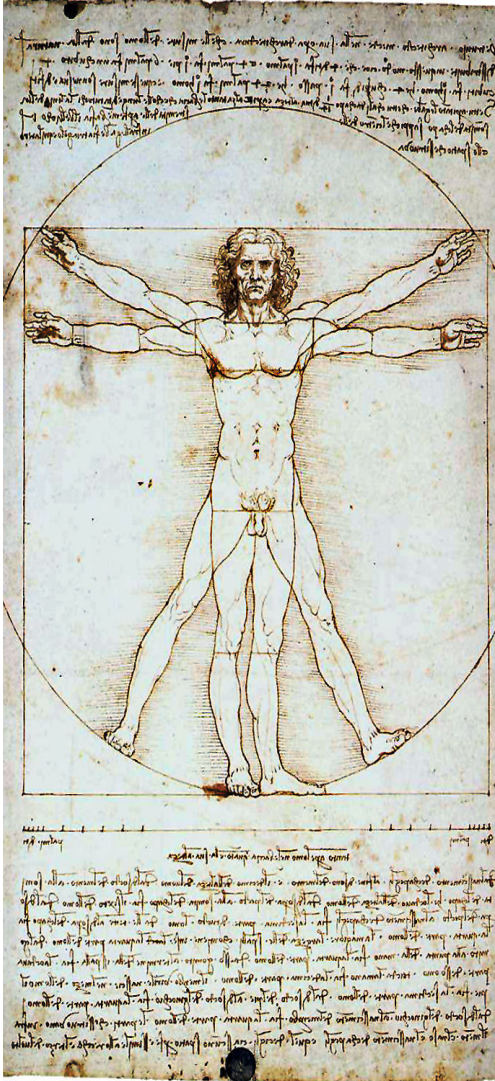
- Pain control
- IV Fluids
- Emergent Gyn Consult
- Time critical!

Male GU problems

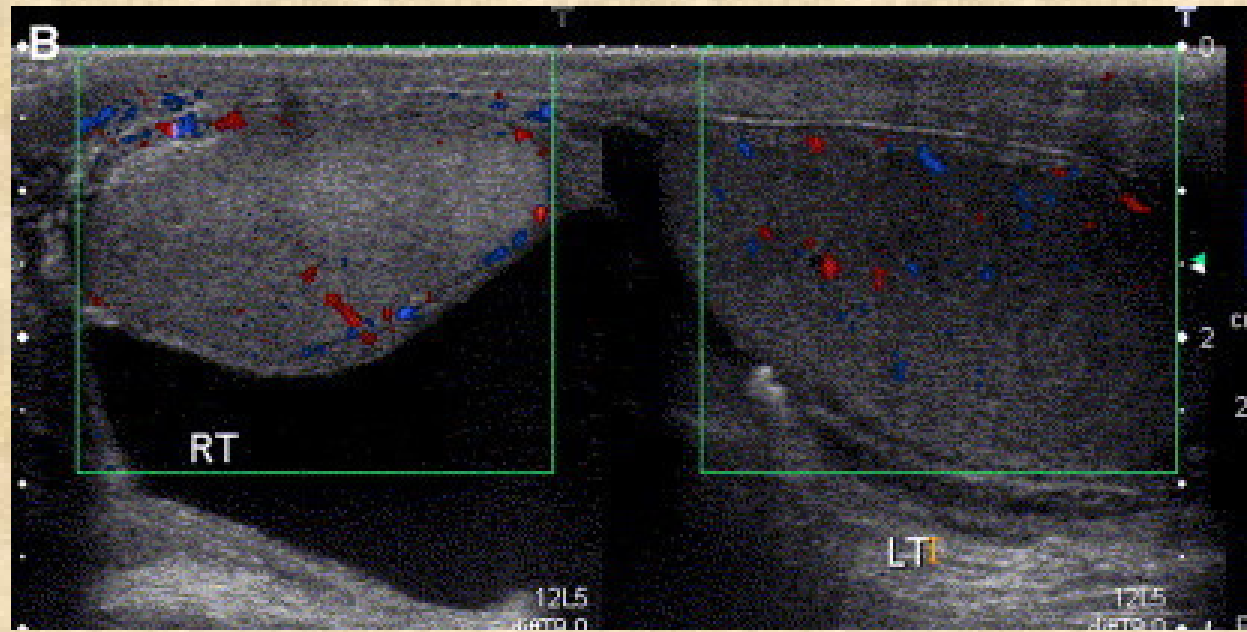
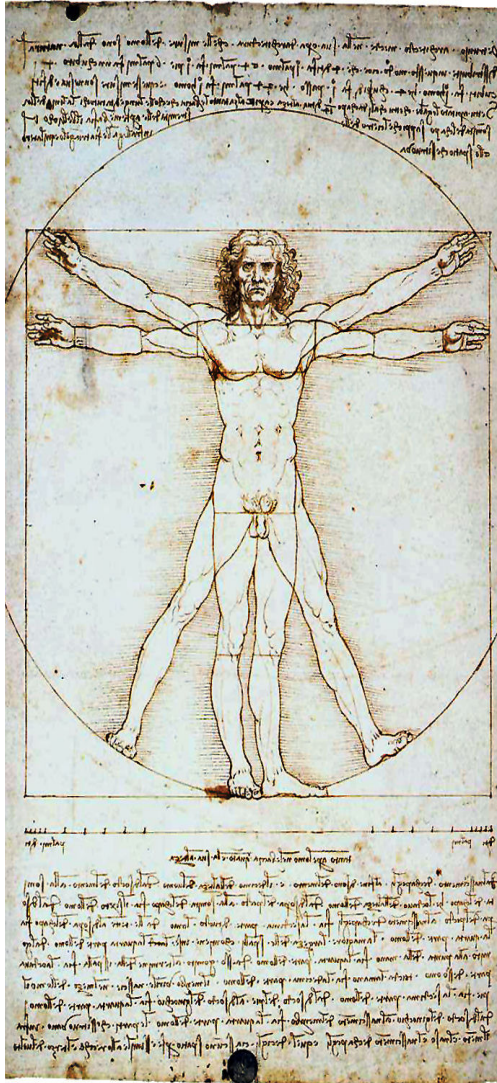


- Scrotal exam nearly mandatory
 - Hernia
 - Torsion
 - Varicocele/Hydrocele
- Hernia –
 - If reducible, outpt mgt
 - If not reducible
 - Trendelenberg/Sedation
 - Surgical consult

Consider scrotal ultrasound

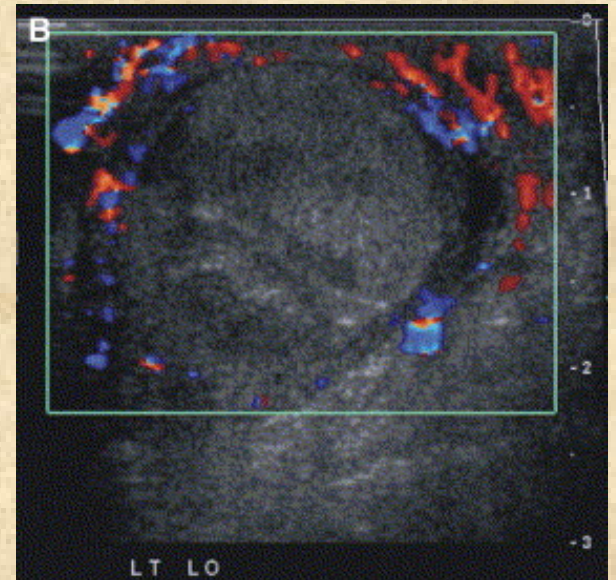
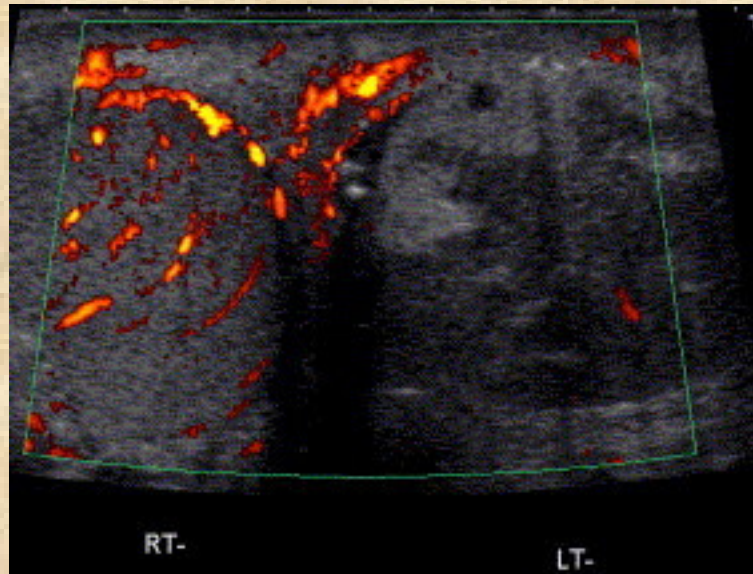
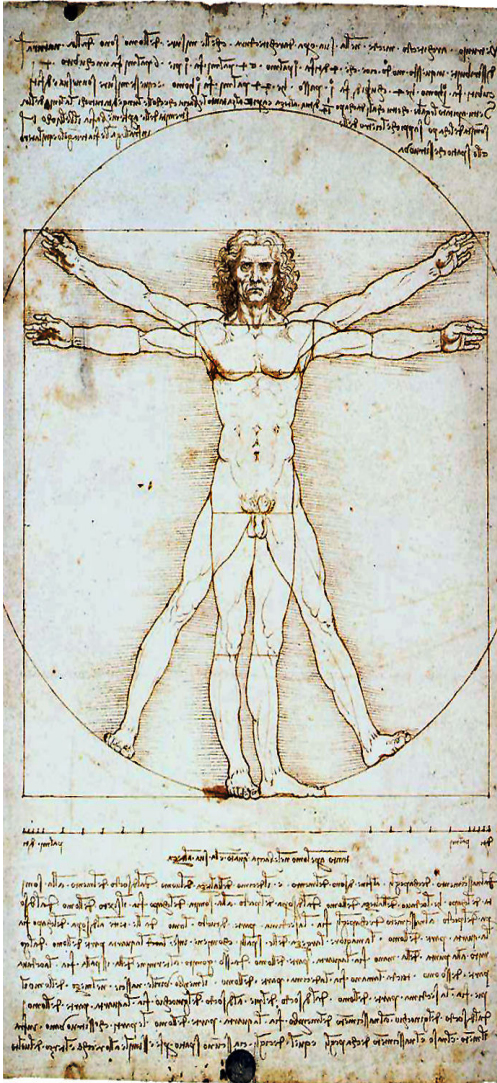


Hernia vs Hydrocele

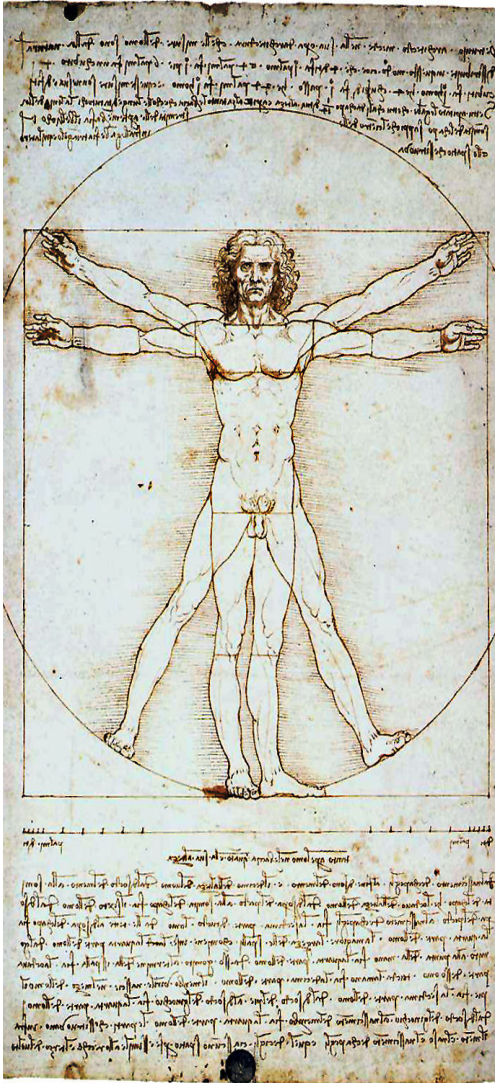


Torsion

- Sudden severe pain
- May present as abdominal pain
 - Children / Delayed Adults

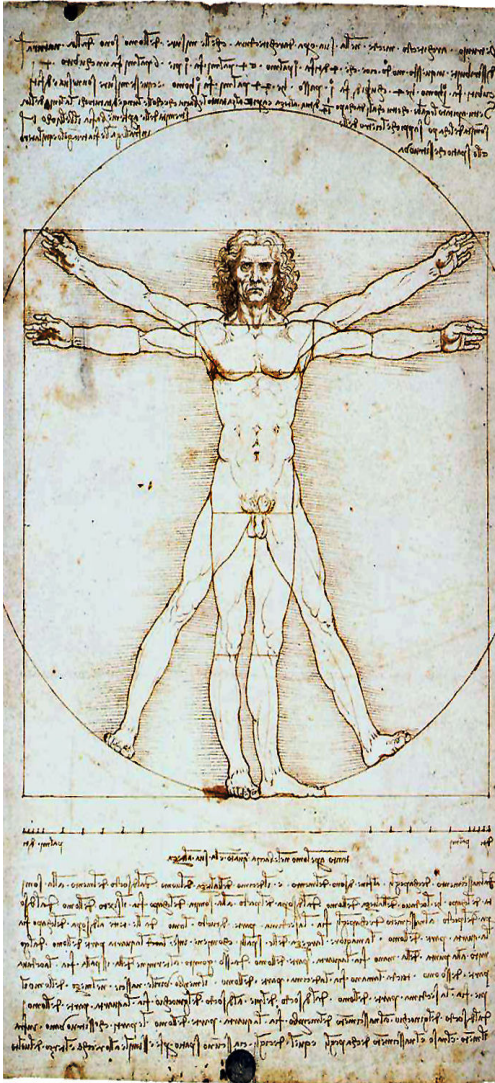


Extra-abdominal causes



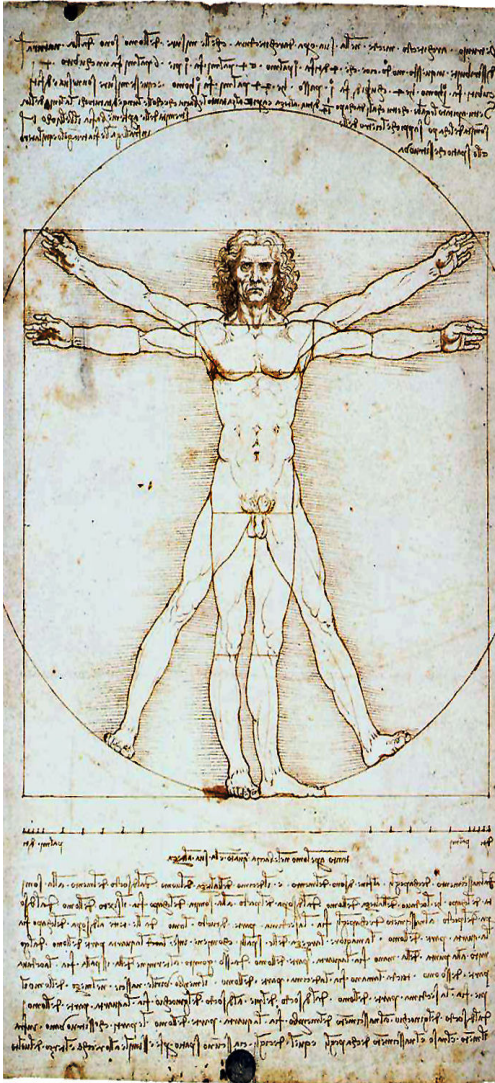
- Acute MI
 - 1/3 women >65 – abd pain presenting symptom
- Other cardiac etiologies
 - CHF, pericarditis, endocarditis
- Pulmonary etiologies
 - Pneumonia
 - PE
 - Pulmonary Effusion
 - Pneumothorax

Extra-abdominal causes



- Endocrine
 - DKA - accucheck!!!
 - Hypercalcemia
 - Vague abd pain
 - Anorexia
 - Constipation
 - Adrenal crisis/Addisonian crisis
 - Especially if on steroids

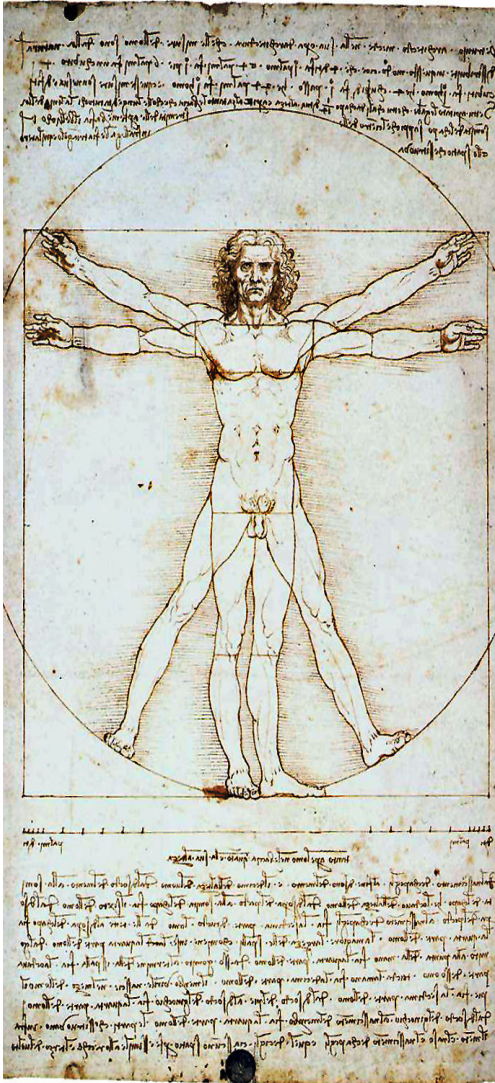
Black Widow Spider



- Latrotoxin, a neurotoxin
 - Stimulates massive Ach release at NMJ (no central)
- +/- h/o spider bite -usually outdoors (outhouse)
- Classically:
 - Local then regional pain
 - Whole body cramps
 - Abdomen worst
 - Mimics surgical abdomen
 - Fatigue, anxiety, insomnia
- Death rates 0.1 to 0.5% (old/young)
- Treatment mostly supportive
 - Pain control, muscle relaxants, IV Ca Gluc
 - Latrodectus antivenin for severe cases
 - Antivenin index (OK City, OK) 1-405-271-5454
 - Tetanus prophylaxis

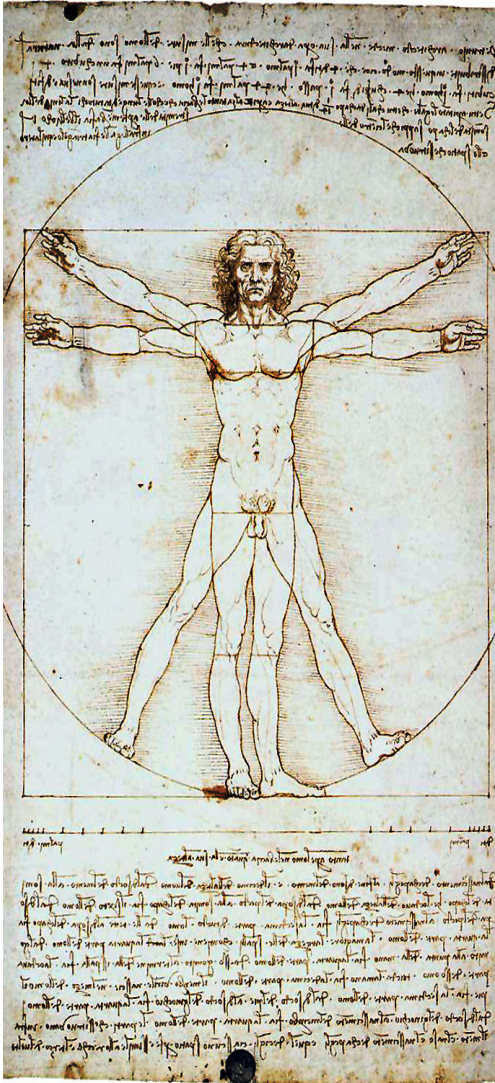


Peds Specific

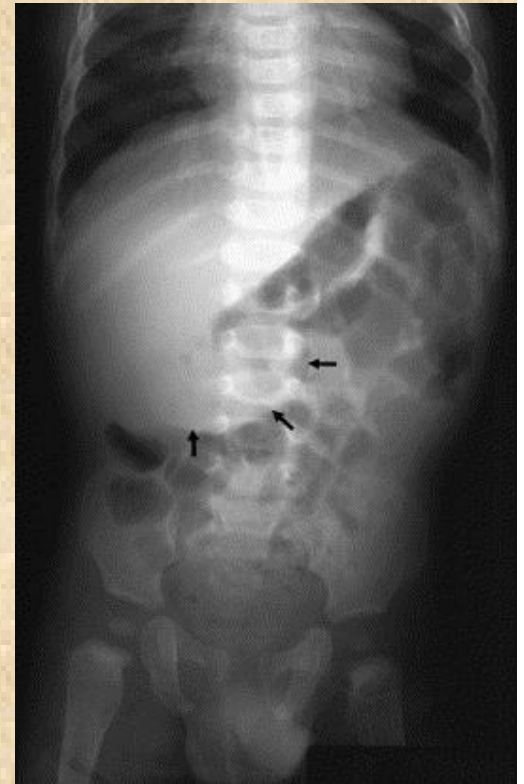


- May be present in all ages
- Generally only worry about in kids

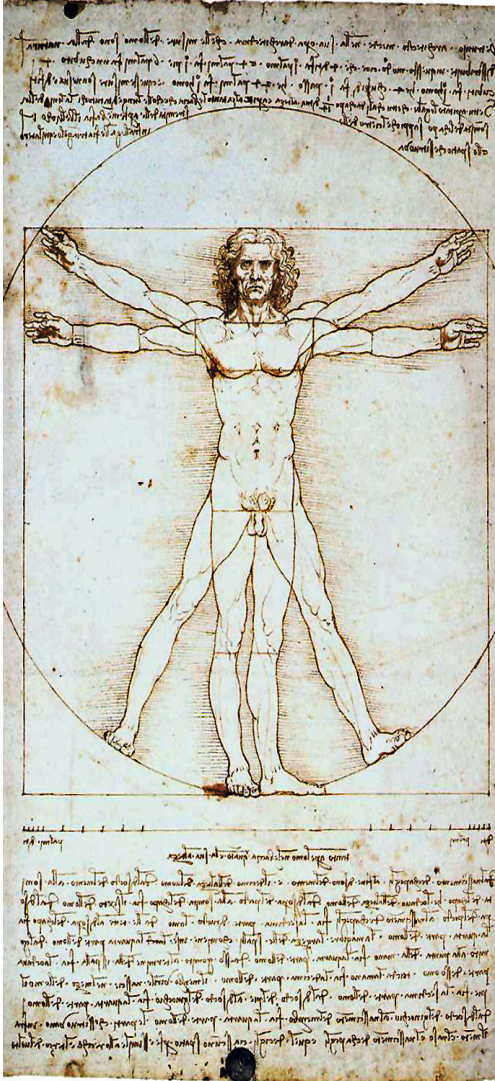
Intussusception



- Classic triad:
 - Colicky abdominal pain
 - Vomiting (usually non-bilious)
 - Bloody stools.
 - 75% hemoccult positive
- If peritoneal signs, plain film to r/o perf
 - “Target sign” (doughnut) rt of spine
 - Abdominal mass

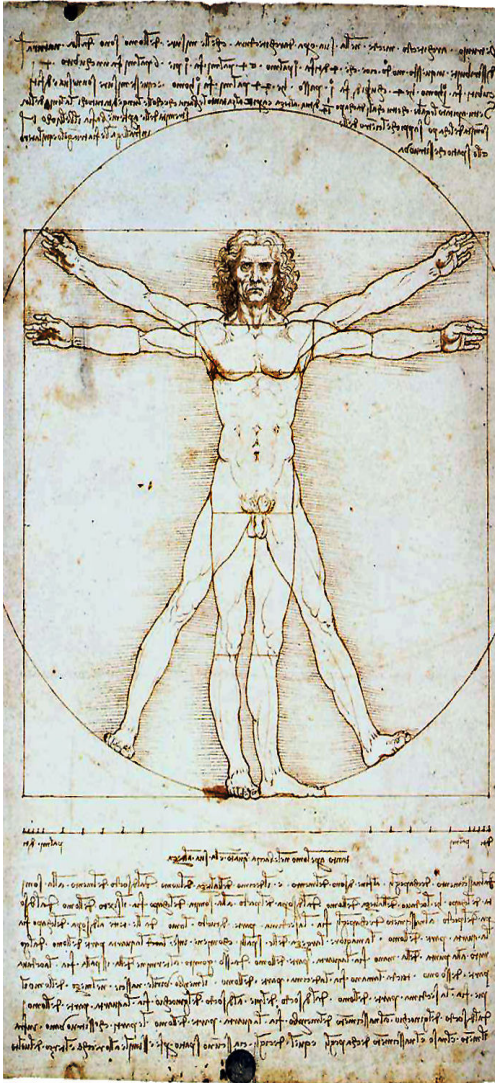


Intussusception



- Fluid/electrolyte resuscitation
- Pain Management
- Cornerstone: Air or Air/Contrast enema
 - Diagnostic and Therapeutic
 - Call surgeon first
 - Contraindications:
 - Perforation suspected
 - Sx greater than 24 hours
 - Obstruction
 - Intestinal ischemia

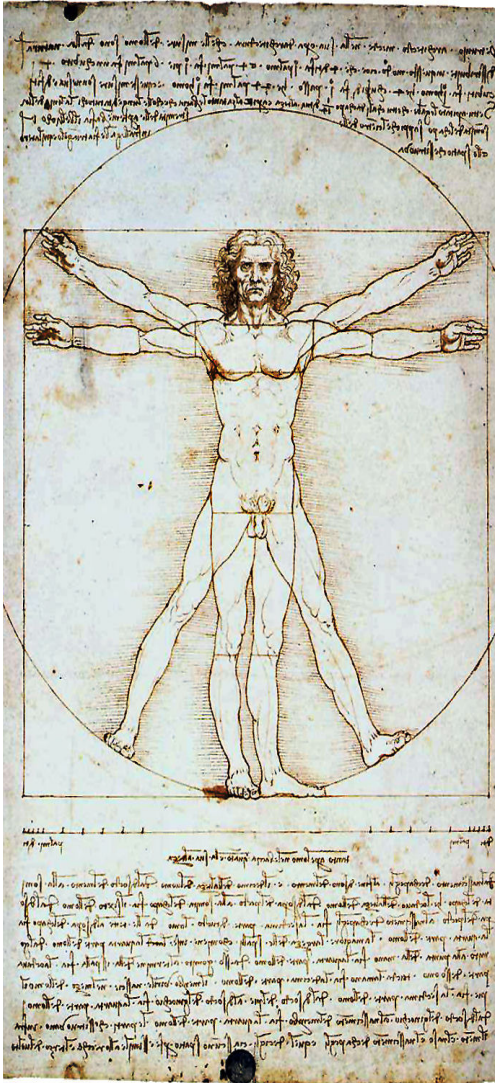
Henoch-Schönlein Purpura



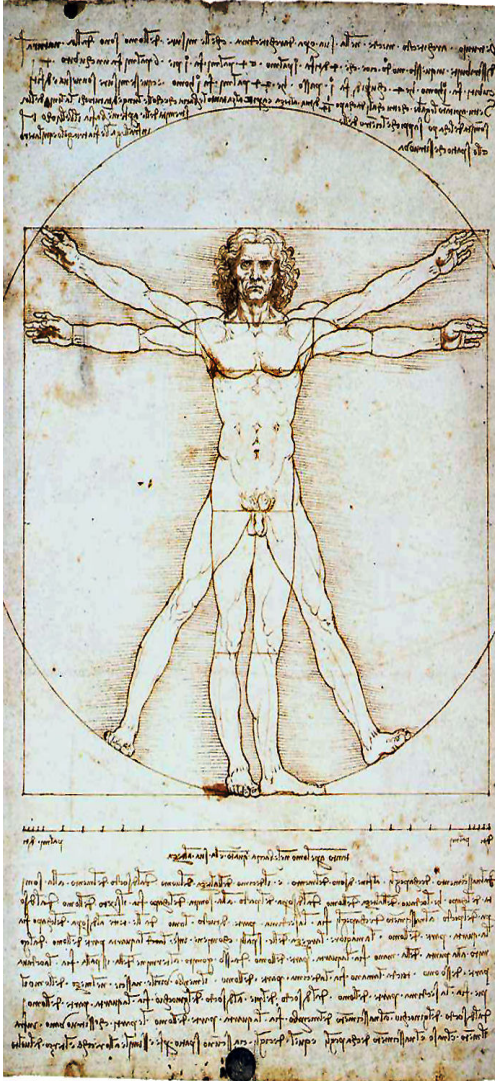
- Small vessel vasculitis – IgA/C3 deposition
 - Abdominal Pain
 - Purpura
 - Arthritis
 - Hematuria
- Most cases aged 2-11 (M>F)
- Cause unknown
 - 50% have preceding viral URI
 - Remainder meds, foods, insect bites

HSP

- Key History/Exam Findings
 - Palpable purpuric rash, especially on buttocks/legs (95-100%)
 - Abdominal Pain/vomiting with abdominal TTP
 - Subcutaneous/scrotal edema
 - Joint Pain
 - H/O Bloody Stools / heme +

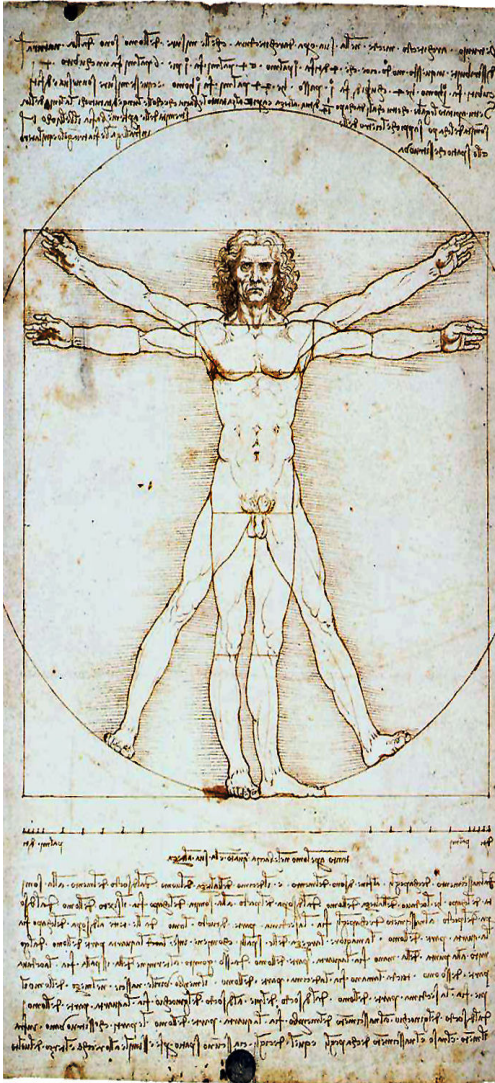


HSP



- Labs/Studies only to r/o other dx
- Treatment
 - Most recover spontaneously
 - Abd pain resolves within 72 hours
 - Self-limiting 1-2 weeks
 - If renal function OK NSAIDS
 - Steroids commonly prescribed
 - No RCT demonstrating efficacy
 - Consult if renal impairment

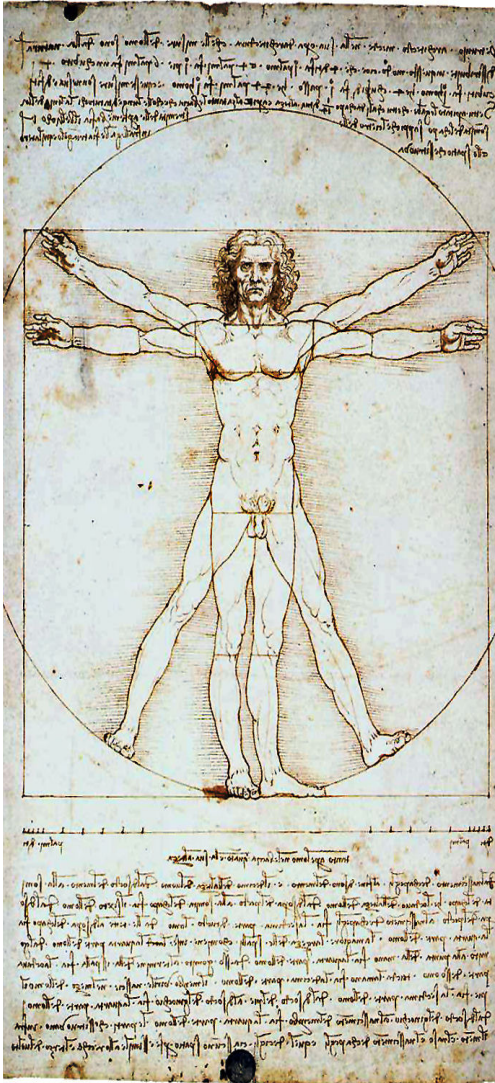
Neonate vomiting/pain



- Biliious emesis – Midgut Volvulus
 - Twisting of intestinal contents around base of abnormally long mesentery
 - Usually occurs 1st mo of life (M>F)
 - May present in adults!
 - Labs – electrolytes
 - AAS “Double Bubble”
 - Treatment:
 - Fluid Resusc
 - Abx
 - Proximal Decompression
 - Peds Surgery!

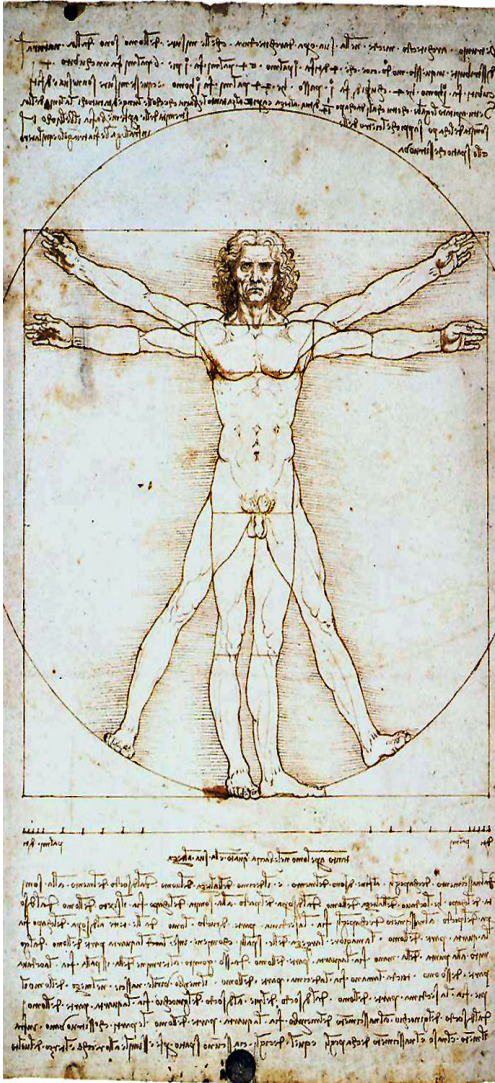


Neonate vomiting/pain



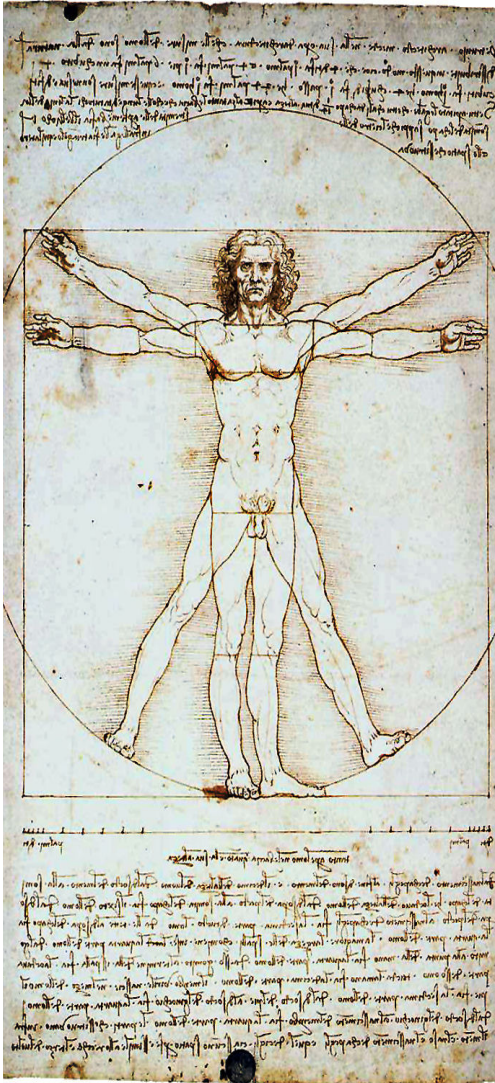
- Non-bilious emesis
 - Hypertrophic Pyloric Stenosis
 - Insidious onset
 - 3rd to 5th week of life
 - Occasional vomiting ~ non-bilious
 - Vomiting increases -projectile after every feed
 - Signs:
 - Poor wt gain or losing weight
 - Acts very hungry
 - Dehydration / constipation
 - Ultrasound
 - IV Fluids
 - Correct Electrolyte abnormalities
 - Non-emergent peds surgery consult

Hirschprung's Disease



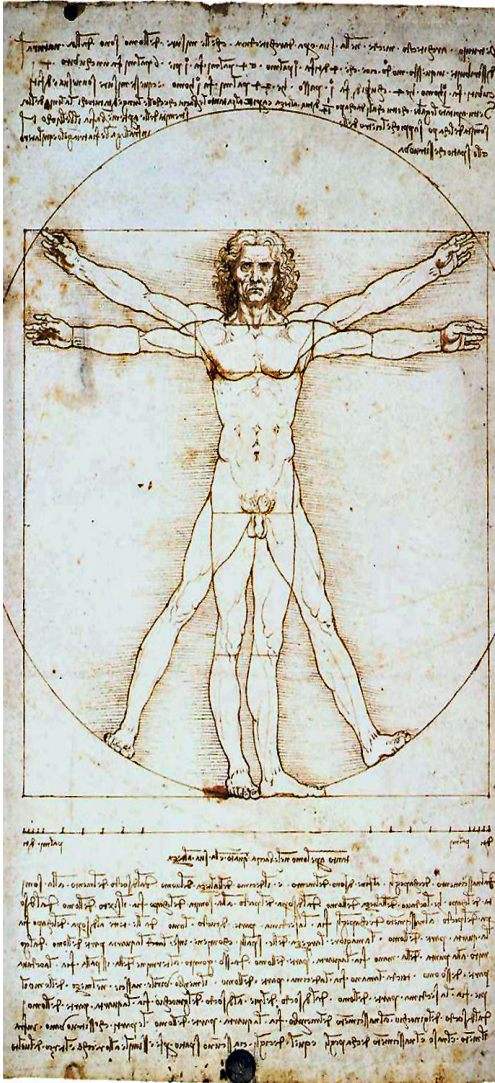
- Denervation of distal colon and rectum
 - Anus always involved – continuous
 - Incidence 1:5000 (M > F)
 - Unstimulated colon is *contracted*
 - Peristaltic waves are waves of *relaxation*
 - Contracted segment → pseudo-obstruction
 - Dilated proximal portion is normal segment
 - Resulted in many surgical catastrophies in first half of 1900's
- Should be considered:
 - Newborn with constipation
 - Any infant with history of constipation, especially if multiple failed treatments

Hirschprung's



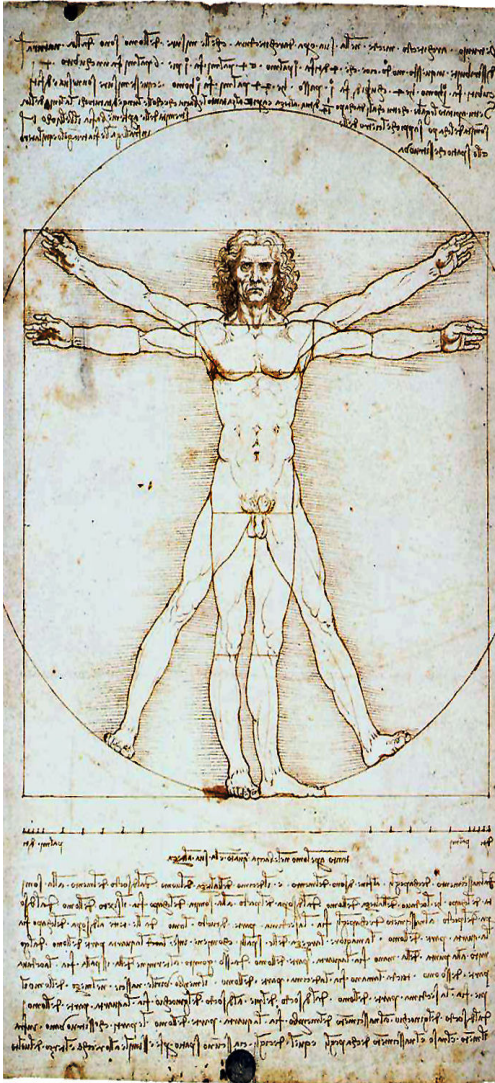
- Early findings:
 - Generally well appearing
 - Distended but soft abdomen
 - Rectal exam:
 - Increased pressure
 - Explosive stool/gas evacuation when finger removed
- Later findings:
 - Distended, tense abdomen
 - May be lethargic, febrile, tachycardic
 - Peritoneal signs with perforation

Hirschprung's

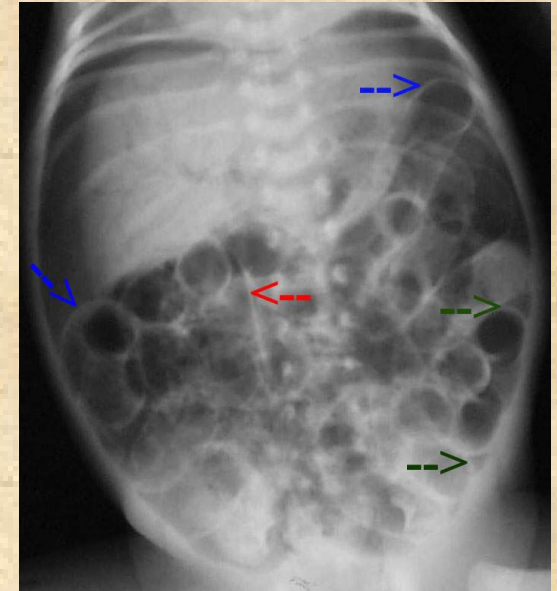


- Studies
 - AAS:
 - Multiple distended bowel loops
 - Ends above pelvic rim
 - Obstruction / Perforation
 - May be misleading post-rectal exam
- Management
 - Vigorous fluid resuscitation
 - Antibiotic therapy:
 - Amp, Gent, Clinda
 - Emergent Surgical Consultation
 - Definitive diagnosis after biopsy
 - Multiple segments biopsied (distal to proximal)
 - Surgical removal of diseased section

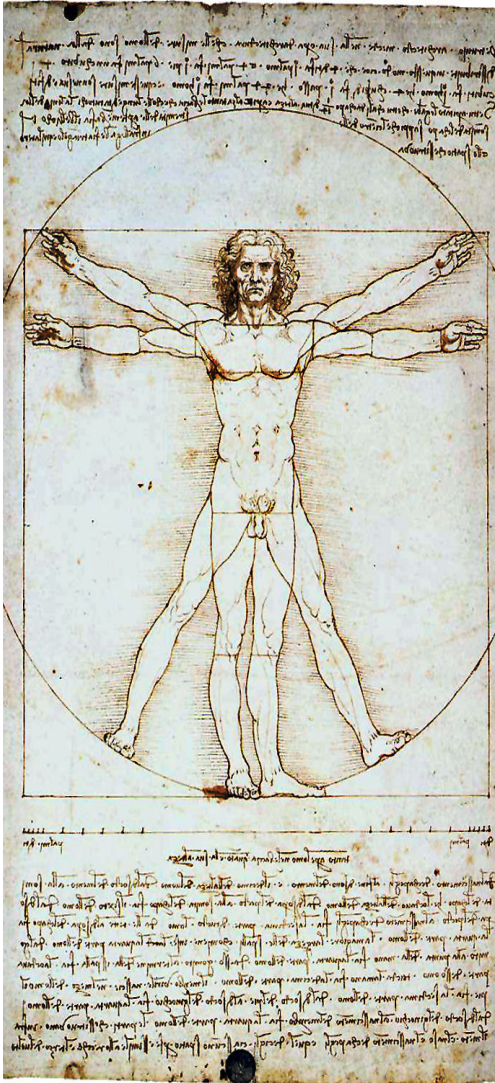
Necrotizing Enterocolitis



- Presentation
 - Ill appearing
 - Lethargic, irritable
 - Decreased PO
 - Distended belly
 - Bloody stools
- AAS diagnostic
- Management
 - Aggressive fluid resuscitation
 - Broad spectrum antibiotics
 - Amp, Gent, Clinda
 - Admit on strict bowel rest
 - Early surgical consultation

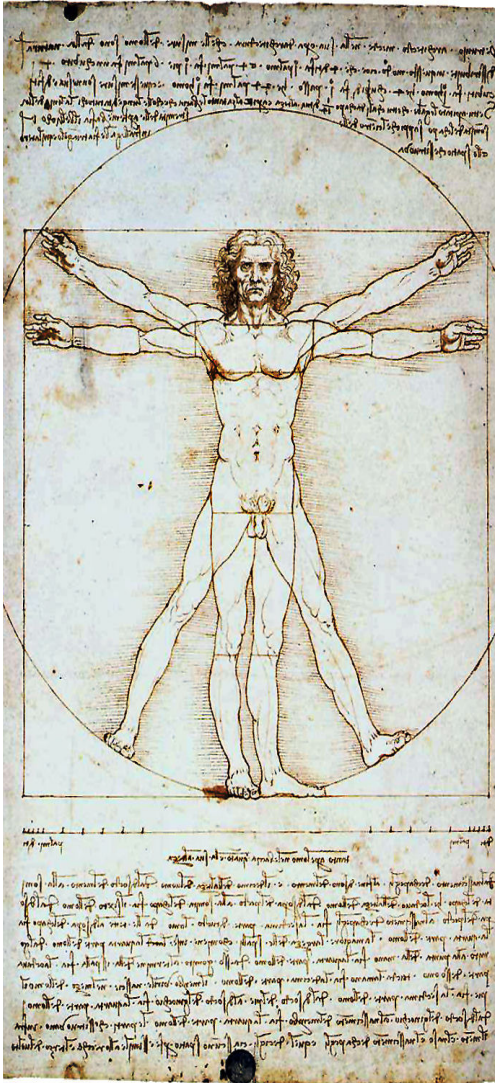


Acute Appendicitis



- Most common emergent abdominal surgery
- Everyone at risk!
- Incidence > age 50
 - 1:35 for women
 - 1:50 for men
 - >65 yo half of appendicitis deaths!
- Perforation rates
 - ~ near 70% in elderly
 - ~ Increases as age decreases in peds
 - Nearly 100% < 1 year old

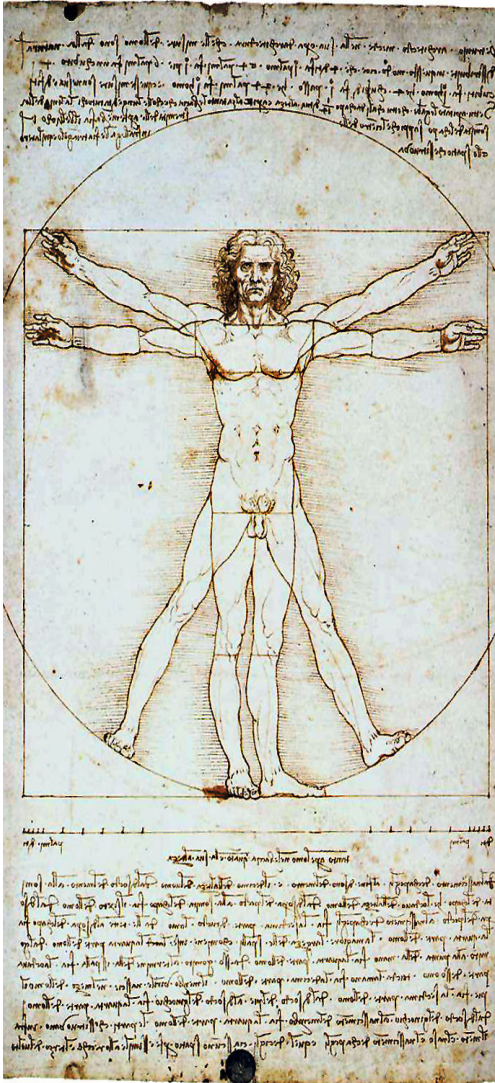
Appendicitis



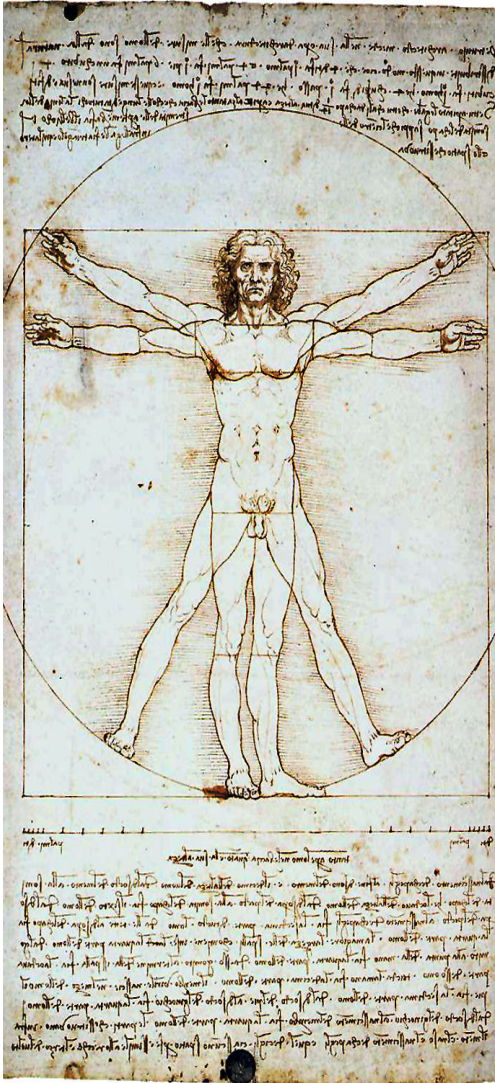
- Classic triad of appendicitis?
 - Gen abd pain, migrating to RLQ → anorexia → vomiting → +/- fever
 - Present in less than 1/3 of children and elderly
- Most specific symptoms?
 - RLQ pain, abdominal tenderness, guarding
 - Rovsing's and Rebound Tenderness sensitive/specific
 - Vomiting
 - Fever, anorexia, pain that migrates helpful if present

Appendicitis

- Bottom line:
 - Appendicitis fairly easy in adolescents/adults
 - Not uncommon in the elderly and young children, but
 - Presentation is!
- AAS – misleading in 25%!
 - Incidental nephrolithiasis
 - Signs of obstruction



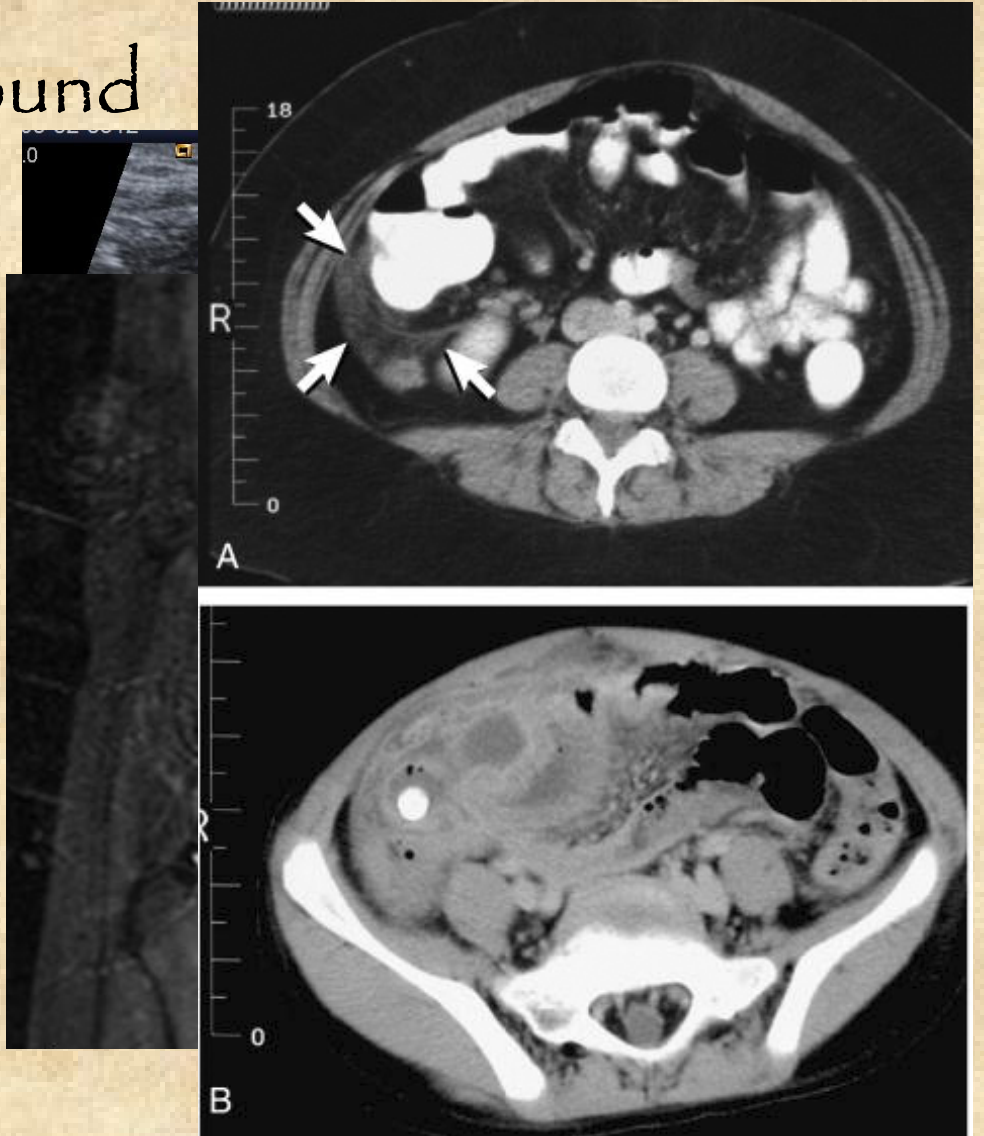
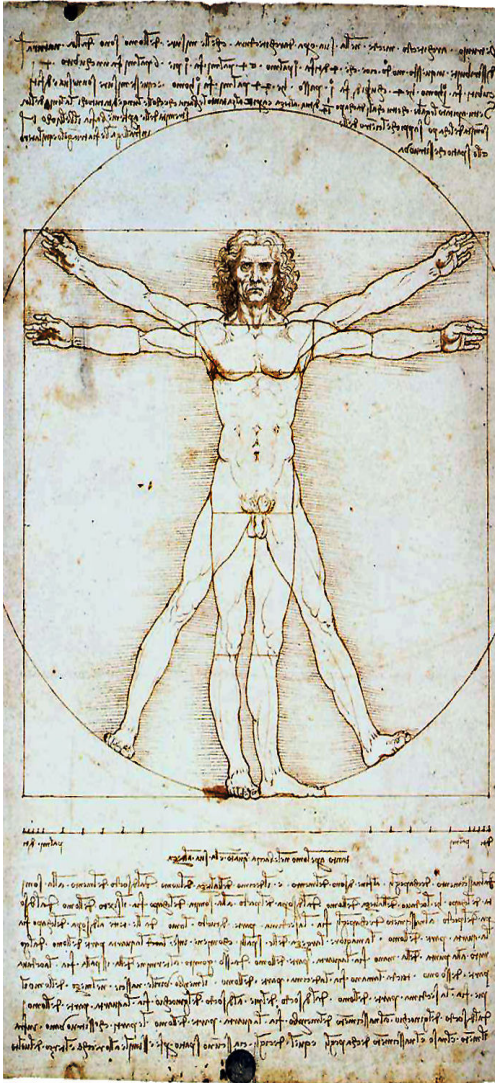
Appy Imaging



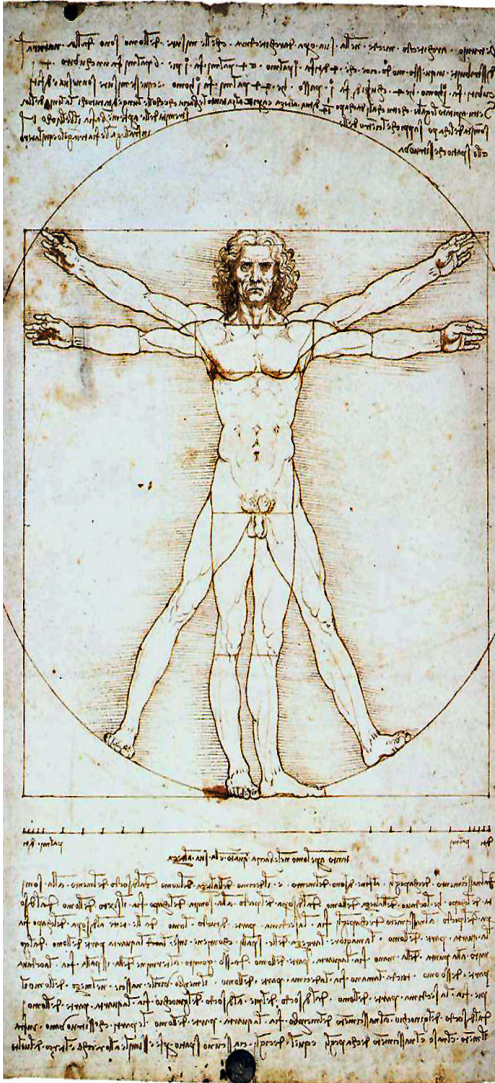
- CT Radiation risk is real!
- Adolescent/younger adult male
 - Rarely advantageous to image
- Adult females
 - Consider CT or surgical consult
 - If pregnant, MRI?
- Children
 - US procedure of choice
 - Consider obs/MRI/CT
- Elderly - low threshold to CT
 - Renal function

Imaging

- Ultrasound
- MRI
- CT

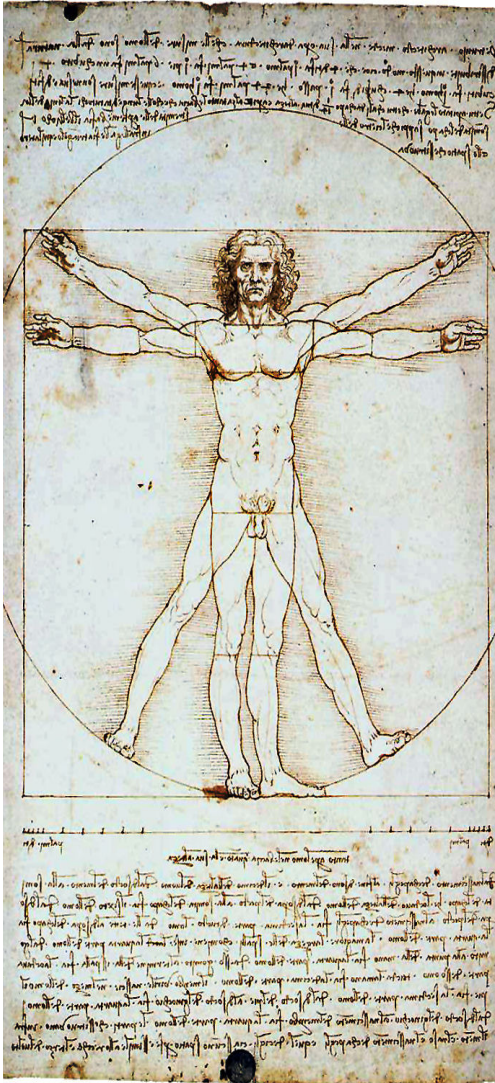


If suspected/diagnosed



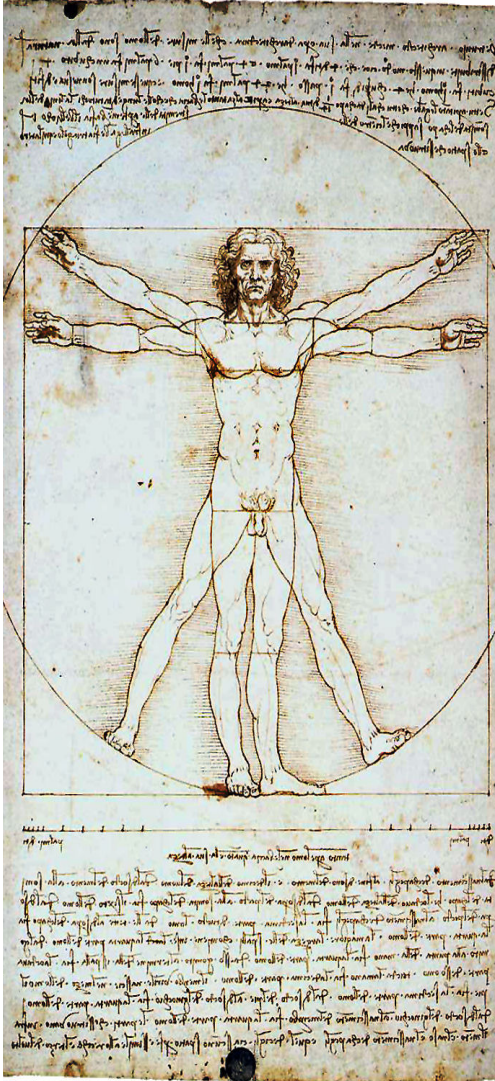
- Fluids
- Pain control
- IV Abx
- Surgical consult

Diagnoses of M&M



- Gastroenteritis
- Constipation
- If unsure of diagnosis
 - Be vague!
 - Give good precautions!

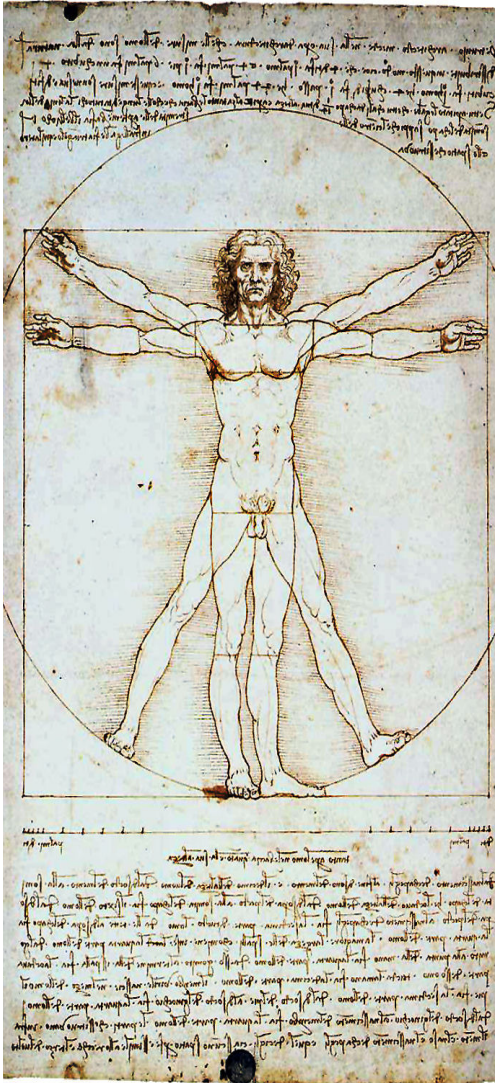
Final Thoughts



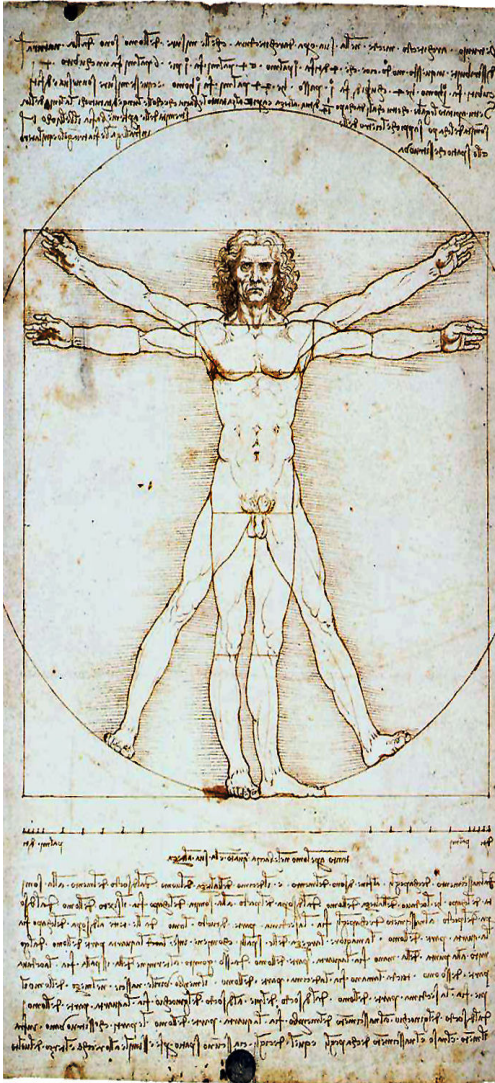
- History is critical
- Be cautious in extremes of ages
- Missed dx carries high M&M
- Lab values are *surrogate markers!*
- Look outside the abdomen
- Image the right people
 - ~ Don't image when you don't have to!

Bottom Line

- Have a high index of suspicion
- Proceed with caution
 - Rely on history and clinical epidemiology
 - Less reliance on labs
- Impossible to eliminate bad outcomes
 - Understanding risk factors and applying systematic evaluation = Best chance for success



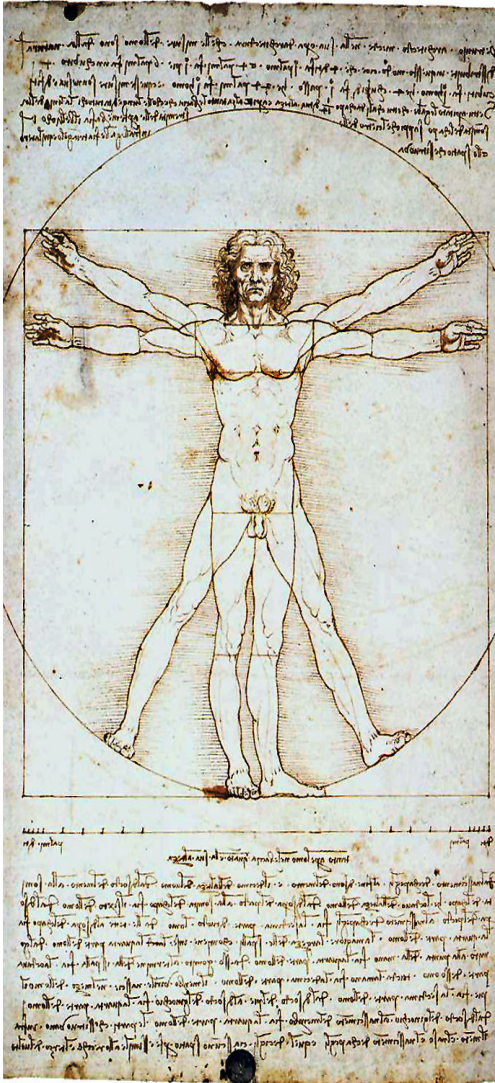
Final Thoughts



It is a good thing for a physician to have prematurely grey hair and itching piles. The first makes him appear to know more than he does, and the second gives him an expression of concern which the patient interprets as being on his behalf.

~A. Benson Cannon

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