---SMALL INTESTINE & APPENDIX---

Anatomy

Total length 8 meters
1st part of duod: 90% of all duodenal ulcers (blood supply: supraduod br of hepatic A, GDA)
2nd/3rd part receives blood from panc duod arteries (GDA, SMA)
4th part receives blood from 1st jejuna br of SMA
SMA splits 3rd and 4th part of duod; 3rd part btw SMA, Aorta
Jejunum = prox 40% of SI (post duod)
- More prominent plica
- Longer vasa recta
- Absorbs majority of SI fluid (isoosmotic)
- Along w/ duod, absorbs majority of fat, protein, Fe, Ca

Meckel's Diverticulum

#1 congenital anomaly of SI
Remnant of vitelline duct
Rule of 2s: 2% of pop'n, 2:1 male:female, w/in 2 ft of i.c. valve, 2 mucosae
Sxs: occur in 5% of affected infants, 1% of affected pts >40 (primarily consider in kids)
- 31% p/w ileus
- 23% p/w hemorrhage d/t ulceration – painless (BRBPR)
- 14% p/w diverticulitis (mimics appendicitis)
- 14% p/w intussusception – mass, red 'currant' stool
- 10% p/w perforation
- May also have enteric fistula or obstruction

Dx: Technetium 99 scan; Air or contrast enema (esp in kids)
Rx: Segmental SI resection
- If found incidentally, resect:
- In children
- If narrow base, mesodiverticular band, or heterotopic tissue present

Crohn's Disease

Sustained mucosal immune response to microflora
Onset of dz – bimodal: teens/early 20s & 50-60s
Ileocecal dz in 50%, SI only in 30%, LI only in 20%

Crohn's	Any GI region	Skip lesions	Transmural	Fistula, granuloma
UC	Rectal	Continuous	Mucosa/Submucosa	Crypt abscess

Sxs: Gradual and progressive but w/ waxing and waning of sxs
- Pain, diarrhea, weight loss (bloody diarrhea rare in Crohn's, common in UC)
- Obstruction d/t stricture
- Constitutional sxs
  - Colonic dz = ↑ extraintestinal sxs (erythema nodosum, pyoderma gangrenosum, iritis, uveitis, ankylosing spondylitis, arthritis, sclerosing cholangitis, aphthous ulcers, vasculitis)
  - Terminal ileal dz: ↓alb, ↓vit B12/ADEK, ↑gallstones

Dx: Colonoscopy; SI contrast study; Bx often not diagnostic

Rx: Sulfasalazine converted by bacteria to 5-amino salicylate
Budesonide (90% degraded in 1st pass by liver = ↓ systemic toxicity)
Azathioprine & 6MP prevent relapse
Infliximab – TNF alpha Ab
Surgical Rx for fistula, obstruction, perforation
Recurrence after surgery: 5yr = 40%, 15yr = 75% (usu prox)
Perform appy during surgery
Cx: Fistula, obstruction, perforation, malnutrition (↓ wound healing, infxn)
Gallstones: d/t ↓ enterohepatic circulation
Nephrolithiasis: fat malabsorption→ binds Ca in GI tract→ ↑oxalate
Short bowel syndrome: less likely if >100cm of intestines remain or I.C. valve intact

Small Bowel Tumors

Much less common than colon tumors
Sxs: obstructin (intuss), bleeding
Dx: usu by contrast study
Benign tumors
More common than malignant tumors
Usu Asx
Peak incidence in 50s
#1 = leiomyomas – usu in jejunum
Part of GIST (GI stromal tumors); arise from Cajal cells, CD117 +
Lipomas – usu males, in duod, ileum
Hemangiomas (5% of stromal tumors)
Often bleed; multiple in OWR; Dx: capsule endoscopy
Hamartomas – usu single; bleed, cz intuss (kids)
Malignant tumors
Only 2% of all GI tumors
50% = adenocarc; usu in duod
Sx: obstruction + wt loss, occult bleed/anemia (50% dx'd in OR)
Px: 5yr survival 10-30% w/ Rx
Carcinoid tumors
From Kulchitsky cells in crypts of Lieberkuhn
Met rate: 2% if <1cm, 90% if >2cm
50% in appendix, rest in SI, usu ileum
Sxs: #1 = obstruction (d/t desmoplastic rxn in mesentery), intuss, bleed
Rx: wide excision w/ resection of liver mets
Carcinoid syndrome
Tumor makes serotonin, degraded by liver; synd only if serotonin passes liver
Either: liver mets or primary lesion outside of portal system
Sx: flushing, wheezing, cramps, diarrhea, R heart valve dz, rash
Dx: urine 5 HIAA
Lymphoma
SI = #1 site of extranodal lymphoma (only 5% of total lymphomas)
#1 SI site = ileum
Peak incidence in 50s

Sx: pain, wt loss: 25% p/w abd emergency (perf, hemorr, obstr, intuss)
Dx: CT shows nodularity, bowel wall thickening
Px: 5yr survival 20-40%
GIST – peak in 50s, c kit +; resect; 50% recur in 2 years; Imatinib for mets

SBO

#1 cz of SI surg (cz = ABCs: adhesions, bulge [hernia], cancer/Crohn's)
USA #1 cz = adhesions (5-10% of pts w/ previous surgery get SBO)
World #1 cz = inguinal hernia
Lower abdominal & pelvic operations have higher risk of adhesions
3rd spacing of fluid – requires resuscitation
Sx: fever, tachy, ↑WBC, local abd pain = ↑ risk of strangulation
↑ infarction risk if wait > 24-48 hours w/ no resolution of sxs
"never let the sun set or rise on a SBO!"
Pain at onset = colicky, periumbilical
Dx: inspect previous surg scars for hernias
CXR, AXR (upright and supine)
r/o PNA, free air, pneumatosis, biliary dz, renal stone
Contrast studies distinguish obstruction from ileus
Paralytic ileus d/t narcotics, bed rest, inflammation, ↓K/Ca/Mg/Ph
distinguish from SBO by minimal pain, gas in colon
1st r/o colon obstruction and mesenteric occlusion b/c need contrast for these studies
Rx: Fluids (volume before electrolytes), foley, NPO, NGT
If partial obstruction, w/ h/o surg and no hernia: 80% resolve
If no h/o surg and no hernia: OR (internal hernia or neoplasm)
If no improvement in sxs in 24 hours: OR
Viable bowel: doppler to assess flow, or use fluorescein dye
Resect intuss point in adults to decrease recurrence
Cx: mortality: <1% if uncomplicated (w/ surg); >25% if strangulated

Acute Appendicitis

5% of population
Most present w/in 24-48 hours
#1 etiology = lymphoid hyperplasia (60%), causes obstruction (viral illness prodrome common)
#2 etiology = fecalith (35%)
Rupture may not cz peritonitis if contained by omentum
Sx: periumb pain→ RLQ pain, w/ anorexia
Repetitive vomiting + diarrhea = gastroenteritis
McBurney's point tenderness
Rovsing's sign (RLQ pain w/ palpation of LLQ), heel tap
Psoas sign (pain w/ R hip ext)
Obturator sign (pain w/ passive internal rotation of flexed R thigh) = inflamn on obt int
U/S: noncompressible appx w/ tenderness
DDx: r/o urinary cz (obtain urine cx), gyn cz (pelvic U/S)
Cx: rupture risk increases after 24 hours

#1 appy cx: post op infxn; abscess not uncommon

Acute appendicitis in pregnancy

#1 surgical emergency in pregnancy (1/800 pregnancies)

Negative appy rate 25% (highest in 2nd trimester)

Fetal loss after appy 4% (higher w/ lap appy); early delivery 7%

No change in future fertility after appy

Only 57% of pts p/w classic sxs; labs not helpful; U/S or MRI best

Appendiceal Tumors

Most = benign

Rx: if <2cm – appy; if >2cm – hemicolectomy