Serology In Viral Hepatitis

Hepatitis A	IgM anti-HAV	Acute disease
	IgG anti-HAV	Past infection
Hepatitis B	HBsAg	Acute or Chronic
	HBeAg	Active replication
	IgM anti-HBc	Acute disease
	IgG anti-HBc	Prior exposure or chronic disease or carrier
	Anti-HBs	Past infection or after vaccination
Hepatitis C	Anti-HCV	Acute, chronic or past infection
	HCV RNA	
Hepatitis D	HBsAg & anti-HDV	
	+ IgM anti-HBc	Acute co-infection
	+ IgG anti-HBc	Superinfection
Hepatitis E	None	

Hepatitis B Serology

	HBsAg	Anti-HBs	Anti-HBc
Acute Hepatitis	+	-	IGM
Chronic Hepatitis	+	-	IGG
Past Infection	-	+	IGG
Carrier	+	-	IGG
Vaccination	-	+	-

Presence of e antigen suggests high infectivity

Extrahepatic Manifestations of Hepatitis B

1. Polyarteritis nodosa (+ Hep B s Ag; 30% of cases assoc. w/ Hep B)
2. Arthritis
3. Glomerulonephritis
4. Urticaria / Angioedema
5. Mixed Cryoglobulinemia
   - weakness
   - progressive wt. loss
   - recurrent purpuric eruptions
   - arthralgias
   - Raynaud's
   - (+) ANA (diffuse)
   - (+) RF
   - ↓ complement
   - active urine sediment
6. Polyneuropathy

Risk Factors for Hepatitis C

Tx Hep C
① IFN: if RNA (+) after 3 months - give for 3 months
② Then Pegylated IFN + Ribavirin if RNA (+) after IFN x 3 months

(In order of priority)

1. Blood transfusion (before 1992)
2. Injection drug use
3. Intranasal cocaine use
4. Tattooing
5. Ear/body piercing
6. Perinatal transmission
7. Sexual Contact
8. Hemodialysis
9. Organ transplantation

Poor Prognostic Factors

1. Age > 40 at acquisition
2. Male sex
3. Heavy alcohol consumption (> 30-50 g/d)
4. Coinfection with HIV or Hepatitis B

If Asymptomatic - start IFN right away ↑'d risk of chronicity

Extrahepatic Manifestation of Hepatitis C

1. Mixed cryoglobulinemia
   - presents as recurrent purpuric eruptions of LE's
   - fatigue
   - arthralgias
   - ↑ BUN/Creat
   - urine → RBC's, RBC casts
   - (+) ANA / RF
   - (+) cryoglobs
   - ↓ complement
   - Tx: Pegylated IFN + Ribavirin Tx Hep C
2. Porphyria cutanea tarda → blisters/scars on sun-exposed areas - confirm Dx w/ urine porphyrins
3. Membranoproliferative glomerulonephritis
   - (+) proteinuria
   - (+) edema

(most common)

4. Lymphocytic sialadenitis
5. Arthritis
6. Sjogren's syndrome
7. Marginal Zone B-cell Lymphoma
   - aka splenic lymphoma w/ villous lymphocytes
   - Tx: Treat Hep C

CHF + ↑LFT's
-ischemic hepatitis

Chronic Hepatitis

Definition
↑LFT's persisting >6 months

Ex) Sepsis + Hypotension
Tx'ing w/ Abx
AST/ALT ~1500/1000
After 2 days - LFT's normal

Dx: Shock liver
(Ischemic Hepatitis)

1. **Hepatitis B, C or D**
   - defective RNA virus
   - requires Hep B co-infection
   - IgM Hep Bc ⊕ or Hep Bs Ag ⊕ then IgG Hep B c ⊕
   - Tx: similar to Hep B
2. **Drugs :**
   Methyldopa, nitofurantoin, methotrexate, amiodarone, PTU, captopril
3. **Autoimmune**
4. **Wilson's disease** → ATP 7 gene mutation on chrom 13 → delirium, hemolytic anemia too → can progress to fulminant hepatic failure
5. **Nonalcoholic steatohepatitis** (NASH)

Ex) Chronic Hep B carrier develops severe hepatitis w/ markedly ↑'d AST/ALT
↓
Dx: Hep B w/ Hep D

Ex) 16 y.o. boy w/ chronic ↑LFT's
Hx of Parkinsonism-like features
Anemia w/ retics
Brown ring around cornea
↓
Kaiser-Fleischer ring

- ↓ ceruloplasmin
- ↑ urinary copper
- Liver Bx: copper deposits

Tx: Low copper diet + penicillamine

Treatment of Chronic Hepatitis

Hepatitis B

→ patient becomes lethargic (T. bili ↑10, PT > 100) → delirium/coagulopathy → acute hepatic failure → liver transplant

HBeAg +, HBV DNA > 20000 IU/ml, ALT > 2 x ULN… Observe 3-6 months and treat if no spontaneous HBeAg loss. Cosider liver biopsy if compensated and immediate treatment if decompensated

anti-virals ϕ IFN

Treatment: IFN: 16 weeks or pegylated IFN: 48 weeks

or

Entecavir, adefovir, lamivudine or telbivudine(treat for minimum 1 year, continue for at least 6 months after HBeAg seroconversion)

HBeAg -, HBV DNA > 20000 IU/ml, ALT > 2 x ULN… treat
Consider liver biopsy in patients who are HBeAg – and HBV DNA > 2000 IU/ml and mildly elevated ALT and treat if liver biopsy shows moderate/severe necroinflammation or significant fibrosis

Treatment: IFN/peg IFN: 1 year

or

preferred → (most potent) **Entecavir, adefovir, lamivudine or telbivudine > 1 year (endpoint of treatment has not been established)**

unless Hep Bs Ag becomes ⊖ → stop tx then

Hepatitis C

Biopsy + for moderate to severe chronic hepatitis
Elevated AST/ALT, positive HCV RNA

contraindicated in pregnancy

ϕ treatment if comorbidities + illnesses present

w/ cirrhosis → ↑'d HCC risk
- vascular enhancement nodules
- hyperechoic masses

Treatment of Hepatitis C

most important prognostic factor → amount of fibrosis seen on liver Bx

Genotype I	Genotype II & III
Pegylated Interferon alfa 2a or 2b + Ribavirin	Pegylated Interferon alfa 2a or 2b + Ribavirin
48 weeks	24 Weeks
SVR: 42-46 %	SVR: 76-82%

Also:
ϕ EtoH
Hep A + B vaccines

most common cause of hepatic masses in non-cirrhotic → metastases

SVR: Absent of detectable viral RNA 6 months after completion of therapy (sustained viral response)

Therapy may be discontinued if no early viral response (EVR) noted after 12 weeks (2 log decrease (100 fold) in viral load after 12 weeks)

↑'d risk in HIV ✓ 5% maternal → fetal transmission risk
↓
✓ Her RNA @ 2-6 months post-delivery in infant to ✓ transmission

Autoimmune Hepatitis

- women - 3rd-5th decade
- fatigue
- arthralgias/myalgias
- amenorrhea
- ↑ AST/ALT
- ↓ Albumin
- ↑ Globs
- HSM

	Autoantibody
Type I	ANA, SMA, Antiactin antibody Antibodies against soluble liver antigen and liver-pancreas antigen (SLA/LP) P ANCA
Type II	Antibody against liver-kidney microsome 1 (LKM 1) Antibody against liver cytosol 1 (LC-1) Poor prognosis, frequent treatment failures All require long-term maintainance therapy
Overlap Syndrome	Antimitochodrial antibody positive ANA and SMA absent Cholestasis absent → differentiates from 1° Biliary Cirrhosis Cholangiographic abnormalities absent

Tx: Prednisone ± Azathioprine

Dx: via Liver Bx

Alcoholic Liver Disease

Indications For Liver Transplant

PT > 100

Alcoholic Hepatitis

- AST < 500
- AST : ALT ratio > 2:1
- Leukocytosis common
- precursor to cirrhosis

Discriminant Function = 4.6 x (Prothrombin time- control PT) + Bilirubin → > 32 thus give steroids

Ex.) Chronic EtoH w/ N/V/fevers confusion
AST-280
ALT-130
Bili - ↑
Ascites ⊕

Fatty Liver

- not a precursor to cirrhosis
- reverses w/ cessation of EtoH

Cirrhosis

- Screen w/ u/s + AFP q 6-12 months

Acute Variceal Bleeding Tx

- nonselective β-blockers → ↓ future incidences
  - goal HR ~60
- Octreotide x 2-5 days + EGD

if ϕ response ← TIPS

Interpretation of Ascitic fluid

Esophageal Rupture → Dx: Gastrografin

Serum-ascites albumin gradient (SAAG) → serum alb − ascitic alb

≥1.1 g/dL (Portal hypertension)

Total ascitic fluid protein

< 2.5 g/dL

1. Cirrhosis

> 2.5 g/dl

1. CHF
2. Constrictive pericarditis
3. Budd-Chiari syndrome
   - obstructed Hepatic vein
   - Dx via Doppler or CT w/ contrast

Tx: Anti-coags, Diuretics, tPA into Hepatic vein, portocaval shunt, liver transplant

< 1.1 g/dL

Exudative Ascites

1. Peritoneal carcinomatosis
2. Tuberculous peritonitis
3. Pancreatic ascites
4. Chylous ascites
5. Nephrotic syndrome
6. Serositis

Fluid with absolute neutrophil count of >250/uL should be presumed to be infected irrespective of culture results

Spontaneous Peritonitis
- E.coli (most commonly)
- 3rd-generation cephalosporin plus IV albumin 1.5 g/kg @ dx then 1 g/kg on day #3
- ↑ risk of hepatorenal syndrome
- 70% will recur

Prophylaxis:
- Quinolones Norfloxacin (esp. if ascites protein is < 1 g/dL)
- variceal bleeding → Norfloxacin or Augmentin as prophylaxis
- only (+) BCx in ~50% same for peritoneal fluid

Ascites Tx
1. Fluid Restriction
2. Spironolactone
3. Lasix
   - goal excrete more Na^+ vs. K^+
4. Paracentesis
5. Alb Infusion (6-8 g / L removed)

↓
Refractory TIPS (Trans Jugular Intra Hepatic Porto systemic shunt)

even if ↓ ascites

Hepatic Encephalopathy

↑ Alk Phos / AST / ALT, mildly ↑ d T Bili

Ex) 46 y.o female w/ 1-week of jaundice, ascites, RUQ pain, Tender smooth hepatomegaly

- confusion
- asterixis
- slurred speech
- ammonia levels → ϕ role

Rules: Hepatic Encephalopathy

Factors precipating

Infections, GI bleeding, Azotemia, ↓K, Alkalosis, ↑Protein diet
Hypoxia, Dehydration, ↓BP, Anemia, Benzodiazepines,
Porto-systemic shunt

Treatment

low protein diet, Lactulose, Neomycin, lactobacillus acidophilus,
Eradication of H. Pylori, Zinc

Hepatorenal Syndrome
- behaves as prerenal

Type I
- creat doubles in < 2 wks.

Type II
- gradually ↑'d creat over wks.

Tx: vasoconstrictors (midodrine w/ octreotide) plus Albumin infusions 1 g / kg D#1 then 20-40 g x 5-15 days

HD does not improve outcomes

Gilbert's Syndrome
- partial defic. of bilirubin glucuronide transferase
- causes:
  - fever
  - surgery
  - fasting
  - exercise
  - EtOH

Risk Factors for Hepatocellular Carcinoma

↓↑ α FP

1. Hepatitis B & C
2. Cirrhosis → Eval for transplant
3. Hemochromatosis
4. Alpha 1 antitrypsin ↓
5. Aflatoxin
6. Anabolic steroids
7. Vinyl chloride
8. Thorium dioxide

Cholangitis
- charcot's Triad
  1. Fever
  2. Pain (RUQ)
  3. Jaundice

Tx: Abx + ERCP

- Bronze DM
- associated w/ ↑ AST/ALT
- Arthropathy
- Fatigue
- Impotence

Dx: Transferrin Sat

Ex) 50 y.o man w/ (+) LE edema, dilated veins over abdomen, upward flow in veins

Dx: IVC obstruction

Nonalcoholic Fatty Liver Disease (NAFLD)

-most common liver dis.

↑BMI → worse dis.

Risk Factors: Obesity, type 2 diabetes, hyperlipidemia

Dx: Liver Bx

Tx: -Gradual wt. loss
-metformin
-Glitazones
-Gemfibrozil
-Statins

Simple Steatosis → fatty liver

Steatohepatitis

Steatosis, infilteration by mononuclear cells or PMN'S, hepatocyte ballooning, spotty necrosis, ± Mallory's hyaline, AST/ALT ratio < 1

vs. 7:1 in EtoH

Fibrosis &Cirrhosis

Aminotransferase Levels 75000
- Tylenol Toxicity
- Hepatic Ischemia
- HSV Hepatitis

Drug Induced Liver Disease

Acute hepatitis	INH, acetaminophen, diclofenac, statins, venlafaxine, telithromycin
Fulminant hepatitis	Acetaminophen
Chronic active hepatitis	Methyldopa, nitrofurantoin, minocylcine
Cholestasis	TMP/SMX, phenothiazines, Anabolic steroids, amoxicillin-clavulanate, erythromycin, estrogen
Granulomatous hepatitis	Phenylbutazone
Adenomas	Oral contraceptives
Cirrhosis	Methotrexate
Steatosis	Amiodarone, tamoxifen, DDI, valproic acid
Ischemia	Cocaine, amphetamines

AIDS cholangiopathy
- upper abd. pain
- obstructed liver tests ↑Alkphos ↑AST/ALT
- causes: -crypto -cmv

Dx: ERCP

Ex.) Chronic EtoH
N/V
Jaundice
AST 5000
ALT 4900

Next Test:
↓Acetaminophen level

- most common cause of fulminant hepatic failure
- ↑d risk w/ binge drinkers
- can also see w/ starvation

Tx: Lavage, charcoal + NAC
↓
↑d glutathione levels → binds toxic product of Tylenol degradation

Suspected Liver Adenoma

Cavernous Hemangiomas
- benign, usually incidental finding
<6 cm → ϕ tx
>6 cm + symptoms
↓
excise

- most common benign liver tumor → bleeding
but ↑d risk of turning malignant Infuture

On oral contraceptives & Size <5cm

↓

Stop oral contraceptives

hepatic adenomas are estrogen dependent

↓

Mass regresses in few months

↓

Observation

Size > 5 cm or Pt. not on oral contraceptives

↓

Consider resection

↓

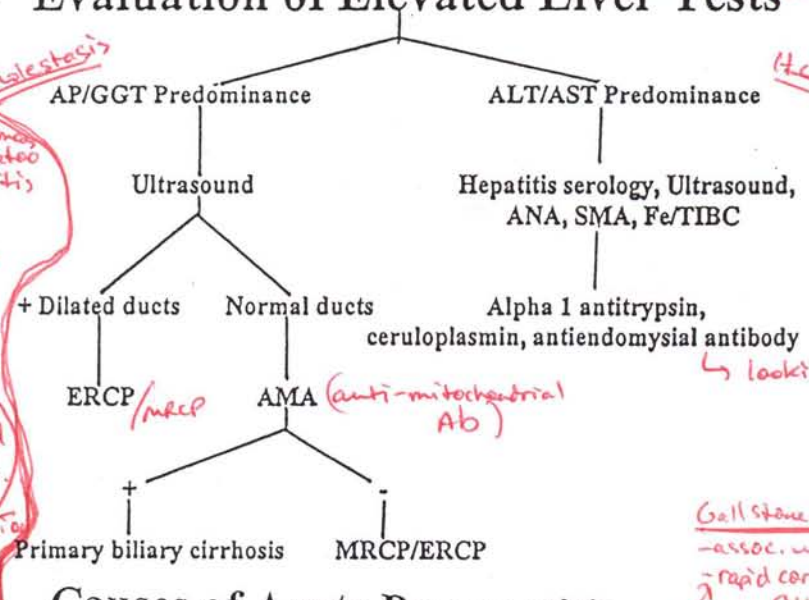
Frozen section

- **Adenoma** → **Resection**
- **Focal nodular hyperplasia** → **Obsevation**

Liver Function Tests

	Bil	AST	ALT	ALKPO4	GGT	
Acute V. Hepatitis	↑	↑↑	↑↑	↑	↑	
Fulminant Hepatitis	↑↑	↑↑↑	↑↑↑	↑	↑	PT↑
Alcoholic Hepatitis	↑	<300	↑	↑	↑	AST/ALT >2
Obstructive Jaundice	↑	↑	↑	↑↑↑	↑↑↑	
Sclerosing Cholangitis	↑↑	↑	↑	↑↑↑	↑↑↑	ERCP
Primary Biliary Cirrhosis	N/↑	N	N	↑↑↑	↑↑↑	
Space Occupying Lesion of Liver	N	N	N	↑↑	↑↑	
Partial Biliary Obstruction	N	N	N	↑↑	↑↑	
Muscle Injury	N	↑	↑	N	N	

Evaluation of Elevated Liver Tests



Causes of Acute Pancreatitis

most common causes

1. Alcohol
2. Biliary Tract Disease
3. Trauma
4. Post ERCP
5. Hyperlipidemia
6. Vasculitis
7. Uremia
8. Hypercalcemia
9. Pancreatic Cancer
10. Pancreatic Ductal Stenosis
11. Drugs: L Asperginase, DDI, Pentamidine, Azathioprine, Thiazides, 6MP
12. Infections: Mumps, viral hepatitis, coxsackievirus, mycoplasma, Opportunistic infections (CMV, Cryptococcus, Candida, TB)

Causes of Elevated Amylase

ABDOMINAL PAIN (↑ Amylase and ↑ Lipase)	NO ABDOMINAL PAIN (↑ Amylase and normal Lipase)
1. Pancreatitis	1. Renal Failure
2. Cholecystitis	2. Diseases of Salivary Glands
3. Intestinal Ischemia	3. Tumors- Lung, ovary
4. Appendicitis	4. Anorexia nervosa/ Bulemia
5. Ruptured Ectopic	5. Alcoholism
6. Ruptured Aneurysm	6. Ketoacidosis
7. Pancreatic Neoplasm	7. Macroamylasemia
	8. Burns

Poor Prognostic Signs in Pancreatitis

1. Systolic BP < 90 mmHg or HR > 130 beats/min
2. PO2 < 60 mmHg
3. Urine output < 50 ml/h or increasing BUN/Cr
4. GI bleeding
5. Pancreatic necrosis (CT severity index > 6)
6. BMI > 29; age > 70
7. HCT > 44%, C-reactive protein > 150 mg/L
8. Apache II score > 8
9. Ranson score > 3

Admission	During 48 hours
Age> 55 years	PO2 <60 mm Hg
WBC > 15000	Drop of Hct > 10%
Glucose >200	BUN increases> 5 mg/dl
AST > 250	Calcium < 8 mg / dl
LDH >350	Fluid Sequestration >6 Criteria

Cholecystitis
RUQ pain
Fevers/chills
⊕ Murphy's sign → cough or deep inspiration ↑d pain or resp. pause → suspect common duct stone w/ TBili 74
Leukocytosis
↑AST/ALT/AlkPhos
Tx: ERCP w/ sphincterotomy
Dx: u/s → ⊕ Gallstones w/ GB edema or u/s Murphy's → Dx confirmed
- if stones only → HIDA to confirm → if HIDA ⊕ → Dx confirmed
- ⊖ stones w/ ⊕ GB edema or u/s Murphy's sign → acalculous cholecystitis
✓ HIDA to confirm
Tx: NG Tube, Abx, Surgery w/in d4-72 hrs., pain control
Complications post-op bile leak
Dx: ERCP

Biliary Pancreatitis
- suspect w/ ALT 3x normal
- also if features of cholangitis
- dilated ducts
- ± common duct stones
Best Dx Test → Endoscopic u/s
Tx: Early ERCP sphincterotomy then cholecystectomy (later)

Ex.) 50 y.o. man w/ RUQ pain/fevers/chills
↑AST/ALT/AlkPhos
TBili - 1.5
u/s → pericholecystic fluid, dilated ducts w/out stones
HIDA → acalculous cholecystitis

Septic Complications of Pancreatitis

Abx for all 3 as well
Tx: surgical drainage
CT-guided percutaneous drainage

1. Infected pancreatic necrosis or phlegmon → solid mass of inflamed tissue
2. Infected pseudocyst
3. Abscess → CT-guided drainage ✓ CT-guided aspiration 1st
- if still spiking fevers on next day → surgery

Insulinoma
- if CT Ok then ✓ an endoscopic u/s (sensitivity 80%)

Complications of Pancreatitis

Early

Shock, ARDS, GI bleeding, DIC, Renal failure
S/C fat necrosis, hypocalcemia, DIC, Common duct obstruction, Splenic infarction & rupture, Pleural effusion, Hematuria

can manifest as weakness w/ spasms

Feedings
- If ⊖ N/V/Abd. pain → NGT feeds
- If N/V/Abd. pain → Jejunal enteral feeds → if ⊖ tolerating then TPN

Late

Pancreatic phlegmon, Pseudocyst, Abscess, Ascites & Pleural effusion

Cause of Ascites / Pleural Effusion
- Disruption of main pancreatic duct or leakage of pseudocyst
Tx: NPO, NGT, IV Octreotide → inhibits pancreatic secretions
if ⊖ response → ERCP

Ex.) Asymptomatic Pancreatic cyst by CT
Tx: Surgery → likely pre-malignant

Chronic Pancreatitis

↑'d risk of pancreatic adenocarcinoma

Tx:
- Analgesics
- Pancreatic Enzymes

Causes

→ pancreatic calcifications on CT

1. Alcohol consumption (most common)
2. Prior severe acute pancreatitis
3. Hereditary
4. Autoimmune (⊕ANA)
5. Tropical (India)
6. Idiopathic

Diagnosis: Endoscopic ultrasonography, CT, ERCP

Colon Ca.
- begin screening @ 50 y.o. unless 1st degree relative w/ Dx ↓ go 10 yrs. pre-their Dx or 40 y.o. whichever comes 1st

Complications

1. Recurrent abdominal pain
2. Malabsorption
3. Diabetes
4. Splenic vein thrombosis

Tx: Pain control → Narcotics or NSAIDs (or octreotide → ↓ extensive) → inhibits pancreatic secretions

Pancreatic Cancer

CT-mass then CT-guided Bx

- metastatic pancreatic Ca. Tx: Gemcitabine

4 Best chance for survival ↓ Whipple procedure

If +LN's ↓ non-resectable tumor

If -LN's ↓ whipple

Palliation → stent placement

Risk factors

Smoking, chronic pancreatitis, coal tar derivatives, ↑fat diet, obesity, radiation

Manifestations

malignant obstructive → ERCP ↓ jaundice ↓ stent

Pain, weight loss, jaundice, thrombophlebitis, GI bleeding

Cystic Tumors of Pancreas

Intraductal papillary mucinous tumor (IPMT)
- secretes mucin
- pancreatic duct obstruction
- recurrent pancreatitis
- ERCP → main pancreatic duct dilation w/ filling defects
- Ampulla → dilated fish mouth opening
- contains mucinous material

Tx: Surgery

Mucinous Cystadenomas { unilocular cystic lesion @ head
Tx: surgical resection

Serous Cystadenomas
- presents as microcystic septated w/ central fibrosis/calcifications
- sunburst appearance
- benign condition

Endocrine Tumors of Pancreas

Chronic Intestinal Pseudo-Obstruction
- involves abnormal small bowel pacemaker cells (interstitial cells of Cajal)

or paraneoplastic syndrome
- amyloidosis
- or scleroderma
- smokers
- small cell lung ca.
- ↓ albumin
- GI mass

1. Gastrinoma
2. VIPoma (WDHA syndrome) ✓ VIP levels
   - watery diarrhea
   - hypokalemia
   - achlorhydria
3. Glucagonoma
   - skin rash
   - wt. loss
   - ↑ glucagon levels
   - Tx: surgery
4. Somatostatinoma
   - chronic diarrhea
   - wt. loss
   - ✓ somatostatin levels

Tx: surgery

Evaluation of Dysphagia

Solids only
- Intermittent
- Progressive + heart burn
- Progressive + weight loss

Solids & Liquids
- Intermittent with chest pain
- Progressive + heart burn
- Progressive + no heart burn

- Schatzki ring
- Peptic stricture
- Carcinoma
- Diffuse spasm
- Scleroderma
- Achalasia

Complications of GE Reflux

1. Esophagitis
2. Cough
3. Asthma
4. Aspiration
5. Hoarseness
6. Stricture
7. Sore throat
8. Erythema of the vocal cords
9. Globus
10. Barrett's esophagus

Gastritis

Type A	Fundus & body
Type B	Antral (H. pylori)
Erosive	Aspirin, NSAIDs, alcohol, severe stress

Diseases Associated with H. Pylori Infection

1. Duodenal ulcer
2. Gastric Ulcers
3. Antral gastritis
4. Mucosal atrophy
5. Gastric carcinoma
6. Gastric lymphoma
6. Gastric MALT lymphoma
(gastric mucosa associated lymphod tissue lymphoma)

Diagnostic Tests For H. Pylori Infection

-urease-producing
-GNeg

1. Serum antibody (screening test)
2. Dye test on gastric tissue (urease test)
3. Direct staining of biopsy tissue
4. Culture and sensitivity
5. Breath test → done 4wks. post-tx to detect eradication
6. Stool antigen ↗

Indications For Treatment Of H. Pylori

1. Duodenal or gastric ulcer
2. Atrophic gastritis
3. Malt Lymphoma
4. Recent resection of gastric cancer
5. History of gastric cancer in first-degree relative
6. GE reflux disease (in patients requiring long-term profound acid suppression)
7. Functional dyspepsia
8. Long term use of NSAIDs

Cameron's Lesion
-assoc. w/ hiatal hernia
-seen also w/ Fe-deficiency anemia
↓
Tx: oral Fe + PPI's
↓
if ϕ response then surgery (fundoplication)

Treatment of H. Pylori

No penicillin allergy

PPI + Amoxicillin 1G BID + Clarithromycin 500 mg BID for 10-14 days → results in eradication in 85%

Penicillin allergy

PPI + metronidazole 500 mg BID + Clarithromycin 500 mg BID for 10-14 days

or

Bismuth subsalicylate 524 mg QID + metronidazole 250 mg QID + tetracycline 500 mg QID + PPI or ranitidine (150 mg BID) for 10-14 days

PPI: Lansoprazole 30 mg BID, Omeorazole 20 mg BID, Pantoprazole 40 mg BID, Rabeprazole 20 mg BID, Esmeprazole 40 mg daily

Gastrin Levels In Peptic Ulcer Disease

PPI → ↑ gastrin levels

Dieulafoy Lesion
- large submucosal artery prone for rupture + lead to large volume bleeds
↓
may give rise to a pigmented mucosal lesion

	Fasting Gastrin	IV Secretin	Food
Duodenal Ulcer	N	NC	Slight
Zollinger-Ellisson	↑	↑↑	NC
Antral G Cell hyperplasia	↑	NC	↑↑
Retained Antrum	↑	NC	NC
Gastric Outlet Obstruction	↑		

ZE
- gastrin-producing tumors
- ulcers in odd location
- chronic diarrhea
- ↑'d acid levels
- gastric pH < 5.0
- gastrin levels 500-1000 → secretin secretion test ↑ 200 above baseline → Dx

Best Test
- somatostatin receptor scintigraphy
↓
Tx: surgical antral removal

Dx: Abd. CT

Gastric ca.
- adenocarcinoma
- Tx: Resection then Rad Tx ± chemo

Complications of Gastrectomy

1. Post vagotomy Diarrhea
2. Malabsorption
3. Afferent Loop Obstruction
4. Anemia (Fe-Defic or B12)
5. Osteomalacia
6. Bile Reflux Gastritis
7. Dumping Syndrome (Tx: small meals, -N/V, -Diaphoresis, -Lightheadedness)
8. Recurrent Ulceration
9. Adenocarcinoma of Stomach

NSAID-Induced Ulcer Bleeding
Tx: PPI (± sucralfate)

Mallory-Weiss Tear - assoc w/ retching - 70% spontaneously heal

Gastroparesis
Tx: small frequent meals, metoclopramide
Dx: UGI series
Erythromycin tx lasts only 3 days (use only if ± able to tolerate metoclopramide)

Features Which Suggest High Risk Of Rebleeding

(Bleeding Ulcers)
- major risk factor → NSAIDs w/ steroids 600 → markedly ↑'d risk

Tx:
- EGD w/ tx (epi w/ electrocautery)
- High-dose PPI
- NSAID-induced ulcer prophylaxis
  - misoprostol w/ NSAIDs or PPI

High-Risk Pt's
- Age > 70
- Prior history serious medical illness
- NSAIDs plus steroids

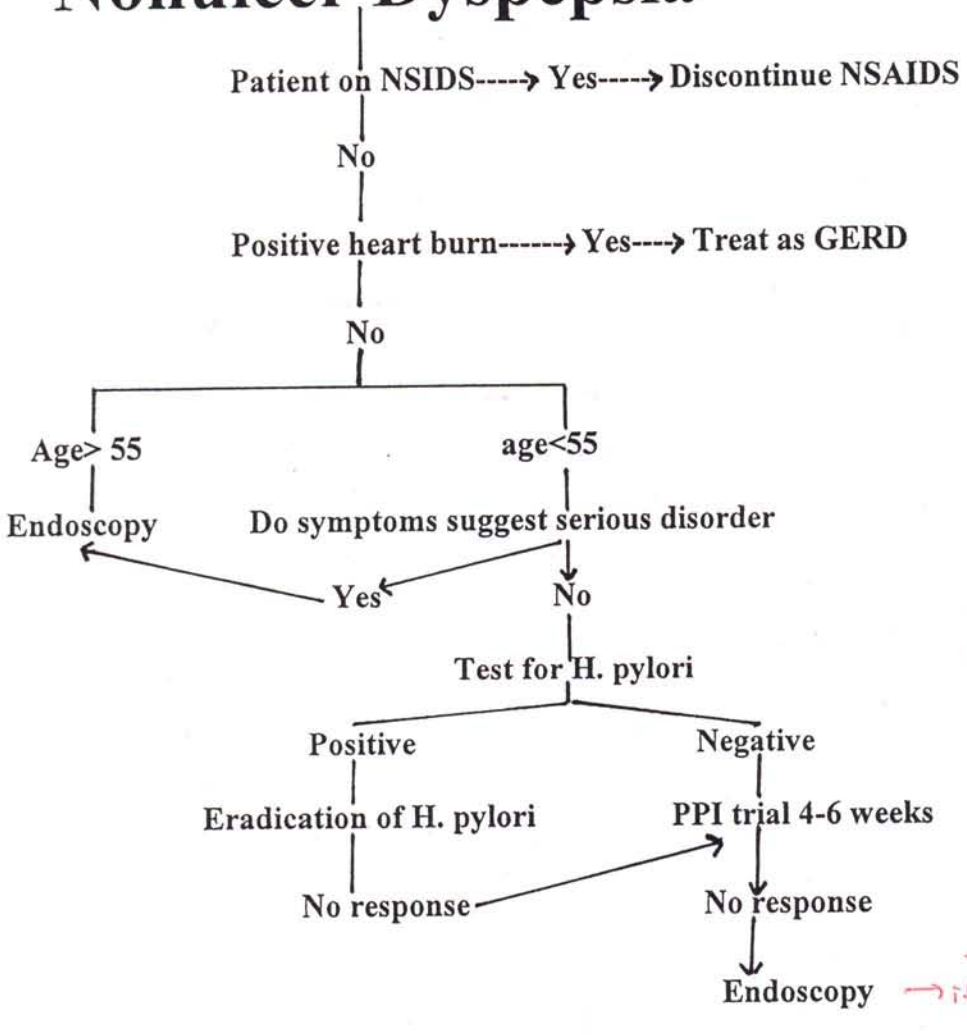
Admit

1. Arterial bleeding
2. Ulcer > 2 cm
3. An adherent clot
4. A visible vessel
5. Esophageal varices

Ex) 23 y.o. female 6 months pregnant
UGI Bleeding
EGD → Bleeding varices
✓ Doppler u/s of hepatic/portal veins to look for thromboses
↑ risk in pregnancy

Recurrent Bleeds w/ End-Organ Damage
Dx Test → Intraop EGD

Nonulcer Dyspepsia



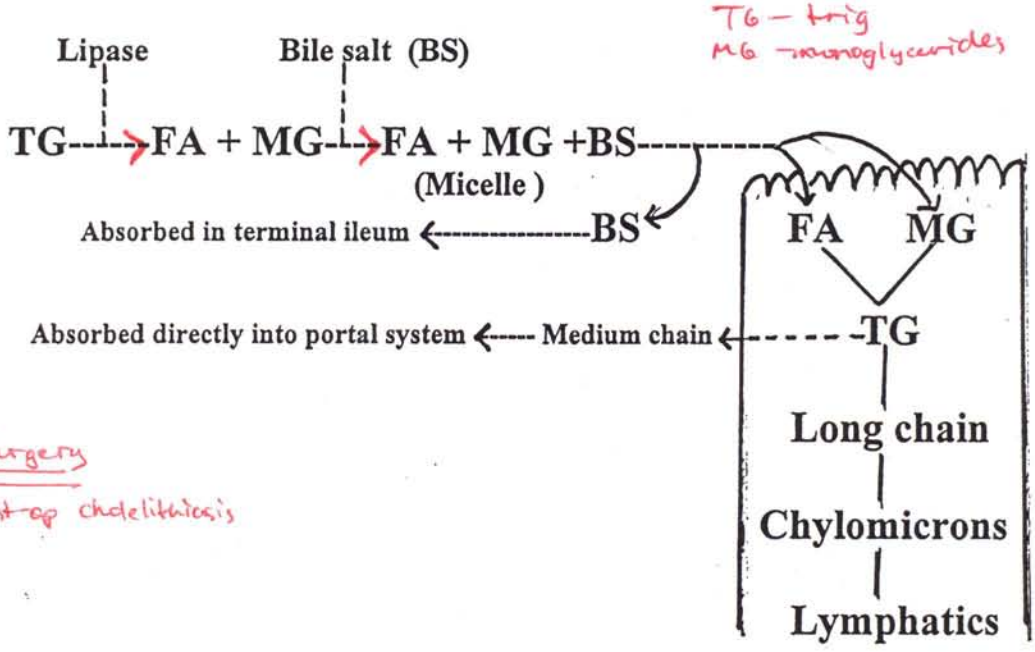
Fundic Gland Polyps
- non-neoplastic
- asymptomatic
- ↓ risk of malignant transformation

↑-Risk Colonoscopy Findings
① Large Polyps (>1cm)
② Villous Polyps
③ High-Grade Dysplastic Polyp

Repeat Colonoscopy @ 3yr
- <2 polyps <1cm in site tubular adenoma → repeat in 5yrs.
- 7-8 polyps → repeat in 1yr.
- 7-3 polyps, large >1cm or villous/ tubulovillous path → repeat in 3 yr

→ if normal → Trazodone

Absorption of Fat



TG – trig
MG – monoglycerides

Bariatric Surgery
~35% have post-op cholelithiasis

Evaluation Of Malabsorption

	Carotene	Fecal fat	D Xylose	Fecal Fat after antibiotics	SB Culture
1. Pancreatic diseases	↓	↑	Normal	No change	-
2. Mucosal disorders	↓	↑	Abnormal	No change	-
3. Bacterial overgrowth	↓	↑	N/A	↓	> 10Col/ul
4. Bile Salt deficiency	↓	↑	Normal	No change	-

Whipple's Disease

Caused by **Tropheryma whipplei** (Gram positive bacilli)
Appears as PAS positive material in macrophages
Diagnosis confirmed by PCR on biopsy sample or CSF

Prodromal stage:

Intermittent episodes of polyathritis or oligoarthritis of the large joints. Rarely chronic seronegative polyarthritis resembling RA

Steady State:

Diarrhea and weight loss are the most common symptoms
CNS: Dementia, myoclonus, supranuclear opthalmoplegia, DI
Psychiatric: Depression and personality changes
Cardiac: Pericarditis, myocarditis, culture negative endocarditis
Lungs: Pleural effusion, lung infilterates, mediastinal lymphadenopathy

Treatment:

IV Ceftriaxone for 2 weeks followed by oral TMP/SMX for 12-18 months

or

Doxycycline + hydroxychloroquin + TMP/SMX for 12-18 months

Ex) chronic watery diarrhea w/ vesicular eruption over extensor surface of (B) elbows
Fe-defic. Anemia
Dx:

Celiac Sprue (Gluten-sensitive enteropathy)

↑d risk of osteoporosis/ osteomalacia

S/S: Abdominal discomfort, bloating, diarrhea, flatulence, weight loss
Deficiency of iron (most common), folic acid, vitamin D & K → Fe + Folate Defic. → microcytes and macrocytes → normal MCV but ↑RDW
Seatorrhea with severe extensive enteropathy
Hyposplenism and apthous stomatitis
May be associated with Dermatitis herpatiformis or other auto-immune diseases (esp. hypothyroidism)

Diagnosis: IGA antiendomysial (anti-tissue transglutaminase antibody) → will be ⊖ in ~10% → IgA Defic.
If ⊖ then → IGA and IGG antigliadin antibody
→ Small bowel biopsy (absent villi and hyperplastic crypts)
Microscopic stool examination or 3 day measurement of stool fat.

Treatment: Gluten free diet (avoid wheat, barley, rye)
Initially avoid foods containing oats and lactose
Avoid beers, lagers, ales, and stouts
IV steroids for acute celiac crisis

Tropical Sprue
- assoc. w/ China travel
- malabsorption
Tx: Tetracycline + Folate x 2-4wks.

Osmotic and Secretory Diarrheas

	Osmotic	Secretory
Stool volume	< 1 L	> 1L
Osmolal gap	> 125	< 50
Effect of fasting	Diarrhea stops	Continues

- malabsorption w/ bacterial overgrowth
- cause → bile salt deconjugation

Osmolal gap = 290 - calculated stool osmolality (2x (Na + K))

Osmotic: Lactose intolerance, osmotic laxatives (Mg, polyethylene glycol), sorbitol, lactulose

Secretory: Stimulant laxative, bacterial toxins, drugs, hyperthyroidism, autonomic neuropathy, post-vagotomy, villous adenoma, neuroendocrine tumors, hyperthyrodism

carcinoid → ↑ 5-HIAA in urine

Infectious Diarrheas

Neisseria Colitis
-assoc. w/ tenesmus (incomplete evacuation)
↓
proctitis
-transmitted via anal intercourse

Staph
-short incubation period
-V/D
-Tx: supportive

Toxigenic

C. perfringens
ϕ diarrhea / vomiting just

1. Staph. aureus
2. Clostridium perfringens
3. E. coli → traveler's diarrhea Tx: Cipro or Azithro
4. Bacillus cereus
5. Vibrio Cholera
6. Giardia → only one to produce malabsorption

B. cereus
V/D -
-fried rice in oriental restaurant
-similar to Staph.

Vibrio C.
-tx w/ Tetracycline

Stool Ag
-frequent giardiasis
↓
Think CVID ↓IgG

Invasive

fever, blood, fecal WBC's

1. Shigella
2. Salmonella
3. Vibrio parahaemolyticus
4. E. coli - most common cause of bloody diarrhea w/out fever
5. C.difficile → Flagyl / Vanco
6. Campylobacter → most common cause
7. Vibrio vulnificus
8. Amoeba → mimics UC
Tx: Flagyl

Shigella
Hus
Tx Cipro x3days

Salmonella
uncomplicated
↓
ϕ tx
tx if bacteremic or aortic aneurysm or prosthetic

Vibrio P.
-uncooked shellfish

EColi O157:H7
Hus
ϕ tx w/ A-bx

Campylobacteri
-pronounced abd. pain
-fevers

Vibrio V
-Tx - Doxy
seawater drinking

Bacterial Food Poisoning

Incubation	Organism
1-6 hours	Staph. aureus, Bacillus cereus
7-16 hours	Bacillus cereus, Clostridium perfringens
> 16 hours	Enterotoxigenic E. coli, Vibrio Cholera, Campylobacter, V. parahemolyticus, Shigella, Salmonella

Irritable Bowel Syndrome

workup
-<50 y/o. → colonoscopy otherwise sigmoid
Bx colon to r/o microscopic colitis

Abdominal pain or discomfort for > 12 weeks (not necessarily consecutive) in the preceding 12 months

Plus 2 of the following

a) Pain is relieved with defecation

b) Onset is associated with a change in the frequency of bowel movements

c) Onset is associated with a change in the form of the stool (loose, watery, or pellet-like)

Treatment of Irritable Bowel Syndrome

Pain predominant

Anticholinergics: Dicyclomine, hyoscyamine
Tricyclics: Amitriptyline, nortriptyline, desipramine
SSRI, NSAIDs, Opioids

collagenous Colitis
Tx: Bismuth

Diarrhea predominant

Leperamide, diphenoxylate, cholestyramine, alosetron

Constipation predominant

High fiber diet
Psyllium bulk laxatives (metamucil)
Osmotic laxatives: Lactulose, polyethyl glycol, milk of magnesia, magnesium citrate

most important ? to ask → childhood abuse
↓
assoc. w/ IBS

Inflammatory Bowel Diseases

↑ risk of sclerosing cholangitis
↑ cholangio carcinoma

	Ulcerative colitis	Crohn's
1. Type of involvement	Diffuse, no skip areas	Skip areas +
2. Depth of involvement	Mucosa &submucosa	Transmural
3. Rectal involvement	95%	50%
4. Perianal disease	-	+
5. Fistulas	-	+
6. Abdominal mass	-	+
7. FUO	-	+
8. Ileal involvement	-	+
9. Aphthous & linear ulcers	-	+
10. Cobblestone apperance	-	+
11. Ulceration	Fine, superficial	Deep with submucosal extension
12 ANCA	70%	Occasional
13. Anti-saccharomyces antibody	occasional	> 50%

→ ↑ risk w/ @ tobacco

Treatment of Ulcerative Colitis

→ surveillance colonoscopies Q1–2 yrs. w/ disease presence >10 yrs.

Proctitis or distal colitis (<60cm)

1. Steroid or 5 ASA (mesalamine) suppository or enemas → will hit sigmoid + rectum (will only hit the rectum (+sigmoid))
2. Oral aminosalicylates (6 weeks)
   - Sulfasalazine
   - Mesalamine
3. Oral + topical Rx

Proximal Colitis

Oral Aminosalicylates

- Response
- No response or severe dis.
  - Prednisone ± Cyclosporine
  - Taper after remission

Long term prophylaxis with aminosalicylates

Low-Grade Dysplasia (c/w adenocarcinoma or progression to in 1/4 cases) → Colectomy

Treatment of Crohn's Disease

If suspected Crohn's and a normal colonoscopy → CT Enterography

Mild to Moderate

Oral aminosalicylates

Metronidazole ± Ciprofloxacin

No response

Corticosteroid

Severe

Corticosteroid (Budesonide if ileal disease)

w/ chronic diarrhea malnutrition ↓alb. → TPN

Immunosuppressive drugs or surgery for steroid dependent or resistant patient

Monoclonal antibody to tumor necrosis factor (Infliximab) → DOC for fistulous Crohn's Dis.

Maintenance: Aminosalicylate or Metronidazole ± ciprofloxacin or 6 –MP or azathioprine

Extraintestinal Manifestations of IBD

Joints : Peripheral arthritis, ankylosing spondylitis
Skin : Erythema nodosum, pyoderma gangrenosa, aphthous ulcers
Eye : Uveitis & episceretis
Liver : Sclerosing cholangitis, pericholangitis, CAH, fatty liver

Ischemic Bowel Disease

→abdominal pain out-of-proportion to physical exam

Dx: Angiogram

- sudden onset
- periumbilical pain
- vomiting
- tenderness
- ✓angiogram

Tx: surgery

1. Acute mesenteric ischemia

very acute in onset

a) Embolism b) Thrombosis (~15% of cases) usually SMV — more delayed in onset

2. Chronic mesenteric ischemia → - Abd. pain after eating + wt loss

- ✓angiogram

Tx: angioplasty or surgery

most common causes
- malignancy
- coagulopathy (prothrombotic)

3. Ischemic colitis → mild abd. pain (if any)

↳ - case resembles malignant process

- frank GI Bleeding (self-limited)
- thumbprinting on x-ray
- Tx: supportive

Avoid Barium swallow → ↑'d risk of perforation

Treatment of Acute Diverticulitis

- after 2nd attack → surgical resection
↑ 30-50% incidence after 2nd attack

Oral regimens for outpatients
- Metronidazole + ciprofloxacin
- Metronidazole + TMP/SMX
- Amoxicillin-Clavulanate

→ then PCP flu in 3-5 days

Inravenous regimens for inpatients
- Metronidazole + ciprofloxacin
- Metronidazole + Ceftriaxone
- Ampicillin-sulbactam

colonic dilation >6 cm → Toxic Megacolon

Short Bowel - Bile salt Deconjugation

PPI or H_2 Blocker ↓ gastric acid ↓ ↓'s stomal fluid losses

- >100 cm: ↓-fat diet
- <100 cm: bile acid diarrhea → will likely need chronic TPN
- fecal fat >40g → pancreatic insuff.

<115 cm