---BILIARY TRACT---

Physiology

Bile composition: cholesterol, bilirubin, bile acids, lecithin
Cholesterol is most soluble if >50% bile acids present
Most bile acids (95%) reabsorbed, mostly in terminal ileum (may recirculate 2-3x/meal)
↑bile acid loss = ↓[bile acid] = ↑lithogenicity (stone formation)
#1 (70%) gallstones = mixed (hi [cholest])
20% = black stones: sterile, d/t hemolysis
Brown stones: w/ infected bile, found in bile ducts
Lap chole for ASx cholelithiasis in: pts w/ DM, SCA, kids, porcelain GB, stone >2cm

Imaging

---Ultrasound
Highly sensitive for detecting gallstones
Acute cholecystitis: 1) thick GB wall 2) perichol fluid 3) stone + acoustic shadow
Air in lumen/GB wall = acute emphysematous cholecystitis
May see dilated bile ducts
Only 15% gallstones seen on xray
---HIDA
IV dye→ liver→ GB
No filling in 4 hours = cystic duct obstruction (NL filling time = 30 mins)
Sensitivity: 96%; Specificity 93%
False + in pts w/ hepatitis or on TPN
Used after U/S shows only gallstones but no other abnormalities
--CT: best for mass w/u, not for GB stones
--MRC: good for localizing CBD stones and biliary tract abnormalities (strictures)

Jaundice

Light stools & dark, tea colored urine, pruritis
Severe, sharp pain = calculous dz
Dull, vague ache (+ wt loss) = malignancy (pancreatic head tumor)
Courvoisier's law: palpable, nontender GB (vs w/ stone, GB thickens, can't distend)
Bile duct obstrxn: ↑direct bili (urine), ↓urine urobilinogen (made by gut bact)

Biliary colic

d/t transient obstruction of cystic duct
Often postprandial, esp larger, more fatty meals
Dull, visceral, steady pain < 4 hours
Pts exhibit writhing movements
Pain rarely relieved by anything

Acute cholecystitis

Acute inflammation/infxn of GB
Sharp, well localized, steady pain, > 4 hours
Fever, Murphy's sign, Boa's sign (R subscapular pain), ↑WBC (left shift)
Mild hyperbili

Rx: NPO, IVF, ABX, lap chole w/in 3 days (choleycystostomy in sick pts)
Acute gangrenous cholecystitis: 20% mortality
Acute acalculous cholecystitis: ICU pts, pts on TPN; Rx: perc cholecystostomy

Acute emphysematous cholecystitis
Gas forming bact, increased perf risk
Older, diabetic pts
Rx: ABX, lap chole

Choledocholithiasis
CBD stone, fluctuating jaundice, h/o biliary colic
U/S shows dilated CBD (>8mm), misses 50% CBD stones; MRCP or ERCP is best
↑T bili, ↑direct bili, ↑alk phos
Rx: ERCP

Acute cholangitis
CBD stone + infection in biliary tree
Charcot's triad: fever, RUQ pain, jaundice
Reynolds pentad: Charcot's + hypotension, altered mental status
Common bugs: E coli, Klebsiella, Enterobacter, Strep faecalis, Bacteroides
Usually occurs in older females
Elderly may be Asx until sepsis occurs
Physical exam findings similar to acute chole
Dx: U/S then ERCP,
Rx: NPO, IVF, ABX, ERCP/PTC/lap chole (remove stone then GB)
15% pts don't respond to ABX and IVF, need emergent decompression
5% mortality

Acute suppurative cholangitis
Pus in bile ducts
Reynold's pentad: Charcot's + hypotension, altered mental status
Rx: urgent CBD decompression

Acute biliary (gallstone) pancreatitis
d/t small stones + sludge , not large stone
Elevated amylase/lipase
Rx: ERCP/sphincterotomy if dz progresses
Lap chole once pancreatitis resolves (b/c dz recurs in 30-60%)

Gallstone ileus
Stone erodes thru GB into duodenum (fistula formed): SBO (terminal ileum) + biliary colic
AXR: air in biliary tree
U/S: good but air may block visualization of stone
CT w/contrast is best
Rx: celiotomy + enterolithotomy (removal of stone from small intestine)
Px: pts usu elderly w/ comorbities, thus do not perform lap chole or fistula repair (hi infxn/mort)

GB cancer
If localized to GB: lap chole
If spread to liver: wedge resection of GB bed, liver
5 yr survival < 5%

Extrahepatic bile duct malignancies
Rare; pts in 50s-70s
Increased risk in pts w/ U.C., PSC (sclerosing cholangitis), choledochal cyst, parasite dz
Spread locally but rarely met (curative resection is rare)
S/Sx: progressive jaundice, Courvoisier's sign
Prox 1/3 tumors: resect ducts if poss; 5 yr survival 5%
Mid 1/3 tumors: resect; 5 yr survival 10%
Distal 1/3 tumors: whipple; 5 yr survival 35%

Congenital choledochal cysts
Cystic enlargement of bile duct
Usu females in teens, 20s
S/Sx: abd pain, jaundice, mass
Imaging shows extrahepatic duct dilation w/o obstruction
Rx: total excision w/ f/u for strictures

Bile duct injury
90% of bile duct strictures are iatrogenic (lap chole higher incidence than open chole)
If injury suspected intraop, perform cholangiography
Ducts <3mm may be ligated; otherwise repair immediately
If suspected post op (pain, jaundice, sepsis): U/S, HIDA, CT, ERCP, PTC
Rx: ERCP sphincterotomy and stent

Laprascopic cholecystectomy (vs open)
Advantages: ↓post op pain, ↓wound cx, ↓pulmonary cx
Disadvantages: cost, ↑injury to bile ducts / intestine / vessels