

## **Vesalius SCALpel™ : Biliary (see also: biliary/pancreatic folios)**

### **Physiology**

95% of bile acids reabsorbed; colic and chenodeoxycolic primary bile acids  
cholecystokinin (CCK) major stimulus of gallbladder contraction  
    hepatic branch of anterior vagus secondary stimulus of contraction  
somatostatin & VIP inhibit Gb contraction, cause stasis  
post-prandial Gb emptying 80% @ 2h  
gallstone risk factors: obesity, rapid wt gain, exogenous estrogen  
    mixed micelles no role in cholesterol stone formation  
    black pigment stones in hemolysis, cirrhosis  
    brown pigment stones stasis, infection

### **Prophylactic cholecystectomy**

hemolytic disorders: sickle cell, thalassemia, spherocytosis  
    if need to do splenectomy, remove Gb at same time  
calcified (porcelain Gb): not as high incidence of cancer as once thought  
large stone > 2.5cm, associated with increased risk of Ca  
transplant patient: danger of cholecystitis with immunosuppression  
diabetics with stones: get sicker, surgery not more complicated  
gallstones increased in spinal injured pts, but severity same, no indication for prophylactic  
    cholecystectomy  
    pts can manifest Gb symptoms, not renal symptoms  
contraindication: cirrhosis

### **Biliary colic**

obstruction of the neck of the gallbladder by stone without inflammation or infection  
visceral pain lasting up to hours  
presenting symptom of gallstone disease in 80%  
only 10-20% of patients with gallstones experience pain  
1-2%/y risk of biliary colic in asymptomatic patients  
multiple other causes of upper abdominal pain (e.g. ulcer, pancreatic disease) to be ruled out  
    cholecystectomy may not relieve symptoms if other cause is operative

### **Cholecystitis**

cystic duct obstruction leads to inflammation  
    sterile/chemical or secondary bacterial infection  
    easier surgery early (24-48h) due to serosal edema  
    > 48-72h subacute, fibrosis/brawny edema more difficult  
    if surgery contraindicated (eg MI), cholecystostomy (percutaneous most commonly)  
adenomyomatosis may cause RUQ pain

## **Chronic acalculus cholecystitis**

HIDA ejection fraction < 30%, late visualization  
reproduction of pain on CCK injection most convincing of diagnosis and probability of relieving symptoms

## **Acute acalculus cholecystitis**

sick, ICU patient commonly  
post op, trauma, burn, hypovolemia, prolonged ileus, opiate, TPN, sepsis, starvation, low flow state  
ischemia, stasis final common pathways; 38% positive culture  
lap chole: 0.3% mort, 1% duct injury, 5% conversion (more in acute/subacute)

## **Cholangitis**

choledocholithiasis highest incidence of positive bile culture (chronic cholecystitis lowest)  
hematogenous via portal v most common source  
cholangitis requires both obstruction and bacteria  
serum concentration of antibiotics most important Rx factor  
Charcot: fever, pain, jaundice  
Reynolds pentad: add shock and mental status changes  
decompress, relieve obstruction with stent  
cover Gm- and anaerobes: e. coli > klebsiella > enterococcus > bacteroides in order of frequency

## **Gallstone ileus**

female, ~70yo  
75% fistula between Gb and duodenum (also stomach, colon, small bowel)  
passage of large (>2.5cm) stone  
50% of patients have hx of Gb disease  
50% of patients have pneumobilia  
intermittent obstruction over several days (tumbling)  
Rx enterotomy proximal to obstruction, remove stone, examine proximal bowel for additional stone  
interval cholecystectomy for symptomatic pts (30%)

## **Benign biliary stricture**

85% iatrogenic: post-op, Endoscopic biliary manipulation (stone extraction, stent)  
bile duct injury requiring reconstruction: laparoscopic equivalent to open  
document extent and location with ERCP, percutaneous cholangiogram  
repair with or without T-tube, Roux-Y if recognize injury immediately  
late Roux-Y choledochojejunostomy; occasional success with dilatation and stent

unreconstructable, secondary biliary cirrhosis may require transplant

## **Gb polyps**

most cholesterol, 8% malignant

risks malignancy: age > 50, size > 10mm, concomitant stones, solitary, symptomatic

< 10mm observe w US Q3-6mo, if changing or pt > 50 remove

> 10mm, symptomatic remove

< 18mm, most not through wall, do lap chole

> 18mm do open chole

## **Bile duct injury**

most bile duct injuries occur during elective procedures: misidentify cystic/common

Bismuth classification:

1 > 2cm of duct left

2 < 2cm

3 injury in continuity at bifurcation

4 no continuity R & L hepatic ducts

## **Gb cancer**

women > men, 1% of patients with stones

risks: older, chronic typhoid carriers, stone > 3cm, calcified gallbladder (10-60%)

90% adenocarcinoma, peritoneal spread

rarely diagnosed pre-op

asymmetric Gb wall without inflammation

>1cm Gb polyp suspicious, do open chole

percutaneous bx for suspected mets only, not for Gb

prognosis depends on depth:

stage I, mucosa only, 60% 5y survival

cholecystectomy alone for stage I

stage IV, all layers and N+ 7% 5y

extended cholecystectomy (en block resection segments IVb and V) plus lymph node

dissection (hepatoduodenal ligament and peripancreatic) for all but mucosal

lesion/stage I (usually incidental finding)

## **Primary sclerosing cholangitis**

chronic progressive generalized stricture

F:M, 40:60%

50% of cases associated with inflammatory bowel disease (UC)

also associated w pancreatitis

no medical Rx

pre-malignant, 10% incidence of cholangiocarcinoma

symptoms: jaundice, pruritis, recurring cholangitis, fatigue, wt. loss

25% asymptomatic  
dilatation not effective  
surgical resection of dominant stricture rarely beneficial  
may come to transplant

## **Choledochocoele**

I diffuse fusiform common bile duct dilatation, 95% type I  
RUQ mass, pain, jaundice, nausea and vomiting, fever, chills  
resect  
II diverticulum, resect  
III intraduodenal: sphincterotomy, Whipple, Roux-Y  
IV intra and extrahepatic  
resect extrahepatic, dilate intrahepatic stricture  
transplant  
V multiple intrahepatic (Caroli's)  
episodes cholangitis, jaundice  
ultimately transplant  
malignant potential, bypass not indicated

Choledochal cyst narrative:

[http://vesalius.com/cfoli\\_frms.asp?VID=1410&StartFrame=1&tnVID=1411](http://vesalius.com/cfoli_frms.asp?VID=1410&StartFrame=1&tnVID=1411)

Choledochal cyst discussion:

[http://vesalius.com/graphics/cf\\_quicknotes/qn.asp?VID=1412](http://vesalius.com/graphics/cf_quicknotes/qn.asp?VID=1412)

## **Cholangiocarcinoma**

60-65yo, M>F  
risks: cystic dilatation of ducts, hepatolithiasis, primary sclerosing cholangitis, chlonorchis  
35% distal common bile duct, 30% common hepatic, 20% bifurcation (Klatskin),  
diffuse 15%  
90% present with jaundice  
resection only Rx  
obstruction: maximum bilirubin 30  
higher = renal, hemolysis, hepatocellular disease  
hypotension, bile acidemia, endotoxemia cause renal failure with obstruction

## **Hemobilia**

iatrogenic 50%: biliary drainage, liver bx  
trauma: blunt > penetrating  
abdominal pain, UGI bleed, jaundice; all 3 in 22%  
blood loss, occlusive clots in the biliary tree  
major bleed: melena 90%, hematemesis 60%, biliary colic 70%, jaundice 60%

EGD, R/O other sources, 10% diagnostic  
Dx: angio, therapeutic embolization 80-100% success  
surgery if embolization fails: ligate vessel, excise aneurysm, hepatic a ligation, resection

**References:**

Massarweh N. Role of intraoperative cholangiography in avoiding bile duct injury. JACS, 204(4), April '07: 656-664.