Vesalius SCALpel™ : Portal hypertension (see also: VIDs 165, 554, discussion 753)

25% of cirrhotics have varices
- 25-33% with varices will bleed at some point
  - 25% mortality with variceal bleed
  - 66% incidence of rebleeding without intervention
  - 50% of pts with varices who bleed, bleed from other causes

normal portal pressure 8mm, higher 2/3 develop varices, 1/3 bleed > 12mm
- varices bleed by rupture, not erosion

Location of blockage

- prehepatic: portal V, splenic V, tumor at porta
- intrahepatic: cirrhosis (alcoholic, hepatitis, toxic injury)(polycystic liver and Caroli's may be complicated by portal hypertension)
- posthepatic: Budd-Chiari

Encephalopathy

- cause unclear; nitrogenous compounds contribute
- sepsis, constipation, dehydration, blood in gut
- no diagnostic test (serum NH_4, EEG non-diagnostic)
- treat dehydration, decrease protein intake, cleanse gut (lactulose, induces diarrhea, does not decrease colonic flora), treat other causes

Ascites

- when sinusoidal pressure exceeds colloid oncotic pressure
- induced by physiologic stress, IV fluids (decreased colloid oncotic press)
- complications
  - spontaneous bacterial peritonitis
  - hepatorenal syndrome (extreme prerenal azotemia)
- control:
  - medical therapy is treatment of choice
    - Na/H_2O restriction, spironolactone (promotes Na diuresis), then give loop diuretic (lasix) if necessary
  - large volume pracentesis (several liters) is safe
    - replace albumin?
  - peritoneal-venous shunt
    - clog early with protein
    - sepsis within 6 weeks
    - increases chance of variceal bleeding (increases circulating volume)
    - contraindicated: bacterial peritonitis, uncontrolled coagulopathy, CHF
  - transjugular intrahepatic porta-systemic shunt (TIPS):
    - trade encephalopathy for ascites
    - doesn't always control, high occlusion rate and encephalopathy like shunt

last resort
umbilical hernia with uncontrolled ascites 30% morbidity, 5% mortality, v 15 and 0 when ascites is controlled

Bleeding

each bleeding admission carries a 25-50% mortality
limit crystalloid, transfuse RBC, FFP, platelets (rarely, only if drops < 50K, mechanism: splenic engorgement and sequestration)
maintain tissue perfusion, monitor urine output, don't overload (variceal pressure parallels CVP, increases bleeding)
prior use of vasopressin: intense constriction all arterial beds, stopped 80% of bleeds
risk peripheral, myocardial ischemia (NTG ameliorates latter)
somatostatin/octreotide drug of choice, 85% success, less side effects, safer
as effective as vasopressin
50mcg bolus, then 50mcg/h X 24h after endoscopy
EGD: 50% of UGI bleeds in cirrhotics are non-variceal
varices source if active bleeding or stigmata and no other source
start somatostatin as soon as possible after accurate Dx, not before scope
with encephalopathy protect airway with intubation before scope
Rx: banding treatment of choice v sclerosing, safer
occasionally requires TIPS
emergency shunt last resort
support after bleeding stops: coag. correction, FFP, vit K, (platelets)
hepatitis profile, angio if evaluation for transplant appropriate

Child-Pugh (Gardner numeric score modification)

original classification to assess for portacaval shunt

	A	B	C
Bilirubin	<2	2-3	>3
albumin	>3.5	2.8-3.5	<2.8
ascites	none	controlled	uncontrolled
encephalopathy	none	minimal	advanced
nutrition	excellent	good	poor

point score: A=1, B=2, C=3 (15 max)
Class (total score): A 5-6, B 7-9, C 10-15

Hepatic coma

decrease protein to 50g/d, control bleeding, lactulose cathartic (acidifies colon, decreases ammonia absorption)
non-absorbable antibiotics: kanamycin, neomycin

MELD (model for end-stage liver disease score)

developed for TIPS but general applicability for liver transplant, more precise than Child
Cr, tot bili, INR, etiology of cirrhosis factors in score

Definitive treatment

2/3 of bleeders will rebleed, most early, <6w
25% of bleeders will die on that admission
definitive treatment indicated with first bleed
beta block decreases bleeding by decreasing cardiac output
    prophylaxis for varices that haven't bled
endoscopic Rx
    banding treatment of choice, as effective as sclerosing with fewer complications, lowest incidence of encephalopathy
    sclerosing: multiple sessions, >60% rebleed, 1/3 fail, 30% complications (ulceration, stricture, perforation, fever, mediastinitis, CNS (embolization of sclerosant)
        rarely done anymore
surgery
    surgical treatment is rarely done anymore since the advent of endoscopic treatment, octreotide and TIPS
    total shunt: 90% prevention of rebleed, 40% encephalopathy
    selective: eg distal splenorenal, same mortality, effect, decreased encephalopathy
        Childs class A, B candidates, not C, high mortality
        low thrombosis (8%, technical error), promotes, does not decrease ascites
        less rebleeding, encephalopathy than portacaval
        distal splenorenal does not require splenectomy v central splenorenal
    partial shunt: short, 8-10mm (larger, 16mm clot) straight supported PTFE
    non-shunt: esophageal transection, variceal ligation, devascularization (done mostly outside US)
    transplant: treatment for liver failure only, not bleeding
TIPS (transjugular intrahepatic portacaval shunt)
    not indicated for prehepatic causes; polycystic liver or Caroli's (risk hemorrhage)
    surgery superior to TIPS Child class A, B
    99% successful technically, 9-50% complications, 3-13% mortality
    30-40% encephalopathy (v 10-15% for distal splenorenal)
    less rebleeding than Endoscopic banding
    33-73% occlusion at 1y, 18% rebleed
        US monitor every few months, dilate or restent
    role: refractory bleeding (after emergency shunt)
        bridge to transplant
        Child class C
        refractory ascites (trade for encephalopathy)

Splenic Vein thrombosis

due to pancreatitis, cancer
most do not result in varices
if coronary vein joins splenic proximal to the thrombosis, may result in esophageal varices
isolated gastric varices, < 10% bleed
anticoagulation increases risk of bleed
sclerosis and banding not effective for gastric varices
routine EGD not indicated
Rx with splenectomy if bleeding

Portal Vein thrombosis

congenital cavernous transformation, neonatal omphalitis
normal liver function with esophageal varices
mostly extrahepatic portal vein thrombosis in children, liver spared
    excellent results with shunt
Endoscopic Rx, distal splenorenal shunt (with normal liver function prevents
    encephalopathy)

Budd-Chiari (hepatic vein thrombosis)

etiology:
    coagulopathy: polycythemia, myeloproliferative , estrogen, disease, paroxysmal
        nocturnal hemoglobinuria, factor V Leiden, essential thrombocytosis,
            antiphospholipid syndr, protein C, S deficiency, antithrombin III deficiency
    IVC occlusion: right atrial myxoma, pericarditis, IVC membrane (most common cause in
        Asia: thrombolysis, angioplasty)
    liver mass
    hi dose chemotherapy
    (no association with right heart failure or cirrhosis)
presentation
    abdominal pain, ascites, new onset hepatomegaly (liver congested, capsule stretches)
Dx: duplex US, CT, angio.
Rx: depends of status of liver, Bx
    no central necrosis treat symptomatically
    lifelong anticoagulation for hypercoagulable state
    necrosis: do shunt (portacaval, mesoatrial) or transplant (in fulminant hepatic failure)
        75% long term transplant survival
    shunt effective in preserving liver function, controlling ascites, 85% symptomatic
    relief

50% of patients with portal hypertension and GI stoma develop parastomal varices: local measures, resite stoma