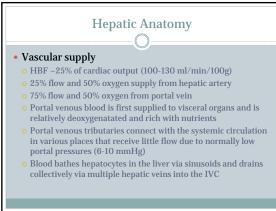
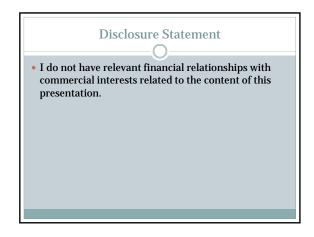
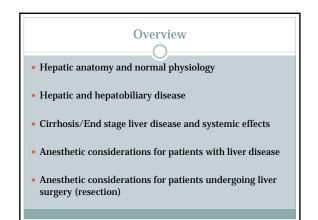
. 2, 2016	Liver Disease and A Surg AAAA ANNUAL MEET SRIKANTH SR
-----------	--

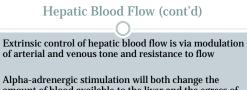




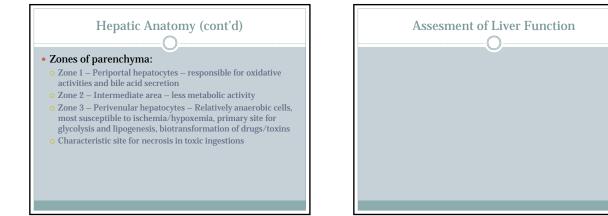
# Hepatic Arterial Buffer Response

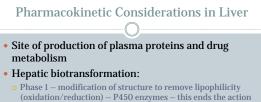
- A microvascular regulatory system in the liver to modify blood flow
- Reciprocal variation of hepatic arterial flow and portal venous flow
- Adenosine is constantly produced by hepatocytes in the periarteriolar regions of the liver and is typically washed out by relatively large portal venous flow Reduction of portal blood flow keeps some adenosine in the vicinity of hepatic arterioles and promotes vasodilation and increased flow
- This system can provide a reserve to account for up to 50% of portal venous flow – protects from ischemic insults since arterial flow has higher oxygen content





- amount of blood available to the liver and the egress of blood from the venous side. This leads to reduction in the blood flow to the liver and blood volume present in the sinusoids (important for function as a reservoir)
- Beta stimulation allows for vasodilation and the opposite effect.





- of the drug
  Phase 2 conjugation with polar substances increases water
- solubility for excretion
- Phase 1 reactions are the most susceptible to liver disease and age

# Hepatic Imaging

- Plain radiographs not helpful (except for pneumobilia)
- Ultrasound is a mainstay gall bladder, tumors, fat infiltration, ascites
- CT complementary to US contrast injection can give a more detailed anatomic picture
- MRI/MRCP very detailed visualization of biliary tree
- ERCP visualization and intervention better than percutaneous approach in IR
- Biopsy imaging guided, histologic diagnosis to determine nature and extent of injury/disease, contraindicated in coagulopathy

### Hepatic Pharmacokinetics (cont'd)

- Hepatic extraction ratio determines the intrinsic metabolic clearance of a drug in the liver
- Drugs with high extraction ratios (lidocaine, metoprolol as examples) are highly dependent on hepatic blood flow for clearance
- Drugs with low extraction ratios (benzos) have clearance that is independent of HBF
- Changes in the free fraction of drugs affect low extraction drugs more than high extraction drugs
- Liver disease affects pharmacokinetics profoundly: shunts, reduction in HBF, hypoalbuminemia, ascites

## Hepatic Disease

- Classify to parenchymal disease and cholestatic disease
- Nearly 10% of population in US suffers from some hepatobiliary disease
- Can lose up to 80% of liver parenchyma before seeing a reduction in functional capacity, so there is a great deal of physiologic reserve
- Hepatocytes also have a great deal of regenerative capacity

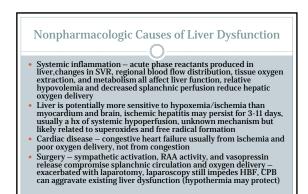
#### **Viral Hepatitis**

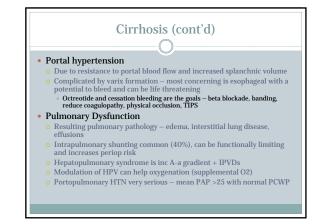
- Hepatitis A enteric infection, highly contagious for 21 days, hepatic failure is rare, coinfection with HCV frequently have FHF and high mortality, detected by serum antibody and RNA in stool Hepatitis B transmitted by percutaneous inoculation, possible chronic infection, rare to progress to cirrhosis, detected by HbsAg, anti-Hbc (if HbsAg to low), HbeAg (denotes infectivity), immunity confirmed by anti-HbsAg to low), HbeAg (denotes infectivity), immunity confirmed by anti-HbsAg to low).
- HbSAg **Hepatitis C** previously transfusion related, transmitted by inoculation (most common blood borne illness in USA), frequently results in chronic disease/cirrhosis/HCC, detected by HCV RNA or anti-HCV **Hepatitis D** RNA strands that coinfect with HBV, HDV coinfection greatly increases chance of FHF and death

- Hepatitis E enteric infection, similar to HAV, restricted in certain geographical **Other viruses** CMV, EBV, HSV usually opportunistic if disseminated to liver and can be very serious

#### Cirrhosis C

- Affects almost all organ/body systems
- Cardiovascular effects
- Vasodilation/shunting (dec. SVR) (NO mediated?)
- o Increased CO, maintained BP
- o Increased blood volume but resdistributed to splanchnic bed
- (appears as hypovolemia)
- Possible cardiomyopathy • Poor response to catecholamines
- Decreased HBF from reduction in portal flow





### Fatty/Alcoholic Liver C NAFLD vs NASH • 70% of obese and 75% diabetics have NAFLD Steatosis causes stress to hepatocyte and make more vulnerable to other insults $\rightarrow$ NASH +/- cirrhosis Alcoholic liver disease • Steatosis -> hepatitis -> cirrhosis • Can be very severe and life threatening

2-3x perioperative morbidity

#### Cirrhosis (cont'd)

#### Ascites and Edema

- Portal HTN + sodium and water retention
  - Na retention from aldosterone activity (decreased effective plasma vol  $\rightarrow$  inc renin secretion  $\rightarrow$  inc aldosterone)
- Treated with distal tubule diuretics spironolactone/amiloride, can also use furosemide but watch for excessive diuresis
- Refractory ascites often treated with paracentesis and shunt Caution for hypovolemia after large volume taps - usually
- manifested after 3 hours

#### Spontaneous bacterial peritonitis

- 10-30%, diagnosed with PMN's in ascites fluid, caused by translocation of gut bacteria?
  - May need long term prophyaxis

