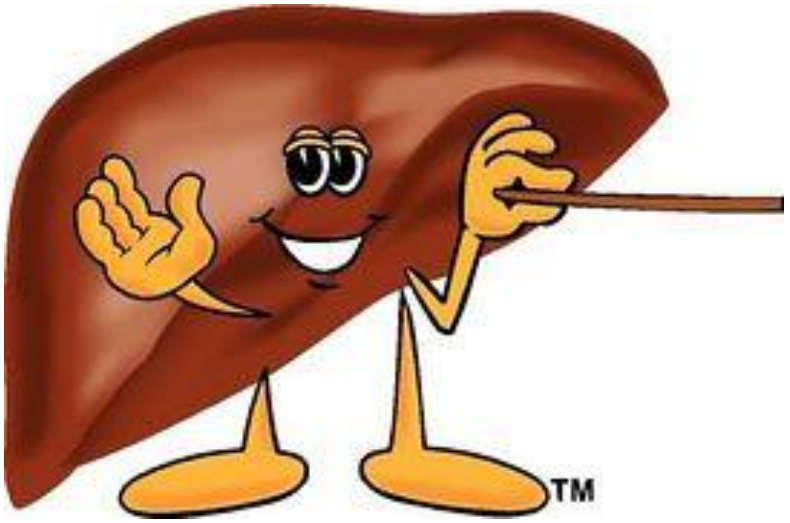
Liver Benign
Part 2

Nathalie Sela

Staff: Dr. Quan

Wednesday Seminar Teaching

Feb 24th, 2016



Objectives

- ***Medical Expert:***
  - Epidemiology, clinical presentation, diagnosis and management of cystic & solid liver lesions
  - Epidemiology, clinical presentation and diagnosis of bile duct cysts
  - Etiology, presentation, investigation, management of hemobilia
  - Indications, and use of transplantation for liver disease
- ***Collaborator:***
  - Role of imaging in differentiating benign solid and cystic hepatic masses
- ***Manager:***
  - Determining patient suitability for transplant
- ***Scholar:***
  - Review of some of the most recent seminal papers on topic

Solid Liver Lesions

- **Benign**
  - Hemangioma
  - Focal Nodular Hyperplasia (FNH)
  - Adenoma
  - Angiomyolipoma
  - Mesenchymal hamartoma
  - Solitary fibrous lesion
- **Malignant**
  - HCC
  - Metastatic disease

Benign Solid Lesions

	Adenoma	FNH	hemangioma
Incidence /100000	1-4	3-4	400-7500
Solitary %	90	90	90
Imaging	US, CT	US, CT, MRI	CT, MRI
Gross features	Hemorrhage, necrosis	Central scar	Blood filled cyst
Diagnosis	Imaging, biopsy	Imaging, biopsy	Imaging
Treatment	Discontinue OCP, Surgical resection	FU imaging	Surgical resection if symptomatic

Diagnostic Imaging

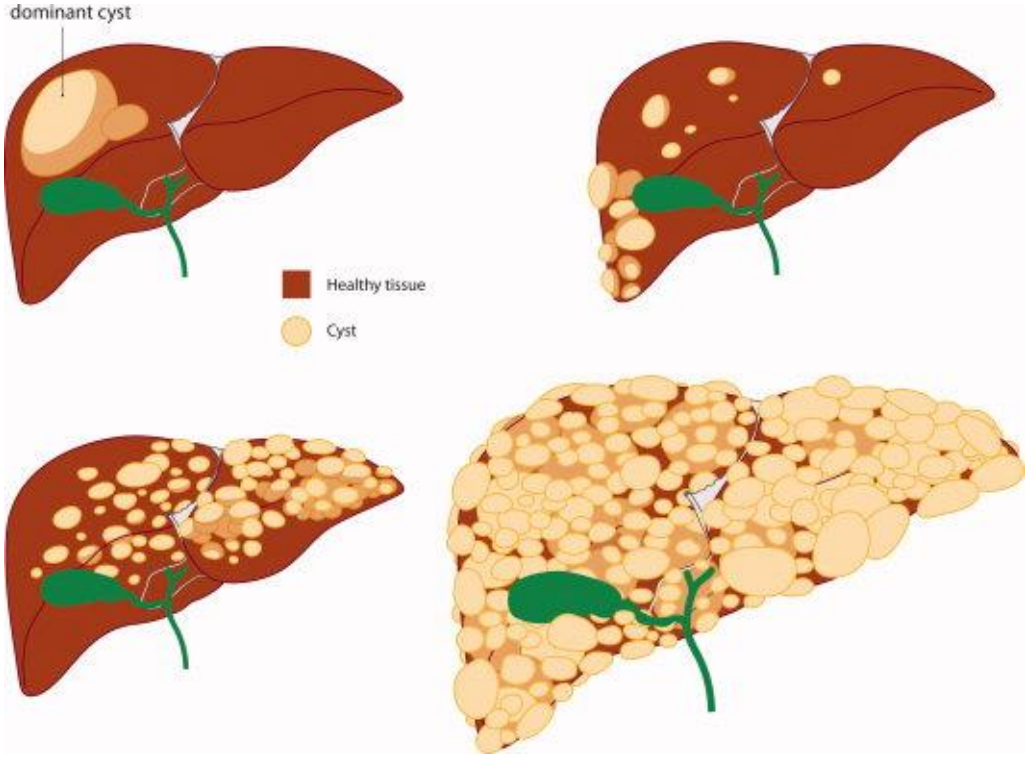
	Focal Nodular Hyperplasia	Adenoma	Fibrolamellar HCC
Ultrasound	Central scar (20%)	well-demarcated heterogeneous mass	variable
CT	Arterial enhancing, **Central scar** (20%)	absence of central scar, **hemorrhage**	Central scar (75%) Calcifications **LN enlargement**
MRI •T1	Iso-hypointense Hypo central scar	Variable	Isodense
•T2	Iso-hyperintense Hyper central scar	Mildly hyperintense	Hypointense central scar
•Gd	early arterial enhancement, central scar retains contrast on delayed scans	Early arterial enhancement	-
Nuclear Med Tc99m sulphur colloid scan	**Positive** (80%)	focal lesion with rim of increased uptake (25%)	**Negative**

Cystic Liver Lesions

- Simple cyst
- Polycystic Liver Disease
- Infectious cyst
  - Pyogenic abcess
  - Hydatid cyst
  - Amebic liver abcess
- Neoplastic
  - Cystadenoma
  - Cystadenocarcinoma

Polycystic Liver Disease

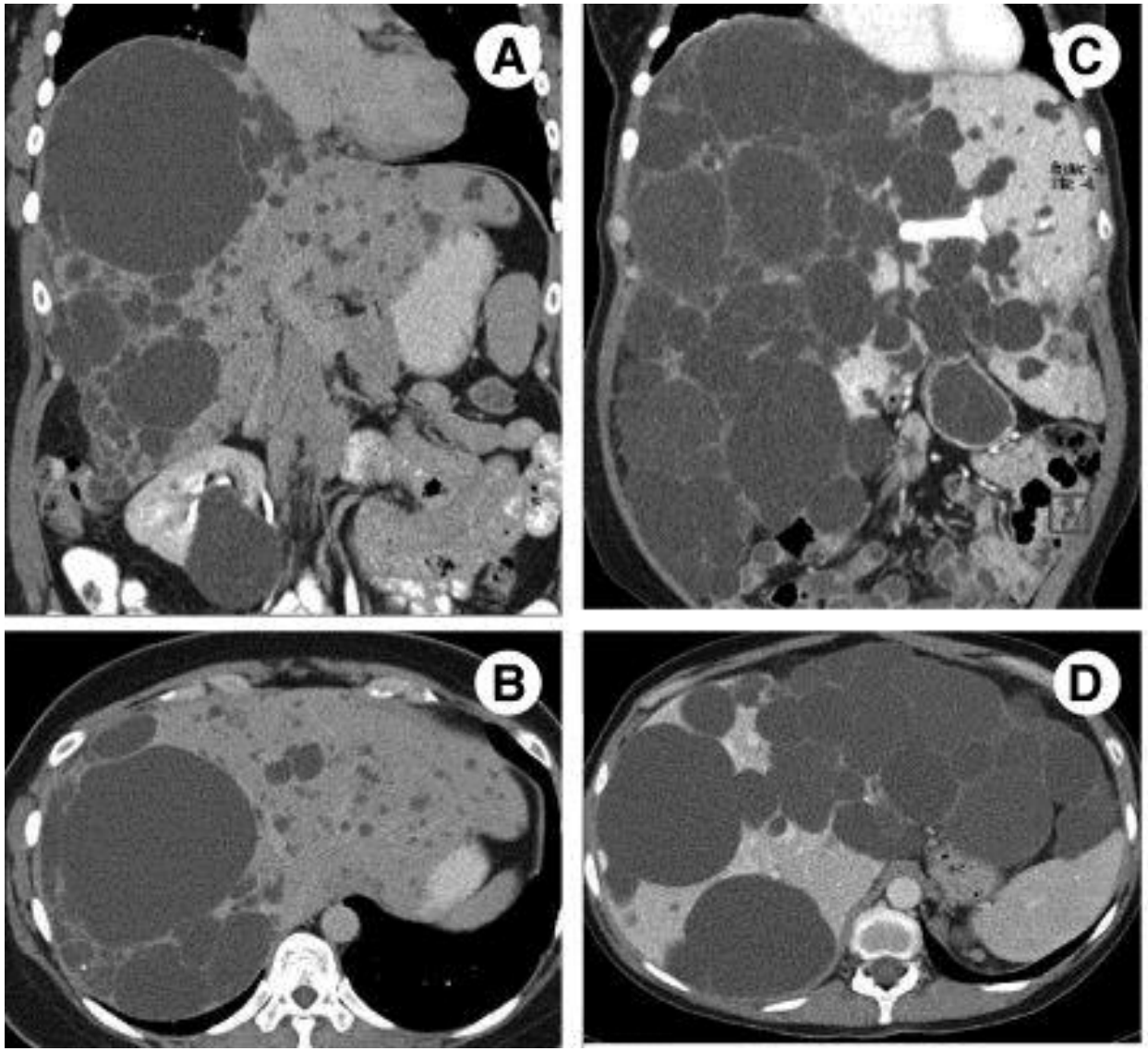
- Inherited autosomal dominant
  - Chromosome 19p and 6q
- Associated with PCKD
- Cysts throughout liver variable sizes
  - >20 cysts
- M=F



Polycystic Liver Disease

- Clinical Presentation
  - Majority asymptomatic
  - Abdominal discomfort RUQ
  - Complications
    - Fever if rupture or infected
    - Jaundice if compress bile duct
    - Portal hypertension if compress portal vein

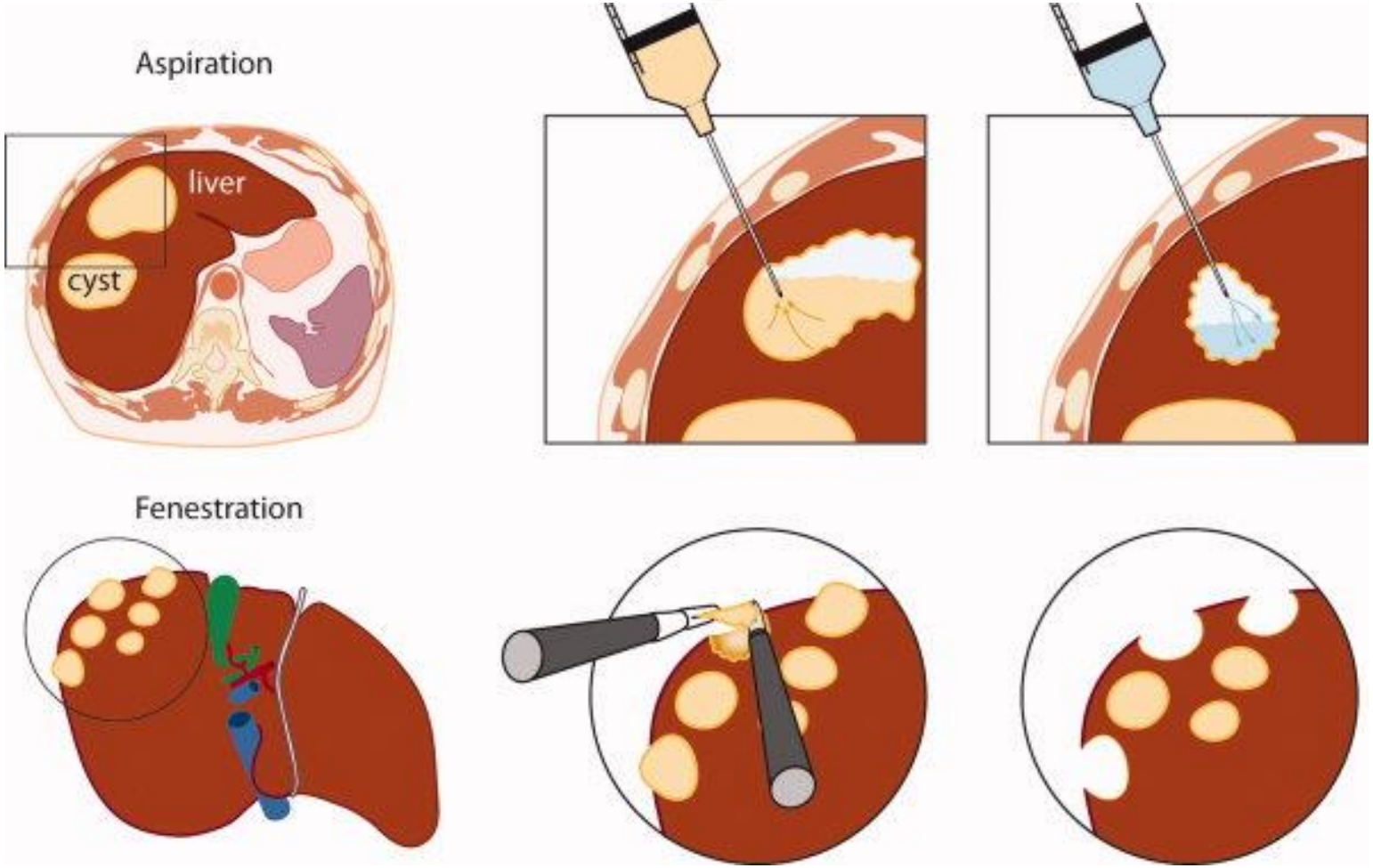
Polycystic Liver Disease



Polycystic Liver Disease: Management

- Surgical Indications
  - Symptomatic
- Surgical Options
  - Aspiration and sclerotherapy
  - Fenestration
  - Liver resection
  - Liver transplantation

Polycystic Liver Disease: Management



Liver Resection

- Cyst rich segments
- At least 1 segment which is cyst free
- Considered when fenestration is unlikely to reduce liver volume
- Symptom relief 85%
- recurrence 35%

Liver Transplantation

- Only curative treatment severe PLD
- Disabling symptoms with complications
  - Portal HTN
  - Malnutrition

- Morbidity 40%
- Survival 5 year 92%

Amebic Liver Abscess

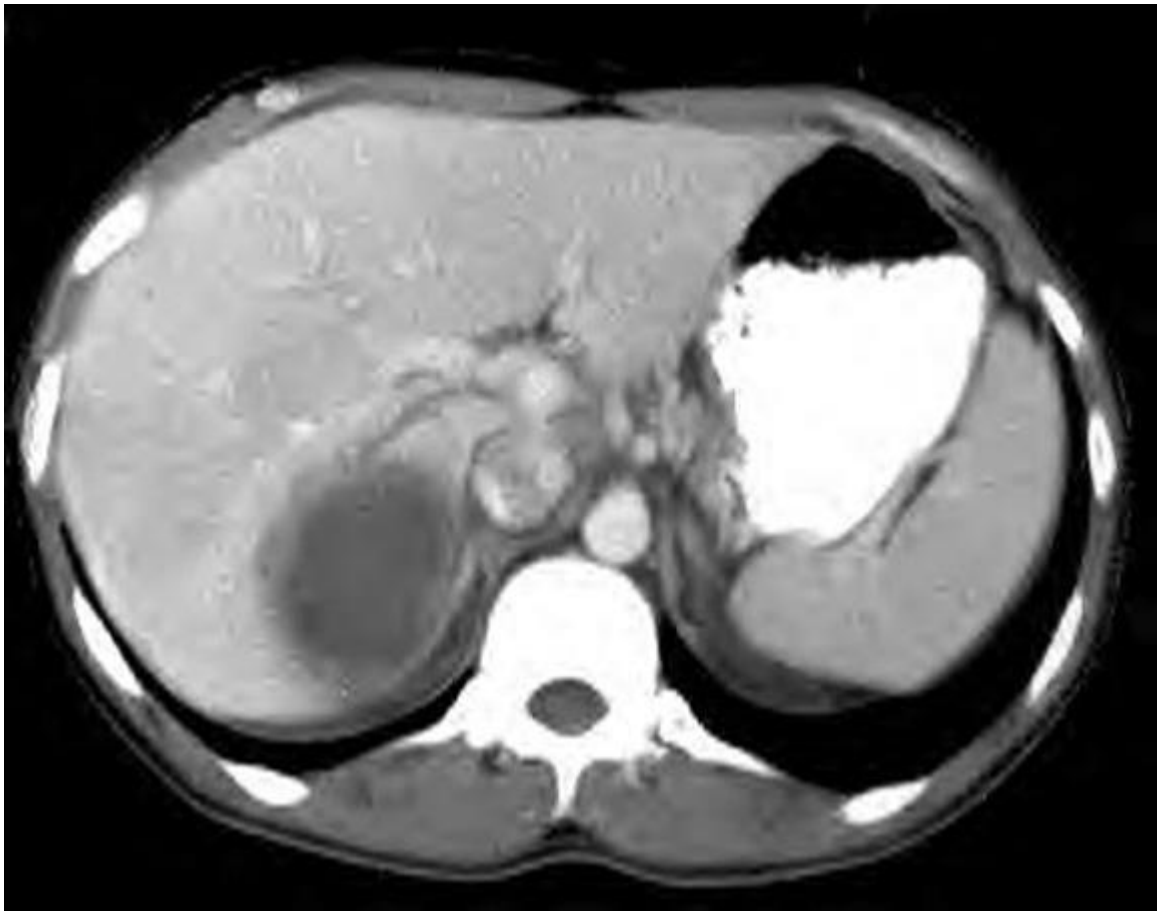
- Most frequent extraintestinal manifestation of *Entamoeba histolytica*
  - Protozoa
- Fecal oral transmission
- Right lobe more common
- 4% with amebic colitis have liver abscess
- RF
  - Travel
  - Endemic: Mexico, India, Central and South America
  - Male 12:1
- 2-7% rupture risk

Amebic Liver Abscess: Clinical Presentation

- Acute symptoms <14 days
  - Fever
  - Abdominal pain
    - RUQ
    - Dull
    - Constant
    - Radiate to R shoulder
  - Nausea
  - Vomiting
  - Jaundice (10%)
- Pulmonary 20-45%
  - Non productive cough, right lung base dullness

Amebic Liver Abscess: Diagnosis

- Elevated WBC
- Elevated AST in acute phase
- Serologic testing



- Ultrasound
  - 75-80% sensitivity
- CT
  - Smooth margin and contrast enhancing peripheral rim
  - 88-95% sensitivity

Amebic Liver Abscess: Management

- Medical Treatment
  - Flagyl 750mg TID x 10 day
  - Luminal agent prevent recurrence
    - diloxanide furoate,
    - Iodoquinol
    - Paromomycin

Amebic Liver Abscess: Management

- Needle aspiration ± drain
- Indications
  - High risk abscess rupture >5cm
  - Left lobe
  - Failure of medical therapy within 7 days

Bile Duct Cyst

- Single or multiple cysts throughout the biliary tree
- Incidence 1:100,000
- More common in women 3:1
- Potential for malignancy
  - Older adults
  - Type I and IV 10-30%

- Complications
  - Cholelithiasis, Choledocholithiasis, Hepatolithiasis
  - Cholangitis
  - Pancreatitis
  - Intraperitoneal cyst rupture
  - biliary cirrhosis
  - Bleeding due to erosion of the cyst into adjacent vessels

Bile Duct Cyst Classification

TYPE	SHAPE	DESCRIPTION	FREQUENCY
I		Choledochal cyst: cilindric or fusiform segmental dilatation	77% - 87%
II		Choledochal diverticulum: supraduodenal segment	< 2%
III		Choledochocele: intraduodenal diverticulus	< 1,5%
IV-A		Multiple cysts at intra and extrahepatic ducts	<19%
IV-B		Multiple cysts at extrahepatic ducts only	
V		Multiple cysts at intrahepatic ducts only (Caloli's Disease): segmental or difuse	<11%

TABLE 1 - Classification of biliary cystic dilatation as revised by Todani[49]. Frequency data from Vercruysse et al.[51]

Bile Duct Cyst: Clinical Presentation

- Majority present before age 10
- Triad
  - Abdominal pain
  - Jaundice
  - Palpable mass
- Adults may present:
  - Nausea, vomiting, fever, pruritis, weight loss
- Clinical presentation of complications
  - Pancreatitis, cholangitis, and obstructive jaundice

Bile Duct Cyst: Diagnosis

- Ultrasound initial investigation
- CT or MRCP to characterize the biliary tree
  - MRCP superior for pancreatic duct assessment
- ERCP (100% sensitivity)
  - Therapeutic (type III cysts)

Bile Duct Cyst: Management

- Type I, II, IV
  - Risk for malignancy
  - Surgical resection of cysts
  - Roux en Y hepatojejunostomy
- Type III
  - Symptomatic
  - ERCP with spincterotomy
- Type V
  - Supportive
  - Liver transplant

Hemobilia

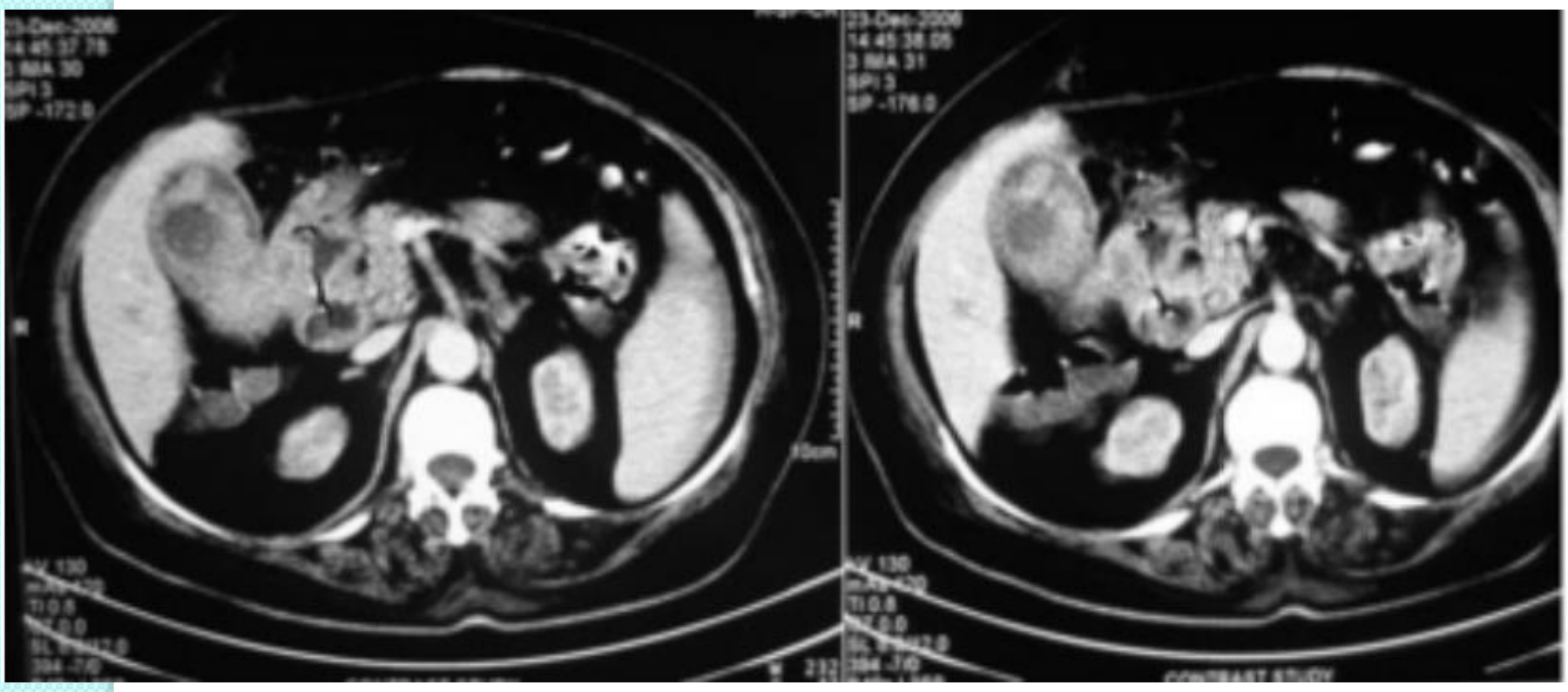
- Bleeding from hepatobiliary tree
- Rare cause of acute UGIB
- Iatrogenic
  - Recent hepatic or biliary tree instrumentation
  - Liver biopsy
  - TIPS
  - Intrahepatic stents
- Non-traumatic
  - Hepatic artery aneurisms
  - Hepatic or bile duct tumors
  - Gallstones
  - Hepatic abscess

Hemobilia: Clinical Presentation

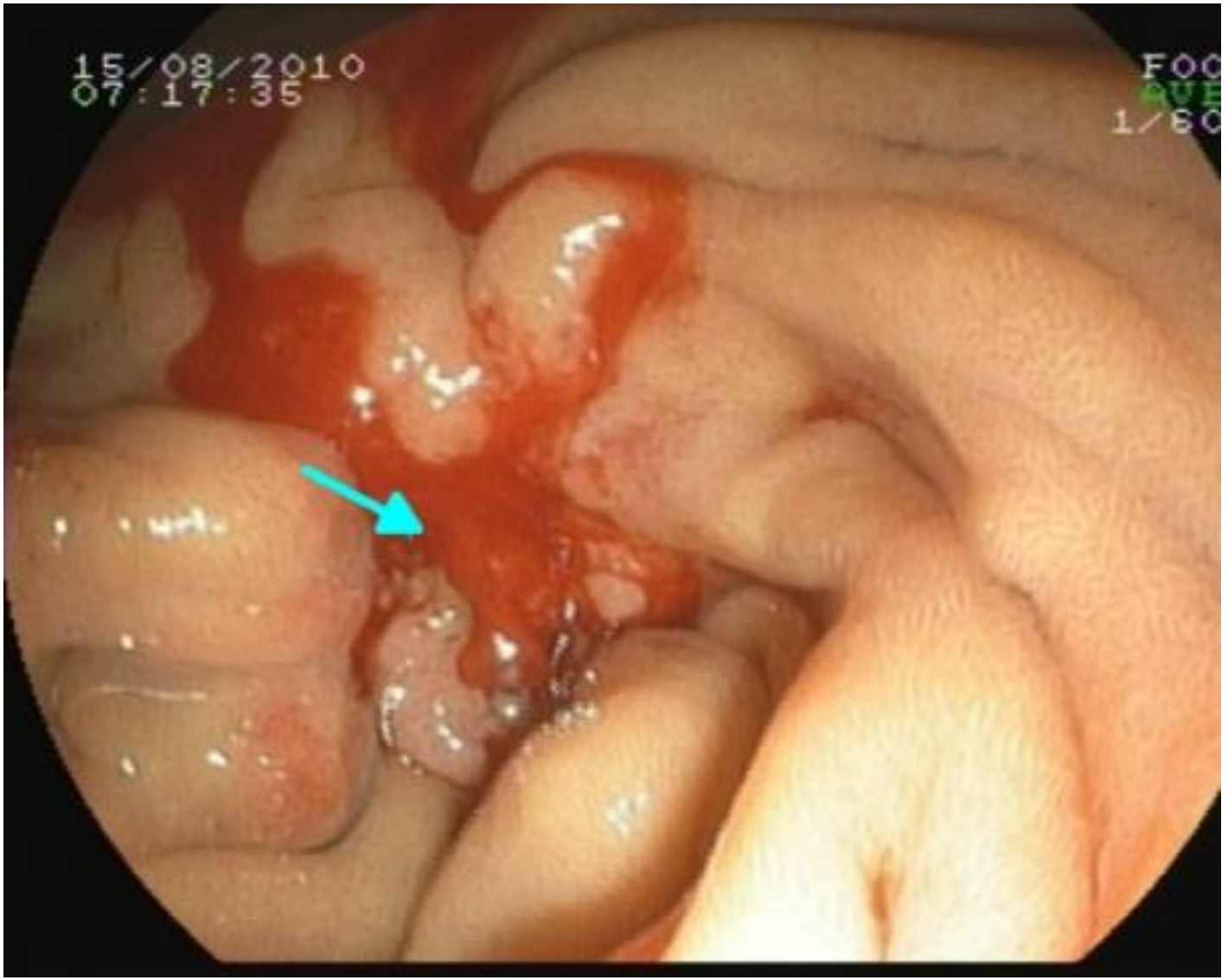
- Triad:
  - Biliary colic
  - Obstructive jaundice
  - Occult or acute GI bleed

Hemobilia: Diagnosis

- CT angiography abdomen/pelvis



Hemobilia: EGD



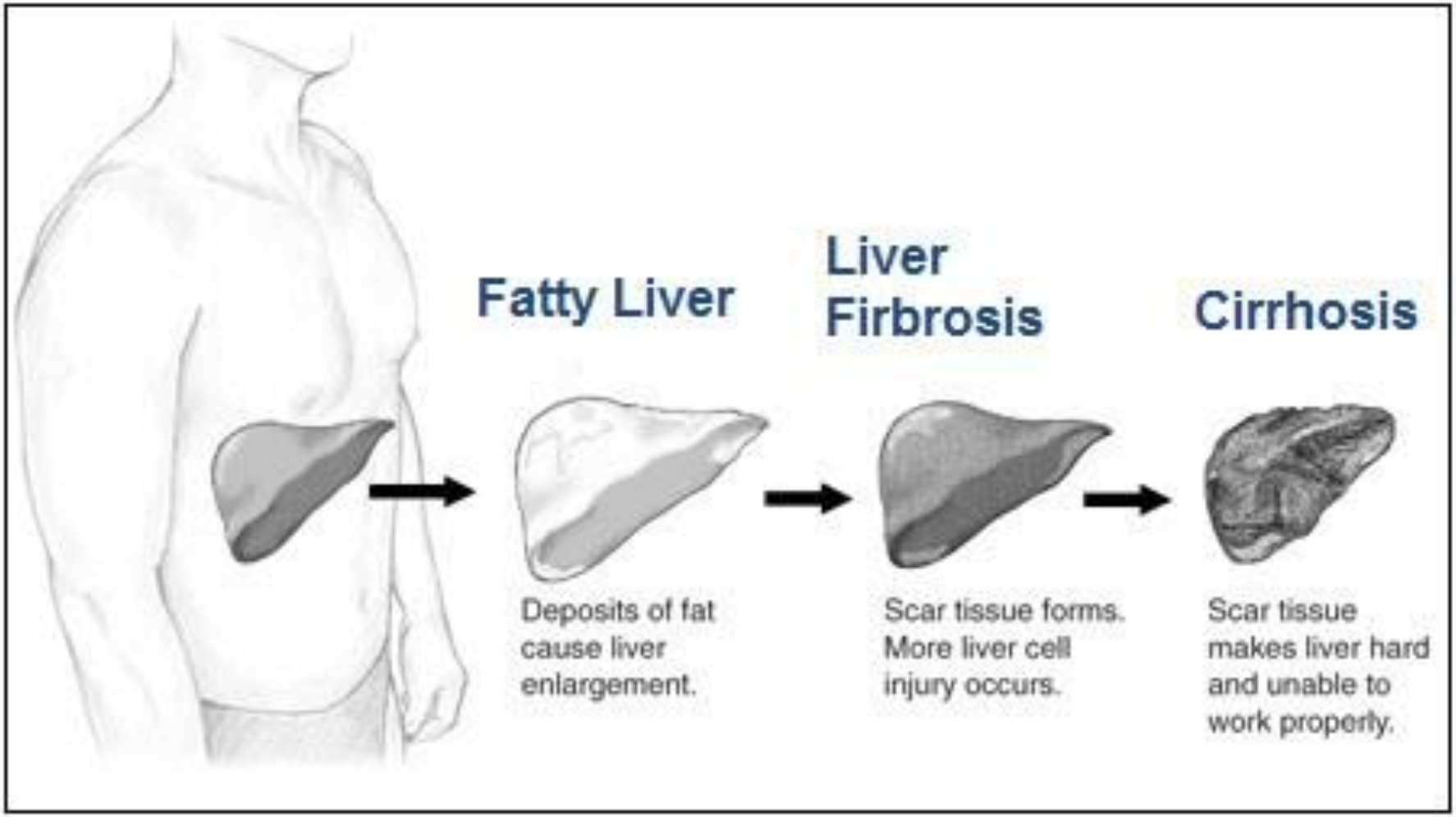
Hemobilia: Management

- Stop source of bleeding
- Arterial embolization
- Surgical resection of malignancy
  - Hepatic
  - Biliary

Liver Cirrhosis

- Late stage of progressive hepatic fibrosis
- distortion of hepatic architecture and nodule formation
- Most common causes in NA (80%)
  - Hepatitis C
  - ETOH
  - NASH

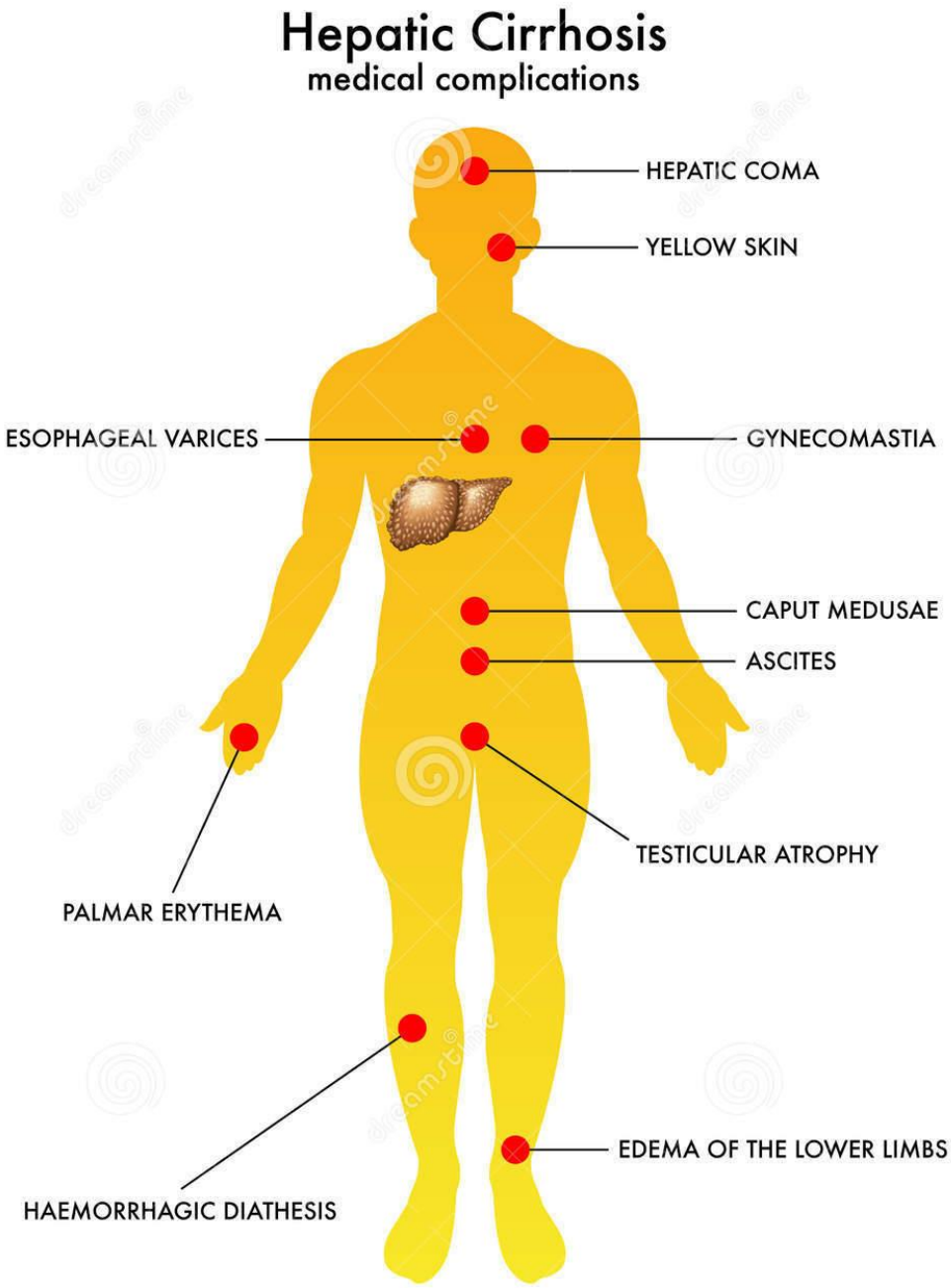
Stages of Liver Damage



Liver Cirrhosis: Clinical Presentation

- Constitutional
  - Anorexia
  - Fatigue
  - Weight loss
  - Weakness
- Hepatic decompensation
  - Jaundice
  - Pruritis
  - Ascites
  - Encephalopathy
  - Upper GI bleed

- Digit clubbing
- Astrixis
- Fetor hepaticus
- Splenomegaly



Natural History of Cirrhosis

- Compensated Cirrhosis
  - Asymptomatic
  - 10-12 years
  - Inflammation and fibrosis
- Decompensated Cirrhosis
  - Ascites
  - Portal hypertension
  - GI bleed
  - Encephalopathy
  - Jaundice

Natural History of Cirrhosis

- Compensated cirrhosis
  - 1-3% mortality / year
  - Higher in esophageal varices
- Decompensated cirrhosis
  - First event:
    - Ascites
    - GI bleed
  - 2 year survival 45%
  - Median survival 2-4 years

Child's Pugh Classification

Child-Turcotte-Pugh (CTP) classification of the severity of cirrhosis

	Points*		
	1	2	3
Encephalopathy	None	Grade 1-2 (or precipitant-induced)	Grade 3-4 (or chronic)
Ascites	None	Mild/Moderate (diuretic-responsive)	Severe (diuretic-refractory)
Bilirubin (mg/dL)	<2	2-3	>3
Albumin (g/dL)	>3.5	2.8-3.5	<2.8
PT (sec prolonged) or INR	<4 <1.7	4-6 1.7-2.3	>6 >2.3

CTP score is obtained by adding the score for each parameter

CTP class: A = 5-6 points
B = 7-9 points
C = 10-15 points

Child-Pugh Classification

Points	Class	1 year survival	2 year survival	Peri-operative mortality
5-6	A	100	85	10
7-9	B	81	57	30
10-15	C	45	35	80

- Severity and prognosis in chronic liver disease

Natural History of Cirrhosis

- End stage liver disease
  - Damaged liver with minimal synthetic function and no potential for recovery
- Fulminent liver failure
  - Progression from good health to liver failure with encephalopathy within 8 weeks
  - 75% mortality
- Only potential treatment is **liver transplantation**

MELD Score

MELD Score = 9.57 * ln (Serum Creatinine in mg/dL)
+3.78 * ln (Serum Bilirubin in mg/dL)
+11.2 * ln (INR) +6.43

- Transplant candidate MELD≥ 15
- <15 mortality rate of waitlist = surgery
- Exception points

Table 1. MELD/PELD Exception Requests, 2014

Diagnosis	Initial	Appeal	Extension	Total	Percent of Total
Familial Amyloidosis	25	3	54	82	0.6%
HCC (not meeting criteria)	1,482	31	1895	3408	26.0%
HCC Meeting Criteria (Stage T2)*	1,735	0	2,731	4,466	34.1%
Hepatic Artery Thrombosis (HAT)	59	4	11	74	0.6%
Hepatopulmonary Syndrome	245	19	225	489	3.7%
Metabolic Disease	80	0	24	104	0.8%
Non-metastatic hepatoblastoma	6	0	0	6	0.0%
Portopulmonary Hypertension	73	5	87	165	1.3%
Primary Oxaluria	18	0	28	46	0.4%
Other specify	2,288	226	1,762	4,276	32.6%
Total	**6,011**	**288**	**6,817**	**13,116**	**100.0%**

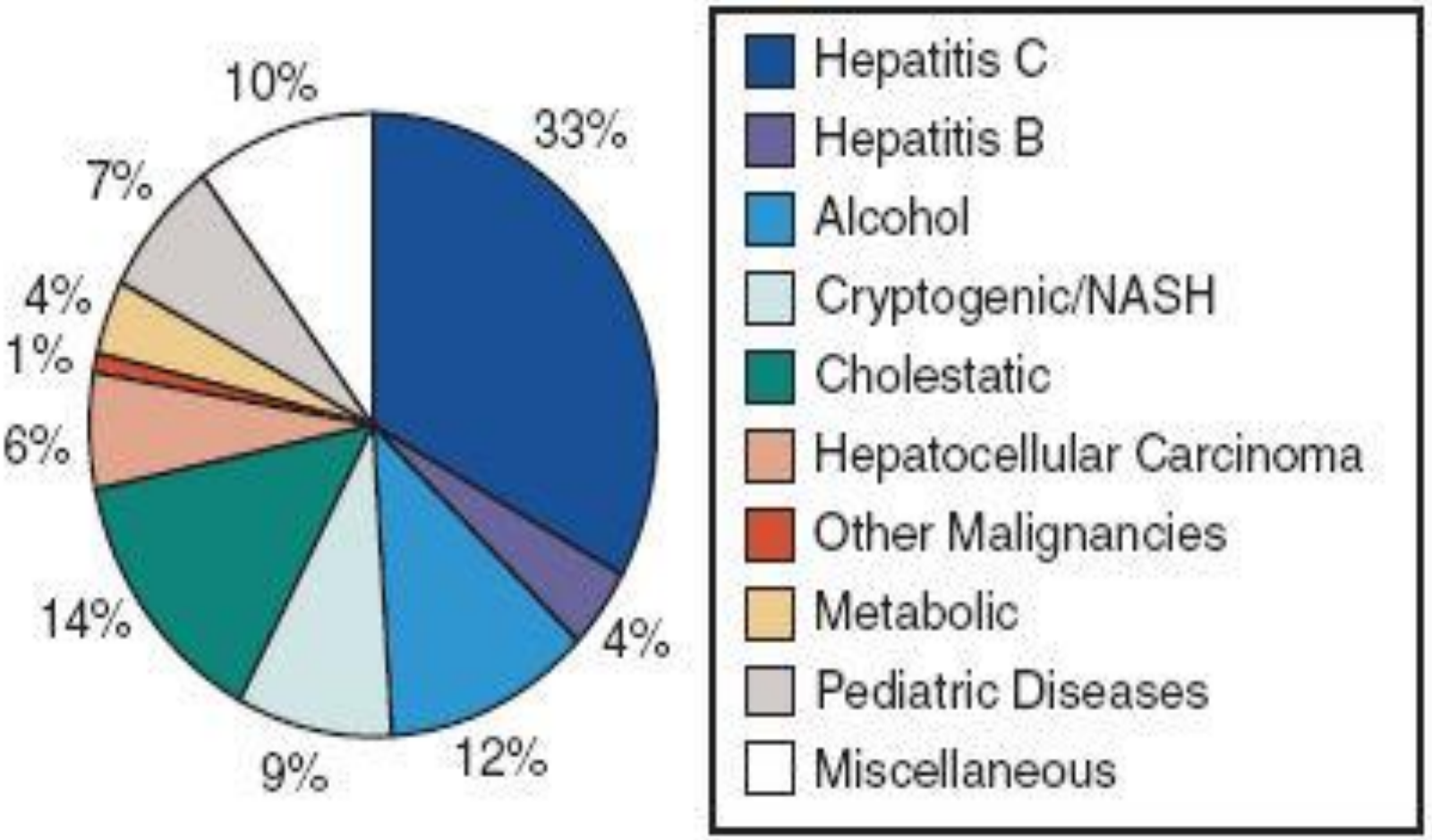
Liver Transplant: Contraindications

- Cardiopulmonary disease that cannot be corrected and is a prohibitive risk for surgery
- HCC with metastatic spread
- Uncontrolled sepsis
- Acute liver failure with a sustained ICP>50 mmHg or a CPP<40 mmHg
- Persistent non-adherence with medical care
- Lack of adequate social support

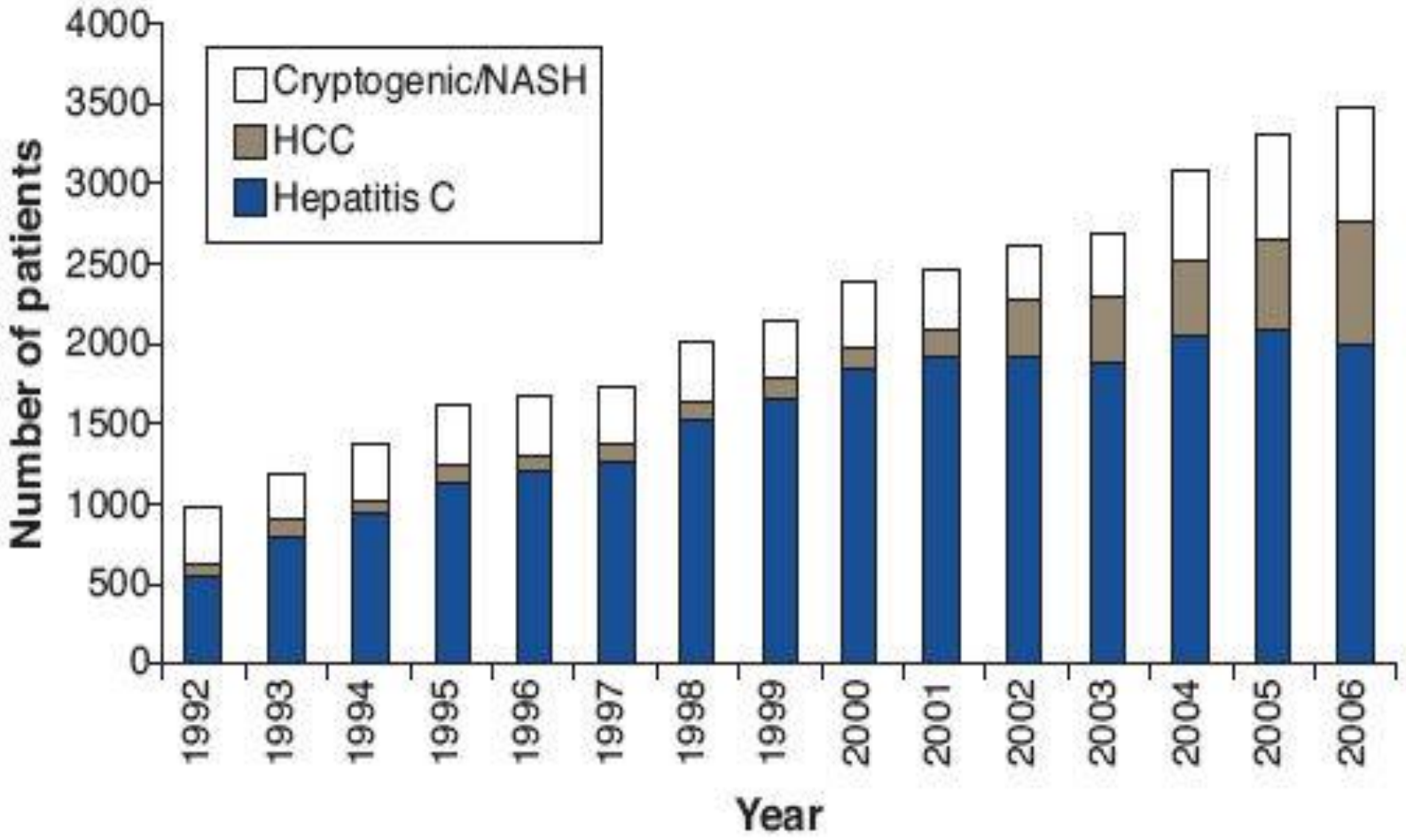
Liver Transplant Assessment

- Laboratory testing
  - ABO Rh typing, LFT, Cr, AFP, viral serology, CBC, INR, bilirubin
- EGD to evaluate varices
- Cardiopulmonary evaluation
  - ECG, echo, PFT, stress testing
- Cancer Screening
  - CT thorax/abdo/pelvis, skin exam, colonoscopy, pap smear
- Psychosocial evaluation and education

Etiology of Liver Disease



Etiology of Liver Disease



Etiology of Liver Disease

- ETOH
  - 6 month abstinence
  - Evaluation by addiction counsellor
  - Stable social supports
- Hep C
  - Most common
  - 25% develop recurrent cirrhosis within 5 years
- HCC
  - No evidence of extrahepatic disease or vascular invasion
  - <stage II: single tumor <5cm or 2-3 tumors <3cm
  - Worst survival (74% at 5 year)

Donor Allocation in Canada

- MELD score
- Code Status
- Time on waiting list

Code Status	Medical Status	Urgency
1	At home	Non-urgent
1T	At home with tumor	
2	Hospitalized	
3	In ICU	Urgent
3F	In ICU, fulminent failure	
4F	ICU, intubated, fulminent	

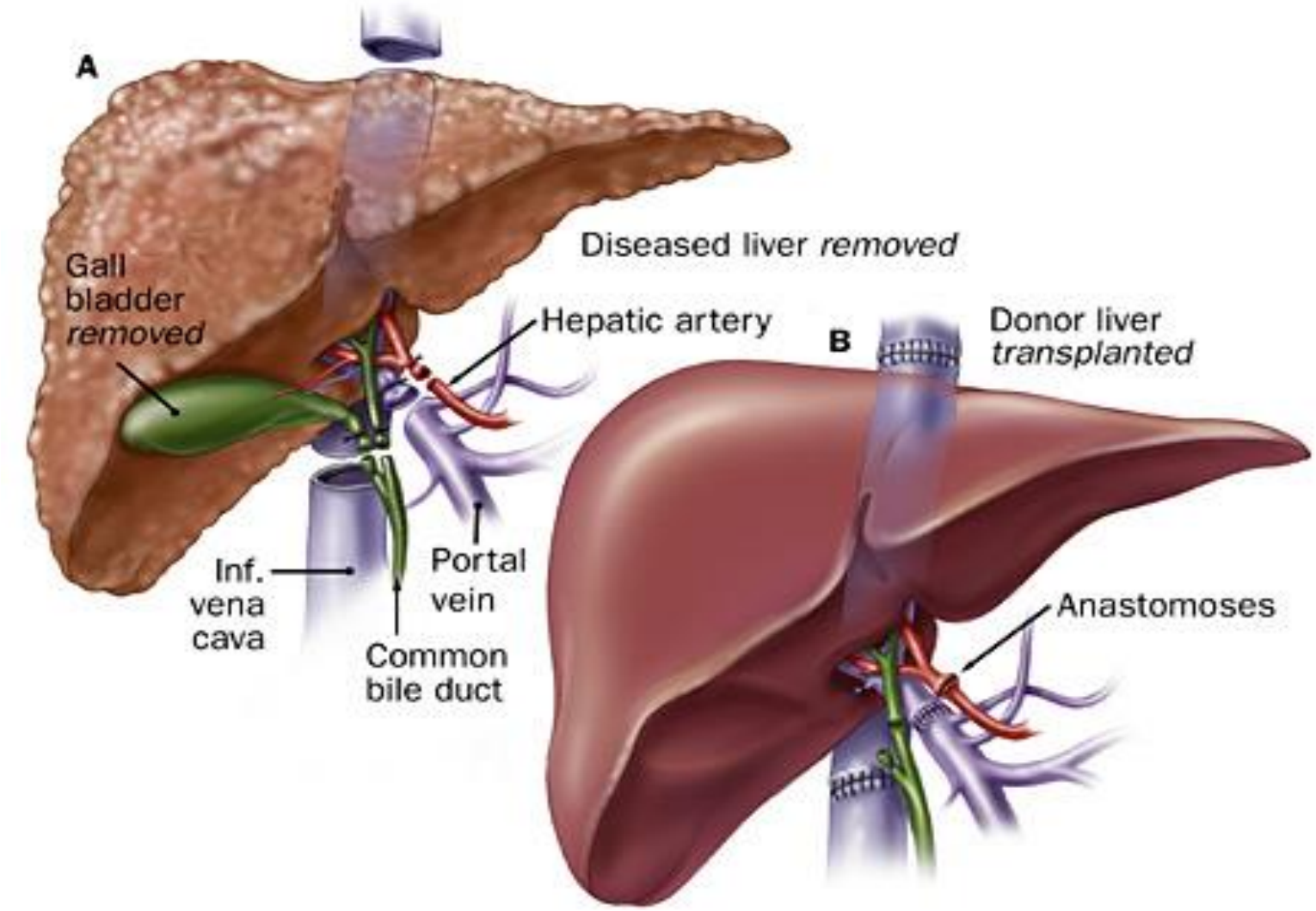
Donor Allocation in Canada

- Trillium Gift of Life Network
  - Manage wait list
  - Organ allocation
- Nationwide agreement organ sharing for urgent cases across country
  - Informal

Surgical Technique

- Incision bilateral sub-costal with upper extension to xiphoid
  - Mercedes
- Stages
  - Hepatectomy
  - Anhepatic phase
  - Implantation

Implantation



Immunosuppression

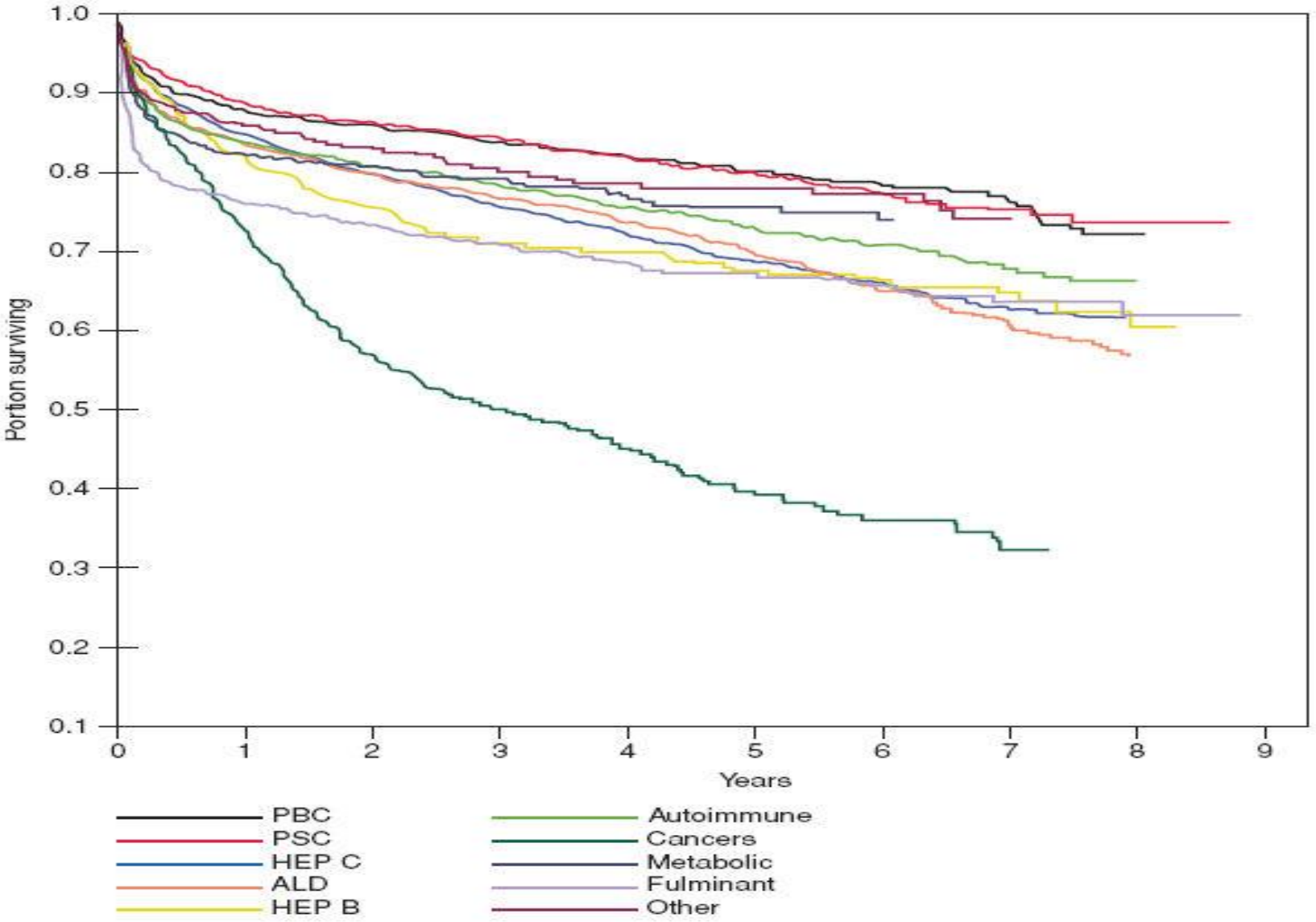
- CNI (Cyclosporin, Tacrolimus) are primary agents
- Addition of other agents (Steroids, MMF, Azathioprine) used to decrease risk of rejection or allow for lower doses of the primary agents.
- Early: multiple meds, high doses
  - Pred + CNI +/- (MMF/AZA)
- Late – fewer meds, lower doses
  - Most patients CNI alone (usually Tacrolimus)
  - Exceptions:
    - Autoimmune hepatitis, PSC, PBC (usually 2 drugs)
    - Renal dysfunction (MMF/AZA + lower CNI dose)

Immunosuppression: CNI

- Block Calcineurin→ ↓IL-2 →↓T-Cell Activation
- Cyclosporin
  - Initial dosage 10 to 15 mg/kg/day divided into 2 doses.
- Tacrolimus
  - Initial dose 0.1 to 0.15 mg/kg/day orally

- Renal dysfuction

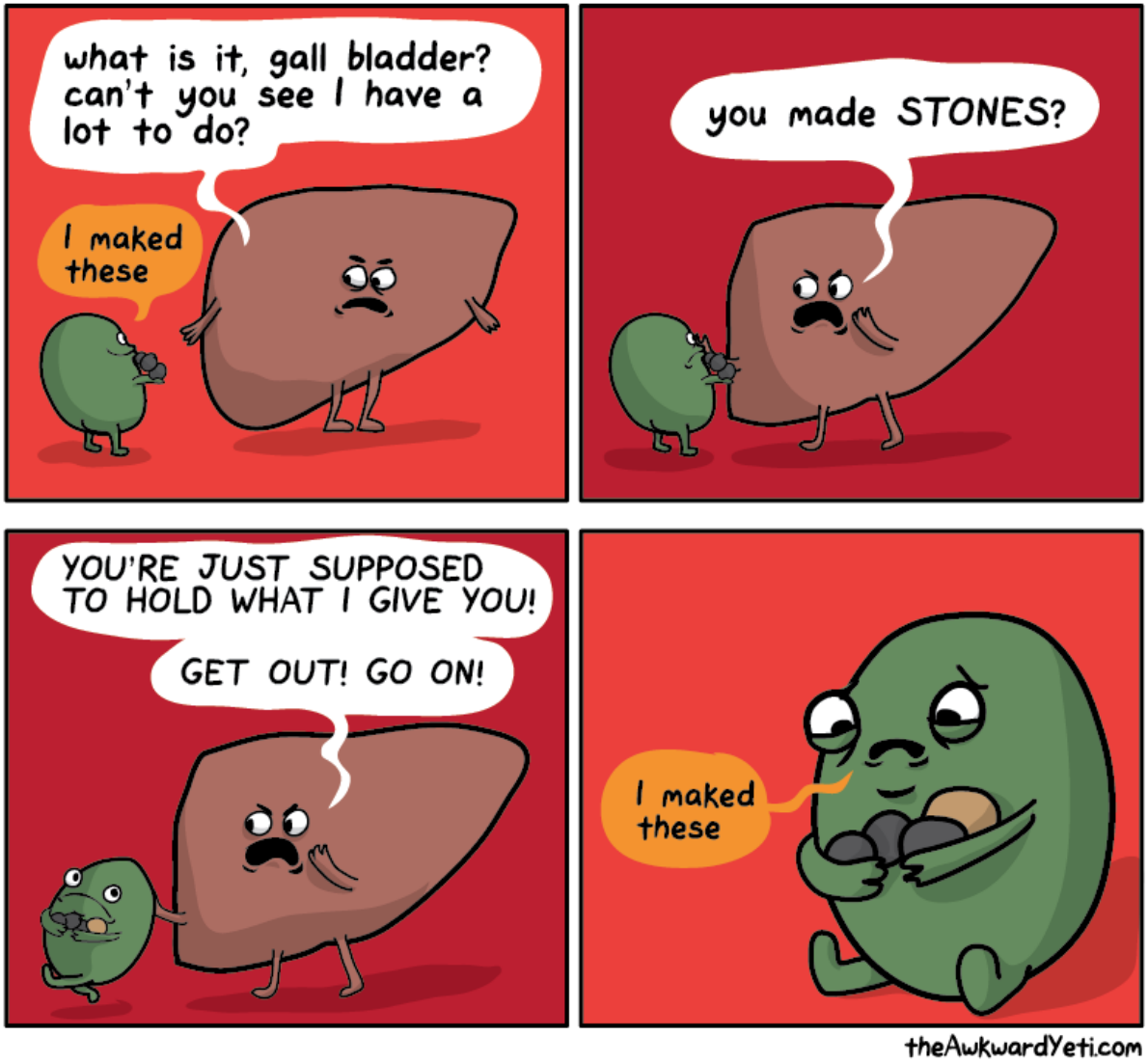
Recipient Survival



Summary

- Imaging plays important role in differentiating different solid and cystic lesions of liver
  - US, CT, MRI
- Management of bile duct cyst depends on type
- Liver transplantation is only curative option for end stage liver disease
  - Wide variety of etiology

Questions?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I maked these
you made STONES?
YOU'RE JUST SUPPOSED TO HOLD WHAT I GIVE YOU!
GET OUT! GO ON!
I maked these
theAwkwardYeti.com

Hepatectomy

- Common complication is excessive bleeding
- Dissection of liver hilum structures
  - Preserve length
  - Preserve tissue around CBD to avoid devascularization
  - Recognize anatomic variation of arterial supply
- Avoid injury to R adrenal and R renal vein