Liver Masses

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Case 1

- 44 y old male
- Colon cancer with metastasis in liver
- Colon resection & post op chemo
- liver resection
- Follow up CT Scans
After 4 cycles of chemo
Case 2

- 79 y Female
- On US incidental liver mass
- No predisposing factor for primary liver cancer
Core Biopsy:
  - moderately differentiated Adenocarcinoma
Plan for her
- Right portal vein embolization
- Then liver resection
INCIDENTALLY DISCOVERED ASYMPTOMATIC HEPATIC MASS
- Cysts
- Solid lesions
Cysts

- Simple hepatic cysts
- Multiple simple cysts
- Polycystic liver disease
- Cystadenomas
  - complex, with internal septae, an irregular lining, and papillary projections
- Complex, multilocular (septated) cysts
HEPATIC ABSCESS

- May be bacterial, parasitic, or fungal in origin.
- 90% of right lobe abscesses are solitary
- 10% of left lobe abscesses are solitary
- The overall mortality rate of 15%
Mode of infection

- Direct spread from adjacent structure
- Spread from biliary tract
- Spread through the portal vein
- Develop after generalized sepsis

- Rare causes include secondary bacterial infection of an amebic abscess, hydatid cyst, or congenital hepatic cyst.
Echinococcosis (hydatid disease)

- *Echinococcus granulosus* and *E multilocularis*
  - liver (75%)
  - lung (15%)
- Excision of the cyst intact
  - dangers of anaphylaxis or implantation
- The overall death rate is about 15%, but it is only 4% in surgically treated cases.
The differential diagnosis of Solid tumors

- Benign solid hepatic mass
  - Adenoma
  - Focal nodular hyperplasia (FNH),
  - Focal fatty infiltration
  - Cavernous hemangioma
  - Other rare neoplasms
    - mesenchymal hamartoma
    - teratoma

- Malignant tumors
  - Primary
  - Secondary
The surgeon must attempt to answer the following three important questions:

1. What is the diagnosis?

2. What is the surgical stage of the disease?
   - Is the tumor resectable?

3. What is the operative rationale that will encompass the disease and produce a margin-free resection?
Hemangiomas

- The most common benign hepatic tumor
- Women > Men
  - up to 75% of patients are female
- Pain is uncommon in tumors < 8-10 cm in diameter.
Rare complications of liver hemangiomata

- hemorrhagic shock
  - spontaneous rupture
- Kasabach-Merritt syndrome,
  - in children
    - associated with thrombocytopenia and a consumptive coagulopathy;
- Large hemangiomata may
  - rise to large-volume arteriovenous shunting,
  - resulting in cardiac hypertrophy and congestive heart failure.
The only reasons to resect hemangiomata are for symptoms, most commonly pain, or diagnostic uncertainty.
Hepatic Adenoma

- Predominantly in women
- Related to the widespread use of oral contraceptives.
- Half of patients are asymptomatic
Well-circumscribed masses
Moderate size
  • (range of 2-15 cm in diameter).
Most of those that cause symptoms are in the 8-to 15-cm range
  • right upper quadrant pain
Two-thirds of hepatic adenomas are solitary;
Transition from benign hepatic adenoma to hepatocellular carcinoma may occur
Adenomas are typically hypervascular compared to the surrounding liver parenchyma
Adenomas can be difficult to distinguish from focal nodular hyperplasia
Potential complication of adenomas

- Spontaneous hemorrhage into the substance of the tumor
- with subsequent rupture and intraperitoneal bleeding
○ The general consensus is that adenomas should be resected because of the risks of malignant change and spontaneous hemorrhage

○ Unfortunately, the true likelihood of these events is difficult to estimate
Focal Nodular Hyperplasia

- Benign lesion with no malignant potential
- More common in young women
- The average age is about 40 years
- Use of oral contraceptive agents does not appear to predispose to the development of FNH
  - Although it has been suggested that these agents can stimulate growth.
○ The tumor is a well-circumscribed
○ Firm
○ Tan
○ Usually subcapsular mass
○ Measuring 2-3 cm in diameter
○ Patients with symptoms, the lesions are much larger, usually around 10 cm
○ Multiple tumors can occur;
  ● 80% are solitary
The gross appearance on cut section is quite characteristic, consisting of:

- central stellate scar
  - (which is an aggregation of blood vessels)
- with radiating fibrous septa
Solid liver masses

- PRIMARY CANCERS
  - Hepatocellular Cancer
  - Intrahepatic Cholangiocarcinoma
- SECONDARY CANCERS
  - Colorectal Metastases
  - Neuroendocrine Metastases
  - Noncolorectal, Nonneuroendocrine Metastases
The patterns of presentation

1) Pain with or without hepatomegaly
2) Sudden deterioration of the condition of a cirrhotic patient owing to the appearance of hepatic failure, bleeding varices, or ascites
3) Sudden, massive intraperitoneal hemorrhage
4) Acute illness with fever and abdominal pain
5) Symptoms related to distant metastases
6) No clinical findings or symptoms
Diagnostic tests

- Ultrasonography
- CT
- Sulfur colloid scanning
- Angiography
- MRI with gadolinium
HCC

- 5th most common cancer in the world
- Most common primary hepatic neoplasm worldwide
- 80-90% of all primary liver malignancies
- 90% of cases arise in patients with chronic liver disease
  - Cirrhosis
    - Alcoholism
    - Hemochromatosis
    - $\alpha_1$-antitrypsin deficiency
    - Primary biliary cirrhosis
  - Viral hepatitis
- Aflatoxins have been shown experimentally to be capable of producing liver tumors.
Viral hepatitis responsible for increased incidence.

Increased incidence associated with cirrhosis
- ETOH, Wilson’s Disease: 2-5 folds
- HCV: 100 folds
- Hemochromatosis: 200 folds
Presentation of sporadic HCC

- Pain,
- Mass,
- Systemic symptoms of cancer,
- May also be discovered incidentally
Laboratory Findings

- Depending on the disease extent and underlying hepatic function, laboratory values may range from entirely normal to suggestive of impending liver failure.
HCC occurring as a complication of liver disease may present similarly, but it is often manifested first as a deterioration of liver function:

- Jaundice,
- Ascites,
- Encephalopathy.
Screening

- Screening programs in high-risk populations.
  - These programs, which use
    - a-fetoprotein (AFP) levels and
    - Ultrasonographic examination of the liver
○ Staging also requires evaluation of the extent of liver disease
○ The Child-Pugh classification is used to determine operability
HCC Resection

- Partial liver resection is the procedure of choice for sporadic HCC in patients with normal livers
- Only 10% Candidate for resection.
- Surgical resection is frequently not possible due to:
  - Hepatic dysfunction/Cirrhosis
  - Advanced stage at time of presentation
- Recurrence reported in more 50% (Unger going Curative resection)
  - Recurrence occurs from
    - Second primaries
    - Intra-hepatic spread
- Intrahepatic recurrence more than 80%
- Rate of repeated resection rarely 20%
In Child class B or C patients with chronic liver disease, liver resection can be hazardous, and liver transplantation is the procedure of choice.
- Indication for transplantation
  - Early stage unresectable HCC
  - Single tumor up to 5 cm or up to 3 masses with largest tumor 3 cm
  - Advance cirrhosis
  - Chemoembolization or tumor ablation used as adjunct while waiting for transplant
- As much as 70% of the liver may be safely excised when normal liver function is present.

- PVE of the side of the liver to be resected may be performed preoperatively to increase the size of the future remnant.
Other Modalities

- Local ablation
- Arterial chemoembolization
MRI:
- Sensitivity = 77% for main lesion
- 11 satellite lesions (mean diam = 0.8cm) in 64 patient were missed by MRI

Repeat imaging after locoregional therapy
- Sensitivity 60%
- Specificity of 60%

Sensitivity and specificity for detection of tumor recurrence is better after TACE than RFA

Shaked A. Liver Transpl 2006;12:665-73
Tumor Markers

- Alpha-fetoprotein (AFP),
  - $\leq 20$ ng/mL is normal
  - $> 200$ ng/mL are suggestive of hepatoma
  - $>400$ ng/mL in
    - cirrhotic patients
    - with a hypervascular liver mass $> 2$ cm in diameter
    - are diagnostic.
Liver Biopsy

- Fine-needle aspiration biopsy is associated with an approximately 30% false-negative rate
- Core biopsy

- Percutaneous biopsy carries some risk
  - bleeding
  - tumor dissemination
In patients with cirrhosis,

- the presence of a hypervascular mass > 2 cm on two different imaging studies (ultrasound, CT, MRI, or angiography)

- or

  - a hypervascular mass > 2 cm on one imaging study combined with a serum alpha-fetoprotein level > 400 ng/mL

is diagnostic of HCC, and a biopsy is therefore not required
Fibrolamellar hepatocellular carcinoma

- Variant of HCC
- Has distinctive clinical, histologic and radiographic features
- Contains numerous fibrous septa and may resemble focal nodular hyperplasia
- In a younger age group (average 25 years)
- Not associated with underlying liver disease
- AFP levels are normal in the majority of patients
- Better prognosis
Intrahepatic Cholangiocarcinoma

- Cholangiocarcinoma: **15%** of primary liver cancers
- Primary sclerosing cholangitis is a predisposing condition
- Widespread infection with liver flukes (*Clonorchis sinensis*) is at least partly responsible for the higher incidence of these tumors in some parts of Asia
- There is some evidence to suggest that chronic hepatitis C infection is associated with the rising worldwide incidence of intrahepatic cholangiocarcinoma
There are three types:

- Mass-forming type
- Periductal infiltrating type
- Intraductal papillary tumor
- The appearance of intrahepatic CCA is suggestive of a secondary tumor
- Diagnosis of intrahepatic CCA usually requires a biopsy
  - which reveals an **adenocarcinoma** that is indistinguishable from a hepatic metastasis arising from a primary adenocarcinoma
- An elevated CA 19-9 concentration is strongly suggestive of this diagnosis
Angiosarcoma of the liver

- Rare fatal tumor
- Has been seen in workers intensively exposed to
  - vinyl chloride
  - for prolonged periods
  - in polymerization plants
SECONDARY LIVER CANCERS
Metastatic cancer is 20 times more common than primary tumors in the liver.

Colorectal Metastases
About 50% of the 150,000 patients who are diagnosed with colorectal cancer annually in the United States either have or will have liver metastases.

About 10% of patients with these colorectal metastases are eligible for liver resection.

Synchronous tumors or Metachronous tumors
If a complete resection can be achieved, the 5-year survival rate is 25-40%.

The mortality rate for resection of hepatic metastases is 1-2% in hospitals where this operation is performed frequently.

Systemic or regional chemotherapy or both is frequently given after resection.
The following are associated with a worse prognosis after resection

1) Original tumor with involved lymph nodes (stage III or Dukes C);
2) Multiple liver lesions
3) Less than 1 year since resection of the colon primary (disease-free interval)
4) CEA level 100 > ng/mL
Variables that do not influence the outcome include

1) Histologic grade of the tumor
2) Bilateral rather than unilateral disease
3) Site of the primary tumor within the large intestine
4) The gender of the patient.
Rationale for surgery

1) The primary tumor has been or can be completely resected
2) (with uncommon exceptions) there is no extrahepatic tumor (other than the primary)
3) is possible to resect all tumors in the liver while leaving enough of a hepatic remnant to ensure that hepatic failure does not develop postoperatively.
Nonanatomic resections are as effective as anatomic resections as long as the resection margin is microscopically clear.
Synchronous resection of the primary tumor and the liver metastases has proved to be safe and is desired by many patients.
Ablation of colorectal metastases.

- Cryotherapy
- RFA
Neuroendocrine Metastases

- Metastatic liver disease from this source may produce carcinoid syndrome
- The aims of surgical treatment are
  - (1) to eradicate the cancer
  - (2) to reduce hormonal symptoms
Noncolorectal, Nonneuroendocrine Metastases

- Occasionally, liver metastases from other primary sites behave like CRMs, in that they are localized to part of the liver in the absence of extrahepatic disease.
In selecting patients with noncolorectal liver metastases for resection, the most important factors are:

- (1) long disease-free interval;
- (2) solitary resectable liver tumor; and
- (3) absence of extrahepatic metastases.

Such patients can be managed according to the same approach employed for CRMs, though the outcome is somewhat less satisfactory.
Tumors that have been treated in this way with acceptable results include

- Breast cancers,
- Renal cell cancers,
- Gastric cancers,
- Acinar cell cancers of the pancreas, and
- Ovarian cancers.
metastases from gallbladder cancer and pancreatic ductal adenocarcinomas can be expected to yield very poor results.
Case 3

- 60 years, healthy female
- LUQ abdominal pain
Post op 3 months
- Primary was HCC
- Lesion at liver edge is cyst confirmed by MRI
- The other new lesion is recurrent tumor
- RFA
Case 4

- 66 y Female
- Not Alcoholic
- Complain of LUQ pain
- CT Chest for lung
- Gastroscopy: H.Pylori +ve
Case 5

- 43 y old healthy female
- Sigmoid colon Cancer resected
- T3N2M1
- Chemtherapy
Initial CT Scan
Post chemo
Case 6

- 41y old female
- On Contraceptive pills
- On Routine blood work
  - GGT mildly elevated
  - Alk P Mildly elevated
- US liver mass
- CT Scan
Venous

Arterial
Thank you

A fool with a tool is still a fool!