Lecture 12: Liver Mets

🔵 **Metastasis Sites:**

1. **GI tract** – *Stomach, pancreas, colon*
2. **Lung**
3. **Kidney**
4. **Prostate**
5. **Melanoma** (Eye & skin)
6. **Breast**
7. **Bile duct** (*Cholangiocarcinoma*)

🔵 **Why is the liver a common site?**

1. Supplied by both **portal** and **systemic** **circulation**
2. **Sinusoidal epithelium** allows easy cancer cell penetration
3. **Produce hormonal and growth factors** (e.g., adhesion molecules)
4. **Anatomically close** to other organs

🔵 **Important Note:**

- In the past, **patients with liver mets were not treated**, but now they are!

🔴 **Clinical Presentation:**

- Often **asymptomatic**
- Depends on **primary tumor** and **extent of liver mets**
- Some may show:
  - **Abdominal pain**
  - **Jaundice**
  - **Pruritis**
  - **Carcinoid syndrome** →occurs in cases of **mets** due to **serotonin and vasoactive peptide release** and presents with: 1- **Flushing** **2- Right-sided heart lesions** **3- Wheezing** 4- "4 D's": **Diarrhea** , **Dermatitis** , **Dementia** , **Death**

🔬 **Physical Exam (PE):**

- **Hepatomegaly**
- **Friction rub**
- **Ascites**

🧪 **Labs:**

- ❌ No **specific labs** for liver metastases
- **CEA**: a marker onlyyyyyy, but **can be negative** even in mets

🖼️ **Imaging:**

1. **Ultrasound (US)** – most used
2. **CT**
3. **MRI** – most sensitive
4. **PET/CT** – with or without contrast

⚠️ **Final Note:**

- **Specific liver imaging is not needed** in **disseminated/inoperable disease**

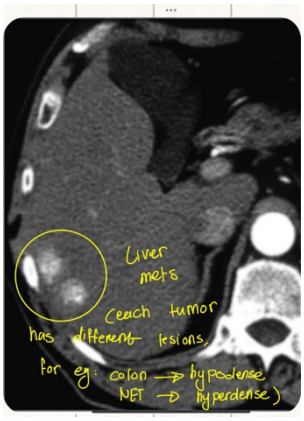
1. Ultrasound (US)

🟦 4 Types:

Type of US	Key Features	Advantages	Limitations	Extra Notes
Transabdominal US (US)	- Performed over abdominal wall- Needs large lesions to be visible	- Most commonly used imaging modality for screening liver metastasis- Low cost, portable, no radiation	- Lower sensitivity than CT/MRI- Especially poor for small lesions < 2 cm- Operator dependent	- Lesions may appear hypoechoic, hyperechoic, cystic, or mixed echogenic
Contrast-enhanced US (CEUS)	- Uses special IV contrast to improve accuracy- Useful for equivocal masses on transabdominal US	- Accuracy similar to CT/MRI- Helps characterize lesions based on enhancement pattern	- Less widely available	- Benign lesions enhance more than liver- Malignant lesions enhance less (portal-venous phase)
Endoscopic US (EUS)	- US probe at tip of endoscope- Done via upper GI endoscopy	- Detects smaller lesions as it's closer to the organ- Diagnostic + therapeutic (FNA, drainage)	- Not often used for liver imaging	- Excellent for pancreatic tumors, cysts, and liver mets near stomach/duodenum
Intraoperative US (IOUS)	- Probe placed directly on liver during surgery (open/ laparoscopic)	- Detects 5–10% of missed lesions- High resolution- Most accurate for small, deep lesions	- Only available intraoperatively	- Often changes surgical management plan- Crucial in determining resectability and prognosis

2. CT with contrast (Triphasic)

- Don't use **without contrast** unless mets are hypervascular (with contrast = more accurate)
- like:
  - Carcinoid
  - Islet cell tumors
  - Renal cell carcinoma
  - Calcifications
- **We order Triphasic CT:**
  - Arterial phase → good for hypervascular mets (e.g., NET)
  - Portovenous phase → good for hypovascular mets (e.g., colon CA)
  - delayed



3. MRI

- Use **T1 and T2** with **2 phases**
- T1: anatomical
- T2: shows increased signal intensity (opposite of T1)
- Helps with post-chemo and for fatty liver diagnosis

4. PET/CT

- Most cancer cells depends on **glucose**
- So we use it and We add **18-FDG** instead of carbon label
- **PET shows abnormality** but **not exact location**
  ➤ Example: lesion on left of abdomen only
  ➤ But **CT** helps to identify the **exact organ** (e.g., liver vs spleen)

🧪 **Histopathology**

- Used when you know there's a lesion but don't know the diagnosis

- Based on biopsy → 3 histo types: (initial **light microscope**)
    1. **Poorly differentiated carcinoma / adenocarcinoma** →doesn't match cells of primary tumor
    2. **Well-differentiated adenocarcinoma** → resemble cells of the (cells of origin) primary tumor
    3. **Squamous carcinoma**

✅ Use **immunohistochemistry** to:

- Identify **site of origin**
- Distinguish **SCC** or **poorly differentiated tumors**

🟧 **CRLM (Colorectal Liver Metastases)**

- Treatment depends on type of liver mets
- Mets can be:
    - **Metachronous**: for e.g. the pt got dx with colorectal CA and had a colectomy then 1-2 years later presented with liver metastasis. (more than 6 months after dx of primary tumor)
    - **Synchronous**: for e.g. the patient had a concomitant liver metastasis along with a primary tumor. (within 6 months of dx of primary tumor)

Management can be surgical resection and there are many types of surgical resection ranging from non-anatomical resection/ wedge resection to extended hepatectomy reaching up to liver transplantation.

* Note: A patient with fatty liver needs at least 40% of the liver
* if diffused bilateral → chemotherapy (High dose with minimal side effects)

This management mentioned in this slide is exclusively for CRLM.
Neuroendocrine tumors have different management.

CRLM

We can also combine these modalities together
for e.g. -> doing surgery as well as other therapies like RFA and then give the patient chemotherapy which can be neoadjuvant (preoperatively) or adjuvant chemotherapy (postoperatively).