# Assessment of liver metastasis & it’s management

Dr. Md. Ashek Mahmud Ferdaus
FCPS (SURGERY), MS (Colorectal Surgery).
Assistant Professor (Colorectal Surgery).
Mymensingh Medical College.

# Colorectal liver metastasis

## Synchronous liver metastasis-

- 15-25%. ( 1/3rd – BL)
- Prognosis poor.
- > aggressive.

## Metachronous liver metastasis-

- 40%. (50%- BL)

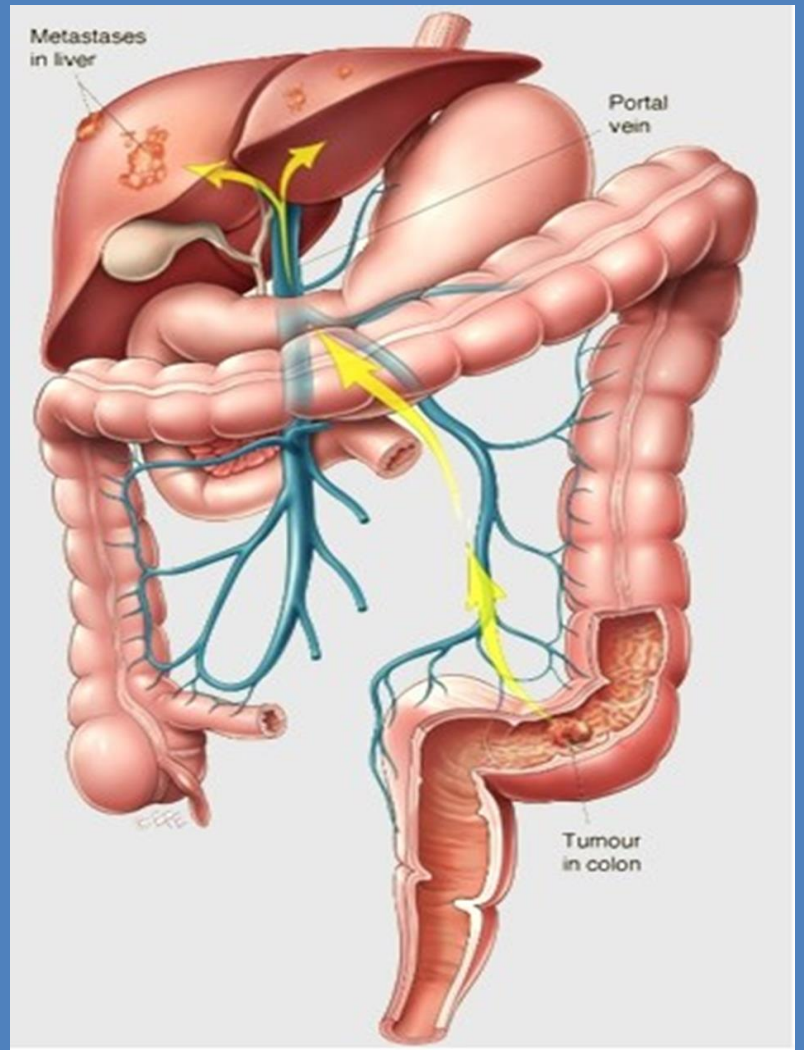
# Colorectal Liver metastasis

- In 30% of curative resection there is occult liver metastasis.

- In 30% liver is the only site of metastatic disease.

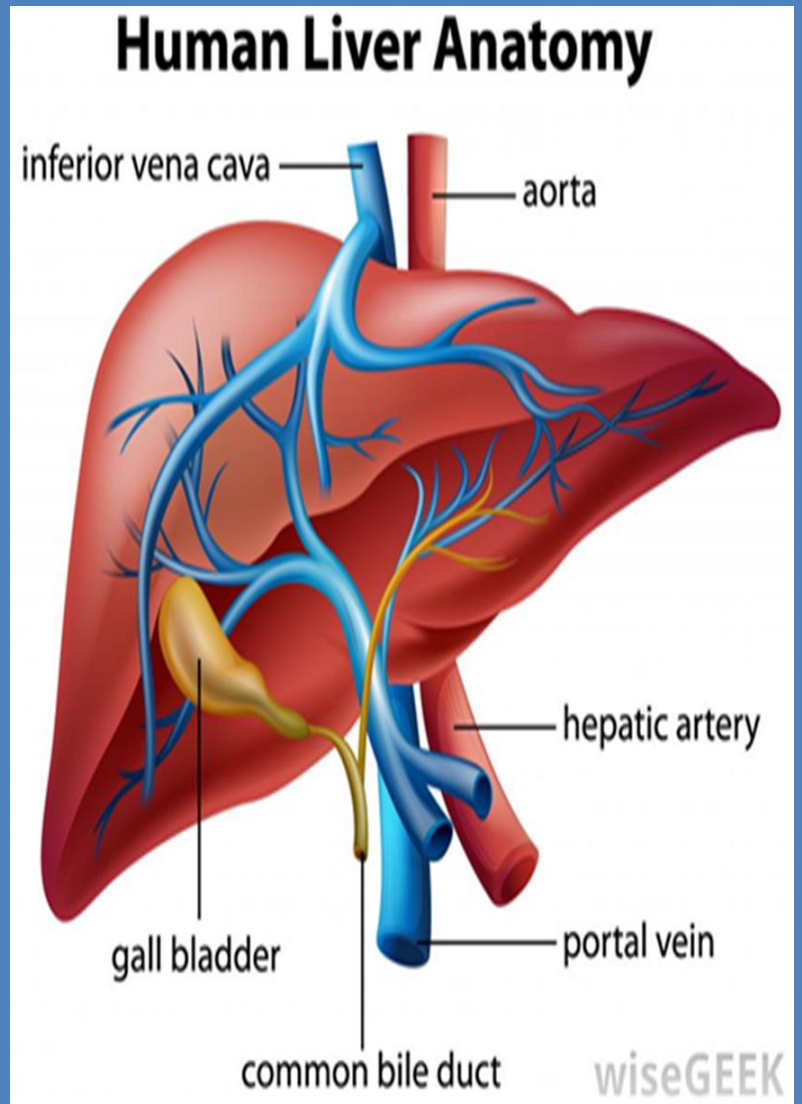
# Which lobe is more involved?

- Right colon to rt lobe 10 times than the left.
- Left colon & rectum distribute homogenously.



# Blood supply

- Dual blood supply.
- Normal parenchyma-
  - 80% portal vein.
  - 20% hepatic artery.
- All liver tumors-
  - Hepatic artery.



# Prognosis

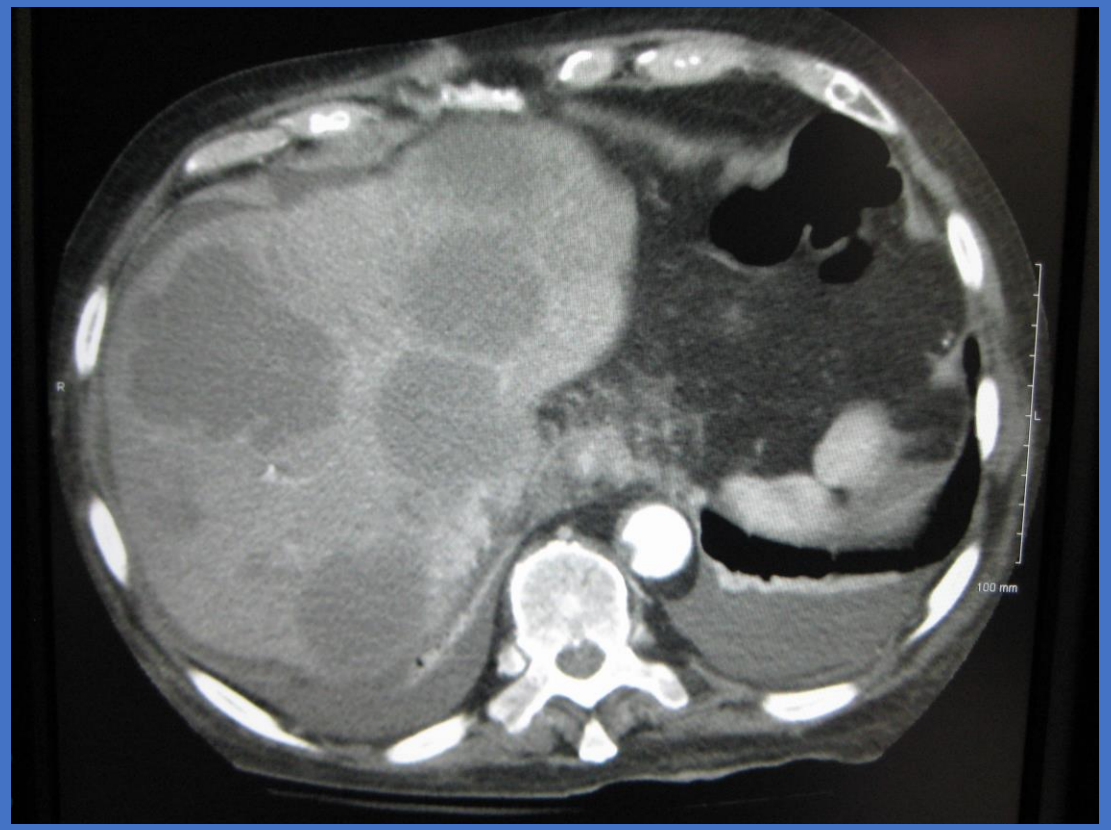
- Majority of liver metastasis have unresectable disease.
- 10% CRC liver metastasis- curative hepatic surgery.
- 5 yrs survival after resection of liver metastasis- 25-40% (over 30%- BL).

## Untreated patient-

- Median survival- 5-10 months.
- Only CT- 10-14 months.
- 5 yrs survival- 2-8%.

# Prognostic factors for liver resection

- Primary staging.
- Time from primary resection ( >= 12 months).
- CEA level.
- Size of the largest lesion.
- No. of lesions.



# Poor prognostic factors

- Synchronous presentation.
- Larger nb. Of tumors.
- Bilobar involvement.
- > CEA level.
- Involved histologic margin.
- LN involvement.

# Adverse predictors for long term outcome

- Nb. Of  metastasis - >3.
- Preop. CEA- >100 ng/ml.
- Tumor free resection margin <10mm.
- Portal LN.
- Largest dimension >5 cm.
- Weight of resected specimen >90gm.

# Contraindications-

- Unresectable extrahepatic metastasis.

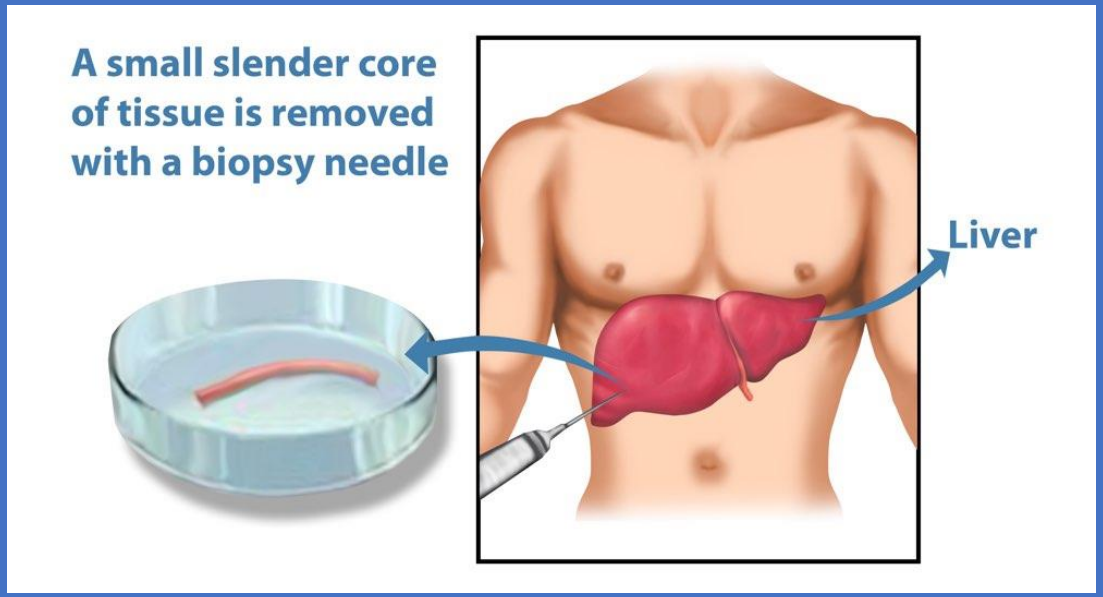
  Exception-

  - Limited pulmonary metastasis.
  - Colonic anastomotic recurrence.

- Numerous liver metastasis involving >1/2 of the liver.
- Large lesion that encroach on major hepatic v. or contralateral hilar ducts or veins.
- Locally advanced primary tumor not respond to neoadjuvant.
- Intraabdominal extrahepatic liver metastasis- no proven benefits.

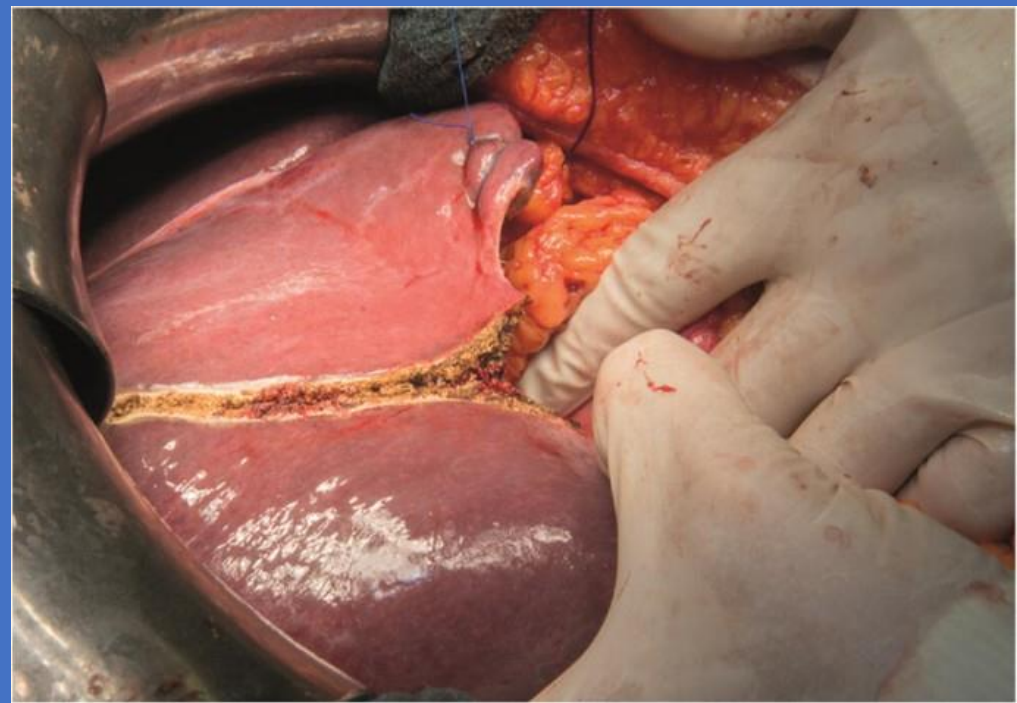
## Confirmation?

- Histologic confirmation not necessary?
- P/C biopsy for resectable liver metastasis should be avoided.




## How much resection?

- Normal liver parenchyma can tolerate 60-75% resection without risk of liver failure.



# FLR

## Future liver remnant-

- 25% in normal liver parenchyma.
- Compromized liver function- larger volume is required.
- Preop portal vein embolization.
- Staged procedure-
    - 1st stage followed by –
        - Portal vein embolization.
        - Liver partition & portal vein ligation.
        - Resection & thermal ablation.

# Traditional principle of resection for CRC liver metastasis.

- Unilobar.
- <4 lesions.
- <5 cm in greatest dimension.
- Without extrahepatic disease.
- Well confined primary lesion.

Nowadays more resection is possible due to-

- > effective systemic therapy.
- Ablative therapies.
- > modalities for downstaging.

# Investigations

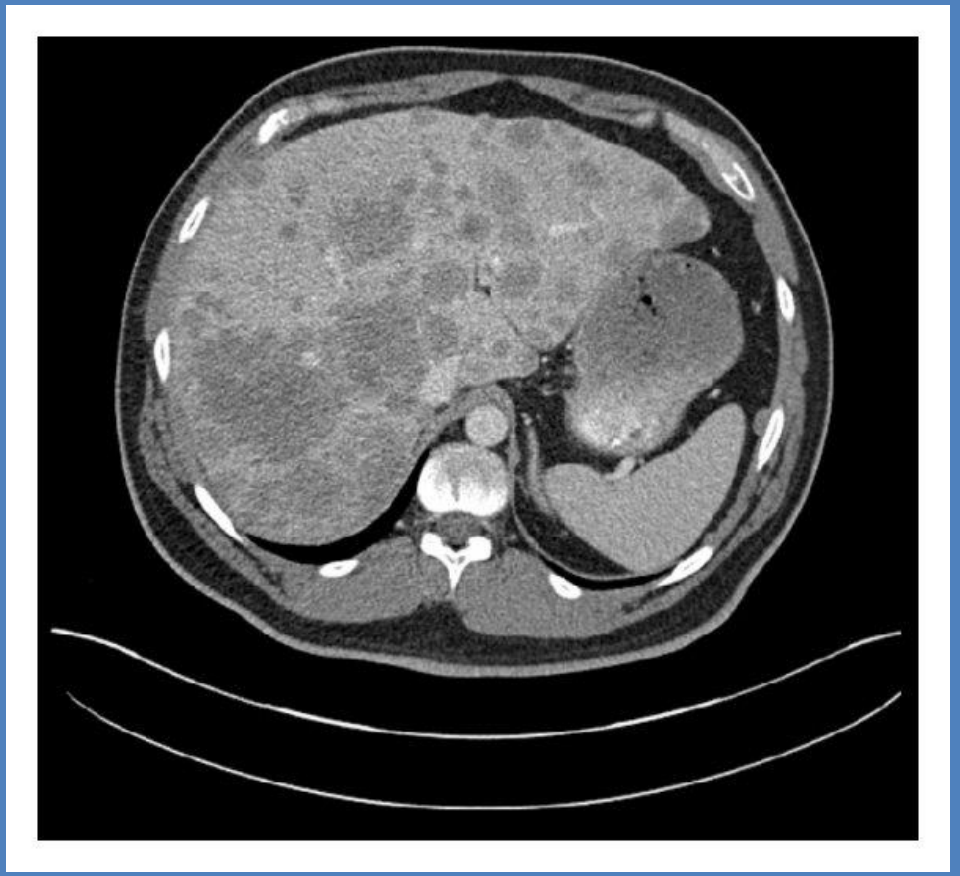
- CT scan of chest & abdomen.
- Contrast MRI of liver.
- Triple phase CT chest / abdomen / pelvis.
- PET CT of whole abdomen.
- USG-
    - Often cannot visualize the entire liver.
    - Upto 2 cm lesion.
    - Excellent at distinguishing benign from malignant.
    - Evaluate relationship.
    - In intraoperative ablative therapies.

## CT abdomen-

- Up to 1 cm lesion.
- Mainstay of hepatic imaging.

## Majority of liver metastasis are

- Hypodense as hypovascular.
- More hypodense in CECT.
- Best depicted during portal venous phase.



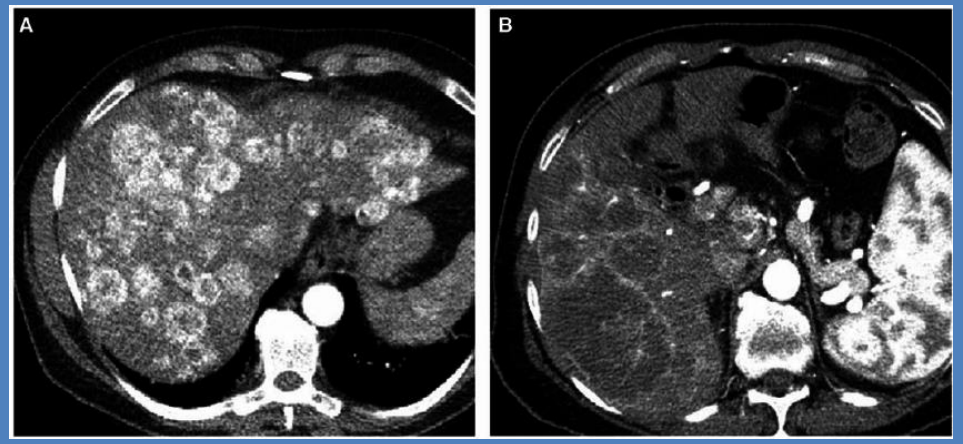
Innumerable liver metastases with colorectal cancer & the primary mass in the ascending colon.

# Hypervascular metastasis

## Hypervascular metastasis-

- Breast.
- Sarcomas.
- Neuroendocrine tumors.
- RCC.
- Melanoma.

- 20-40 secs.
- Normal liver parenchyma not yet enhanced.
- Hypervascular liver tumor enhance via hepatic artery.
- Hypervascular tumors enhance optimally at 35 secs.

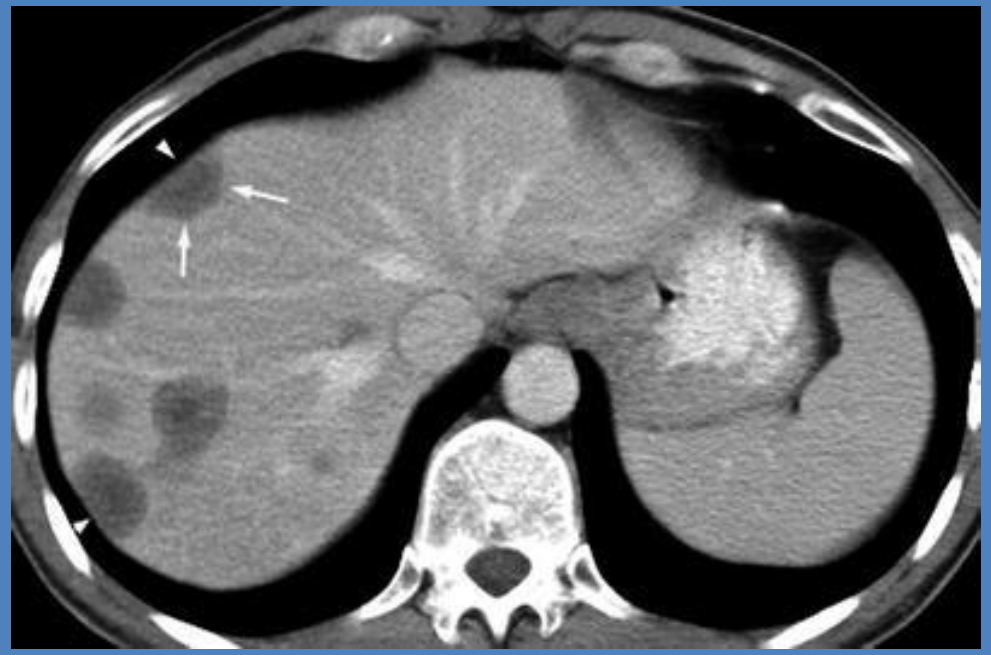


# Hypovascular metastasis

## Hypo vascular metastasis-

- Colorectal cancer.

- Portal venous phase.
- 60-80 secs.
- Detect hypovascular tumor.



# Calcified liver metastasis

- Mucinous GI tumor.
- Ovarian cancer.

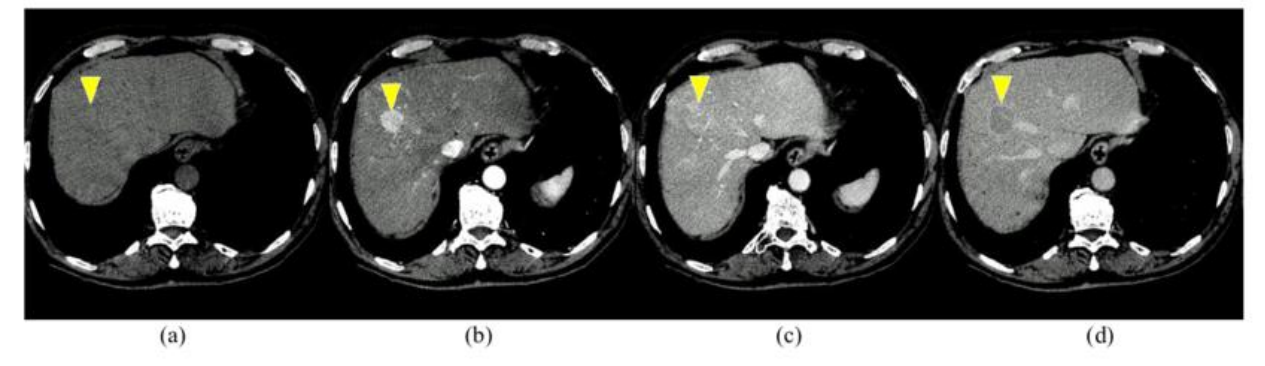
Calcified liver metastasis from colon cancer

# Triple phase CT

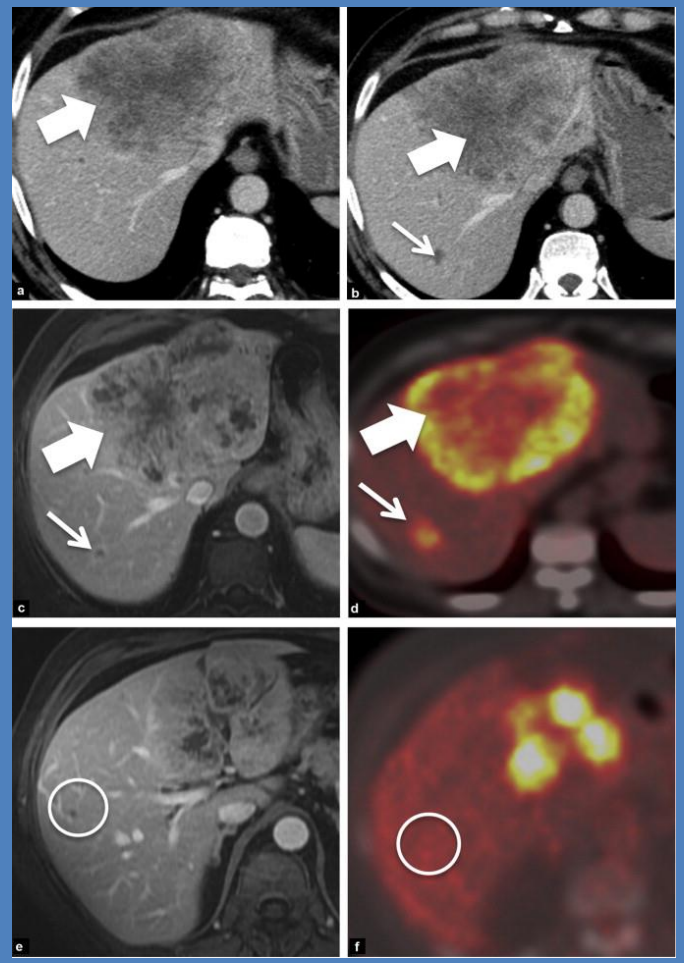
- Evaluate extent of liver disease.
- Surgical planning.

- Survelliance or follow up for HCC.
- Chemoembolization in liver malignancy.
- Liver transplant

  - Arterial – 30 sec
  - Portal venous-70 sec
  - Equilibrium (hepatic venous phase)-180sec.

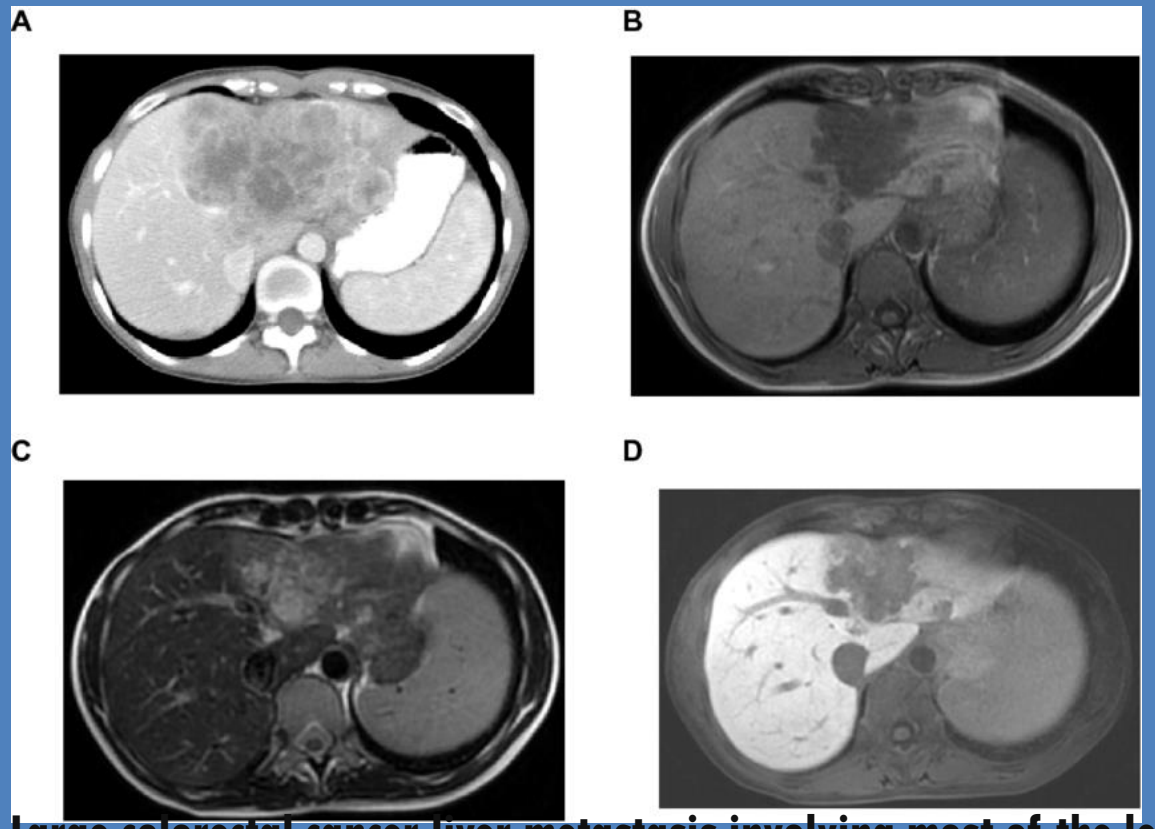


# Diffussion weighted CT



# MRI of liver

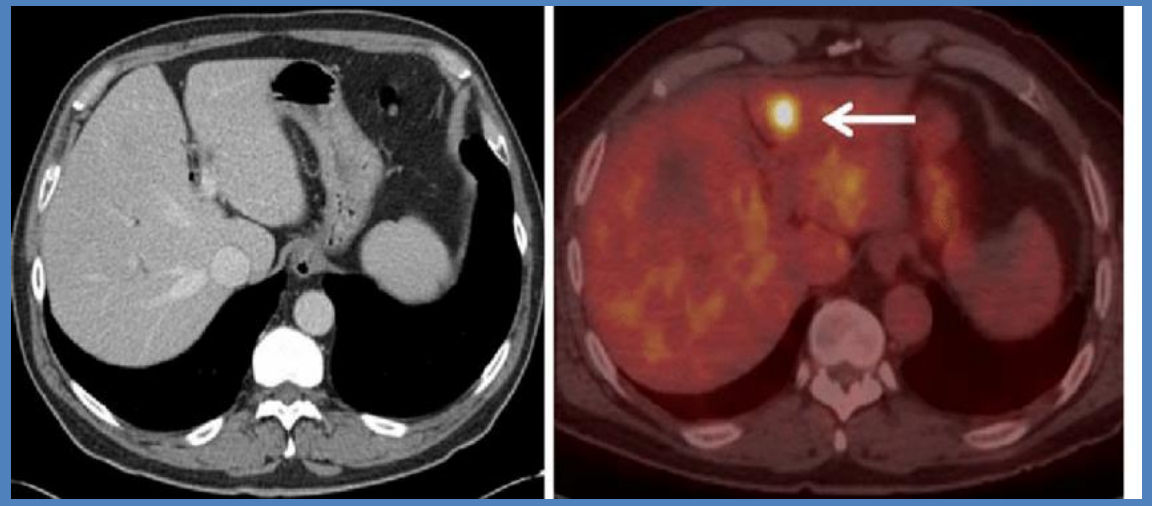
- Superior to CT.
- Distinguish malignancy from cysts, haemangioma etc.
- Liver specific contrast-
  - Taken up by normal functioning hepatocytes.
  - Lesion not containing hepatocytes –no uptake- dark.
- Liver specific phase CT.
- MRCP- excellent quality of non invasive.




**Large colorectal cancer liver metastasis involving most of the left liver lobe. (A) The CT scan shows a large, hypodense, inhomogeneous mass. (B) The lesion is hypointense on the T1-weighted image and (C) slightly hyperintense and inhomogeneous on the T2-weighted scan. (D) At mangafodipir-enhanced MRI the metastasis is very hypointense and has well defined margins with respect to the normal hepatic parenchyma.**

# PET- CT Abdomen

- Detect occult extrahepatic mets- 20% of stage IV disease.
- Mandatory before liver resection.
- Accurate tumor localization & surgical planning.

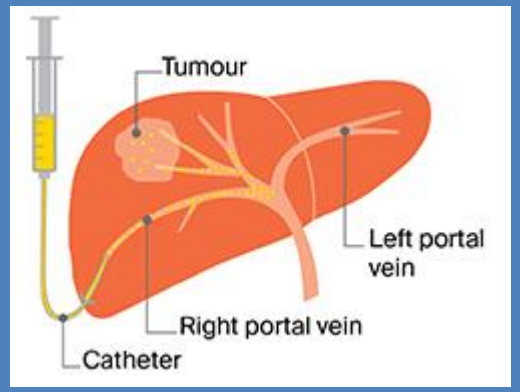


**PET/CT detection of occult liver metastasis. Computed tomography and PET/ CT scan in a 66-year-old male diagnosed with a T1N0 pancreatic adenocarcinoma by endoscopic ultrasound. PET/ CT demonstrated a lesion in the left lobe of the liver not identified on CT, which was biopsy proven to be metastatic adenocarcinoma.**

# Multidisciplinary team

- Surgeon.
- Medical oncologist.
- Radiation oncologist.
- Pathologist.
- Radiologist.
- Gastroenterologist.

# Treatment options

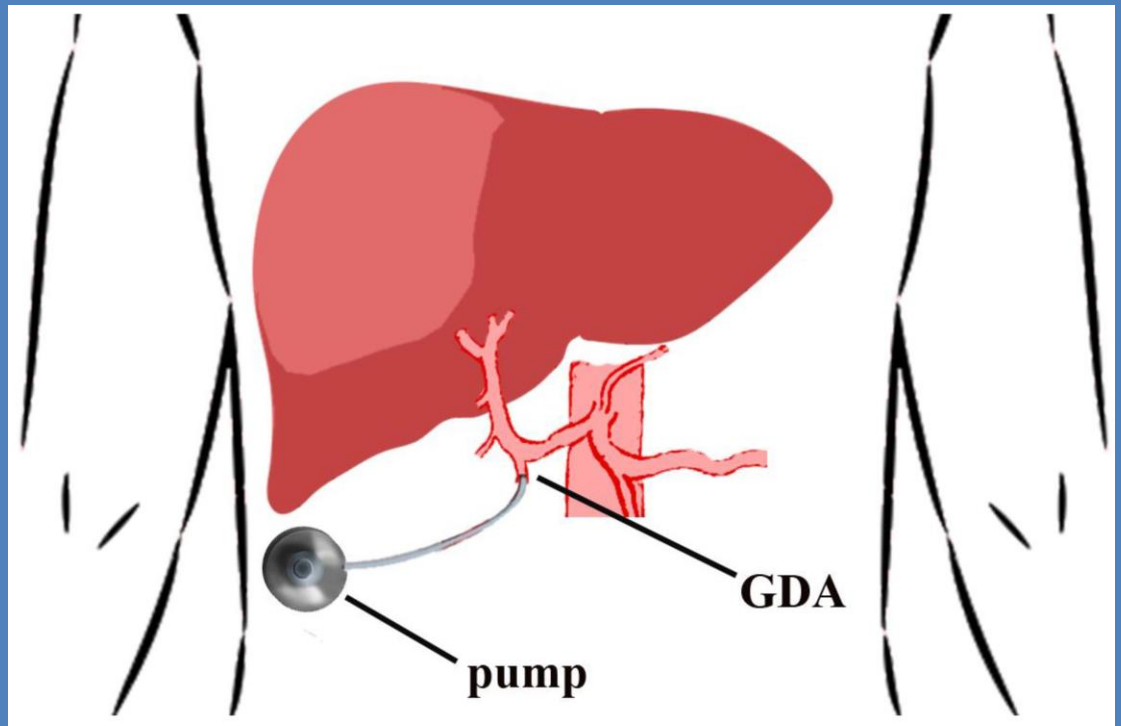



## Consider 3 things-

- Fitness.
- Whether liver disease is curable?
- If initially unresectable- can be made amenable to Sx or ablation after systemic CT.

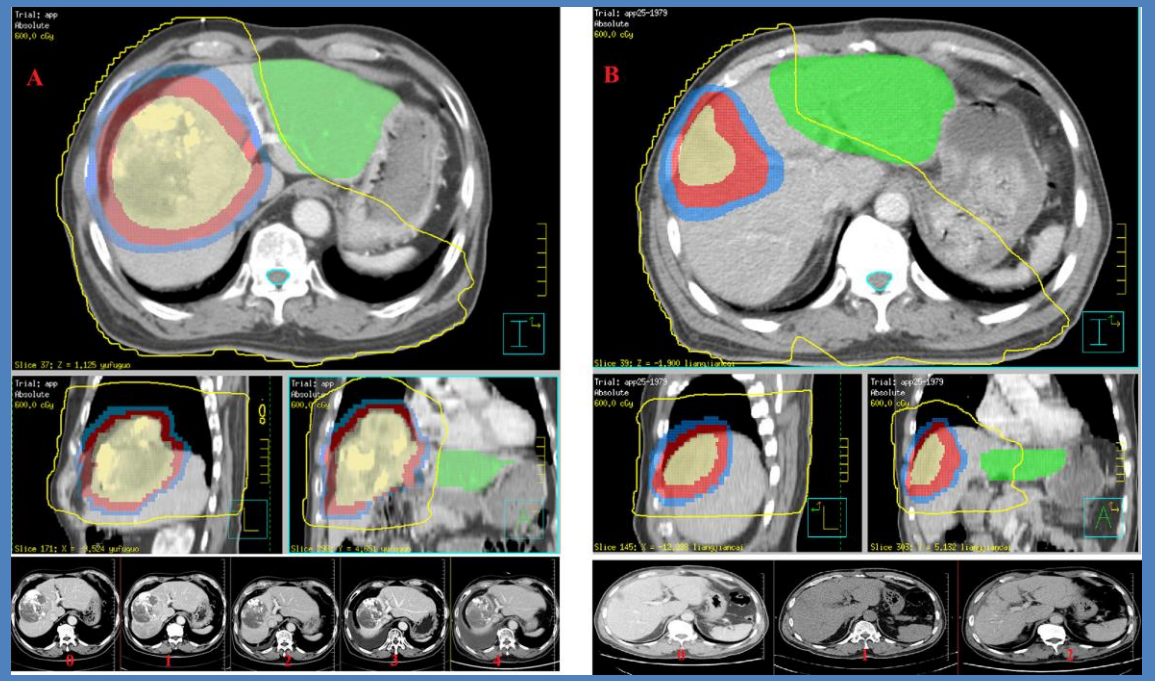
## Options-

- Resection.
- Ablation.
- Combination.



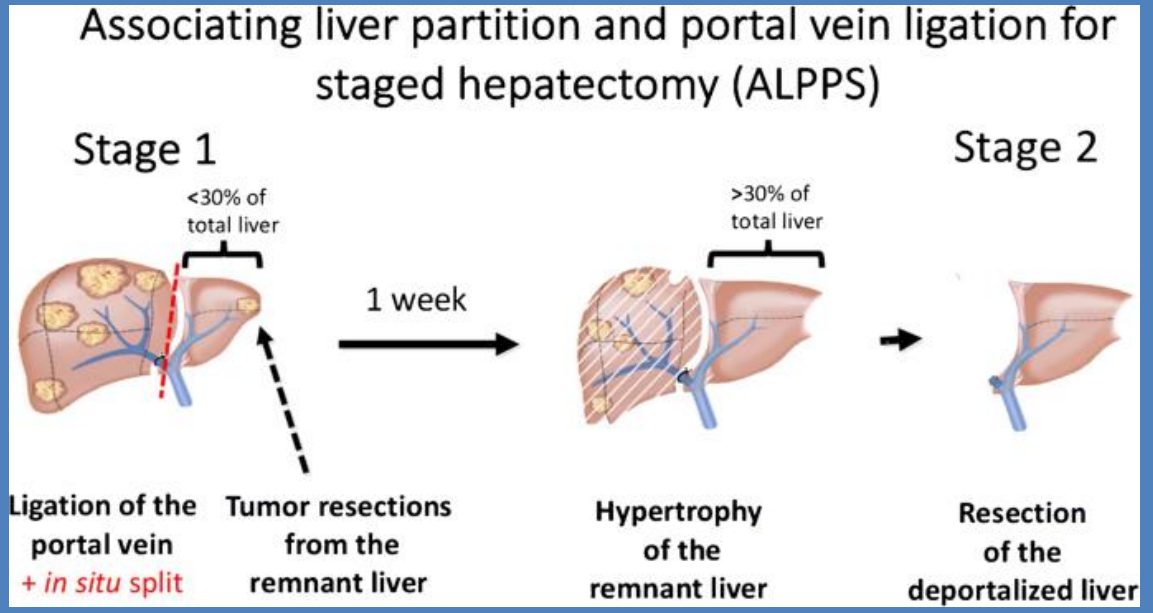
# Downstaging for colorectal liver metastasis

- Chemotherapy.
- CT + mAb.
- Staged resection.
- Portal vein embolization- 3-6 weeks before.
- Ablative technique.
    - Cryotherapy.
    - Interstitial laser hyperthermia.
    - RFA.
    - Microwave therapy.
    - Focused USG.
    - Electrolyte therapy.
    - Radioembolization.



# Ablative therapy

- Portal vein or hepatic artery?
  - Liver regeneration- portal vein embolization / ligation.
  - Tumor reduction- HAI.



# Chemotherapy

- Largely ineffective for irresectable metastasis.
- Resectability after CT varies from 6-60%.
- 5 yrs survival after gaining resectability -35-50%.
    - FOLFOX- response rate 50-60%.
    - FOLFIRI.
    - CapeOX.
- Hepatic arterial infusional therapy.
    - Hepatic artery feeds metastasis.
    - FUDR (Fluorodeoxyuridine) or 5 FU.
- Molecular targeted therapy- mABs-VEGFR, EGFR.
    - Cetuximab.
    - Bevacizumab.
    - Sorafinib.

# Surgery

- Classic approach-
  - Colon 1st.
- Liver first.
- Synchronous resection.

# Liver resection

## Classic strategy-

- Primary resection.
- Adjuvant therapy.
- Liver resection.

- In case of major hepatic resection.
- When combined partial hepatectomy & colectomy is risky for 1 setting.

## Liver 1st or reverse sequential approach-

- CR primary is small & asymptomatic.
- Liver mets >3 cm.
- If delay causes progression of liver mets.

# Liver 1st or reverse sequential approach-

- Locoregional control does not require downstaging.
- Liver metastasis- curative resection with adequate residual liver.
- Fit patient with no major comorbidities.
- High volume liver unit with very low mortality & morbidity.
- Delay due to unexpected postoperative complications will not jeopardize local control or cure.

# Simultaneous liver & CRC resection

- Who require minor liver resection.
- Right sided colonic resection can be combined with liver resection safely.
- Wide resection with 1 cm clear margin.

# Recurrance

- > 2/3$^{rd}$ develops hepatic recurrence following hepatectomy.
- Liver is the common site of recurrence (45%).
- 90% who die from CRC have liver metastasis.
- 5-10% patients are candidate for 2$^{nd}$ liver resection.

# Thank You

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