

# LIVER METASTASIS

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Edited by:

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# OUTLINE

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- Introduction
- Clinical presentation
- Diagnosis: Histology and Imaging
- Management

# INTRODUCTION

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- The liver is a common site of distant metastasis originating from different neoplasms including gastrointestinal (pancreatic, stomach, colorectal), lung, breast cancers, melanoma (eye, skin), renal and gynaecological system.
- Also primary liver tumours such as cholangiocellular carcinomas (CCC), cancers of the bile ducts , may disseminate into the liver.

Hepatocellular carcinoma , cholangiocellular carcinoma --> can metastasize to liver

# THE HIGH FREQUENCY OF LIVER METASTASES IS CAUSED BY:

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1. The liver's vast blood supply, which originates from portal and systemic systems.
2. The fenestrations of the hepatic sinusoidal endothelium may facilitate penetration of malignant cells into the hepatic parenchyma.
3. Humoral factors that promote cell growth and cellular factors, such as adhesion molecules, favour metastatic spread to the liver.
4. The liver's geographic proximity to other intra-abdominal organs may allow malignant infiltration by direct extension.

Winter, J., & Auer, R. A. C. (2012)

# INTRODUCTION

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- Oncologists were so pessimistic about the appearance of hepatic metastases that “no treatment” was often the recommendation.
- Advancing technology and improved surgical techniques.
- Patient selection is the most important aspect of surgical therapy for metastatic disease in the liver and clinical follow-up of resected patients has identified those most and least likely to benefit. Therefore, realistic expectations and honest patient education is an important aspect of treatment.

# CLINICAL PRESENTATION

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- Variable and subtle.
- Most patients are asymptomatic; a minority may report abdominal pain, jaundice, or pruritus.
- Symptoms of the carcinoid syndrome.
- Physical examination may reveal hepatomegaly, a friction rub over hepatic metastases, or ascites caused by hepatic venous obstruction or peritoneal carcinomatosis.

Colonic tumor pt. --> need to stage the disease by CT scan to rule out mets  
Cuz most of mets are asymptomatic

Kemeny, N., & Kemeny, M. L. (2008)

Pancreatic or neuroendocrine tumor with liver mets --> the symptoms will be related to the primary tumor

# BIOCHEMICAL LABORATORY TESTS

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- The laboratory tests that are available for liver function assessment are not very sensitive.
- CEA remains the most sensitive test for metastatic colon cancer, but even this test can be normal in the presence of liver metastases, especially with minimal hepatic disease.

*High level of CEA after excision of tumor = recurrence of the disease*

# IMAGING TECHNIQUES

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- The choice among the various techniques, and the sequence with which they are used, should be guided primarily by the clinical indication, taking into account the primary type and the different possible treatments, which also depend on the general status of clinical history of the patient.
- Dedicated liver imaging is not needed in patients diagnosed with disseminated, inoperable disease.



# ULTRASONOGRAPHY

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- Transabdominal ultrasonography (US)
- Contrast-enhanced US *To decide if the lesion is cystic or solid mass. + is it primary or not .  
Most common cystic lesion = hemangioma*
- Endoscopic ultrasound (EUS)
- Intraoperative US (IOUS): detects 5-10% of missed lesions.

# COMPUTED TOMOGRAPHY (CT)

There is some limitation to use it, but still it is the most useful images to detect liver mets when the size of mets more than one cm.

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- **Noncontrast CT.** Useless in case of liver mets
  - **Contrast CT.** Contrast should be: arterial, venous and (triphasic)

In case of liver mets -m with contrast is favorable unless there is contraindication to contrast such as kidney failure pt, allergy to contrast.

# COMPUTED TOMOGRAPHY (CT)

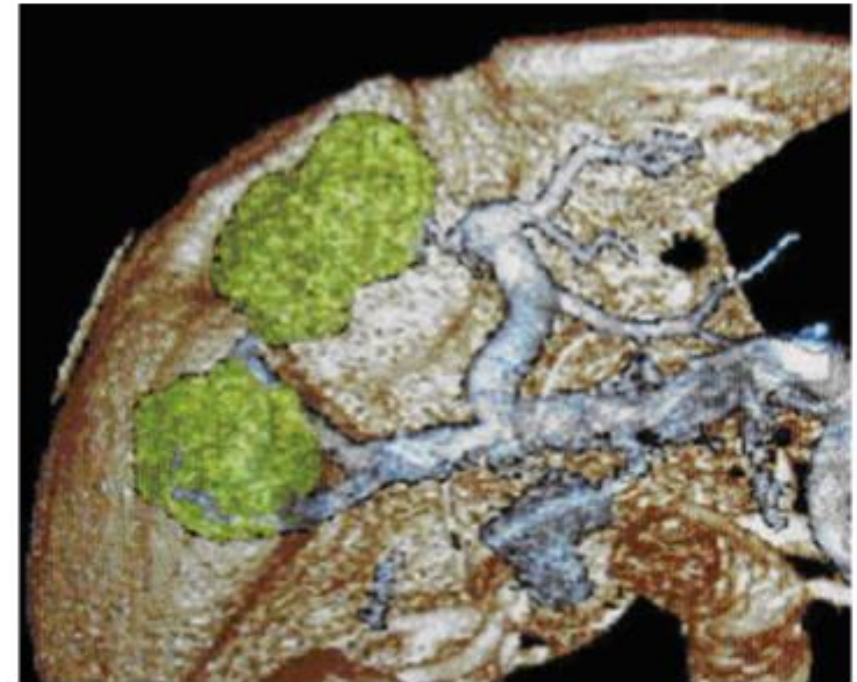
White = hyperdense ( bone)

Dark = hypodense ( liver )

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Computed tomography of hypervascular liver metastases from a renal primary tumor at the arterial phase.



Computed tomography 3-D reconstruction before surgical showing liver metastases

# MAGNETIC RESONANCE IMAGING (MRI)

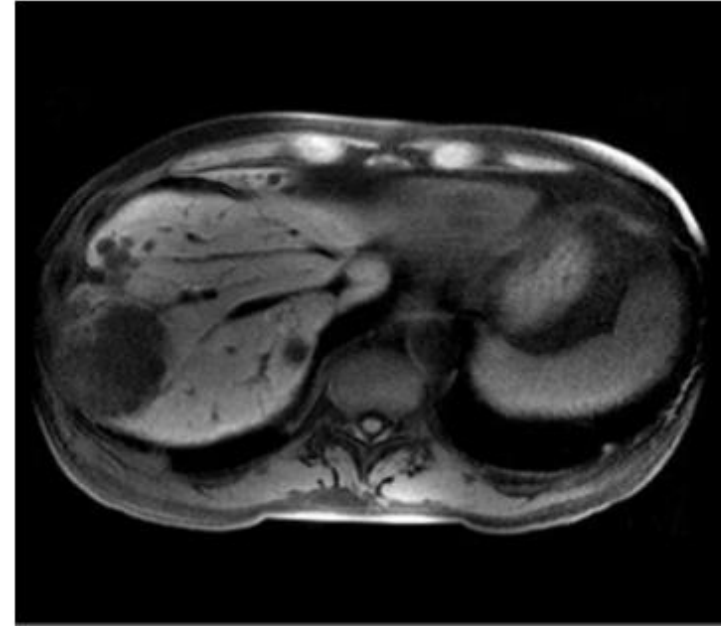
Indication :

1- contraindication to contrast . ( kidney failure , allergy to contrast)

2- mets size less than one cm

3- young age we would not let thier exposued to irradiation

Dynamic, breath-hold MR imaging with a gadolinium-based contrast material is considered to be the most sensitive MR technique for detection of hepatic metastases



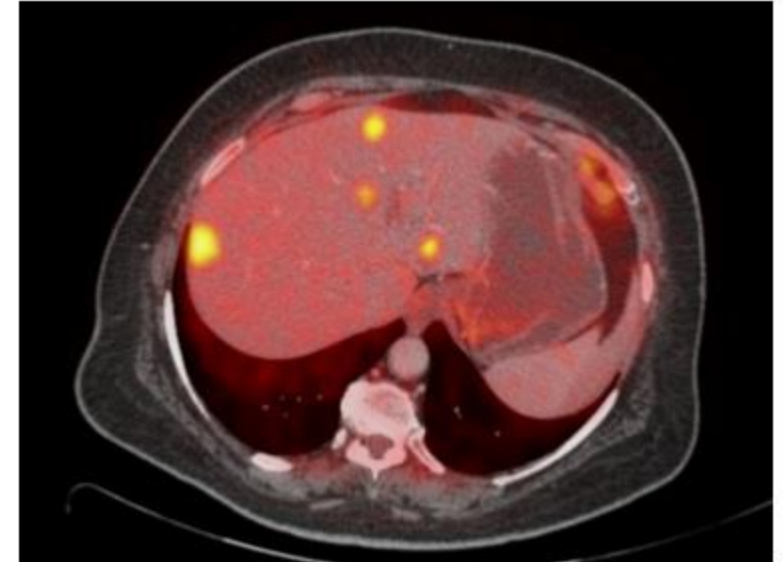
Liver metastases after Mn DPPD or mangafodipir injection.

# POSITRON EMISSION TOMOGRAPHY (PET)

To detect small lesion

Sensitive but not specific , cuz the area of inflammation has high metabolism rate , so suger uptake will by high also.

- The majority of clinical experience relies on the uptake and use of glucose in human cells.
- $^{18}\text{F}$ -Fluorodeoxyglucose  $^{18}\text{F}$ FDG, the most commonly used marker in PET imaging, is an analogue of glucose in which a carbon atom is replaced by a radioactive fluorine isotope.
- Combined PET/CT scanners allow the precise localization of the abnormal areas of uptake.



PET/CT Cancer pancreas with liver metastases (<http://www.radrounds.com/photo/petct--2context>).

# HISTOPATHOLOGY

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- The histologic appearances of metastatic deposits in the liver may resemble those of the primary tumors.
- Because the metastatic cell population may not be representative of the primary tumour, it can be difficult to determine the site of origin based on the histologic appearance of the metastases alone.

# HISTOPATHOLOGY

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The initial light-microscopic findings can be used to categorize the tissue into one of three groups:

1. poorly differentiated carcinoma or adenocarcinoma.
2. well-differentiated adenocarcinoma.
3. squamous carcinoma.

In most cases, immunohistochemical studies further differentiate these metastases.

مش مطلوب نحفظهم  
As what dr. Alzoubi said in O18 lecture

| <b>Tumor</b>           | <b>Antigens</b>                               |
|------------------------|---|
| Colonic adenocarcinoma | CEA   |
| Pancreatic carcinoma   | CEA, pancreatic carcinoma-associated antigen  |
| Lung carcinoma         | CEA, cytokeratin, neuron-specific enolase     |
| Breast carcinoma       | CEA, milk-fat globulin, hCG                   |
| Thyroid carcinoma      | Thyroglobulin                                 |
| Prostate carcinoma     | Prostate-specific acid phosphatase, PSA       |
| Melanoma               | S-100, vimentin, neuron-specific enolase      |
| Carcinoid              | Chromogranin, neuron-specific enolase         |
| Lymphoma and leukemia  | CLA   |
| <b>Sarcoma</b>         |   |
| Smooth muscle          | Type IV collagen, vimentin, desmin            |
| Skeletal muscle        | Myoglobin, vimentin, desmin                   |
| Neurogenic             | S-100, myelin basic protein                   |
| Cartilage              | S-100, vimentin                               |
| Bone                   | Vimentin                                      |
| Germ cell tumors       | $\alpha$ -fetoprotein, $\alpha$ 1-antitrypsin |
| Trophoblastic tumors   | hCG, $\alpha$ -Fetoprotein                    |

Immunohistochemical antigens for the identification of primary tumors.



# CRLM

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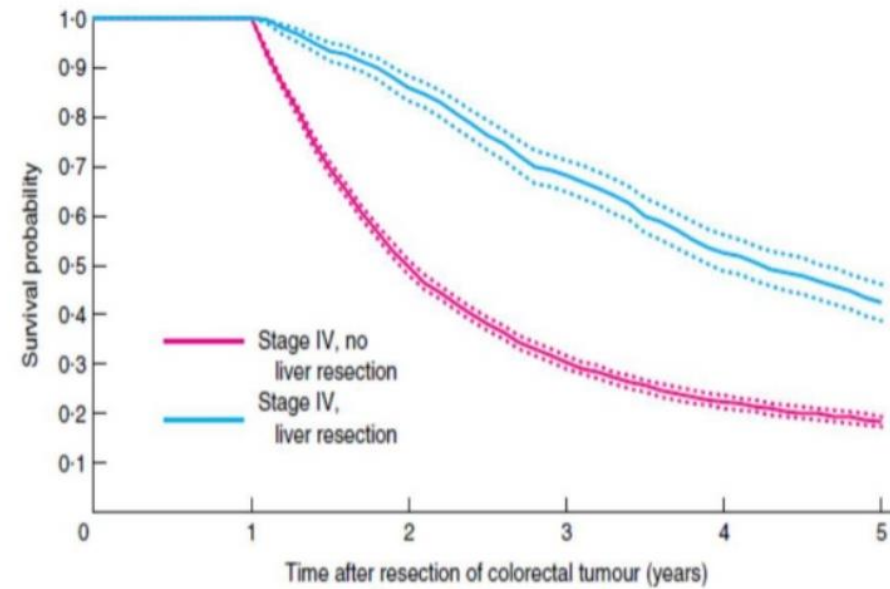
- Colorectal cancer (CRC) is one of the most common cancers in the world, ranking third in terms of incidence (10.2% of all cancer cases worldwide) and second most common cause of cancer mortality (9.2% of all cancer mortality) in the world. Over 1.8 million new CRC cases and 881,000 deaths are estimated to occur in 2018, accounting for about 1 in 10 cancer cases and deaths.

**Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries.***Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal ACA Cancer J Clin. 2018 Nov; 68(6):394-424.*



Surgical management and outcomes of colorectal cancer liver metastases

*British Journal of Surgery* 2010; 97: 1110-1118



Hepatectomy :

1- any type of liver resection regardless if it is large liver resection ( 3 or more segments ) or minor liver resection ( less than 3 segments.)

\*\* best chance for cure is liver resection regardless large or minor resection

## CRLM

Locally ablative therapy indication :

1- not fit pt.

2- lesion near to major vessel

## Management

- Hepatectomy
- Locally ablative therapy
- Chemotherapy
  - systemic Indication for systematic chemo :  
Diffuse and not suitable for local therapy
  - Hepatic Arterial Infusion (HAI)
- Embolization - Chemoembolization

# CHEMOTHERAPY

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- **Neoadjuvant** To down tumor stage, Before operation
- **Adjuvant** After operation
- **Palliative**  
To stabilize tumor size , to avoid complication ( behind IVC : lead to obstruction and edema ,DVT , ASCITES )

55 yrs old male , complain of left sided abd. Pain:

Ddx: at the top of ddx is diverticulitis and to confirm or to rule out the ddx that we think about we have to do CT .

التي طلع بالصورة perforated tumor with abcess collection

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# THANK YOU



