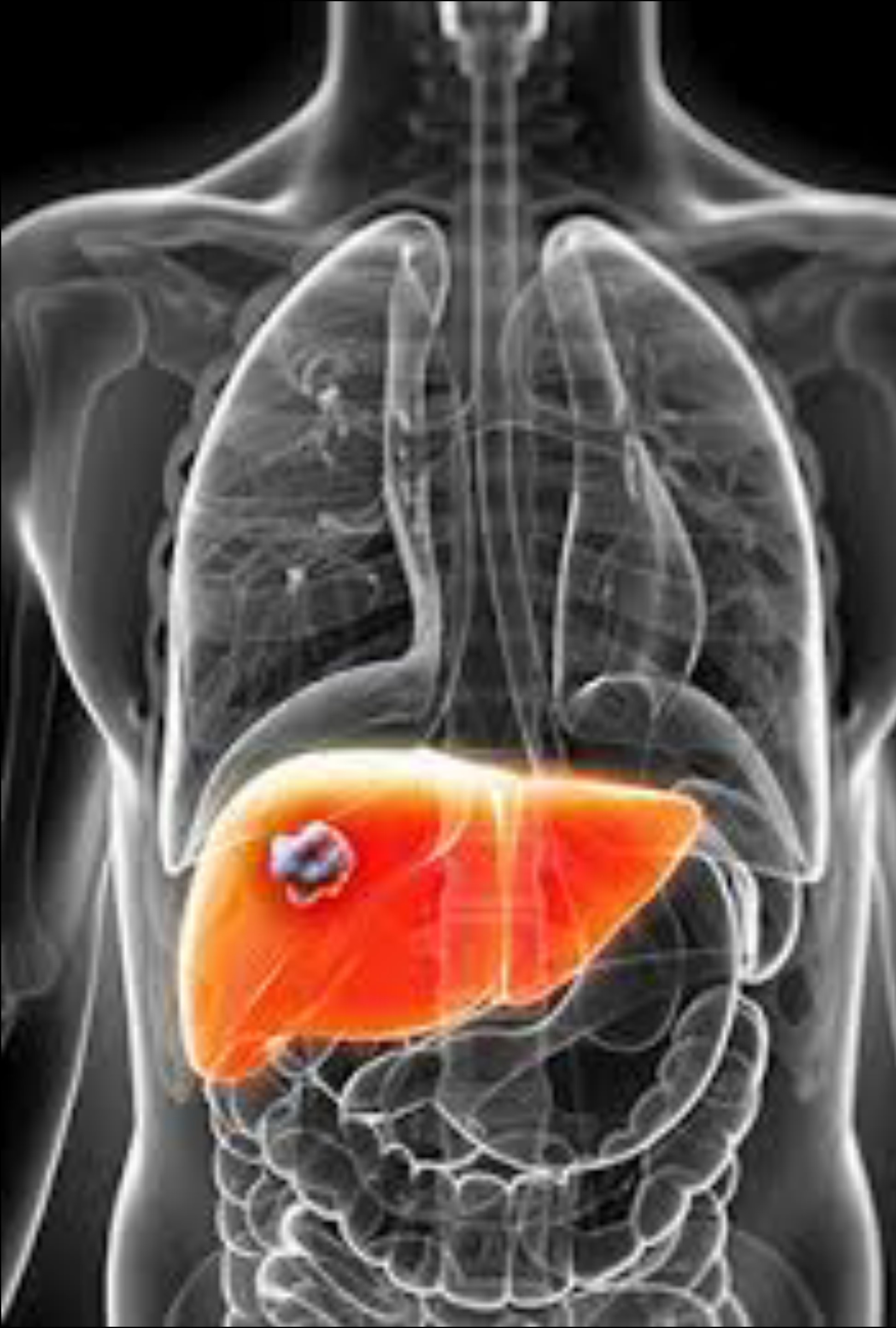


LIVER METASTASIS

Edited Based on 018 lecture

اذكرونا بدعوة ♡..

OUTLINE

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

INTRODUCTION

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.

Gut. 2002 Nov; 51Suppl 6():VI1-9.

THE HIGH FREQUENCY OF LIVER METASTASES IS CAUSED BY:

Hepatic artery 25%
Portal Vein 75%

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. Stomach , Right Kidney , Adrenal gland

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

INTRODUCTION

- Oncologists were so pessimistic about the appearance of hepatic metastases that "no treatment" was often the recommendation.
- Advancing technology and improved surgical techniques.

  tumor resection in Liver mets (colorectal tumors mainly) improve the mortality

- 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

- 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.

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

BIOCHEMICAL LABORATORY TESTS

No Special test

- 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.

IMAGING TECHNIQUES

- 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.

Hepatobiliary Tumors Radiol Clin N Am, 49-679,2011

ULTRASONOGRAPHY

- Transabdominal ultrasonography (US)
- Contrast-enhanced US to focus on one lesion to See it's feature if it is primary or Secondery and the nature of the lesion (cystic or Solid)
- Endoscopic ultrasound (EUS) Same tqnique of Endoscopy but the tip of probe has Camera (See the liver lobe that surround the Stomach)
  Diagnostic + therapeutic (in malignant Cases)
  more Sensitive then the first 2
- Intraoperative US (IOUS): detects 5-10% of missed lesions.
  Put the probe directly over the liver + can detect up to 10% of missed lesions on CT Scan
  Better than CT

COMPUTED TOMOGRAPHY (CT)

- Very good in Detecting tumors > 1 cm
- has limitation for Pt who are not Sutable for Contrast (Renal failure Pt)

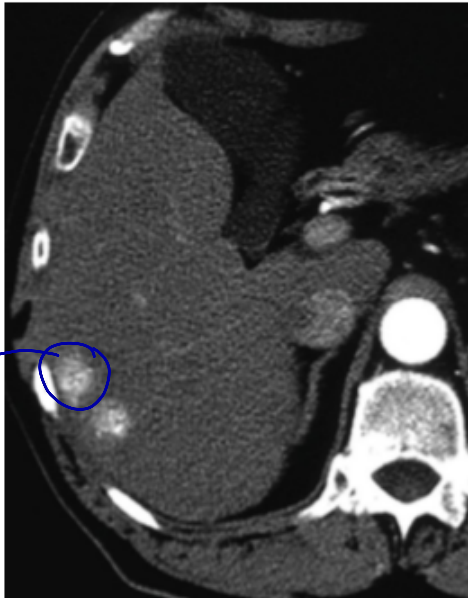
- Noncontrast CT. → uselen for mets
- Contrast CT. → for liver mets, Triphasic contrast is needed.
  - arterial, Venous, Delayed

Iodaine-based contrast

COMPUTED TOMOGRAPHY (CT)

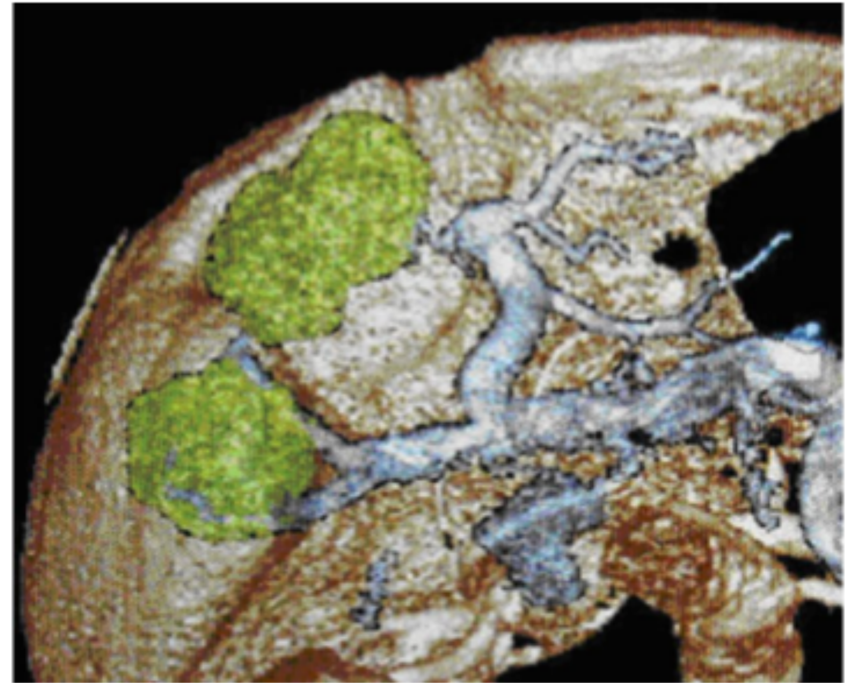
liver is Hypodense compared to the lesions

Hyperdense



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

lesions and the relation with Portal Vesseles

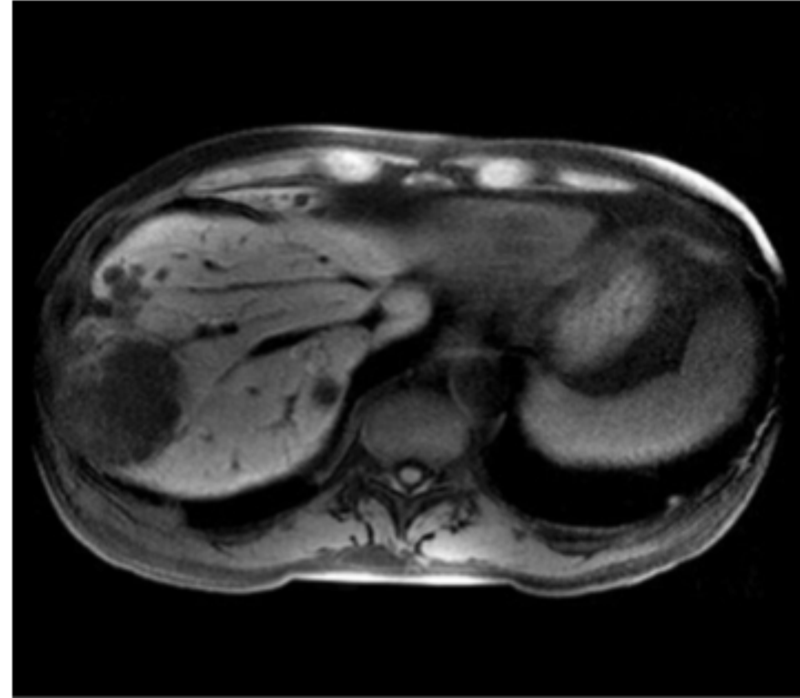


Computed tomography 3-D reconstruction before surgical showing liver metastases

MAGNETIC RESONANCE IMAGING (MRI)

- Young pt + multiple scans are needed
- Detect lesion < 1 Cm

- 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



ver metastases after Mn DPPD or mangafodipir injection.

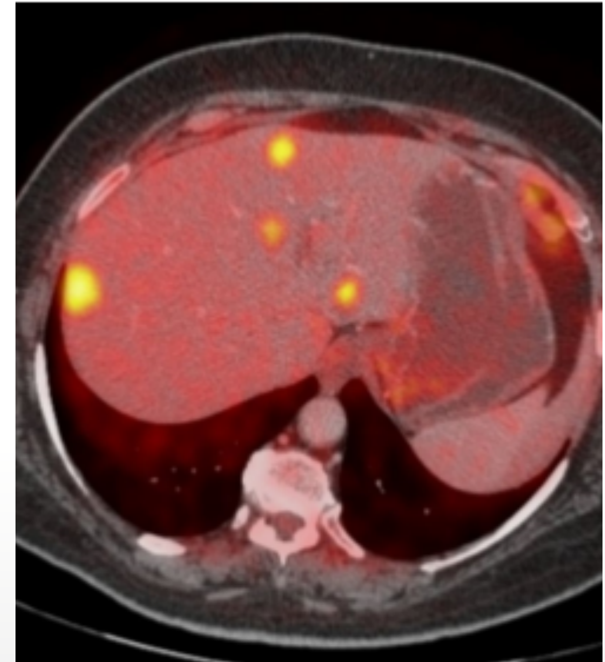
PET → I will see lighting but I will not know if it from kidney, liver etc...
PET CT → In which organ ✓

POSITRON EMISSION TOMOGRAPHY (PET)

Done for the whole body

Sensitive but not specific (areas of inflammation will light up)

- The majority of clinical experience relies on the uptake and use of glucose in human cells.
- 18F-Fluorodeoxyglucose 18FDG, 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.



with liver metastases (http://www.radrounds.cor

HISTOPATHOLOGY

- 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

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. كل ما كانت بتشبه ال Primary Origin أكثر
3. squamous carcinoma.

In most cases, immunohistochemical studies further differentiate these metastases.

to know the organ of origin

Tumor	Antigens
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
Sarcoma	
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	α-fetoprotien, α1-antitrypsin
Trophoblastic tumors	hCG, α-Fetoprotein

Immunohistochemical antigens for the identification of primary tumors.

CRLM

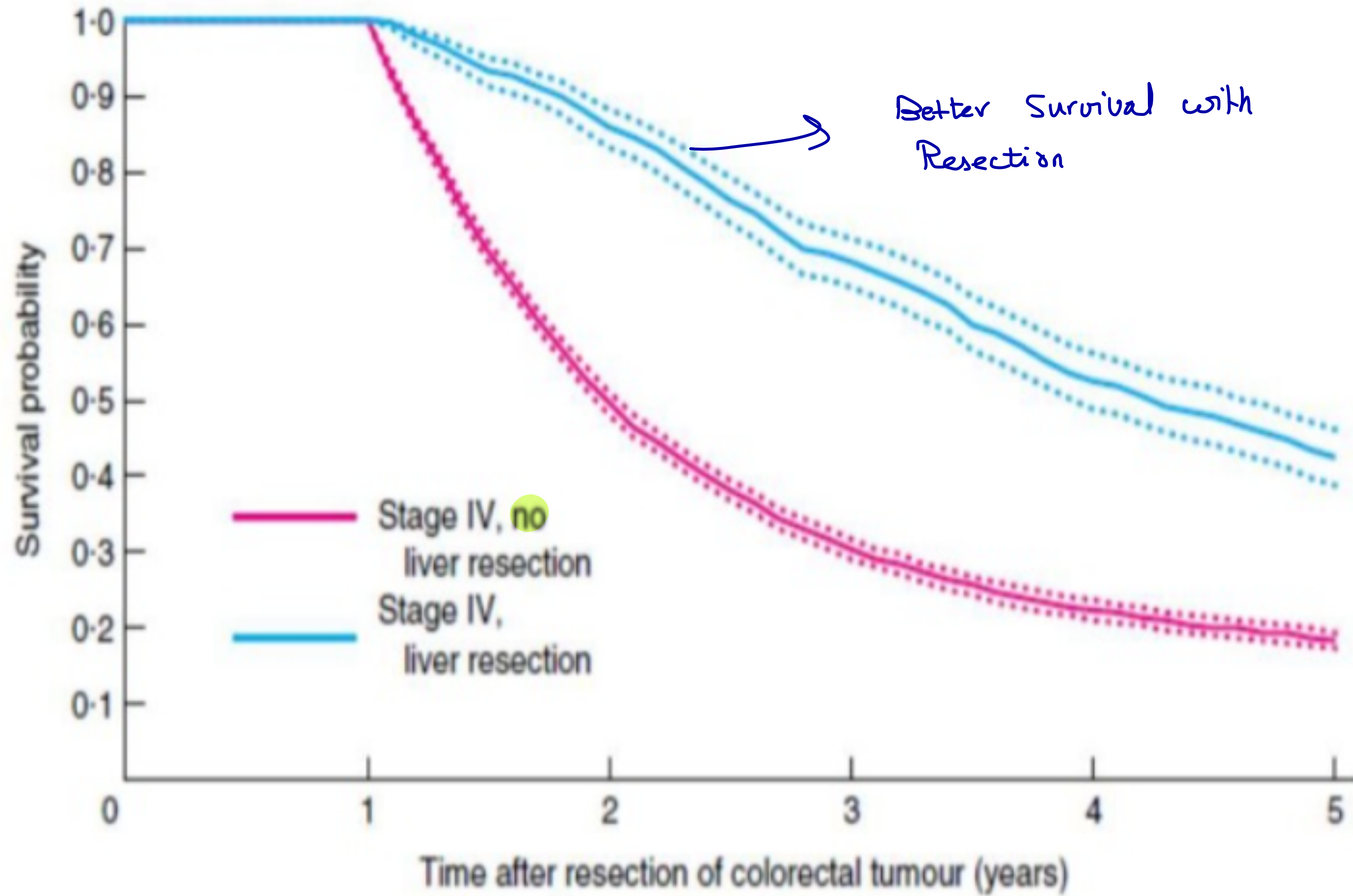
good outcomes of resection

- 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



CRLM

Management

- Hepatectomy Better Prognosis
- Locally ablative therapy → If Pt not fit Surgery → tumor is near greater Vessels
- Chemotherapy
  - systemic
  - Hepatic Arterial Infusion (HAI) Selective Same mechanism of Cath
- Embolization - Chemoembolization

CHEMOTHERAPY

- Neoadjuvant for Down Staging → Before any Surgery
- Adjuvant After OP
- Palliative to Stabilize the tumor Size if it non resectable