



Round : ..General surgery.....

Group no : B3.....

Done By : ..Fatima abu assal.....

Malignant tumours of the liver and pancreas

Liver tumors:

✨ Primary:

(HCC, intra hepatic, cystadenocarcinoma, lymphoma angiosarcoma,) 🌸 mc in primary is HCC 🌸

✨ Secondary: (colorectal Mets, NET, Others) 🌸 most common overall 🌸

HCC:

🌸 HCC: 10-20% no underlying Cirrhosis but not a normal liver (مهم جدا!!!!)

✨ The **fourth** cancer related death worldwide

✨ Hyper vascular tumor

✨ high risk for vascular invasion, multifocality and lymphatic Mets (so only 20% is Resectable)

✨ Very **unlikely** to invade biliary tree or compress it

🌸 Risk factors: hepatitis B+C (highest risk for chronic viral hepatitis (HBV)), males and infrequent causes such as Alpha one anti trypsin deficiency, hemochromatosis, glycogenosis.

✨ Clinical representation: MC presentation is abdominal pain and could present with jaundice (10-20%) mainly due to decompensated liver rather than tumor compression

✨ Diagnosis: U/S is the initial screening // triple phase liver CT is the gold standard // A-FB (normally = 0-20) in 80% if >400 considered diagnostic if >1000 poor differentiation

🌸 On CT and MRI Typical feature of early arterial contrast enhancement and early washout out in the delayed phase

✨ HCC can be diagnosed by images so biopsy is not mandatory

✨ Liver tumors received their blood supply predominantly from hepatic artery not portal vein.

Treatment:

✨ According to CPS stage of cirrhosis child-A is resectable B+C are unresectable

✨ Hepatectomy, liver transplant, RFA are **curative** treatment in the **absence of decompensated liver**

🌸 In patients who are not candidate for curative treatment and have NO decompensated Liver use trans arterial chemo embolization and systemic therapy (Sorafenib)

🌸 Note that there is NO rule of a new adjuvant or adjuvant IV chemotherapy

🌸 The major cause of death following resection of HCC is tumor recurrence (40%) within the 1st year

✨ Patients who are candidate for transplant according to milan criteria if they have one nodule (5cm) three nodules (The maximum diameter is 8cm)

✨ Best survival in case of small encapsulated tumor (<2cm) in patient with (child A score)

Fibrolamellar HCC:

🌸 Occurs in young adults **Without** underlying cirrhosis

🌸 Non-encapsulated but will circumscribed high respectability rate(grows slowly and has better prognosis)

✨ F>M (عكس HCC)

🌸 A-FB elevated in less than 10%

✨ Recurrence is common(80%)

✨ Can metastasize to lymph nodes

Intrahepatic cholangiocarcinoma(ICC):

🌸 Second MC primary tumor after HCC

✨ It arises from the peripheral intrahepatic biliary radicle(2nd+3rd) order Biliary tree

🌸 Large non-encapsulated heterogeneous associated with narrowing of adjacent portal veins and retraction of liver capsule.

✨ In old ages M=F

✨ Poor prognosis

🌸 **Most** of them develop without a background of liver disease

✨ As HCC unlikely to compress or invades the biliary confluence

🌸 LFT and serum markers(Ca19.9,CEA) are not specific nor specific

🌸 Mostly they are unresectable because of satellite nodules

🌸 CT scan and MRI are diagnostic

(showing **hypo**enhancing)

✨ Types: 🌸 mass forming(MC) 🌸

🌸 infiltrating type the worst prognosis (spread along Glissons capsule)

🌸 Intraductal growth type(the best of the process)

🌸 Treatment: there is NO place for liver transplantation except in very very selective cases

✨ surgical resection is the only curative TTT

Biliary cystadenocarcinoma:

✨ intrahepatic in location may arise from pre-existing biliary cystadenoma

✨ F:M(2:1)

🌸 CA19-9 is markedly raised

🌸 The presence of an associated ovarian-like stroma in female patients appears to signify (favourable prognosis)

✨ Cyst aspiration is not recommended

✨ High survival rates

✨ The only potentially curative treatment is complete removal

colorectal liver metastasis:

🌸 The liver is the most frequent site of metastasis from CRC

✨ Diagnosis is usually based on imaging

✨ Ultrasound is not sensitive Diagnostic test

🌸 triple-phase liver CT is the modality of choice

✨ MRI superior to CT in detecting small lesions

✨ Appears hypo-attenuated lesion and best identified in portal Venous phase

✨ Surgical resection offers the best chance for long-term survival

🌸 future liver remnant post surgery (FLR) (at least 20% in normal liver, 30% in chronic liver disease and 40% in cirrhotic liver)

✨ In case of small FLR we can use Portal vein embolization of the lobe that has the mets before the surgery to induce atrophy of the affected liver lobe and hypertrophy on the non-diseased lobe in effort to have adequate FLR and avoiding the post-hepatectomy liver failure.

NET:

✨ large multifocal bilobar

✨ Less than 20% are candidate for surgery

✨ High vascularity tumor (hyper-enhancing on CT)

✨ Overall survival after surgery >80% at 5 years (more than the CRLM or other primary liver tumour)

✨ Surgical treatment with curative intent is the best modality if the patient fits for the surgery

🌸 Somatostatin analogue used for symptomatic treatment in hormonally active (in carcinoid tumor)

Pancreatic malignant tumor:

7th leading cause of cancer-related deaths worldwide

Exocrine (mc) PDAC, Mucinous, Adenosquamous (worst type)

Endocrine P-NET (5% of pancreatic tumors)

PDAC:

🌸 Most common pancreatic cancer and the most common exocrine pancreatic cancer and overall (most common site head > body > tail)

✨ Mostly in males 72 years old African Americans

🌸 Most common clinical presentation is jaundice (mainly painless).

Weight loss, palpable distended gallbladder in 1/3 of patients with periampullary PDAC (Courvoisier sign), palpable left Virchow's node, and Sister Mary Joseph node, Trousseau's sign (migratory venous thrombosis)

🌸 MC gene mutation in pancreatic cancer is (K-ras2)

🌸 There is association between this cancer and H. pylori colonization and ABO blood group

✨ Risk factors are age (>60 yo) + some syndromes like FAP, Lynch, Fanconi, ...

🌸 Investigations: Ca19-9 (if >100 is diagnostic (if >400 advanced stage do laparoscopy before surgery)), some people don't express this AG (15%)

,it can be elevated in cholestyitis, cholangitis,chronic pancreatitis(بس مو کتير يرتفع يا دوب) so it is mostly used as prognostic marker to assess response to therapy in patients already diagnosed.

🌸 CT scan is investigation of choice for evaluation of lesions arising in the pancreas showing (hypo-intense mass, double ductal sign (dilated CBD and PD))

✨ Pancreatic ca can be diagnosed based on imaging and presentation so it isn't necessary to do biopsy before surgery

✨ Treatment: role of ERCP in pancreatic ca with jaundice (ممنوع ياخذ chemo هو اصفر)

✨ Only 20% are surgically resectable(in tumors that have Mets) it's the only potential curative treatment of pancreas

🌸🌸 Tumours of head of the pancreas,periangillary tumor,distal cholangiocarcinoma (Whipples -classical or PPPD)

Whipple's Procedure Involves Resection of		
• Distal stomach ^a <i>antrum</i>	• Duodenum ^a	
• Gallbladder ^a	• Proximal jejunum ^a	
• CBD ^a	• Regional lymphatics	
• Head of pancreas ^a		
Restoration of GI Continuity Requires		
• Pancreaticojejunostomy^a	• Hepaticojejunostomy^a	• Gastrojejunostomy^a

🌸🌸 Tumours of body & tail of the pancreas
(Distal pancreatectomy and en-bloc splenectomy)

Palliative Therapy for Pancreatic Cancer <i>(unresectable)</i>	
Biliary obstruction	• ERCP with metal stent placement (Best) ^a • Roux-en-Y hepaticojejunostomy
Gastric outlet obstruction	• Endoscopic stenting (Preferred) ^a • Double bypass (Roux-en-Y hepaticojejunostomy + gastrojejunostomy)
Pain	• NSAIDs or opiates ^a • Celiac nerve block ^a

Median Survival in Carcinoma Pancreas <i>How bad is this tumor ☹️</i>	
• Resectable disease (stage I and II)	• 15-20 months^a
• Locally advanced disease (stage III)	• 6-10 months^a
• Metastatic disease (stage IV)	• 3-6 months^a

P-NET:

🌸 Non functional (MC)

🌸 Functional (insulinoma is the MC functional overall)(gastrinoma is the MC malignant functional)

↙

TERMINOLOGY	DIFFERENTIATION	GRADE	MITOTIC RATE (mitoses/2 mm ²)	Ki-67 INDEX (PERCENT)
NET, G1	Well differentiated	Low	<2	<3
NET, G2	Well differentiated	Intermediate	2 to 20	3 to 20
NET, G3	Well differentiated	High	>20	>20
NEC (small cell or non-small cell)	Poorly differentiated	High	>20	>20

Handwritten notes: "المعدل" (the rate) with an arrow pointing to the Mitotic Rate column; "memori" (memory) with an arrow pointing to the Ki-67 Index column.

Insulinoma:

✨ 97% in pancreas (equal distribution)

✨ Sporadic in majority of cases

🌸 **Painless**

✨ Hyper-attenuation

✨ Significant weight gain

🌸 Hallmark is whipple's triad (hypoglycemia (relieved by administration glucose), fasting induced neuroglycopenic symptoms of hypoglycemia (diaphoresis, shaking, mental confusion, obtundation, seizure))

🌸 Gold standard for diagnosis is the 72/hrs fasting test

🌸 Gold standard for pre-op localization is portal venous sample

✨ Insulin : glucose >0.4

🌸 Treatment : Diazoxide and surgery

Gastrinoma (Zollinger Ellison syndrome):

🌸 mc functioning malignant pancreatic endocrine tumor

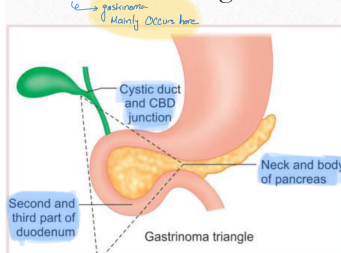
✨ Men mainly

🌸 Sporadic (75%) & MEN-1 association (25%)

✨ Those associated with MEN-1 are almost always multiple, early onset, more common in duodenum

🌸 MC site is duodenum (50-70%) followed by Pancreas (20-40%)

the **Passaro's triangle**



🌸 Clinical presentation: peptic ulcer with refractory severe diarrhea// MC presenting symptoms are abdominal pain (70-100%), diarrhea (50-70%) & GERD (30-35%)

✨ 100% patients will have a fasting serum gastrin level >100 pg/mL

🌸 An increase of >200 pg/mL the gastrin value after administration of secretin is diagnostic

🌸 Somatostatin receptor scintigraphy (SRS) is imaging test of choice for localizing both primary and metastatic gastrinomas

Glucagonoma:

- ✨ Mainly in females/malignant
- ✨ MC site is Body and tail of pancreas.
- 🌸 presentation: Diabetes, dermatitis, DVT, depression
- ✨ Fasting glucagon level >50 is considered diagnostic + CT
- 🌸 Necrolytic erythema migrans is MC manifestations
- ✨ Resection is the treatment of choice

Verner Morrison syndrome (VIPOmas):

- 🌸 Also known as WDHA syndrome (watery diarrhea(mc), hypokalemia, achlorhydria) or pancreatic cholera
- ✨ Usually solitary MC site is tail of pancreas
- malignant mainly
- ✨ Managed by preoperative hydration and correction of electrolyte abnormalities & Octreotide
- Resection is the treatment of choice
- ✨ Precursor lesions :
 - 🌸 1-**pancreatic intraepithelial neoplasia (PanIN)(mc)**
 - 2- **intraductal papillary mucinous neoplasm (IPMN):**
 - ✨ also known as mucin-secreting carcinoma, villous adenoma of the duct of Wirsung.
 - ✨ Seen in 6th to 7th decade of life.
 - Equal sex distribution.

More common in head & uncinata process of the pancreas.

- 🌸 Clinical Features: abdominal pain or recurrent pancreatitis, (caused by obstruction of pancreatic duct by thick mucin) extruding through a large, fish-mouth like papillary orifice

🌸🌸 Aspirated fluid: Mucinous content with elevated CEA & amylase level (مهممهمم)
(جدا جدا)

- Any of the following features associated with high risk of malignancy:
- Obstructive jaundice in a patient with cystic lesion of the head of the pancreas. B) Enhancing solid component within cyst. C) Main pancreatic duct >10 mm in size.
- Stigmata of malignancy:
- A) Pancreatitis .B) Cyst >3 cm. C) Thickened/enhancing cyst walls. D) Main duct size 5-9 mm. E) Non-enhancing mural nodule. F) Abrupt change in caliber of pancreatic duct with distal pancreatic atrophy

3 - mucinous cystic neoplasm (MCN):

- 🌸 Most Common cystic neoplasm of the pancreas
- 🌸 Frequently seen in young***women***, mean age 5th decade

🌸 ovarian-like stroma surrounding the columnar epithelium is considered a pathognomonic finding

🌟 More common in the body & tail of the pancreas

🌸 No relation or communication with pancreatic duct

🌟 Risk of invasive carcinoma 10-50 %

🌸🌸 Cyst fluid analyses: Mucin-rich aspirate, high CEA & low amylase levels (مهمممم)

فوقه بنسبه ال amylase بفرق عن اللي (جدا جدا جدا)

Note :pseudocyst has high levels of amylase and very low level of CEA

1. A 30-year-old female is referred to your office for a second opinion after diagnosis of an incidental hepatic mass, found on CT scan as part of a workup for vague abdominal pain at an outside hospital. You are able to view her imaging: an MRI shows a 3-cm mass in the right hemiliver, with heterogeneous appearance and no retention of an administered hepatocyte-specific contrast agent (gadoxetate disodium). The lesion is not hyperintense on T2-weighted imaging. What diagnosis should you favor?

- a. Simple biliary cyst
- b. Focal nodular hyperplasia
- c. Hemangioma
- d. Hepatic adenoma**
- e. Hepatocellular carcinoma

1. Answer: d. Hepatic adenoma is commonly identified incidentally in young women due to an association with estrogen and progesterone exposure. It is characteristically a heterogeneous mass that does not retain gadoxetate disodium contrast on hepatobiliary phase imaging, as this lesion does not contain bile ductules. Alternatively, focal nodular hyperplasia does retain this contrast and is more homogeneous. Hemangioma and biliary cysts would appear hyperintense on T2-weighted imaging. Imaging-based descriptions of hepatocellular carcinoma should include commentary on arterial phase enhancement, capsular enhancement, and the pattern of washout.

3. A patient is referred to you by your hospital's colorectal surgery group. This is a 60-year-old female who had a rectal cancer resected 2 years ago and now has multiple hepatic lesions identified on surveillance CT scan. She has few other

comorbidities and good baseline functional status. Her imaging shows six discrete lesions, all around 3 cm: four are in the right hemiliver and two are in segment IV. None are amenable to wedge resection. Resection with a right trisectionectomy would leave her with an estimated future liver remnant under 20%. Which of the following would be an *inadequate* treatment option?

- a. Trisectionectomy**
- b. Portal vein embolization followed by trisectionectomy
- c. Right hepatectomy and radiofrequency ablation of the lesions in segment IV
- d. Two-stage resection with right hepatectomy and systemic chemotherapy followed by possible resection of the lesions in segment IV
- e. ALPPS procedure

3. Answer: a. This clinical scenario demonstrates the myriad options for the management of multiple hepatic metastases with colorectal cancer. A is the only incorrect answer, as the patient would be left with a future liver remnant under 20%, which is commonly accepted as too low to support necessary physiologic hepatic function. Any of the other options could be reasonable depending on the preferences or capabilities of an institution and the wishes of the patient.

4. The same patient as in question 3 elects to undergo two-stage resection. You see her back in clinic for a repeat examination prior to the second stage. At this visit, she reports she has not tolerated systemic chemotherapy well and has issues with itching, jaundice, and "mildly" elevated liver enzymes. Surveillance imaging of her liver shows persistent lesions as well as fatty infiltration, increased nodularity, and poor hypertrophy of the remaining segments. She is very motivated for the second stage of surgery. What is the next best step?

4. Answer: b. This patient is showing signs of hepatic toxicity from chemotherapy. Proceeding with surgery should not be performed until her hepatic function has been assessed for any injury from systemic chemotherapy, including with a liver biopsy. Her future liver remnant after a two-stage procedure was going to be low (under 20%) and was reliant on hypertrophy after the first stage. Now, with possible worsened hepatic function, her FLR may need to be higher, around 30%, to consider offering her a resection. Portal vein embolization would be inappropriate at this time, as she has already undergone unilateral hepatic resection. Cessation of chemotherapy would be an appropriate alternative answer but, in a patient who might be a surgical candidate, additional workup including liver biopsy can enhance an informed discussion of the risks and benefits of further treatment.

- a. Proceed with surgery
- b. Liver biopsy**
- c. Continue systemic therapy and reimage in 3 months
- d. Cessation of all therapies
- e. Portal vein embolization

5. You are evaluating a patient with liver failure due to alcohol-induced cirrhosis in a hepatology clinic. No recent laboratory data exist for this patient in your medical records and you want to calculate a MELD score. Which selection has the appropriate combination of lab values to calculate MELD?

- a. Bilirubin, INR, albumin
- b. Bilirubin, INR, albumin, sodium
- c. Bilirubin, INR, creatinine, sodium**
- d. Bilirubin, INR, creatinine, alkaline phosphatase
- e. INR, creatinine, alkaline phosphatase

5. Answer: c. Bilirubin, INR, creatinine, and sodium are combined into a complex equation to determine a score for the Model for End-Stage Liver Disease (MELD). Choice A reflects the lab values that are part of the Child-Pugh score, which also requires an assessment of the severity of ascites and hepatic encephalopathy.

1. A 65-year-old female presents to clinic with an incidental finding of a 5-cm cystic pancreatic head mass with calcified central scar. Endoscopic ultrasound (EUS)-guided fine needle aspirate (FNA)-guided aspirate of the fluid reveals a low CEA and amylase level with no evidence of malignancy on cytology. What is the most likely diagnosis?

- a. Pancreatic adenocarcinoma
- b. Intraductal papillary mucinous neoplasm
- c. Mucinous cystic neoplasm
- d. Serous cystadenoma**
- e. Pancreatic pseudocyst

1. Answer: d. Serous cystadenoma (SCA) is most commonly discovered incidentally in women in the fifth to sixth decades of life. Imaging characteristics include a microcystic “honeycomb” appearance with central scar present in 30%. SCA is a benign lesion and asymptomatic patients do not require resection or additional surveillance imaging.

2. A 45-year-old female presents with abdominal pain and an elevated amylase and lipase. The rest of her laboratory values are remarkable for a mildly elevated AST of 100 and elevated white blood cell count of 15,000. On hospital day 3, her pain is resolved and she is tolerating a regular diet. Which of the following should be performed prior to discharge?

- a. ERCP
- b. RUQ ultrasound**
- c. Amylase and/or lipase
- d. CT scan of abdomen
- e. Serum ethanol level

2. Answer: b. RUQ ultrasound is the most sensitive means to establish the likely etiology of gallstones as the source of pancreatitis, thus impacting consideration of cholecystectomy prior to discharge. Gallstone disease is one of the most common etiologies of pancreatitis. In medically fit patients, cholecystectomy on index admission is associated with reduced risk of recurrent pancreatitis and readmission rates (*Pancreas*. 2018;47(8):996–1002).

3. A 73-year-old male is referred for evaluation of an incidentally discovered 2-cm cyst in the tail of his pancreas. On examination the patient has no abdominal pain, and his laboratory values are unremarkable. He undergoes an endoscopic ultrasound which shows a cystic lesion that appears to communicate with the pancreatic duct, originating from a side branch. Which of the following is the next step in management?

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- a. Distal pancreatectomy
- b. Total pancreatectomy
- c. Observation**
- d. Enucleation
- e. Biopsy

3. Answer: c. Side branch IPMN management per current consensus guidelines recommends resection in patients with lesions >3 cm, mural nodules, cytology concerning for malignancy, or in symptomatic patients. In patients without these concerning features, routine surveillance imaging is recommended.

4. A 35-year-old female is found to have an incidentally discovered 3-cm cystic lesion in the tail of her pancreas on a CT scan. She undergoes an endoscopic ultrasound which reveals a 3.5-cm cyst without communication with the pancreatic duct. Analysis of cyst fluid reveals high levels of mucin. What is the next step in the management of this patient?

- a. Distal pancreatectomy**
- b. Repeat CT scan in 1 year
- c. MRCP
- d. Total pancreatectomy
- e. Endoscopic drainage

4. Answer: a. Main duct IPMNs have a high incidence of associated malignancy or high-grade dysplasia (70%) and oncologic resection is recommended in medically fit patients. Intraoperative frozen section is useful to confirm the resection margin is free of high-grade dysplasia or malignancy.

5. A 59-year-old male is 2 weeks out from a pancreaticoduodenectomy for pancreatic adenocarcinoma complicated by a pancreatic fistula. He presents to the ED with new onset of bloody output in his drain. He is tachycardic to the 110s, but otherwise looks well. His Hgb is 10. What is the best course of management for this patient?

- a. CT scan
- b. ERCP
- c. Angiogram**
- d. Exploratory laparotomy
- e. Remove the drain

5. Answer: c. Pseudoaneurysm, most commonly of the GDA stump, is a relatively rare, but potentially fatal complication following pancreatectomy. Patients may present with an initial “herald” bleed, followed by postoperative hemorrhage. Initial diagnosis with angiography allows for simultaneous treatment via embolization or stent placement.

6. A 60-year-old physically fit female with painless jaundice and a 20-lb weight loss presents for evaluation of a 2-cm hypodense mass in the head of the pancreas on CT scan. The patient was referred to you from a gastrointestinal medicine colleague, who performed an endoscopic ultrasound with biopsy and ERCP with stent. The biopsy is suspicious for malignancy. By imaging, the lesion appears to be clearly resectable without evidence of malignancy. Which of the following is the most appropriate management of this patient?

- a. Repeat endoscopic ultrasound with biopsy
- b. Pancreaticoduodenectomy**
- c. Total pancreatectomy
- d. MRI pancreatogram
- e. Neoadjuvant chemoradiation

6. Answer: b. Patients with suspicious pancreatic mass consistent with adenocarcinoma should undergo pancreatectomy if resectable at

time of diagnosis. Pathologic confirmation with tissue biopsy may confirm the diagnosis, but is not required in patients with a resectable lesion. While several studies have shown adjuvant chemotherapy to provide a survival benefit, neoadjuvant therapy remains controversial and is reserved for patients with borderline resectable disease.