

# الطب الباطني الجراحي الفصل الثاني

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المحاضرة الاولى

jaundice



EPOMEDICINE

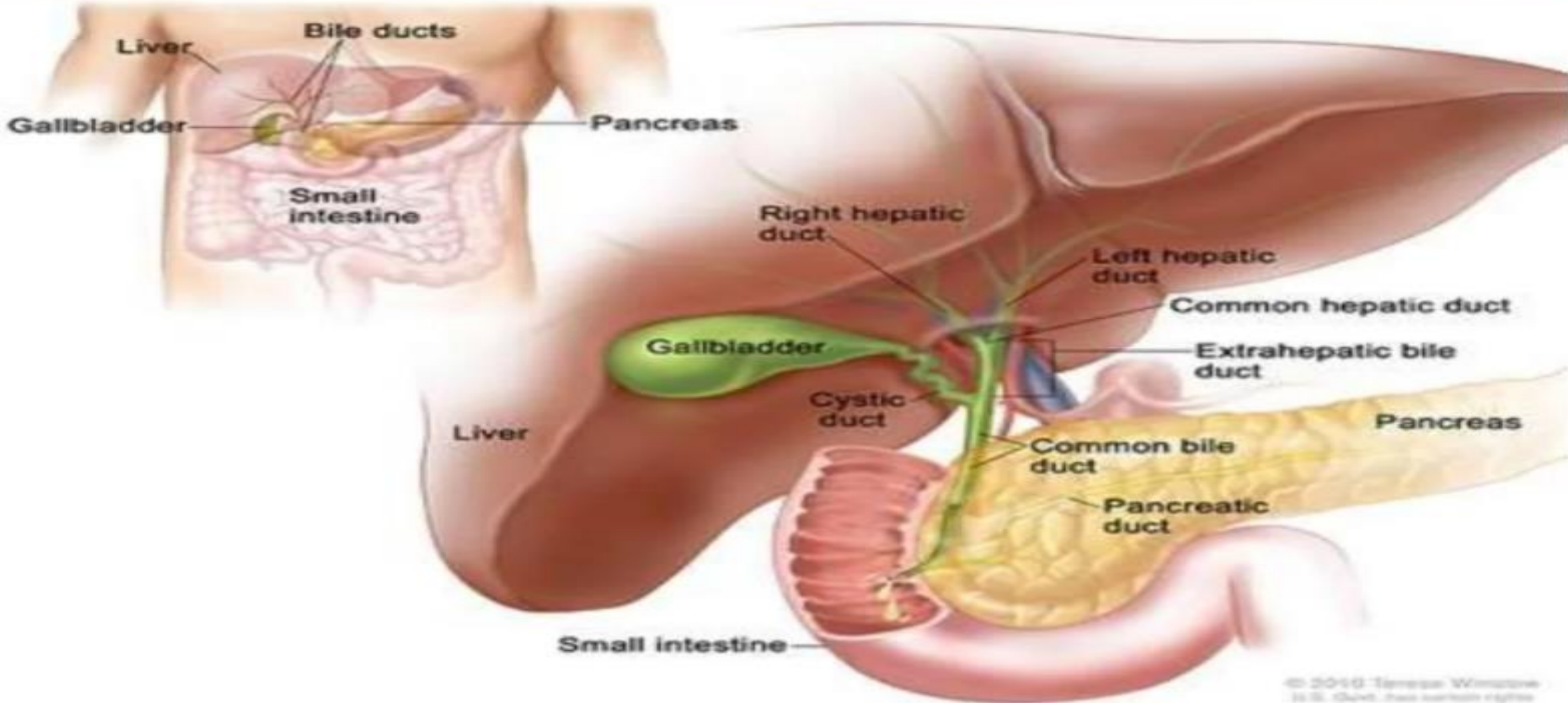


# OBJECTIVES

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1. Surgical anatomy & physiology of biliary tract
2. Definition of jaundice
3. Bilirubin metabolism
4. Classification of jaundice
5. Important points in the history & examination of jaundice
6. Investigations of biliary tract with indications
7. Treatment of surgical jaundice

# 1. SURGICAL ANATOMY & PHYSIOLOGY OF BILIARY TRACT



## 2. DEFINITION OF JAUNDICE

- ✘ Jaundice is the yellowish pigmentation of the skin, the conjunctival membranes over the sclerae, and other mucous membranes caused by hyperbilirubinemia
- ✘ Icterus is the clinical manifestation due to jaundice
- ✘ Total serum bilirubin values are normally 0.2-1.2 mg/dL. Jaundice may not be clinically recognizable until levels are at least 3 mg/dL.

- ✘ Surgical jaundice is any jaundice amenable to surgical treatment.
- ✘ Majority are due to extra-hepatic biliary obstruction
- ✘ Jaundice is not a diagnosis.

### 3. BILIRUBIN METABOLISM

- ✘ Bile is produced by hepatocytes
- ✘ 500-1000 ml/day
- ✘ An exocrine secretion
- ✘ Contains bilirubin (a pigment) + bile salts
- ✘ Bile goes from liver to duodenum and also stored within gallbladder

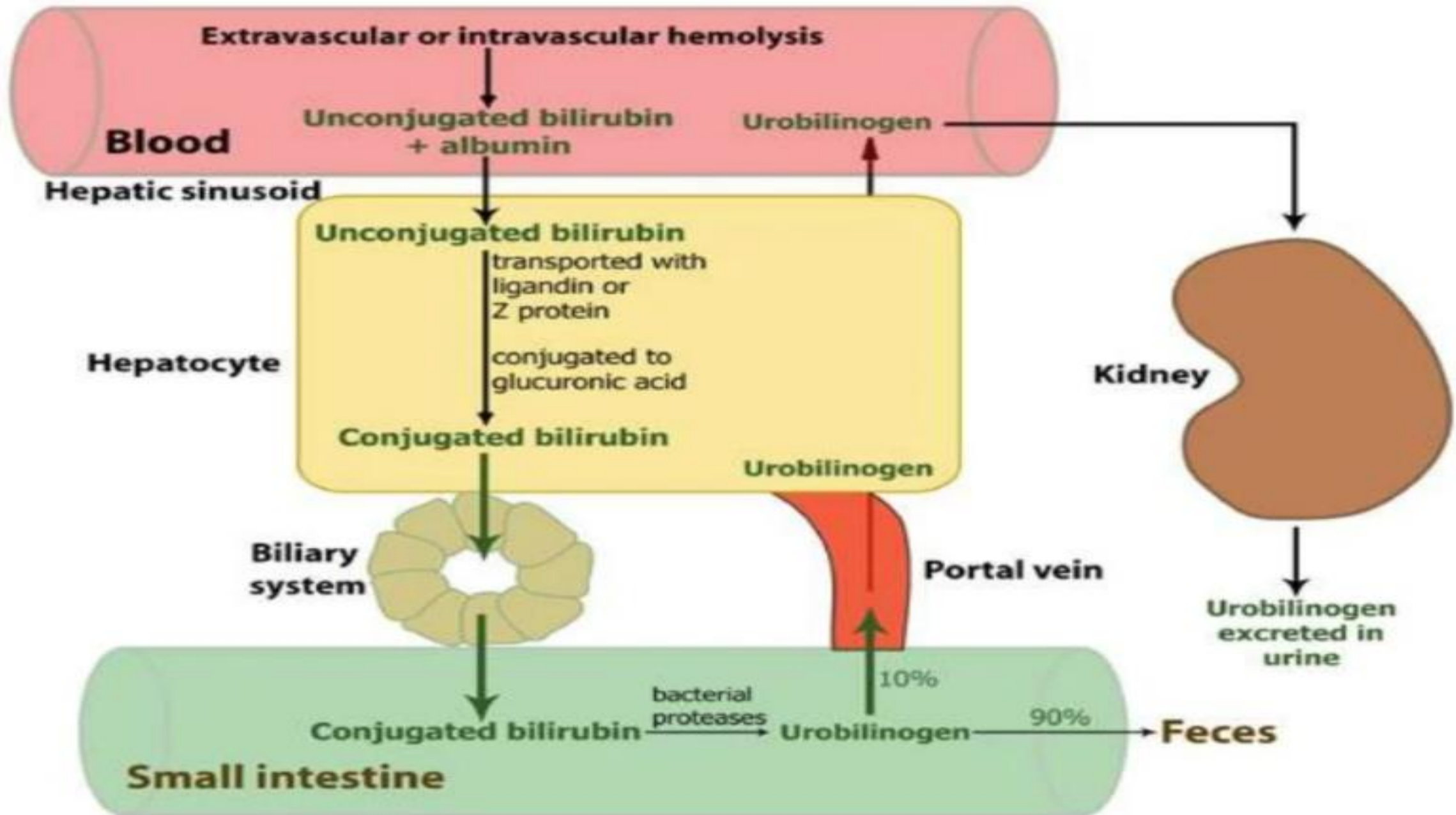
- ✘ From gallbladder, it is released in response to acid, fat & amino acids / CCK from duodenal mucosa
- ✘ CCK relaxes the sphincter of Oddi
- ✘ VIP & Somatostatin inhibit the contraction of gallbladder



# BILIRUBIN

- ✘ Bilirubin may be unconjugated (Indirect) or conjugated (Direct)
- ✘ Produced from heme portion of hemoglobin as biliverdin which converts to bilirubin
- ✘ Bilirubin conjugates in liver with glucronic acid by glucronyl transferase enzyme, which makes it water-soluble

- ✘ Within intestine (colon), the bilirubin is metabolized by bacteria to stercobilinogen
- ✘ Minor quantity of stercobilinogen is reabsorbed to reach the liver and then to kidneys and excreted in urine as urobilinogen
- ✘ Major portion is excreted into feces as stercobilinogen



# NORMAL BLOOD VALUES OF BILIRUBIN

	$\mu\text{mol/L}$	mg/dL
Total bilirubin	<21	<2.1
Direct bilirubin	1.0–5.1	0.1–0.4

# BILE SALTS

- ✘ Bile salts help to absorb fats after converting these to micelles
- ✘ Bile salts are re-absorbed through terminal ileum, hence maintain the enterohepatic circulation

## 4. CLASSIFICATION OF JAUNDICE

- ✘ Pre-hepatic
- ✘ Hepatic
- ✘ Post-hepatic (Obstructive)

## PREHEPATIC (HEMOLYTIC) JAUNDICE

- ✘ Occurs in case of hemolytic anemia.
- ✘ Total bilirubin level is increased due to increased blood indirect bilirubin level.
- ✘ The color of urine remains normal, because indirect bilirubin is bind to albumin, and subsequently unable to pass the glomerular filter.
- ✘ Higher level of blood indirect bilirubin, results in higher bilirubin uptake by the liver and increases the rate of formation of direct bilirubin, and increases the direct bilirubin that passes to the small intestine. This results in dark brown color of the feces.

## PREHEPATIC (HEMOLYTIC) JAUNDICE CONTD:

- ✘ The increased stercobilinogen level in the small intestine results in increased formation of urobilinogen, which is excreted in urine.
- ✘ The most important changes in pre-hepatic jaundice are increased total and indirect bilirubin in blood, dark brown feces and increased urobilinogen in urine.



# HEPATIC JAUNDICE

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- ✘ Occurs in case of hepatitis.
- ✘ Total bilirubin level increased due to increase of both direct and indirect bilirubin.

# POST-HEPATIC (OBSTRUCTIVE) JAUNDICE

- ✘ Occurs in case of obstruction of main bile duct.
- ✘ Total bilirubin increased due to increase blood direct bilirubin level.
- ✘ Dark brown color of urine.
- ✘ Clay color of feces
- ✘ Absence of urobilinogen from urine.

- ✘ Biliary obstruction refers to the blockage of any duct that carries bile from the liver to the gallbladder (intrahepatic) or from the gallbladder to the small intestine (extrahepatic).
- ✘ This can occur at various levels within the biliary system.
- ✘ The major signs and symptoms of biliary obstruction result directly from the failure of bile to reach its proper destination.

- ✘ Extrahepatic obstruction to the flow of bile may occur within the ducts or secondary to external compression.
- ✘ Overall, gallstones are the most common cause of biliary obstruction.
- ✘ Other causes of blockage within the ducts include malignancy, infection, and biliary cirrhosis.

- ✘ External compression of the ducts may occur secondary to inflammation (eg, pancreatitis) and malignancy.
- ✘ Regardless of the cause, the physical obstruction causes a predominantly conjugated hyperbilirubinemia

- ✘ The lack of bilirubin in the intestinal tract is responsible for the pale stools typically associated with biliary obstruction.
- ✘ The cause of itching (pruritus) associated with biliary obstruction is not clear.
- ✘ It is that it may be related to the accumulation of bile acids in the skin.

# CAUSES OF OBSTRUCTIVE JAUNDICE

1. Gallstones
2. Ca head pancreas
3. Biliary strictures
4. Liver abscess
5. Pseudopancreatic cyst
6. Cholangiocarcinoma
7. Peri-ampullary carcinoma
8. Choledochal cyst

- ✘ Stone disease is the most common cause of obstructive jaundice.
- ✘ *Ascaris lumbricoides*
- ✘ *Clonorchis sinensis*, *Fasciola hepatica*
- ✘ Common in Asian countries



# 5. HISTORY & EXAMINATION OF JAUNDICE

## Clinical Evaluation:

- ✘ History
- ✘ Examination
- ✘ Investigations
- ✘ Treatment

# HISTORY OF OBSTRUCTIVE JAUNDICE

- ✘ Patients commonly complain of pale stools, dark urine, yellowness of the eye, and pruritus.
- ✘ The following considerations are important:
  - ✘ Patients' age
  - ✘ Jaundice (duration ,onset, progression)

# HISTORY

- ✘ the presence of abdominal pain( location and characteristics of the pain)
- ✘ The presence of systemic symptoms (e.g. fever, weight loss)
- ✘ Symptoms of gastric stasis (e.g. early satiety, vomiting, belching)
- ✘ Change in bowel habit
- ✘ History of anemia
- ✘ Previous malignancy
- ✘ Known gallstone disease
- ✘ Gastrointestinal bleeding
- ✘ Hepatitis
- ✘ Previous biliary surgery
- ✘ Diabetes or diarrhea of recent onset
- ✘ Also, explore the use of alcohol, drugs, and medications

# PHYSICAL EXAMINATION

- ✘ Upon physical examination, the patient may display signs of jaundice (sclera icterus).
- ✘ When the abdomen is examined, the gallbladder may be palpable (**Courvoisier law**). This may be associated with underlying pancreatic malignancy.
- ✘ Also, look for signs of weight loss, occult blood in the stool, suggesting a neoplastic lesion.

# PHYSICAL EXAMINATION

- ✘ Note the presence or absence of ascites and collateral circulation associated with cirrhosis.
- ✘ A high fever and chills suggest a coexisting cholangitis.

# PHYSICAL EXAMINATION

- ✘ Abdominal pain may be misleading; some patients with CBD calculi have painless jaundice, whereas some patients with hepatitis have distressing pain in the right upper quadrant.
- ✘ Malignancy is more commonly associated with the absence of pain and tenderness during the physical examination.

## **6. INVESTIGATIONS OF BILIARY TRACT WITH INDICATIONS**

# LAB STUDIES

## Basic

- ✘ FBC+ Blood film: aneamia, infection, Hgbpathy
- ✘ Serum E/U/Cr
- ✘ Urinalysis : bilirubin present, urobilinogen absent
- ✘ Stool for ocult blood: ca ampula
- ✘ Stool mucus for ova and parasites
- ✘ Clotting profile: PT deranged
- ✘ Hepatitis serology: HbsAg, HCV



# IMAGING

- ✘ Plain radiographs are of limited utility to help detect abnormalities in the biliary system
- ✘ Ultrasonography (US): US is the procedure of choice for the initial evaluation



- ✘ Traditional computed tomography (CT) scan is usually considered more accurate than US for helping determine the specific cause and level of obstruction.
- ✘ Percutaneous transhepatic cholangiogram (PTC): done esp if the intrahepatic duct is dilated, outline the biliary tree, locates stones.

# ENDOSCOPIC RETROGRADE CHOLANGIO-PANCREATOGRAPHY (ERCP)

- ✘ It is an outpatient procedure that combines endoscopic and radiologic modalities to visualize both the biliary and pancreatic duct systems.

# ENDOSCOPIC ULTRASOUND (EUS)

- ✦ It combines endoscopy and US to provide remarkably detailed images of the pancreas and biliary tree. It allows diagnostic tissue sampling via EUS-guided fine-needle aspiration (EUS-FNA)

# MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY (MRCP)

- ✘ It is a noninvasive way to visualize the hepatobiliary tree.
- ✘ MRCP provides a sensitive noninvasive method of detecting biliary and pancreatic duct stones, strictures, or dilatations within the biliary system. It is also sensitive for helping detect cancer.

## **7. TREATMENT OF SURGICAL JAUNDICE**

# TREATMENT

- ✘ **Medical care:** Treatment of the underlying cause is the objective of the medical treatment of biliary obstruction.
- ✘ Do not subject patients to surgery until the diagnosis is clear.
- ✘ In cases of cholelithiasis in which either the patient refuses surgery or surgical intervention is not appropriate give

- ✘ **Ursodeoxycholic acid** (10 mg/kg/d) works to reduce biliary secretion of cholesterol. In turn, this decreases the cholesterol saturation of bile.
- ✘ **Extracorporeal shock-wave lithotripsy** may be used as an adjunct to oral dissolution therapy.
- ✘ Contraindications include complications of gallstone disease (eg, cholecystitis, choledocholithiasis, biliary pancreatitis), pregnancy, and coagulopathy or anticoagulant medications (i.e. because of the risk of hematoma formation).



- ✘ Bile acid-binding resins, cholestyramine (4 g) or colestipol (5 g), dissolved in water or juice 3 times a day may be useful in the symptomatic treatment of pruritus associated with biliary obstruction.
- ✘ Vitamins A,D,E,K supplements
- ✘ Antihistamines may be used for the symptomatic treatment of pruritus, particularly as a sedative at night.

## SURGERY (PRE-OPERATIVE CARE)

- ✘ The following are problems of a jaundiced pt and all must be taken care of before surgery
- ✘ Infection due to biliary stasis
- ✘ Uncontrolled bleeding due to vitamin K deficiency
- ✘ Liver glycogen depletion
- ✘ Dehydration
- ✘ Hepatorenal syndrome

# THEREFORE;

- ✘ Fluid resuscitation using dextrose alternate with Saline. Encourage oral rehydration as well
- ✘ Give broad spectrum antibiotics at induction of anaesthesia to cover for G+,G- and anaerobes
- ✘ Bowel prep
- ✘ IM Vit. K 10mg daily until PT/APTT normalizes (start 5 days pre-op)
- ✘ Monitor UO, catheterize night before surgery
- ✘ You may consider given Mannitol pre-op, intra-op and post-op for diuresis to prevent hepatorenal syndrome

# SURGERY

- ✘ The need for surgical intervention depends on the cause of biliary obstruction.
- ✘ Cholecystectomy is the recommended treatment in cases of choledocholithiasis .(open or lap)
- ✘ Open / Laparoscopic cholecystectomy is relatively safe, with a mortality rate of 0.1-0.5 %.

# PREVENTION

- ✘ In patients with risk factors for developing any of the conditions that lead to biliary obstruction, awareness of the signs and symptoms can improve chances for early diagnosis and improved outcome.
- ✘ **Diet:** Reduce intake of saturated fats, High intake of fiber has been linked to a lower risk for gallstones.
- ✘ Gradual and modest weight reduction may be of value in patients who are at risk.

- ✘ **Activity:** Regular exercise may reduce the risk of gallstones and gallstone complications
- ✘ Estrogens cause an increase in the risk for formation of gallstones and may need to be avoided in patients with known gallstones or a strong family history of stone disease.

# COMPLICATIONS

- ✘ The complications of cholestasis are proportional to the duration and intensity of the jaundice.
- ✘ High-grade biliary obstruction begins to cause cell damage after approximately 1 month and, if unrelieved, may lead to secondary biliary cirrhosis.

- ✘ Acute cholangitis is another complication associated with obstruction of the biliary tract and is the most common complication of a stricture, most often at the level of the CBD.
- ✘ Bile normally is sterile. In the presence of obstruction to flow, stasis favors colonization and multiplication of bacteria within the bile.
- ✘ Concomitant increased intraductal pressure can lead to the reflux of biliary contents and bacteremia, which can cause septic shock and death.



- ✘ Biliary colic that recurs at any point after a cholecystectomy should prompt evaluation for possible choledocholithiasis.
- ✘ Failure of bile salts to reach the intestine results in fat malabsorption with steatorrhea. In addition, the fat-soluble vitamins A, D, E, and K are not absorbed, resulting in vitamin deficiencies.
- ✘ Disordered hemostasis with an abnormally prolonged PT may further complicate the course of these patients.