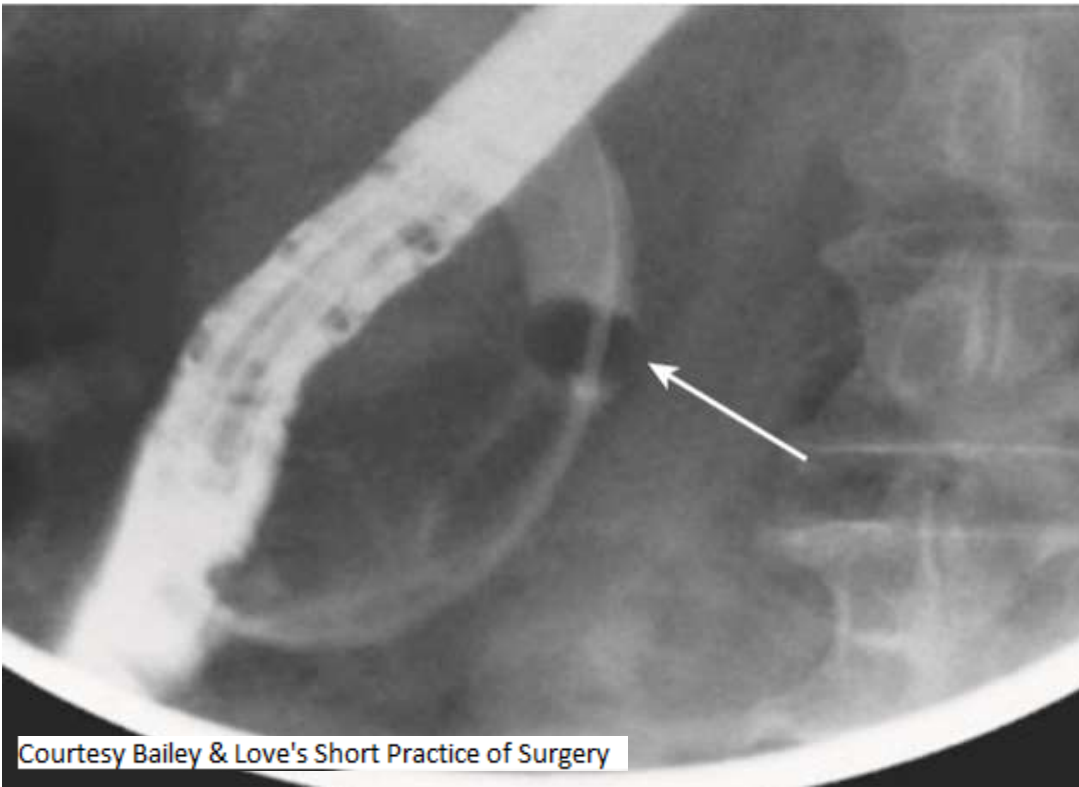




**Dr.Thulfiqar Baiae**  
**General surgeon**  
**Jan.2017**

# Obstructive jaundice

الدكتور ذو الفقار حسن بيبي



Courtesy Bailey & Love's Short Practice of Surgery



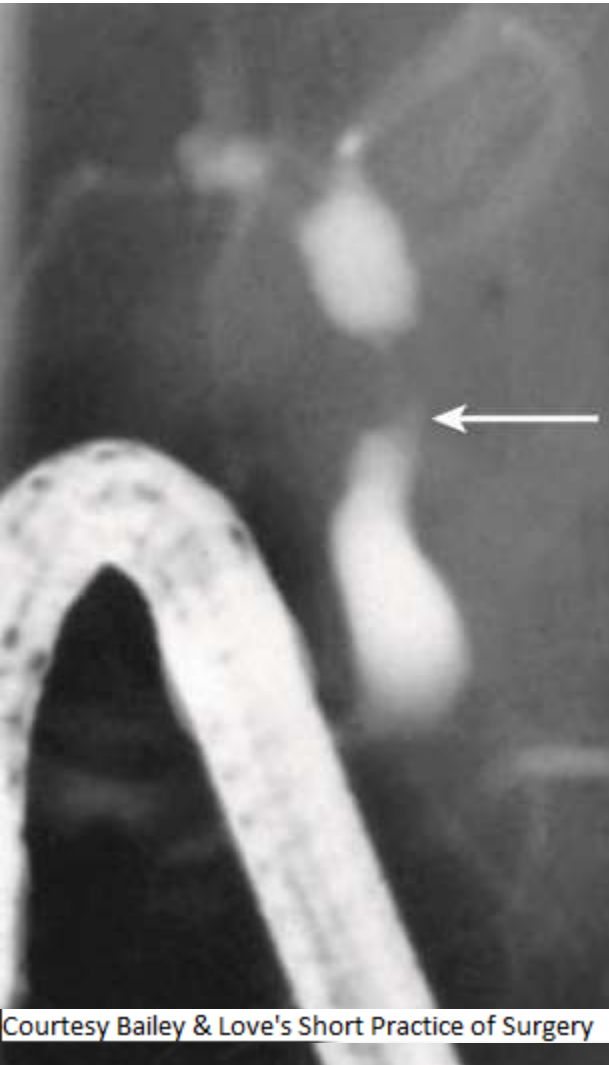
Courtesy Bailey & Love's Short Practice of Surgery



# Obstructive jaundice

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# Objectives:

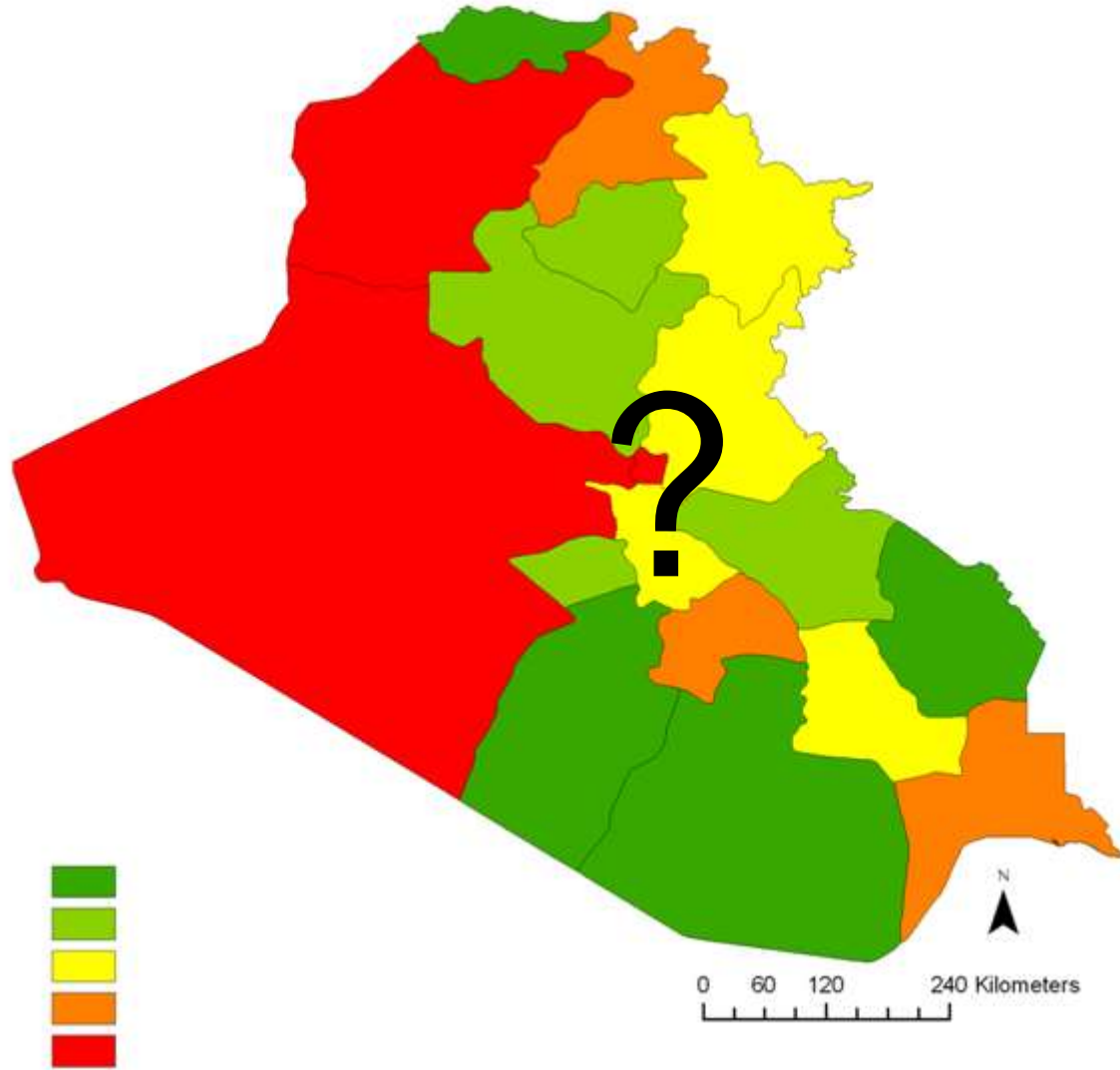
# The causes of obstructive jaundice.

#The management of :

Obstructive jaundice.

Acute cholangitis.(behavior)

#The preparation of the patient with obstructive jaundice.(skill)



أ.م.د جمال الخضيرى courtesy





INTERNATIONAL STUDENTS' EDITION

# *Bailey & Love's*

Courtesy Bailey & Love's Short Practice of Surgery

CHAPTER

67

The gall bladder and  
bile ducts

## Obstructive jaundice

# SURGICAL ANATOMY



The common hepatic duct is usually less than 2.5 cm long and is formed by the union of the right and left hepatic ducts. The common bile duct is about 7.5 cm long and formed by the junction of the cystic and common hepatic ducts

# SURGICAL ANATOMY



It is divided into four parts:

- Supraduodenal portion
- Retroduodenal portion.
- Infraduodenal portion.
- Intraduodenal portion



# SURGICAL ANATOMY

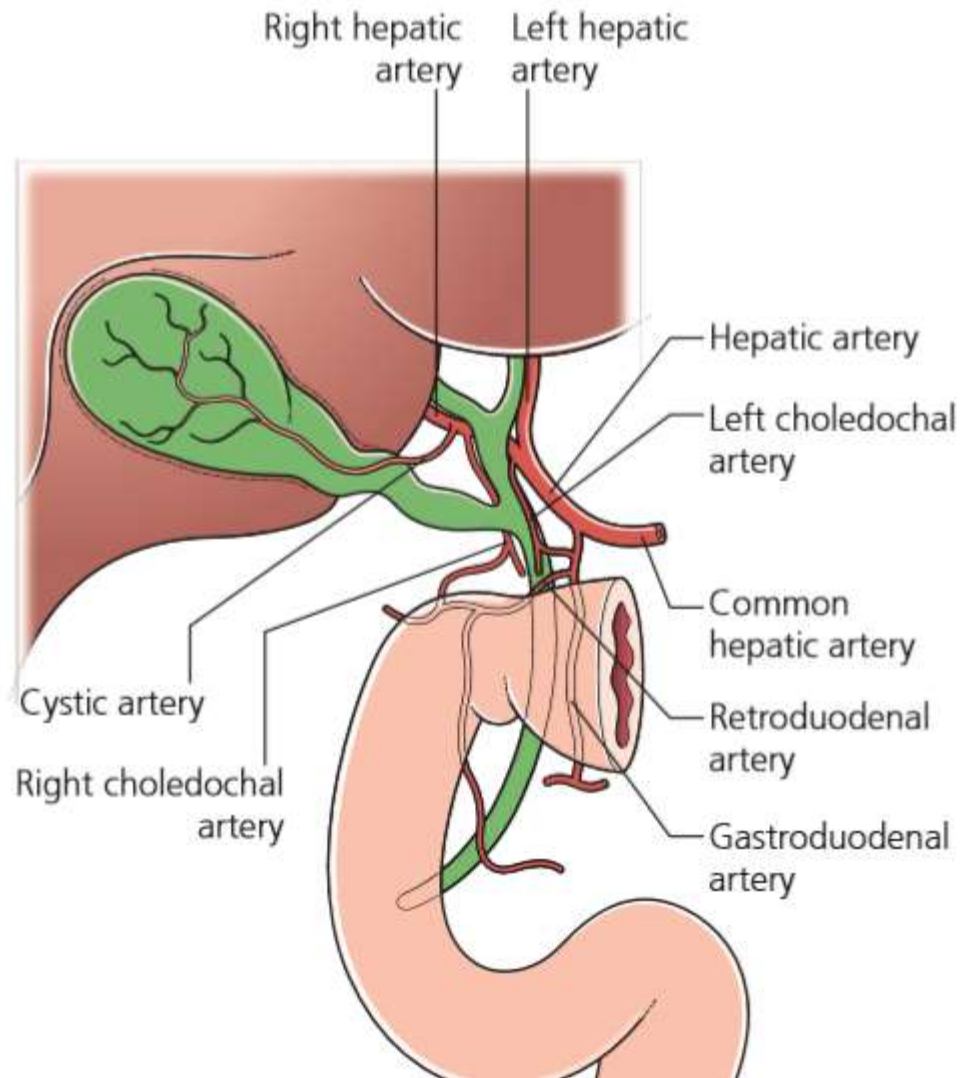


- Supraduodenal portion. About 2.5 cm long, running in the free edge of the lesser omentum.
- Retroduodenal portion.

# SURGICAL ANATOMY



- Infraduodenal portion lies in a groove, but at times in a tunnel, on the posterior surface of the pancreas.
- Intraduodenal portion passes obliquely through the wall of the second part of the duodenum, where it is surrounded by the sphincter of Oddi, and terminates by opening on the summit of the ampulla of Vater.





# *Symptoms*

Pain

Jaundice

Fever

Loss of weight

Pale stools, dark urine and skin itching



# *Signs*

Jaundice

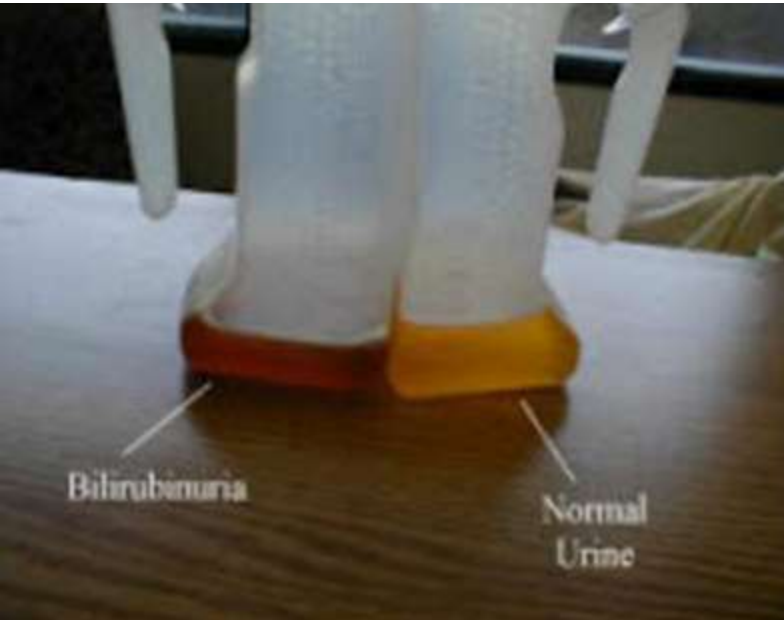
Loss of weight(malignancy)

Patient is toxic(acute cholangitis)

Fever

Tender right upper abdomen

A palpable, non-tender gall bladder (**Courvoisier's sign**)



<http://mynotes4usmle.tumblr.com/post/42275682781/biliary-tract-disease-features-jaundice>

<http://photos1.blogger.com/img/250/1358/1024/Pale%20stool-dark%20urine.jpg>

<http://www.slideshare.net/ramraut10sept/approach-to-cholestatic-jaundice>





# Obstructive jaundice

Jaundice is a physical sign and not a diagnosis.

Obstruction to the flow of bile (cholestasis) may occur within the intrahepatic ductules (hepatic cholestasis) or in the extrahepatic biliary system (extrahepatic cholestasis). This latter group is usually referred to as cases of 'obstructive jaundice'.

The early diagnosis and timely treatment of obstructive jaundice is important because pathological changes such as secondary biliary cirrhosis and hepatorenal failure can develop in the liver if the obstruction is not relieved.

# Obstructive jaundice



Post-hepatic jaundice has traditionally been used to describe obstructive jaundice but it is more accurate to refer to it as cholestatic jaundice; as it can occur within as well as outside the liver. Cholestasis, which can occur at any point between the hepatocytes and the ampulla of Vater is accompanied by a raised serum conjugated bilirubin and alkaline phosphatase



# Obstructive jaundice

## Causes

**The jaundice is due to**

Liver disease,  
Disease within the duct,  
Obstruction

**Other classification:**

Extraluminal  
Intraluminal  
Mural

Another classification of causes:

Outside the duct.  
Inside the duct.  
In the wall of the duct .



# **CAUSES OF OBSTRUCTIVE JAUNDICE**

## **> INTRALUMINAL CAUSES**

**CBD stones ( most common)**

**Parasites ( Ascariasis)**

## **> TRANSMURAL CAUSES**

**Cholangiocarcinoma**

**Choledochal Cyst**

**Strictures**

## **> EXTRALUMINAL CAUSES**

**Ca head of pancreas**

**Periampullary tumour**

**Lymph node**

**Mirrizi Syndrome**

**Accidental ligation of CBD**



# Obstructive jaundice

The incidence of symptomatic stones in the bile duct varies from 5 to 8 per cent.

Brown pigment stones form in the bile duct and are related to bile stasis and infected bile.

Stone formation is related to the deconjugation of bilirubin deglucuronide by bacterial  $\beta$ -glucuronidase. Insoluble unconjugated bilirubinate precipitates.

Brown pigment stones are also associated with the presence of foreign bodies within the bile ducts, such as endoprosthesis (stents), or parasites, such as *Clonorchis sinensis* and *Ascaris lumbricoides*.



# Obstructive jaundice

Duct stones may occur many years after a cholecystectomy or be related to the development of new pathology, such as infection of the biliary tree or infestation by *Ascaris lumbricoides* or *Clinorchis sinensis*.

Any obstruction to the flow of bile can give rise to stasis with the formation of stones within the duct.

The consequences of duct stones are either obstruction to bile flow or infection. Stones in the bile ducts are more often associated with infected bile (80 per cent) than are stones in the gall bladder.



# Obstructive jaundice



The cystic duct is densely adherent to the common bile duct and this is the Mirizzi syndrome (a stone ulcerating through the neck of the gall bladder into the common hepatic duct).



# Obstructive jaundice

**Obstructive jaundice** occurs when the essential flow of bile to the intestine is blocked and remains in the bloodstream. This might be due to blocked bile ducts caused by gallstones, or tumours of the bile duct which can block the area where the bile duct meets the duodenum.

Pancreatic cancer can also be a cause of blockages as it often occurs near to the ampulla of Vater.

Other conditions that can cause obstructive jaundice include those that cause pressure on the bile duct such as swelling of lymph glands, scar tissue (from previous infections or surgery), or a cyst, of the pancreas, hydatid cyst.



## Effects and complications of gallstones

Biliary colic

Acute cholecystitis

Chronic cholecystitis

Empyema of the gall bladder

Mucocoele

Perforation

Biliary obstruction

Acute cholangitis

Acute pancreatitis

Intestinal obstruction (gallstone ileus)



# Obstructive jaundice

The patient may be asymptomatic but usually has bouts of pain, jaundice and fever. The patient is often ill and feels unwell. The term '**cholangitis**' is given to the **triad of pain, jaundice and fevers sometimes known as 'Charcot's triad'**.

**Pentad?**



# Obstructive jaundice

## **Carcinoma of the pancreas**

Eighty-five per cent of pancreatic cancers arise in the head of the pancreas .Although many present with jaundice and weight loss, abdominal pain is the presenting symptom in more than half and occurs at some stage in over 90 per cent.

Jaundice develops in almost 90 per cent of patients at some stage of the disease and is characteristically progressive but rarely painless.

Pale stools, dark urine and skin itching indicate obstructive jaundice.Weight loss is almost universal.



# Obstructive jaundice

A palpable, non-tender gall bladder (**Courvoisier's sign**) portends a more **sinister** diagnosis. This usually results from a distal common duct obstruction secondary to a peripancreatic malignancy.

Courvoisier's law – 'in obstruction of the common bile duct due to a stone, distension of the gall bladder seldom occurs; the organ usually is already shrivelled'.

If there is no disease in the gall bladder and the obstruction is due to a cancer of the ampulla, pancreas or bile duct, then the gall bladder may well be distended.





# Obstructive jaundice

## Causes of benign biliary stricture

- Congenital Biliary atresia

- Bile duct injury at surgery

Cholecystectomy Choledochotomy Gastrectomy

Hepatic resection Transplantation

- Inflammatory

Stones Cholangitis Parasitic Pancreatitis Sclerosing

cholangitis Radiotherapy

- Trauma

- Idiopathic liver disease,



# Obstructive jaundice

## Causes

### Hydatid disease

A large hydatid cyst may **obstruct the hepatic ducts**. Sometimes, a cyst will **rupture into the biliary tree** and its contents cause obstructive jaundice or cholangitis, requiring **appropriate surgery**



# Obstructive jaundice

## Causes

Bile duct cancer (cholangiocarcinoma)

Most patients present with abnormal liver function tests or frank jaundice

**Majority of patients receive palliative care only**

Adjuvant chemoradiation therapy has limited role



## **Preliminary investigation of jaundice**

### **Blood tests**

#### **Full blood count**

#### **Clotting screen**

**International normalized ratio (INR) or prothrombin ratio and activated partial thromboplastin time (APTT) are often abnormal**

**Serum urea, Creatinine and electrolytes should also be measured.**

#### **Liver function tests consist of:**

- **bilirubin:**
- **alkaline phosphatase**
- **aminotransferases (transaminases: AST/ALT)**
- **albumin:**

#### **Blood cultures**

#### **Urine tests**



## **Preliminary investigation of jaundice**

### **Blood tests**

**These should be performed on all jaundiced patients on presentation before beginning any special investigations.**

#### **Full blood count**

#### **Clotting screen**

**international normalized ratio (INR) or prothrombin ratio and activated partial thromboplastin time (APTT) are often abnormal in liver disease because of malabsorption of vitamin K.**

**The serum urea, which will become elevated if hepatorenal failure is developing, creatinine and electrolytes should also be measured.**

**Liver function tests consist of:**

- bilirubin: the conjugated/unconjugated ratio is now rarely used**
- alkaline phosphatase: high levels are typical of obstructive jaundice**
- aminotransferases (transaminases: AST/ALT) may be raised in the presence of active infection (cholangitis) but are typically not as high as the levels seen when major hepatocyte damage occurs as for example severe viral hepatitis**
- albumin: usually normal but may fall in the presence of long-standing malignant bile duct obstruction or persisting infection**
- blood cultures should be taken if the patient is septic or febrile. Cholangitis (inflammation in the bile ducts) is usually caused by organisms from the gut including Escherichia coli, Streptococcus faecalis and Klebsiella. Anaerobic organisms are more frequently present in patients who have had previous biliary surgery.**

### **Urine tests**

**Urinary bilirubin and urobilinogen levels can sometimes be helpful. In prehepatic jaundice the excess bilirubin is unconjugated and fat soluble and therefore not excreted in the urine (acholuric jaundice).**



**In obstructive jaundice the bilirubin is conjugated and water soluble allowing it to be excreted in the urine, when it produces a very dark (yellow/brown) colour. The urine does not contain urobilinogen, as no bilirubin is reaching the gut for conversion into urobilinogen before being reabsorbed and excreted in the urine.**

### **Immunology**

**Hepatitis status (especially hepatitis B and C) should be known before performing any endoscopic or invasive investigations. In immunocompromised patients, it is important to exclude cytomegalovirus and Epstein–Barr (EB) virus infections. An obstructive liver function test pattern may be seen in certain stages of hepatitis.**





# Obstructive jaundice

## Further Investigation of jaundice

### Imaging

Abdominal ultrasound

CT or MRI scans

Percutaneous transhepatic cholangiography

Radionuclide scanning

Endoscopic retrograde cholangiopancreatography

Tumour staging



# Obstructive jaundice

## Management

Full supportive measures are required with :

Rehydration,

Attention to clotting(vitamin K)

Starting the appropriate broad-spectrum antibiotics.

Exclusion of diabetes



## Management

Preliminary management of jaundice(**preparation**)

These patients are seriously ill, the following general measures are required before undertaking special investigations and treatment.

- Correction of dehydration
- Monitoring of urine output.
- Restoration of fluid balance
- Correction of clotting disorders with intravenous vitamin K (10 µg daily)
- Control of sepsis with an intravenous broad-spectrum



## Management

### Preliminary management of jaundice(preparation)

As many jaundiced patients are seriously ill, it is important to consider whether the following general measures are required before undertaking special investigations and treatment.

- Correction of dehydration with intravenous fluids including plasma expanders in patients with endotoxic shock.
- Monitoring of urine output. Jaundiced patients are at risk of developing acute renal failure (tubular necrosis). Assessing osmolarity, urea concentration and sodium and potassium levels in a 24-hour urine specimen are useful base line measurements.
- Restoration of fluid balance with mannitol or frusemide and appropriate intravenous fluids and inotropic support (e.g. dopamine  $3\mu\text{g}/\text{kg}/\text{minute}$ ) may be needed on occasions.
- Correction of clotting disorders with intravenous vitamin K ( $10\ \mu\text{g}$  daily) until the international normalized ratio (INR) or prothrombin time returns to normal.
- Control of sepsis with an intravenous broad-spectrum cephalosporin (second or third generation) with gentamicin or Tazocin (a combination of piperacillin and tazobactam). The use of anti-anaerobic agents (e.g. metronidazole) must be considered in 'complex' situations particularly for those who have had previous biliary surgery or interventional procedures for benign strictures.



# Obstructive jaundice

## Management

As resuscitation has taken place, **relief of the obstruction is essential.**

Most patients can be managed by minimally invasive techniques



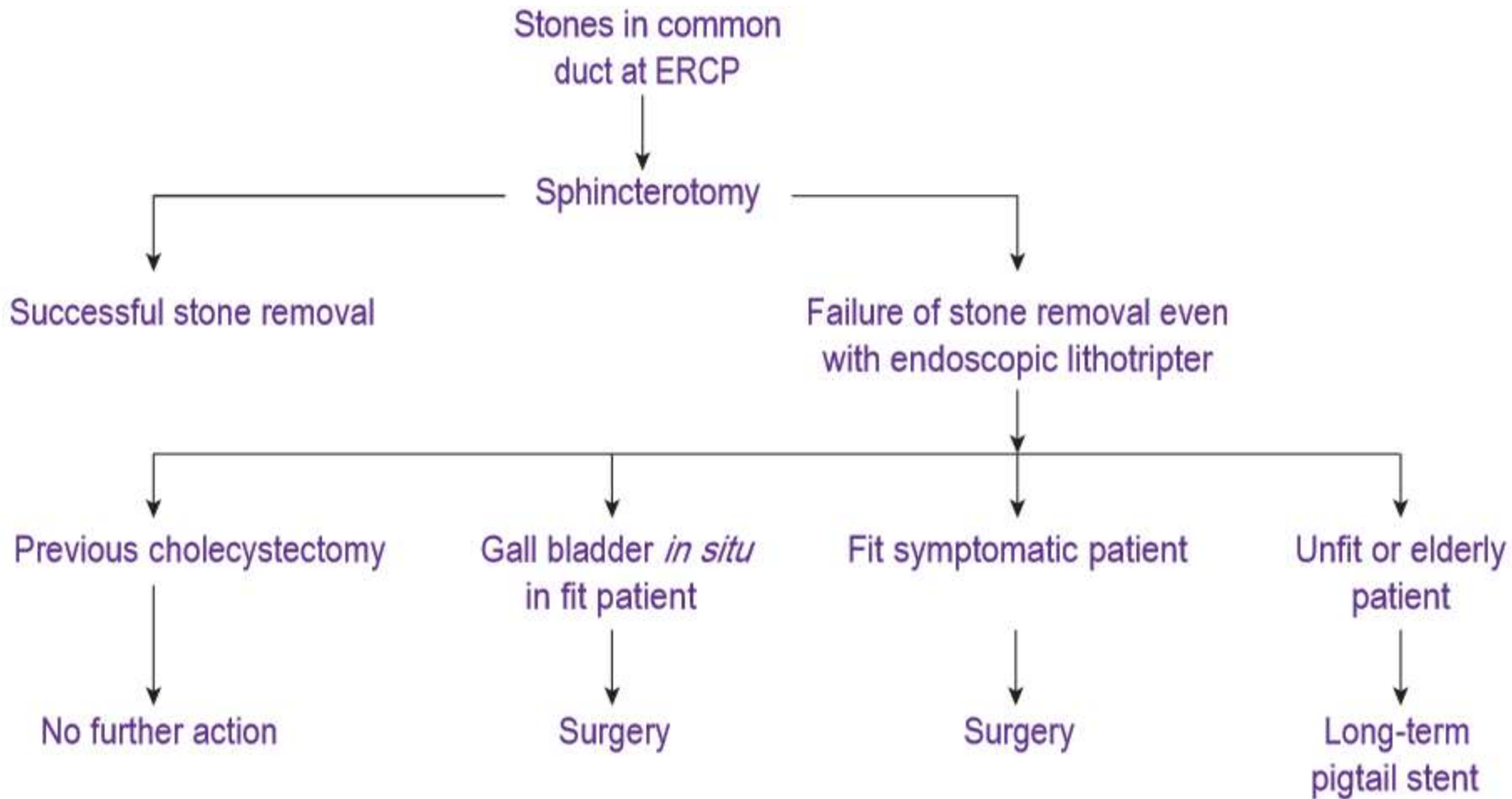
# Obstructive jaundice

## Management

Endoscopic papillotomy is the preferred first technique with a sphincterotomy,

Removal of the stones using a Dormia basket

The placement of a stent if stone removal is not possible



ERCP, endoscopic retrograde cholangiopancreatography.

### Therapeutic options for choledocholithiasis

# Obstructive jaundice



## Management

Percutaneous transhepatic cholangiography can be performed to provide drainage and subsequent percutaneous choledochoscopy.



# Obstructive jaundice



## Management

Surgery, in the form of choledochotomy, is now rarely used for.



Obstructive jaundice

## **Management**

Indications for choledochotomy

The traditional indications for choledochotomy are:

- palpable duct stones;
- jaundice or a history of jaundice or cholangitis;
- a dilated common bile duct;
- abnormal liver function tests, in particular a raised alkaline



# Obstructive jaundice

## Management

It is probably **inadvisable** to perform a choledochotomy laparoscopically; rather one should rely on endoscopic techniques or convert to an open operation.

These can, in the main, be dealt with endoscopically without resort to opening the duct. However, current trials suggest that in experienced hands the morbidity of the two techniques is identical.



# Obstructive jaundice

## Management

When the duct is clear of stones, a **T-tube** is inserted and the duct closed around it; the long limb is brought out on the right side and the bile allowed to drain externally. When the bile has become clear and the patient recovered, a **cholangiogram** is performed by the radiologist. If residual stones are found, the tube is left in place for 6 weeks so that the track is 'mature'. The radiologist can then use the track for percutaneous removal of the stones



Courtesy Bailey & Love's Short Practice of Surgery

Extraction of a stone from the common bile duct by the Burhenne technique. (a) A T-tube in situ with a stone in the duct. (b) A steerable catheter has been manipulated into the duct and a basket placed around the stone. (c) The stone being extracted from the bile duct along the T-tube



Courtesy Bailey & Love's Short Practice of Surgery



Courtesy Bailey & Love's Short Practice of Surgery

Peroperative cholangiography. (a) Normal common bile duct: gentle infusion of contrast which passes without hindrance into the duodenum. (b) The common bile duct is dilated with multiple stones. Contrast is seen to reflux into the pancreatic duct. A sphincterotomy was performed.



Courtesy Bailey & Love's Short Practice of Surgery





Magnetic resonance cholangiopancreatography demonstrating dilated central intrahepatic bile ducts and a stricture of the common bile duct in a patient with obstructive jaundice and cholangiocarcinoma.

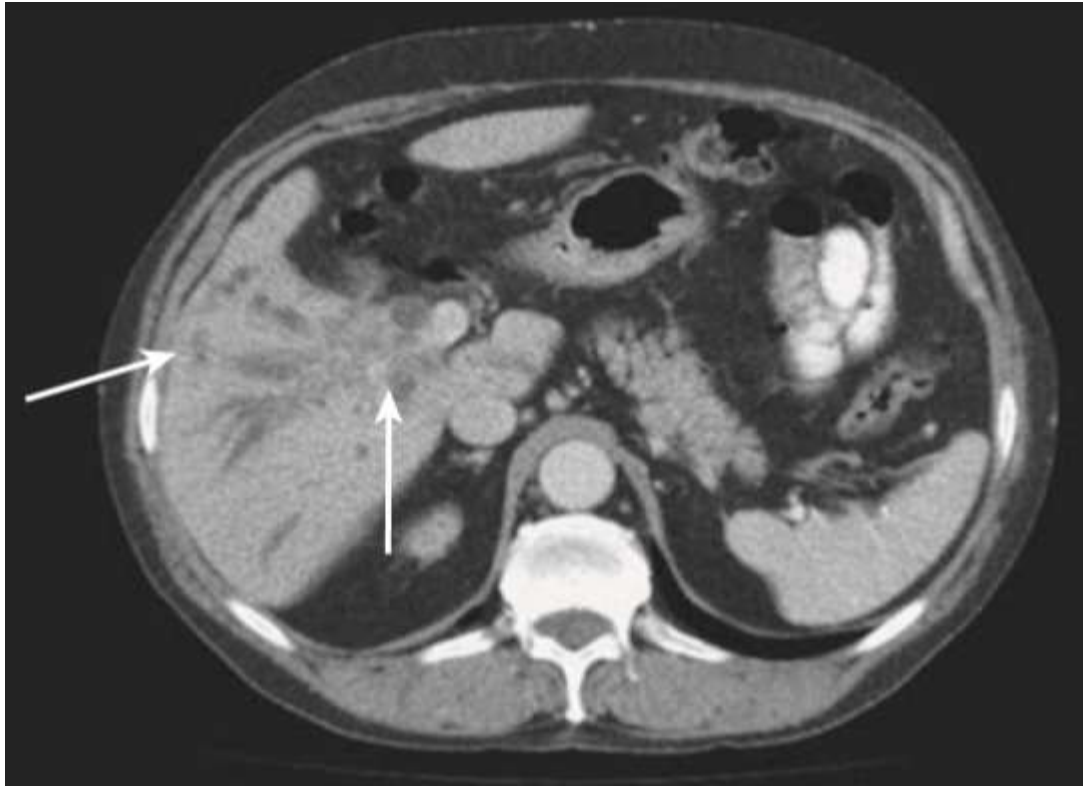


Courtesy Bailey & Love's Short Practice of Surgery

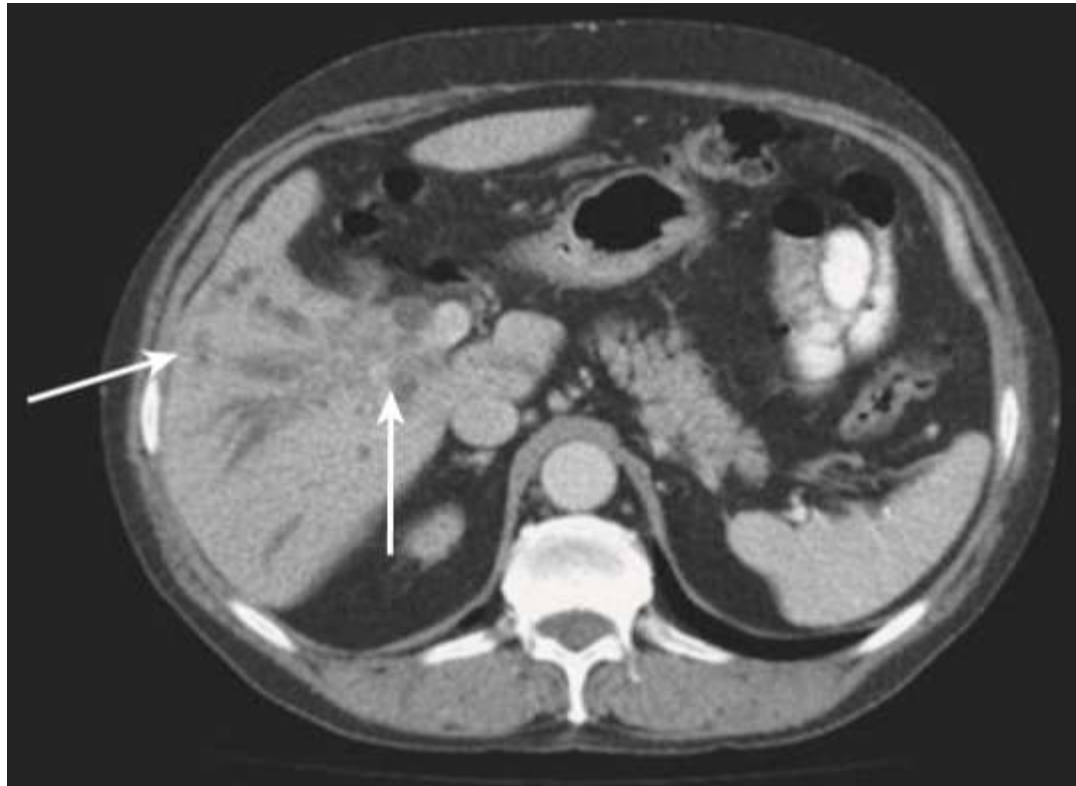


Courtesy Bailey & Love's Short Practice of Surgery

Magnetic resonance cholangiopancreatography demonstrating hilar obstruction (arrow).



Courtesy Bailey & Love's Short Practice of Surgery



Courtesy Bailey & Love's Short Practice of Surgery

Computed tomography scan demonstrating a hilar mass.

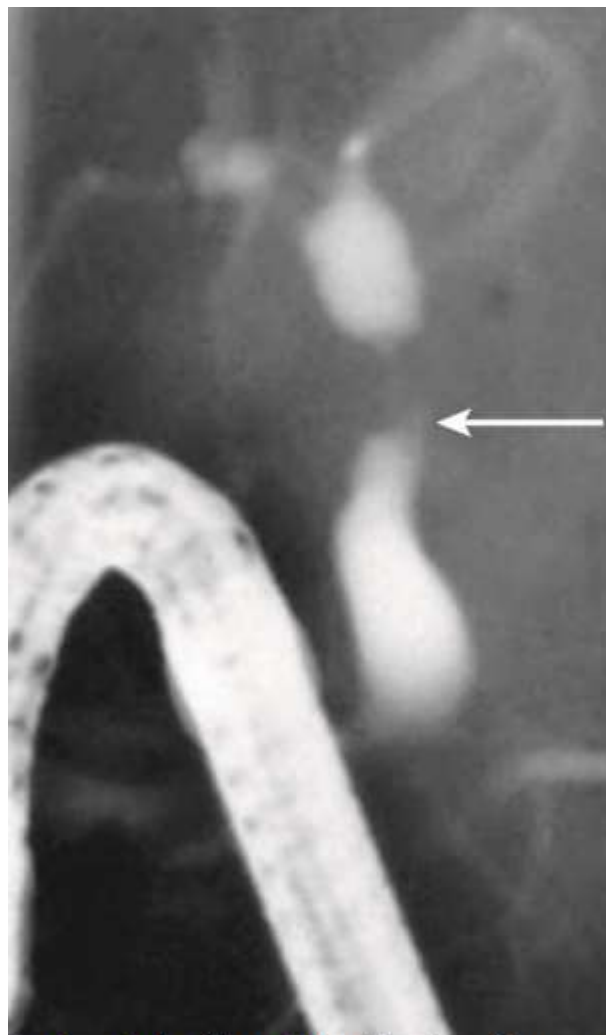


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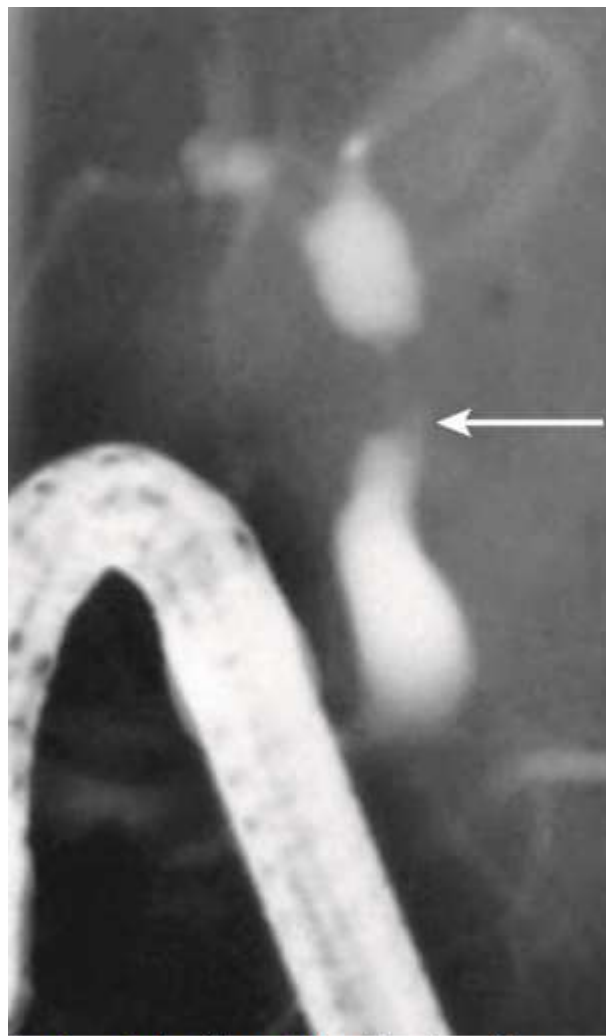
Courtesy Bailey & Love's Short Practice of Surgery

Endoscopic retrograde cholangiopancreatography: normal cholangiogram.



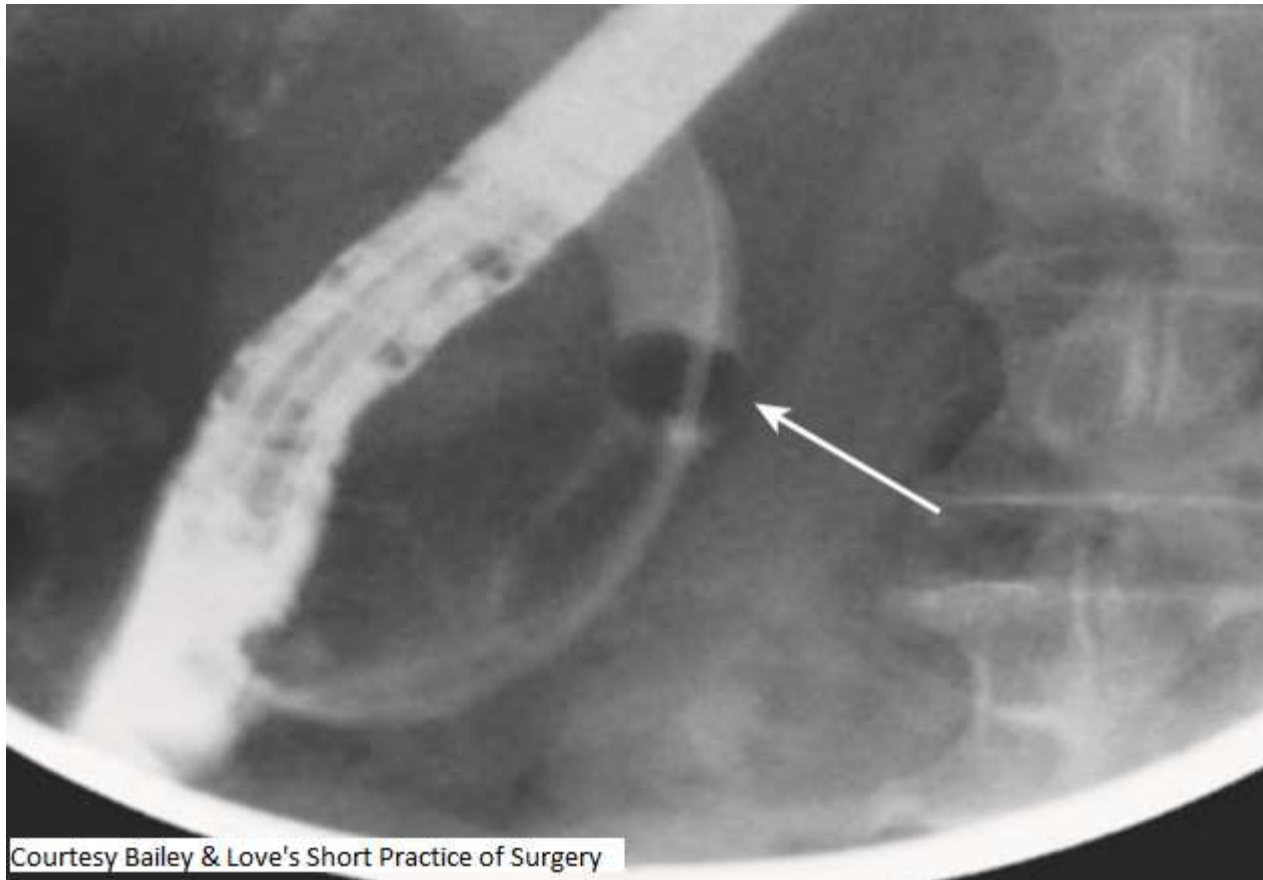
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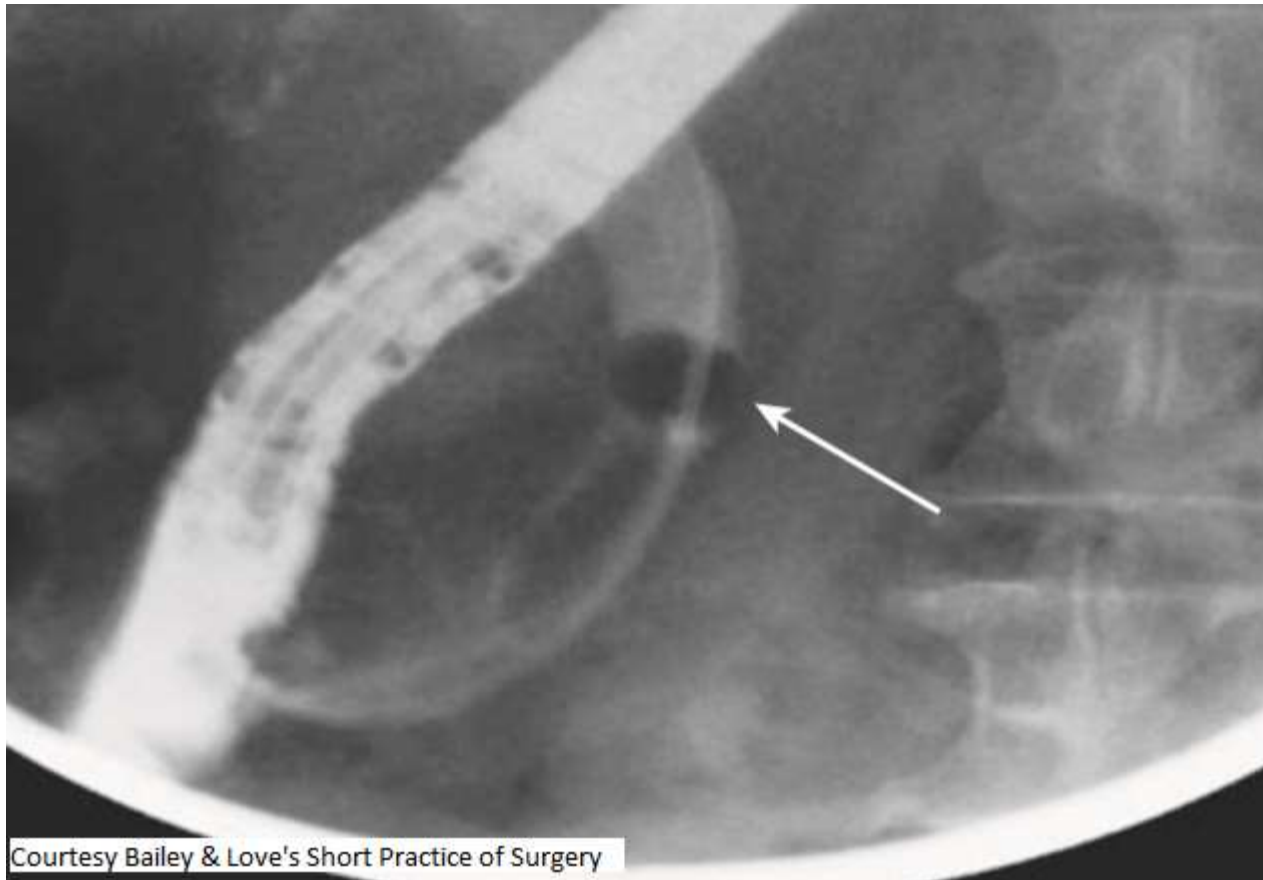


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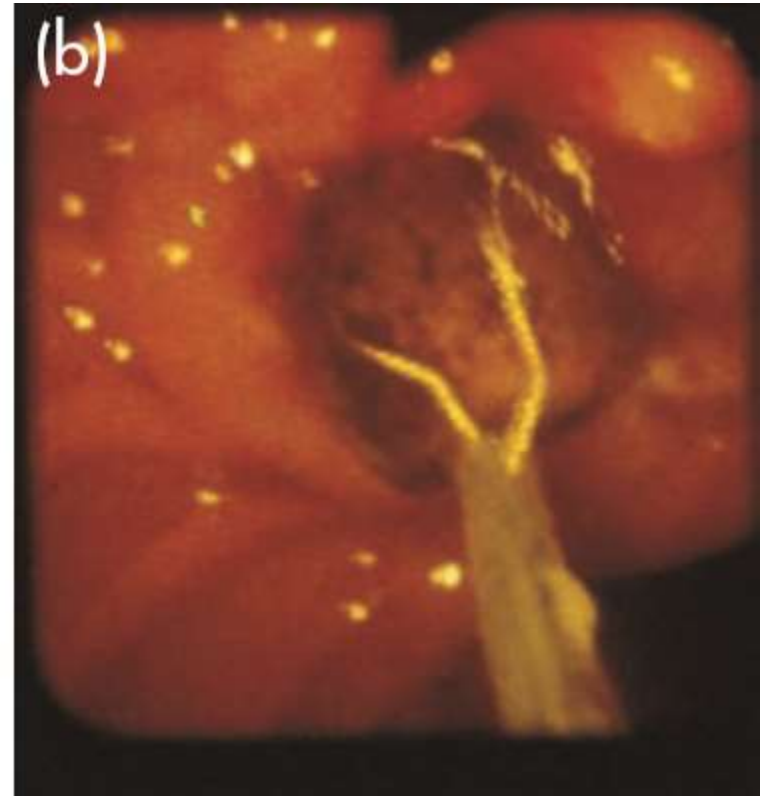
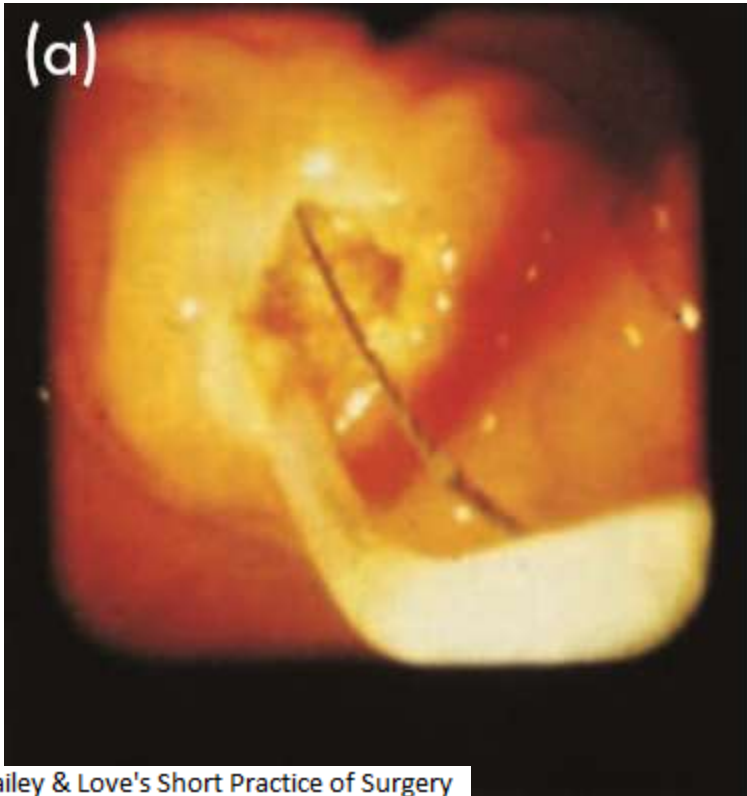
Endoscopic retrograde cholangiopancreatography: partial occlusion of the bile duct by a malignant stricture (arrow).



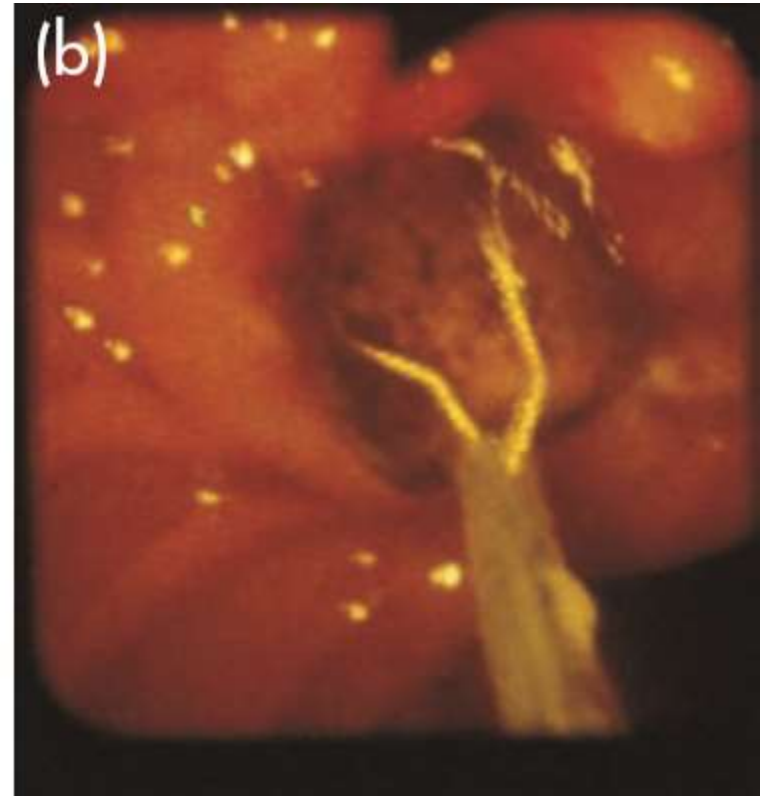
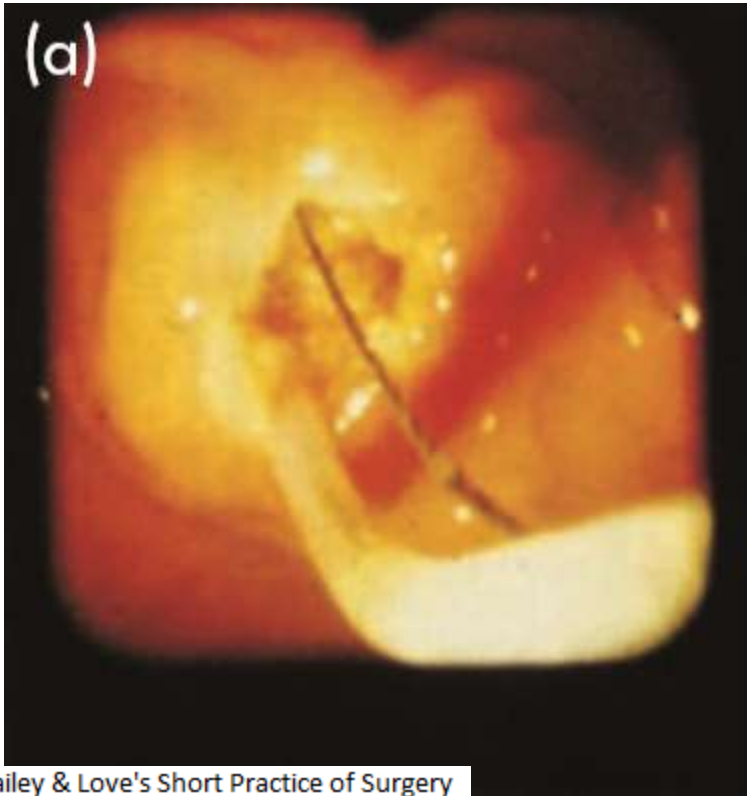
Courtesy Bailey & Love's Short Practice of Surgery



Endoscopic retrograde cholangiopancreatography showing common duct obstruction due to a stone (arrow).



Courtesy Bailey & Love's Short Practice of Surgery



Courtesy Bailey & Love's Short Practice of Surgery

(a) Endoscopic sphincterotomy; (b) extraction of a stone from the bile duct through the ampulla.



Courtesy Bailey & Love's Short Practice of Surgery



Courtesy Bailey & Love's Short Practice of Surgery

Transhepatic cholangiogram showing a stricture of the common hepatic duct.



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