Biliary tract infections and liver abscesses

By
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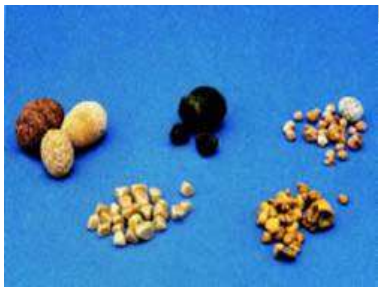
- Cholecystitis
- Cholangitis
- Liver abscesses
  - pyogenic liver abscess
  - amoebic liver abscess

Acute cholecystitis

- Acute inflammation of the gall bladder wall
- Female > male
- Other risk factors increasing age, obesity, pregnancy, certain ethnic groups etc.



Pathogenesis

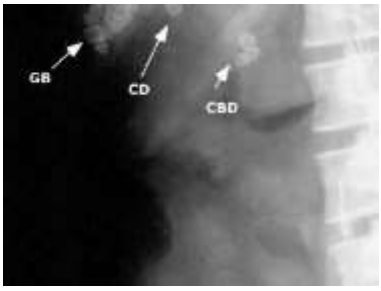
Impaction of gall stones in the cystic duct (> 90% cases)
↓
Obstruction and dilatation of gall bladder
↓
Vascular congestion and oedema
↓
Necrosis of wall, bacterial proliferation
↓
Complications eg. gangrene, perforation, liver abscess, cholangitis, bacteraemia etc.

Clinical features

- Epigastric or RUQ pain
- Nausea, vomiting
- Fever, anorexia, chills, sweats
- Moderate pyrexia
- Local peritonitis, RUQ tenderness (Murphy's sign)
- Palpable gall bladder (30–40%)
- Jaundice unusual

Diagnosis

- Moderate leukocytosis
- LFTs: ↑ bilirubin (50%), transaminases (40%) & alk phos (25%)
- Cultures of aspirate/biopsy specimens
  - not usually available
  - enteric organisms (Gram-neg bacilli, anaerobes, enterococci etc.
- Imaging studies ultrasound, CT scan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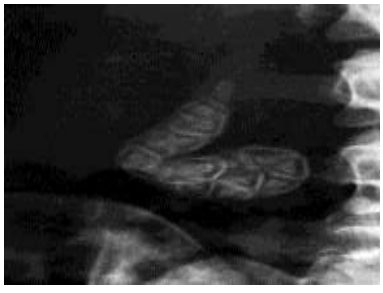

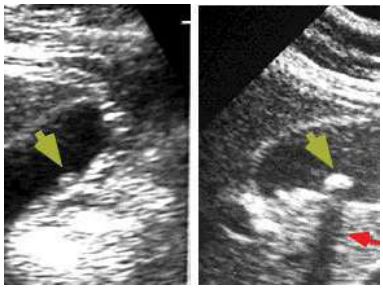

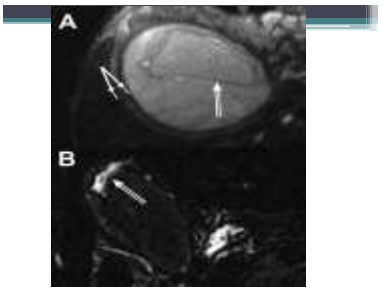

Cholelithiasis in Gallbladder Cancer: Coincidence, Cofactor, or Cause!

EJSO 36 (2010): 914-919

- While gallstones are associated with cancers of the gallbladder, the actual nature of their relationship needs to be clarified. This would aid the recommendations on the need for prophylactic cholecystectomy.
- The evidence at the current time indicates that gallstones are a cofactor in the causation of gallbladder cancer. Absolute proof of their role as a cause for gallbladder cancer is lacking. The recommendation for prophylactic cholecystectomy in countries reporting a high incidence of gallbladder cancer and associated gallstones needs to be tailored to the epidemiological profile of the place.

Cholelithiasis in Gallbladder Cancer: Coincidence, Cofactor, or Cause!

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In the case of gallstones, despite the lack of evidence to support a recommendation, large stones (>3 cm) or a gallbladder packed with stones (high stone:GB volume ratio) could serve as potential indications for prophylactic cholecystectomy.

Differential diagnosis of cholecystitis

Common
- Appendicitis
- Perforated peptic ulcer
- Acute pancreatitis

Uncommon
- Acute pyelonephritis
- Myocardial infarction
- Pneumonia – right lower lobe

Ultrasound scan aids diagnosis

Uncertain diagnosis – do CT scan

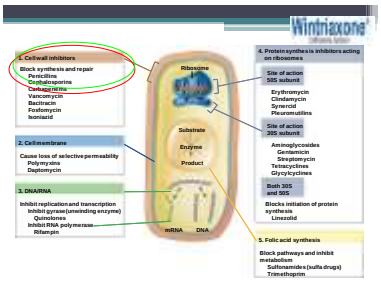
Complications

- Infection- develops in >50% cases
- Gangrene/empyema
- Perforation (10-15%)
- Obstruction of bile duct; cholangitis, pancreatitis
- Liver abscess
- Peritonitis
- Bacteremia

Treatment

- Medical Rx: IV fluids, IV antibiotics, analgesia, anti-emetics, bowel rest (NPO)
- Surgical Rx: usually cholecystectomy (Laparoscopic or Open)

Practical Classification of Bacteria



Cephalosporin Agents by Generation

Generation	Route Of Administration	Agent, Trade Name & Manufacturer
1st Generation	PO	Cefadroxil (Duricef), GSK Cephalexin (Keflex), GSK Cephradrine (Velosef), GSK
	Parenteral	Cefazolin (Ancef, Lilly)
2nd Generation	PO	Cefaclor (Ceclor, Lilly) Cefprozil (Cefzil, GSK)
	Parenteral	Cefmetazole (Zefazone, Bristol)
3rd Generation	PO	Cefpodoxime proxetil (Vantin, Pfizer)
	Parenteral	Ceftazidime (Fortaz, Glaxo) Ceftriaxone (Rocephin, Roche)
4th Generation	Parenteral	Cefepime (Maxipime, GSK)
5th Generation	Parenteral	Ceftaroline (Teflaro, Takeda)

Cephalosporin Coverage

Generation	Primary Coverage	Secondary Coverage
1°	Gram positives (except MRSA)	None
2°	Anaerobes	Gram positives (except MRSA) Gram negatives (except Pseudomonas)
3°	Gram negatives (any ceftazidime treats Pseudomonas)	Gram positives (except MRSA)
4°	Pseudomonas	Gram positives (except MRSA) Gram negatives
5°	MRSA	Other gram positives Gram negatives

3rd generation Cephalosporins'

- 3rd generation Cephalosporin provide new therapeutic approaches to difficult infectious disease problems.
- Currently available 3rd generation Cephalosporins differ in their anti-microbial spectrum, pharmacokinetic profile, side effects and costs.
- 3rd generation Cephalosporins are 10-100 fold more active against most aerobic Gram negative organisms than 1st generation.

Important definitions

- C max : Peak plasma concentration of a drug.
- Tmax :The time after administration of a drug to reach peak plasma concentration.
- Bioavailability : The percentage of an administered dose which enters the systemic circulation as indicated by the area under the plasma concentration vs time curve.
- Plasma elimination half-life (t ½) :Is the amount of time required for the plasma concentration of an antibiotic to decrease by half.

Wintriaxone® Ceftriaxone Sodium — Pharmacokinetic Properties

- IV ceftriaxone 0.5, 1 or 2 g produces mean peak plasma concentrations (Cmax) of 82, 151 and 257 mg/L
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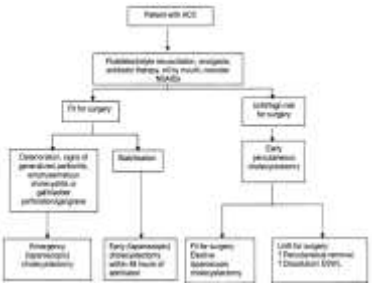
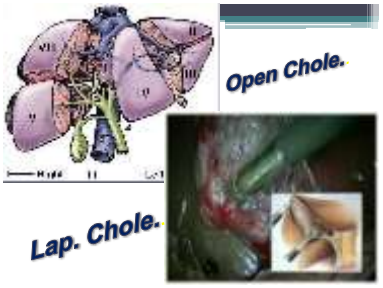
- Ceftriaxone binds reversibly to albumin and the level of binding decreases with increasing ceftriaxone plasma concentration (~95% at <100 mg/L to ~85% at 300 mg/L).
- Ceftriaxone distributes widely into the body fluids and tissues. The volume of distribution of ceftriaxone is usually 5–13 liters (mean 8 liters).
- Ceftriaxone preferentially localizes in bile and mean concentrations of 155 and 449 mg/L are obtained 1 and 3 hours, respectively, after intravenous administration of 1g dose.





Anatomy and congenital malformation

The classic description of the extra hepatic biliary tree and its arteries applies only in about one third of patients.

Molmenti EP, Pinto PA, Klein J, et al: Normal and variant arterial supply of the liver and gallbladder. *Pediatr Transplant* 7:80, 2003. [PubMed: 12581334]
Chen TH, Shyu JF, Chen CH, et al: Variations of the cystic artery in Chinese adults. *Surg Laparosc Endosc Percutan Tech* 10:154, 2000. [PubMed: 10872977]
(Schwartz's Principles of Surgery , Ninth edition)

Golden rules for safe cholecystectomy:

(1)-Decide the best approach, then dissect the cholecysto hepatic triangle for good anatomical identification especially of cystic artery and duct.
(2)-Good dissection and identification of the gall bladder cystic junction prior ligation and cutting to avoid CBD injury or ligation.
(3)-Avoid clipping, ligation, or even clamping of any unidentified structure as it always ends in biliary injury.
(4)-Avoid unnecessary use of diathermy in general, and in the vicinity of CBD in particular.
(5)-Ligation of the cystic artery nearby the gall bladder wall to avoid hepatic artery injury.

(6)-Do not manipulate in myth, if in doubt consult, shift lap. to open procedure, or use cholangiogram if feasible.
(7)-Any sizable duct structure connected to the bladder bed should be identified then assured by cholangiogram, if accessory it is ligated to avoid post operative leak, if major duct, it must be repaired or anastomosed.
(8)-Any bile leak in the field should be taken seriously and searched for its source and managed accordingly without reluctancy with cholangiogram visualization.
(9)-Do not skeletonize the CBD aiming for good identification as it end almost in ischemic stricture.
(10)-Do not attempt to close the patient till you are extremely sure about all details, and consult if in doubt as most of biliary injuries discovered intra operatively and managed non into cure in 80% of cases.

(11)-If you do not have the facility to manage complications, drain the sub hepatic area and refer the patient immediately to the convenient center with full detailed report about the procedure without hesitancy.
(12)-CBD exploration should be attempted if in doubt about obstruction, or the cause of biliary dilation.
(13)-Choledochotomy is done in supra duodenal CBD anterior wall with clean cut edge, without laceration of the tissue or massive diathermy use.
(14)-Do not use forcible testing of CBD clearance using metal dilators or scoops.
(15)-T-shaped tube application is the standard after CBD exploration, with upper end apart from the cystic, and lower end above the sphincter of Oddi.

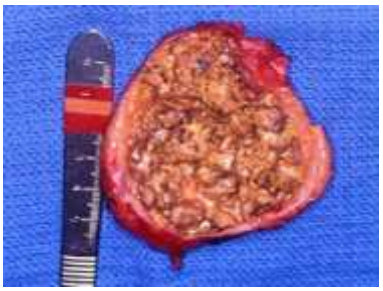
(16)-Choledochotomy incision closure necessitates at least one stitch above and below T-tube external limb osteum for better healing and less complications safer extraction.
(17)-Do not hesitate to open the duodenum if stone is impacted in the papilla with operative papillotomy.
(18)-Lower down CBD obstruction is not managed symptomatically with side to side choledocho duodenostomy without good intra operative diagnosis of its nature and subsequent biopsy if needed then managed accordingly.
(19)-Choledocho jejunostomy, with Roux en Y loop end to side or side to side is the operation of choice in securing the biliary tract to the gut with the least drawbacks.
(20)-Almost always fusion the biliary stoma as large as possible (at least 3 cm in diameter) by all possible techniques for better outcome without stricture formation later on, and splint the anastomosis in smaller caliber externally, or internally by inert silastic, or Teflon tubes.

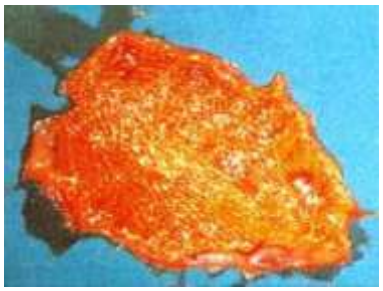
Prophylactic Cholecystectomy

- Prophylactic cholecystectomy may be considered in those patients with high rates of complications:
  - Calcified (porcelain) gallbladder (high cancer risk)
  - Ileal resection
  - Liver transplantation, Sickle cell disease
  - Children
  - Morbid obesity/gastrectomy
  - Cholelithiasis
  - Immunocompromised
  - Chronic hemolysis+ splenectomy
  - Large stone > 2.5cm
  - GB polyp

Treatment Symptomatic GS

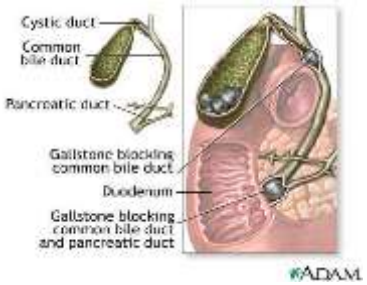
- Elective cholecystectomy is the preferred treatment of patients with symptomatic GS
  - Biliary colic, Cholecystitis, Choledocholithiasis, Cholangitis, GS pancreatitis
- Overall mortality for cholecystectomy 0.5%
  - Significantly lower for elective operations
  - Higher in emergencies
  - 2-3x higher for CBD exploration





Cholangitis

- Inflammation involving the hepatic and common bile ducts
- Pathogenesis similar to that of cholecystitis
  - obstruction of common bile duct → oedema, congestion, necrosis of walls → bacterial proliferation within biliary tree.
- Causes of obstruction
  - gallstones
  - biliary tract surgery, tumour, parasitic infection, calcific pancreatitis etc.



Etiology

- Obstruction of the common bile duct due to gallstones
- Benign strictures
- Malignant strictures
- Sclerosing cholangitis
- Parasites

Clinical features

- High fever
- RUQ pain
- Jaundice (usually prominent)
- (Charcot triad: present in 85% cases)
- Chills, rigors
- RUQ tenderness, pale stools
- Sepsis, septic shock

History of Cholangitis

- 1877 – Dr. Jean-Martin Charcot recognized triad of symptoms
- 1958 – Dr. Benedict Reynolds recognized a more severe form

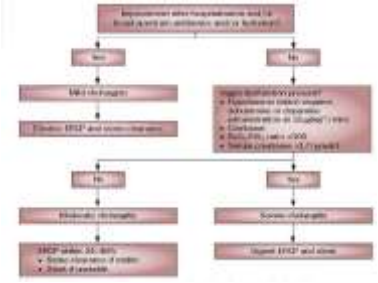
- Charcot's Triad
  - Jaundice, fever, and RUQ pain
- Reynold's Pentad
  - Addition of altered mental status, and hypotension

Risk factors

- Age > 50 years
- Cholelithiasis/formation of gallstones
- Benign strictures
- Malignant strictures
- Post procedure injury of bile ducts
- History of sclerosing cholangitis

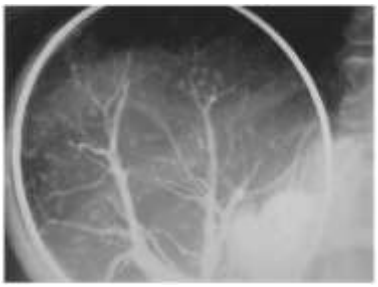
Box 1.2 Differential diagnosis of common causes of severe acute epigastric pain

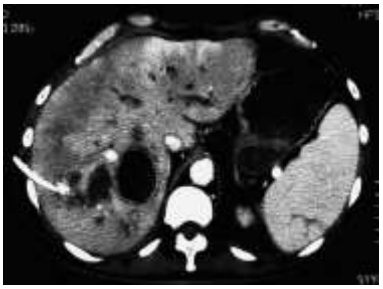
- Biliary colic
- Peptic ulcer disease
- Oesophageal spasm
- Myocardial infarction
- Acute pancreatitis



Complications

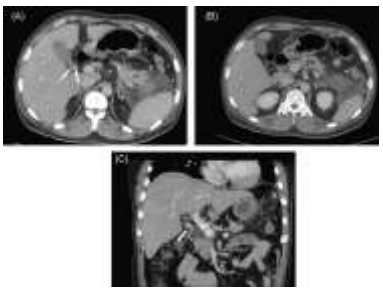
- Bacteraemia (about 50% cases)
- Liver abscesses
- Septic shock

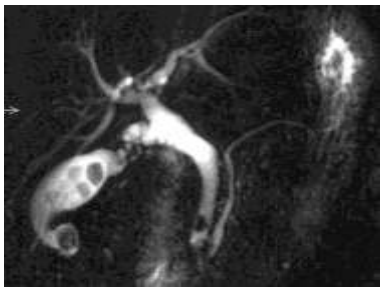


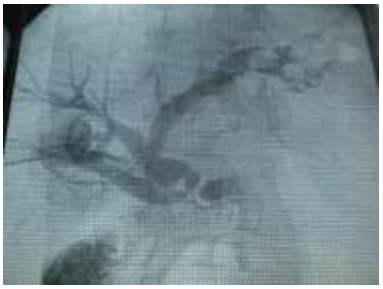


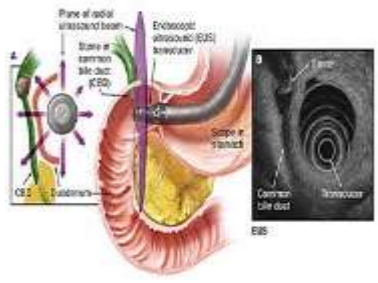
Diagnosis

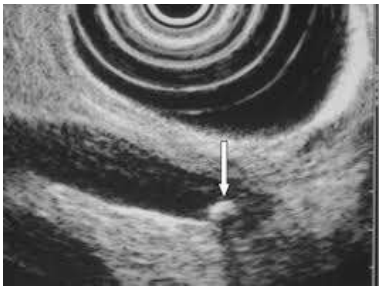
- Marked leukocytosis
- Marked ↑ bilirubin, alkaline phosphatase; moderate ↑ transaminases
- Blood cultures
  - enteric G/NB and anaerobes most frequently isolated.
- Imaging studies
  - Ultrasound; CT scan
  - ERCP (endoscopic retrograde cholangiopancreatography), PTC (percutaneous transhepatic cholangiography)








Plane of radial ultrasound beam
Endoscopic ultrasound (EUS) transducer
Stump of common bile duct (CBD)
Tumor
Stomach
Duodenum
Common bile duct
Transducer
EUS

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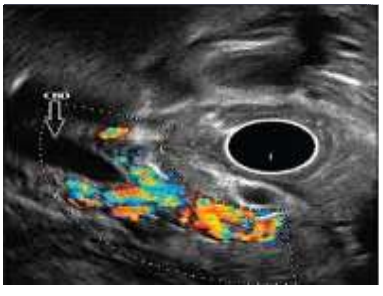

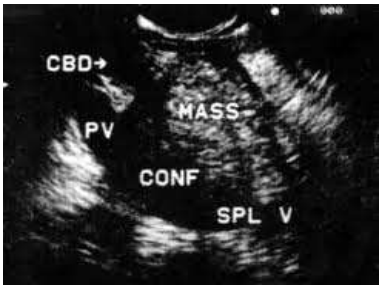
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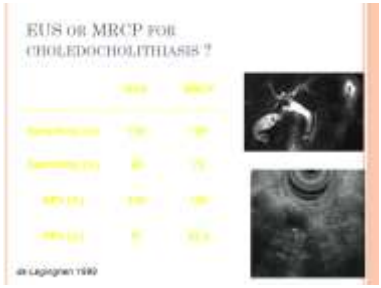


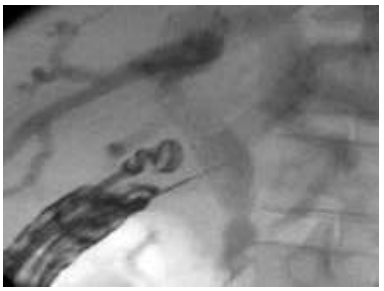
ENDOSCOPIC ULTRASOUND: EUS

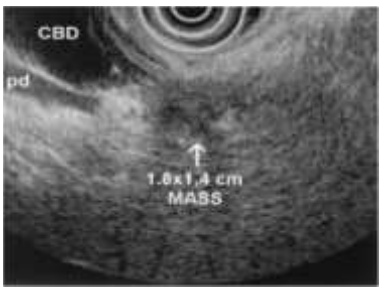
- Advantages
  - Comparable accuracy to ERCP
  - less complications
  - less costly (diagnostically)
- Disadvantages
  - no therapeutic capability
- Recommended use:
  - low pretest probability of stones or used for therapeutic intervention
  - prior unsuccessful ERCP
  - contraindications for ERCP

ACCURACY OF EUS

A meta-analysis of 27 studies (with a total of 2673 patients) estimated an overall sensitivity of 94 percent (95% CI 93-96%) and specificity of 95 percent (95% CI 94-96%) of EUS compared with ERCP, intraoperative cholangiography or surgical exploration as the reference standard

Ref: EUS: a meta-analysis of test performance in suspected choledocholithiasis





Predicting CBD stones-1

Risk	Clinical	LFT	CBD diameter	Risk CBD stones
Low	well	N	≤ 7mm	2-3%
Intermediate	Cholangitis/ pancreatitis	↑ <2x	8-10mm	30-50%
High	Cholangitis; jaundice	↑ >2x	>10mm	50-80%

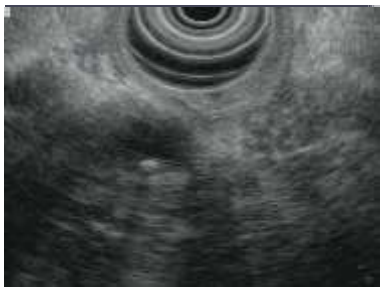
High probability of choledocholithiasis

Patients were considered to have a high probability of choledocholithiasis if they had

1- CBD stone on US or CT or

2- At least three of the following:

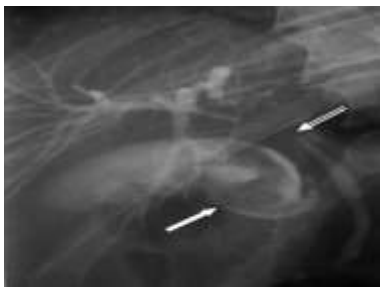
- Dilated CBD on US (>7 mm)
- Fever
- Bilirubin >2 mg/dL
- Elevated alkaline phosphatase
- Serum ALT >twice normal

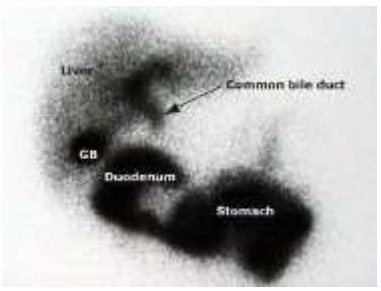


Endoscopic Retrograde Cholangiopancreatography: ERCP

- Gold standard
- Choledocholithiasis, unresolving cholangitis or gallstone pancreatitis
- Both diagnostic and therapeutic potential
- Sensitivity - 95%
- Specificity - 95%

ERCP of Common Duct Stone





Tests

- transabdominal ultrasound
- Endoscopic ultrasound
- CT
- Magnetic resonance cholangiopancreatography (MRCP)
- Endoscopic retrograde cholangiopancreatography (ERCP)
- Lab tests
  - abnormal LFTs, elevated CRP, WBC

Diagnosis of acute cholangitis has traditionally been made by the Charcot triad criteria; that is, clinical findings of fever, jaundice, [illegible] and [illegible].

- Approximately 80% of patients with acute cholangitis respond to broad-spectrum antibiotics alone while the remainder require early biliary drainage in addition to antibiotic therapy.
- Endoscopic retrograde cholangiopancreatography (ERCP) and stent placement are considerably safer than surgical biliary decompression.
- Elective cholecystectomy should be performed after resolution of acute cholangitis in patients with an intact gallbladder.

Treatment

- Prompt institution of appropriate antimicrobial therapy essential:
  - initial choice usually empirical
  - eg, 3rd gen cephalosporin/quinolones/co-amoxiclav + metronidazole.
- Biliary drainage
  - ERCP
  - Percutaneous transhepatic cholangiography (PTC)
  - EUS guided drainage
  - Open surgical drainage

Wintriaxone® Ceftriaxone Sodium

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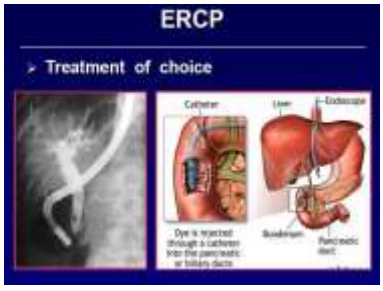
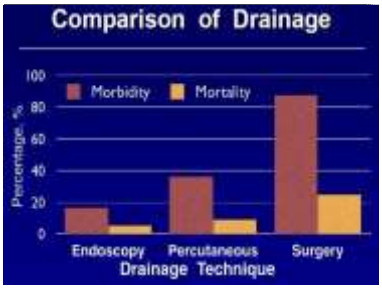
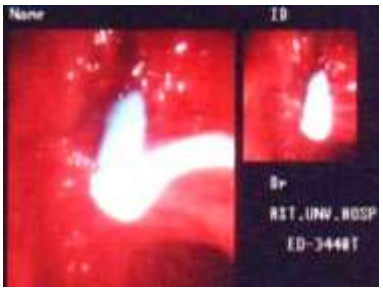
2nd Generation	PO	Cefaclor (Ceclor, Lilly) Cefprozil (Cefzil, GSK)
	Parenteral	Cefamandole (Mandol, Lilly)
3rd Generation	PO	Cefpodoxime (Vantin, Pfizer)
	Parenteral	Ceftazidime (Ceftibid, Pfizer) Ceftriaxone (Rocephin, Roche) Cefotaxime (Claforan, Roche)
4th Generation	Parenteral	Cefepime (Maxipime, GSK)
5th Generation	Parenteral	Ceftaroline (Teflaro, Takeda)

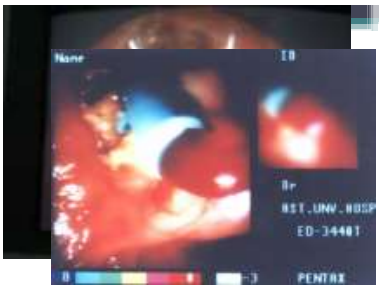


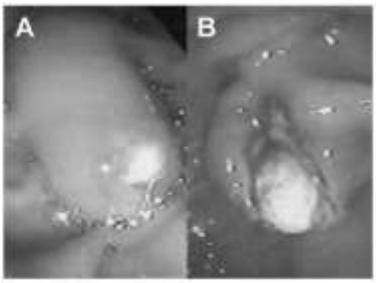


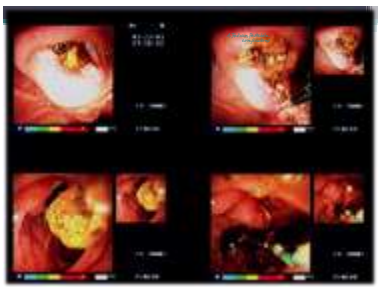
- Result of biliary stasis & infection
- 80% respond to conservative therapy
- ERCP first line drainage therapy
- CBD stones removed in 90-95% after sphincterotomy

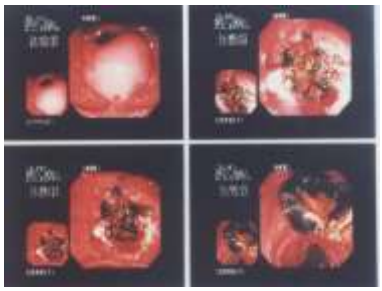
Biliary Blokage

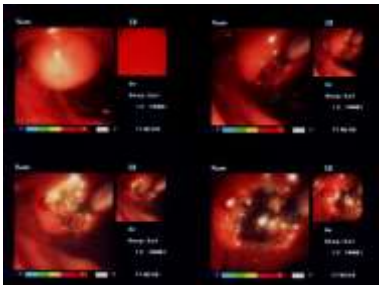


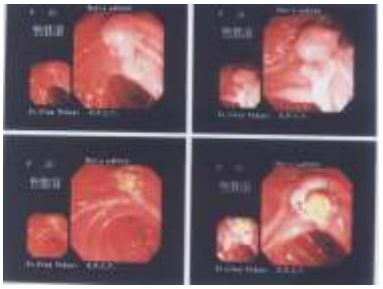


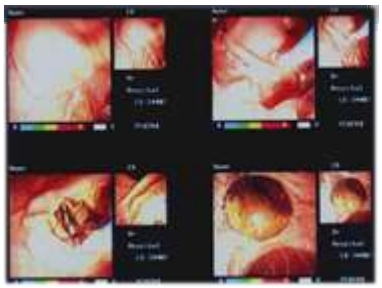


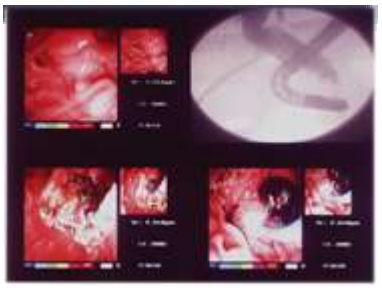


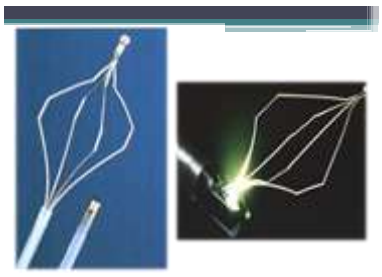


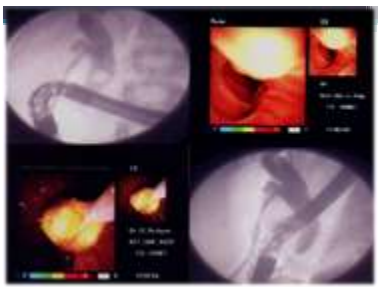


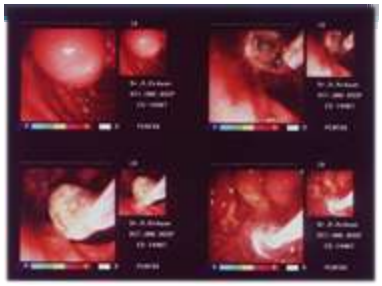


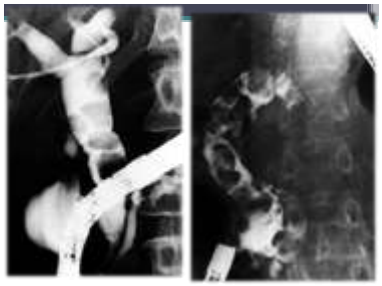


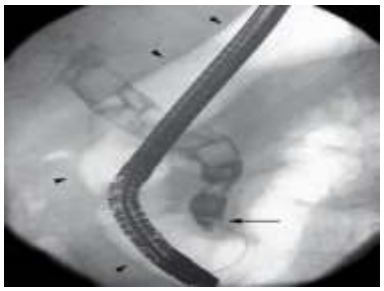


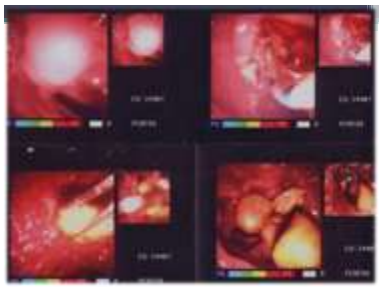


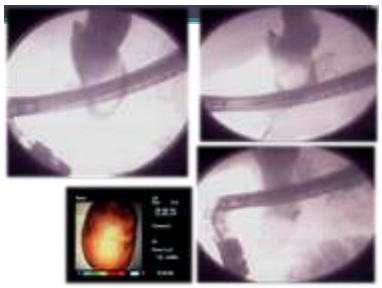


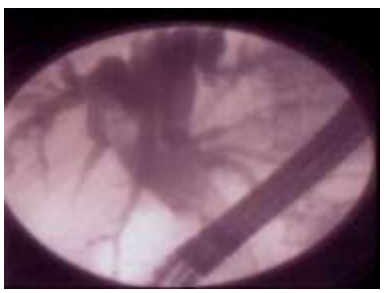


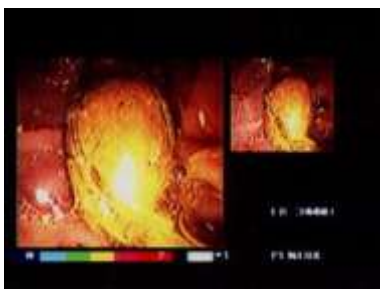


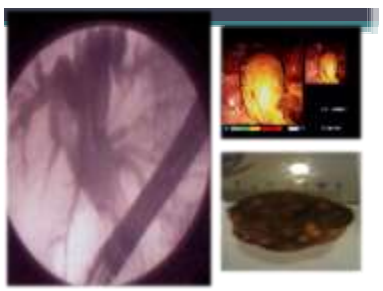


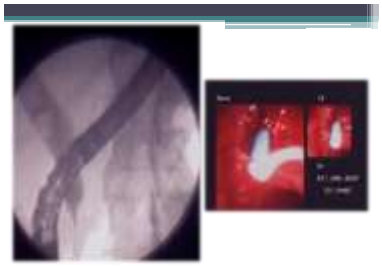


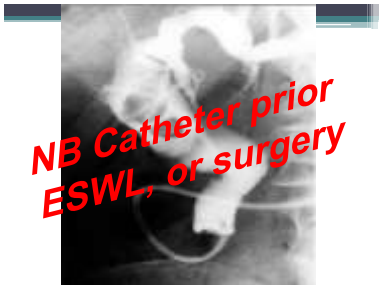


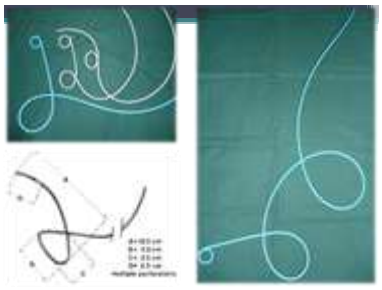


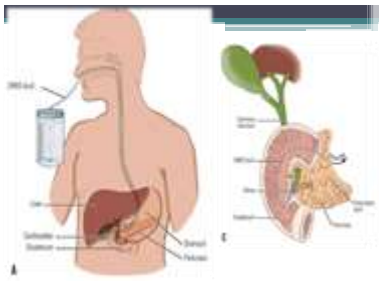


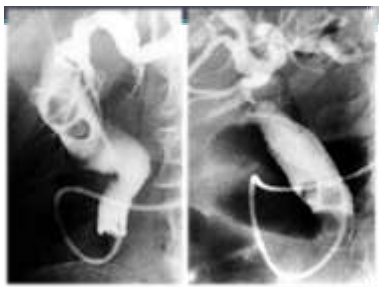








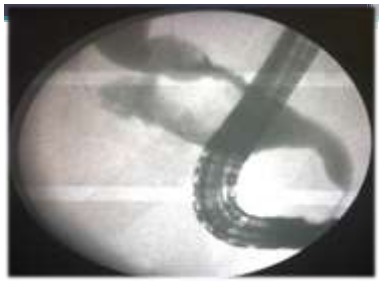


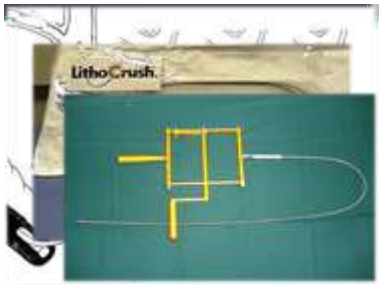


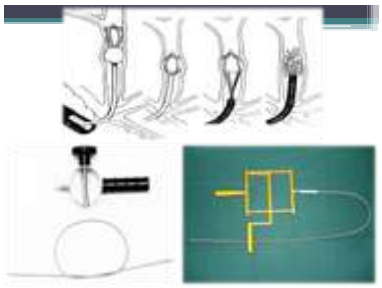
Lithotripsy

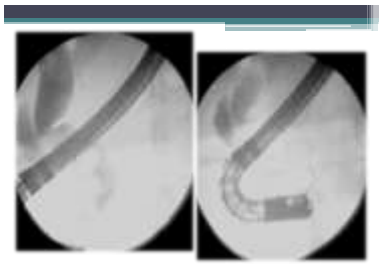
Mechanical manual lithotripsy (internal or external)
Electrohydraulic shockwave lithotripsy (ESWL)
Chemical lithotripsy (Dissolution treatment)
Electrohydraulic lithotripsy
LASER lithotripsy (Smart LASER)

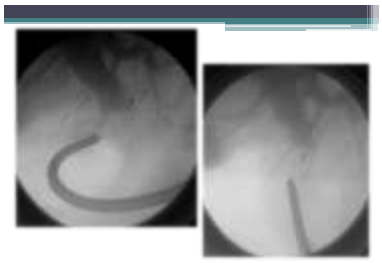

Stone Removal and Lithotripsy
Either via the transorally inserted duodenoscope or via a percutaneous
hepatocholangioscope, these methods have yielded highly acclaimed
success in the removal or destruction of stones in the common bile
duct, without the burden of a laparotomy procedure. This endoscopic
approach can also be performed intra- or post-operatively to confirm
the removal of all stones, thereby preventing cases of retained stones

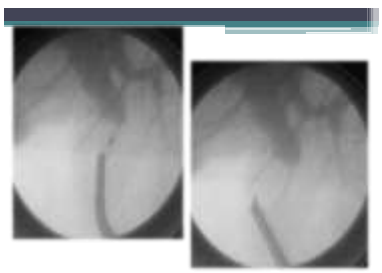


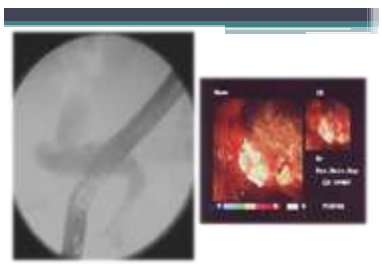

LithoCrush

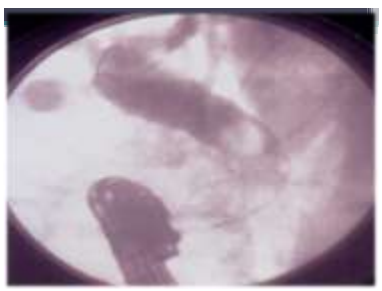


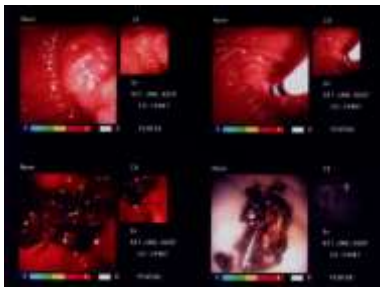


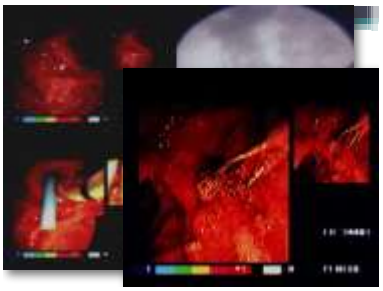




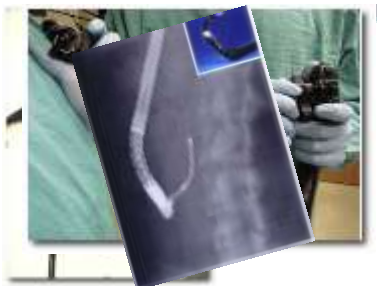








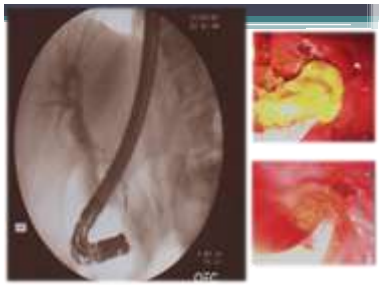
Mother and baby scope technique

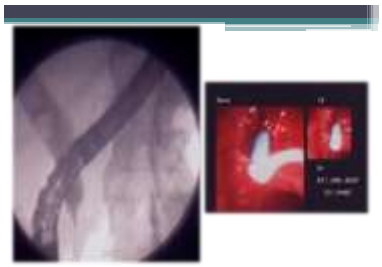


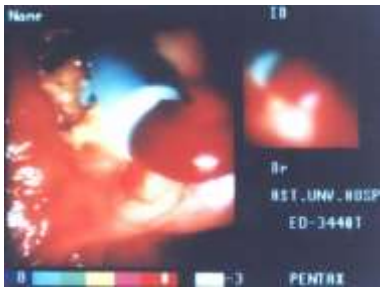
Spyglass technique

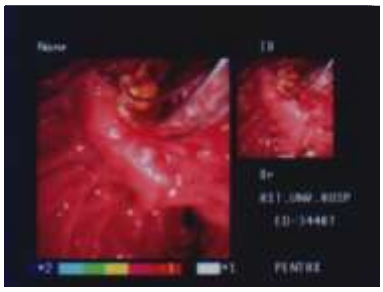
PER ORAL CHOLANGIOSCOPY

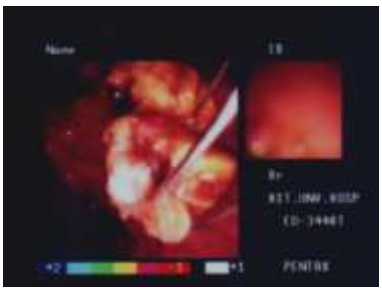
Very Interesting Rare Cases

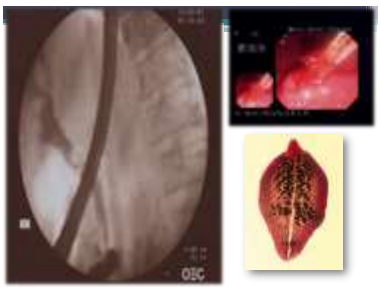


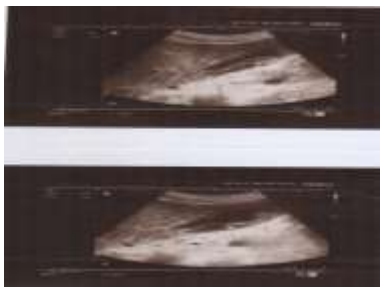


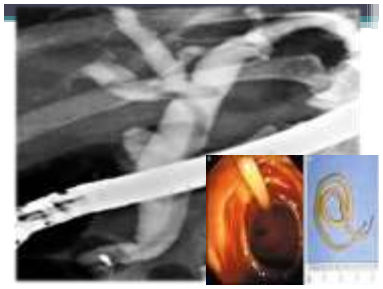


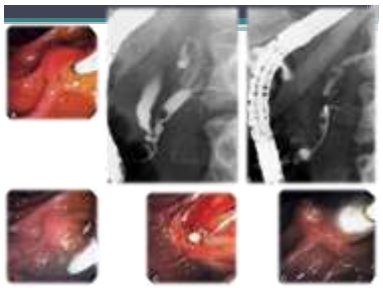


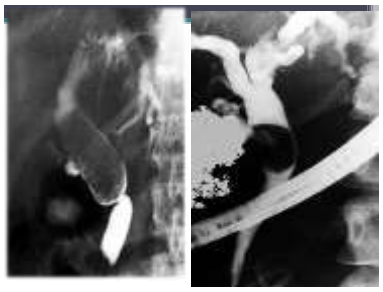


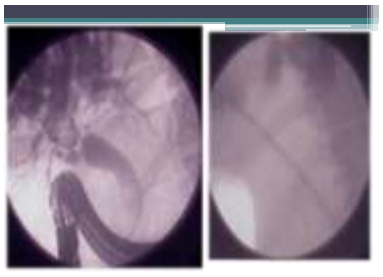


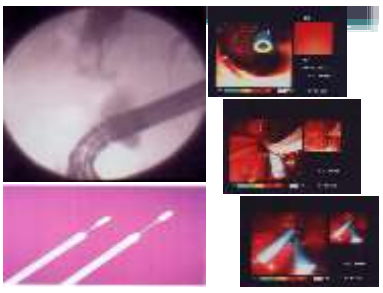


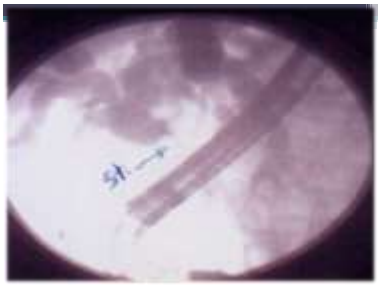


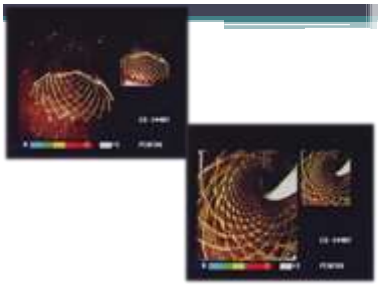




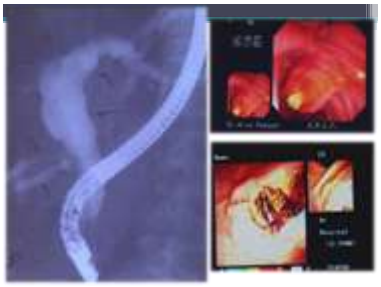


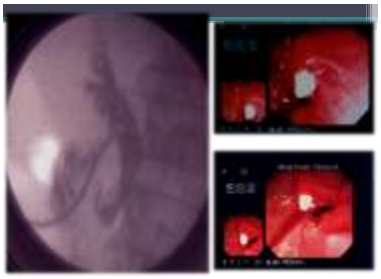


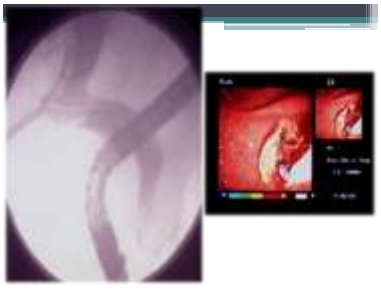


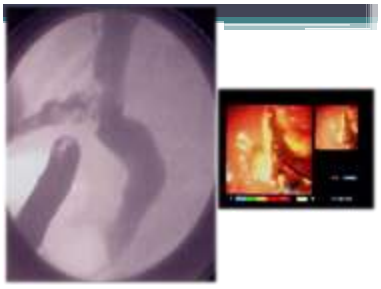


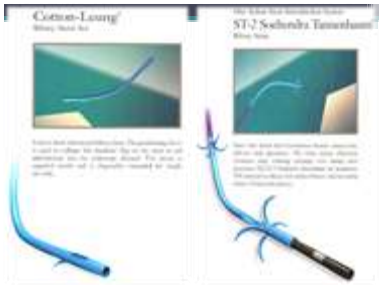
Biliary Injury

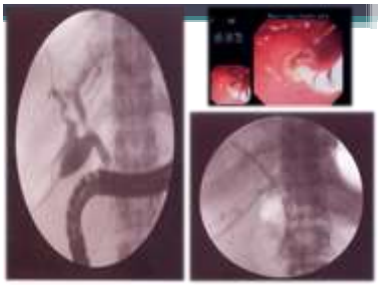


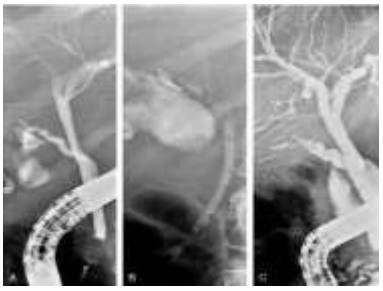


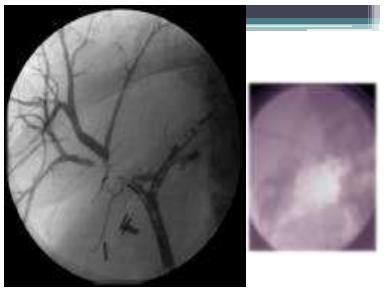


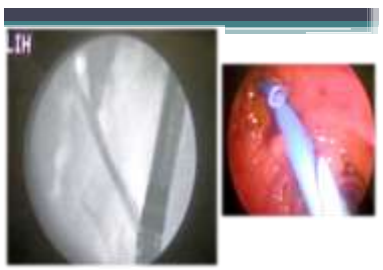


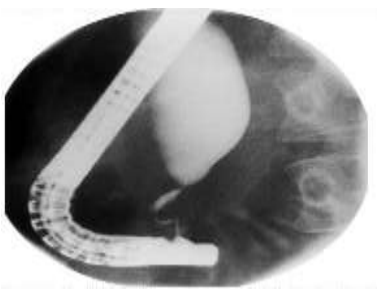

Cotton-Leung'
ST-J Sodhrdra Tanenbaum

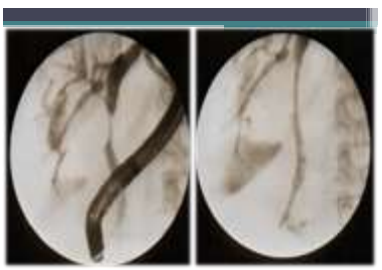


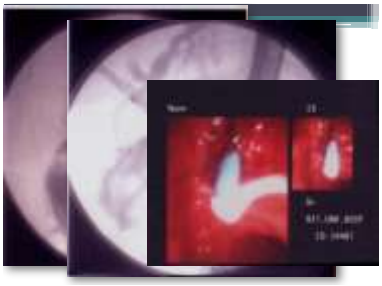


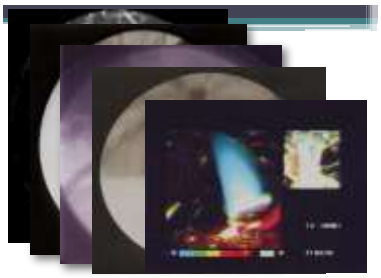


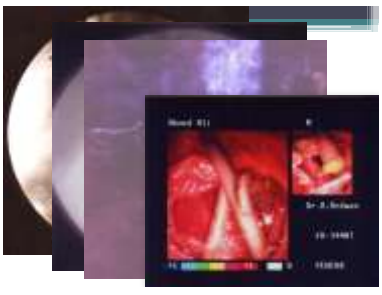


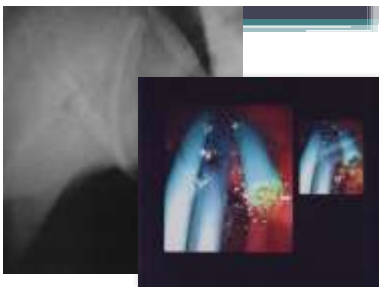


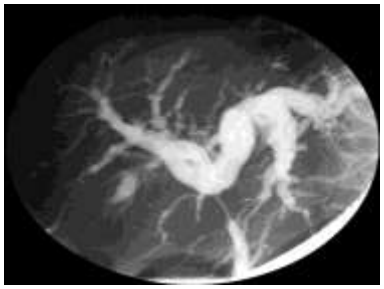


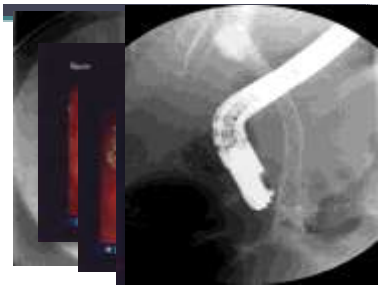


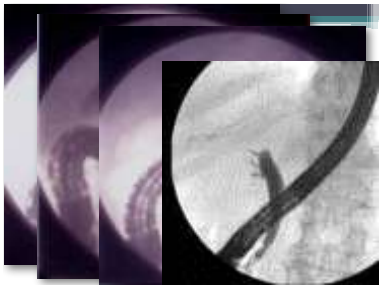


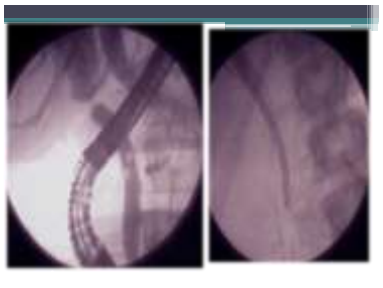


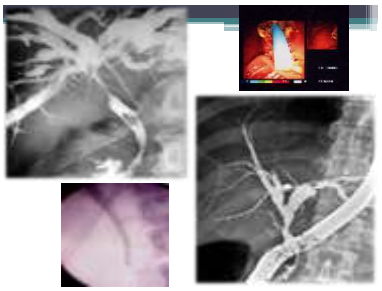


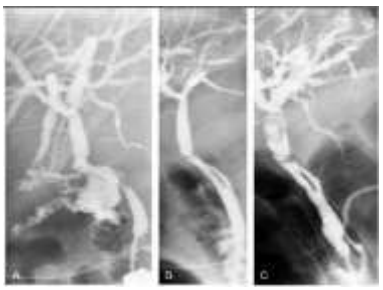


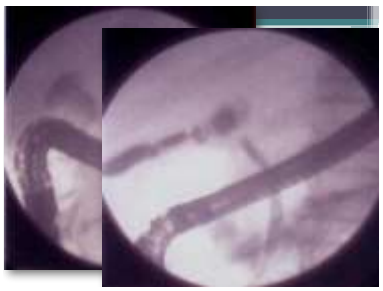


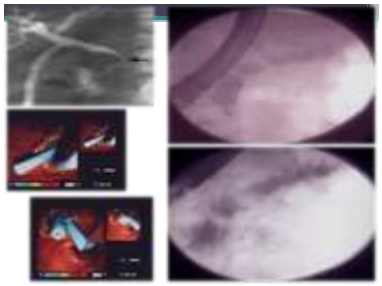


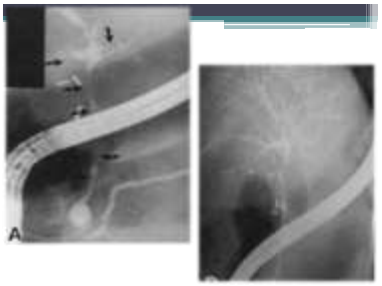


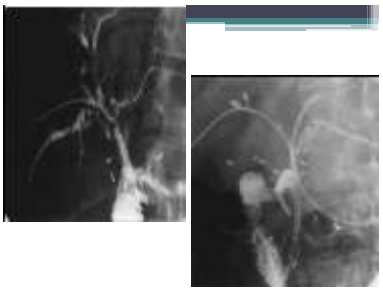


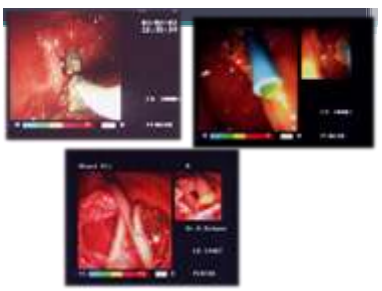


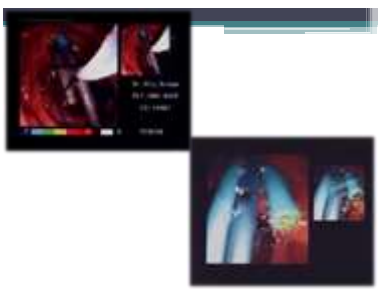


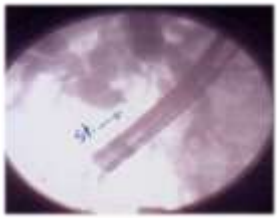


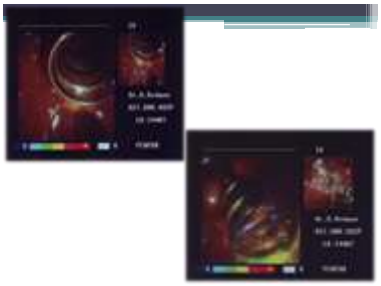




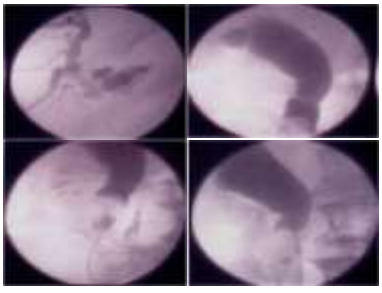


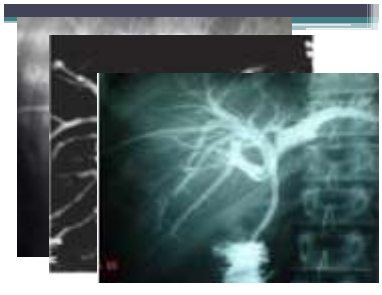


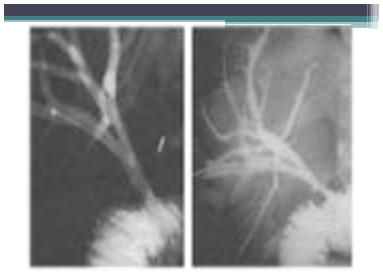




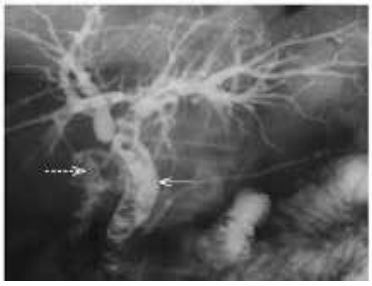
Percutaneous manipulations

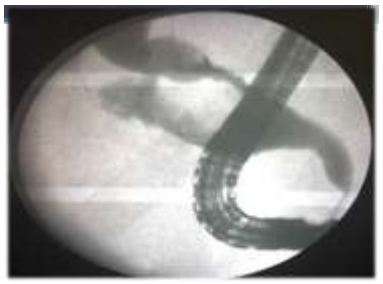






Surgery

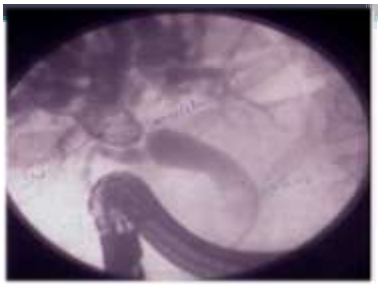


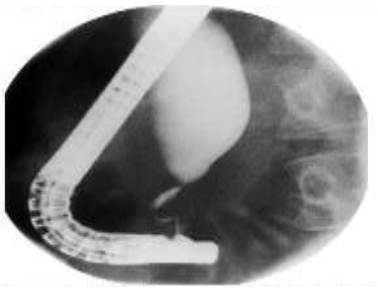


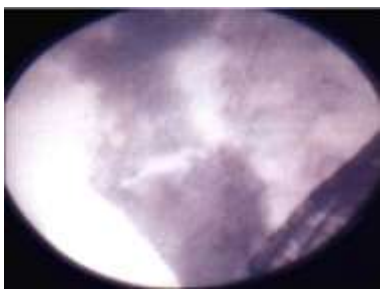
Operations in quiescent phase

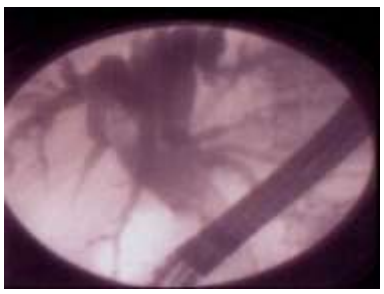
Complicated cases

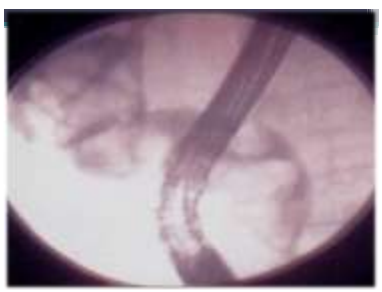
- Hepatocutaneous jejunostomy
- Stricturoplasty
- Partial hepatectomy

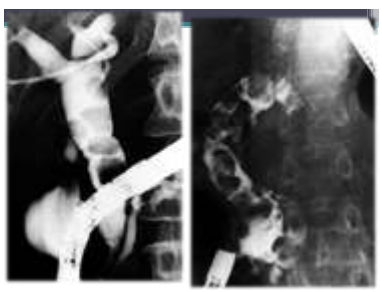


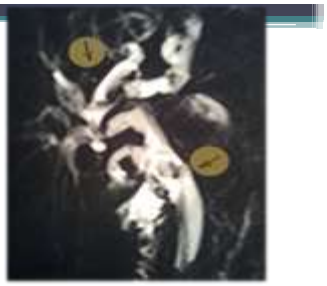
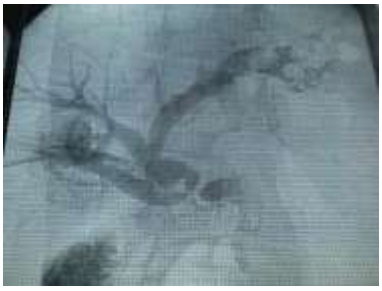
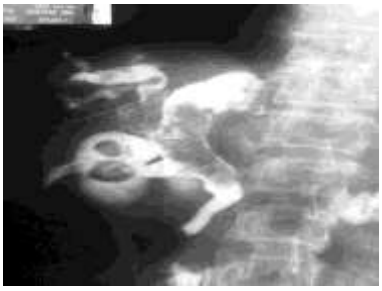




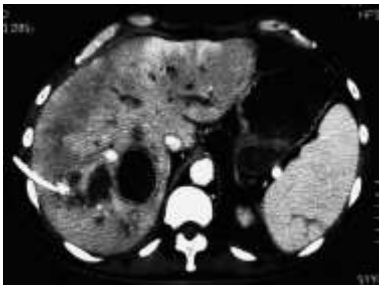
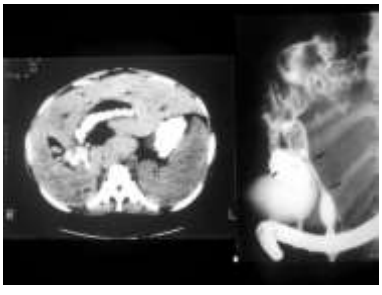


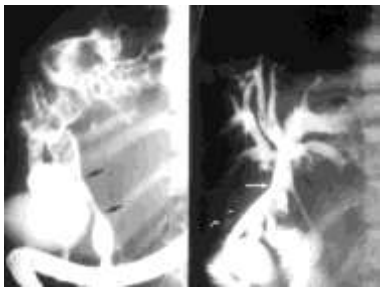


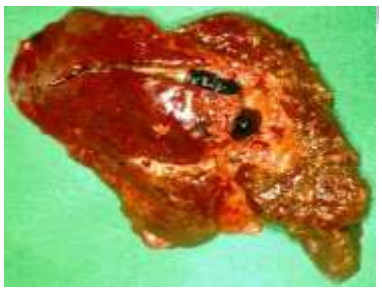


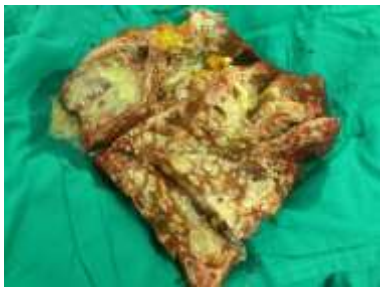








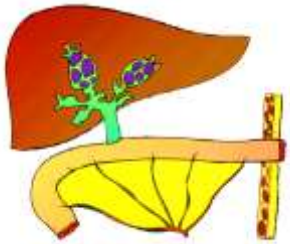


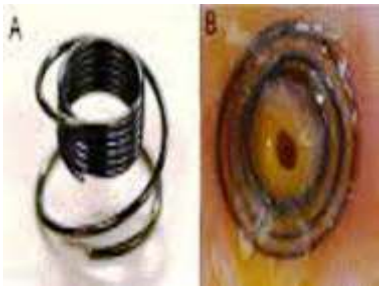


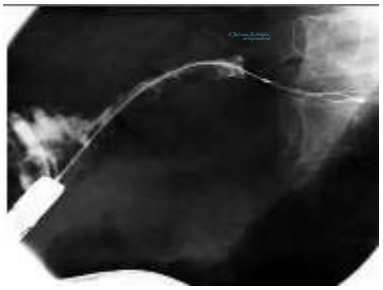
Hepatico / choledocho jejunostomy

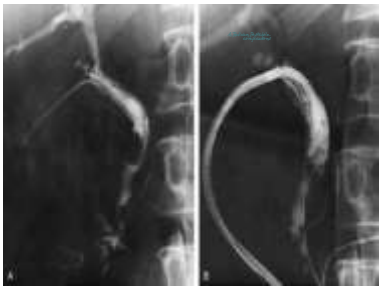
Hepaticocutaneous jejunostomy

- For repeated or unlimited access to the biliary tract by choledochoscopy
- Reopening of stoma for recurrence of stones and strictures




A
B






1
إنتي كل يوم شيخسي
و عمرك ما أنتشي بيض
2
ما أنت كل يوم بتكدن
و عمرك ما ركعتها


THANK YOU
ProfAlaaRedwan@Yahoo.com