Management of Acute Cholecystitis and Cholangitis

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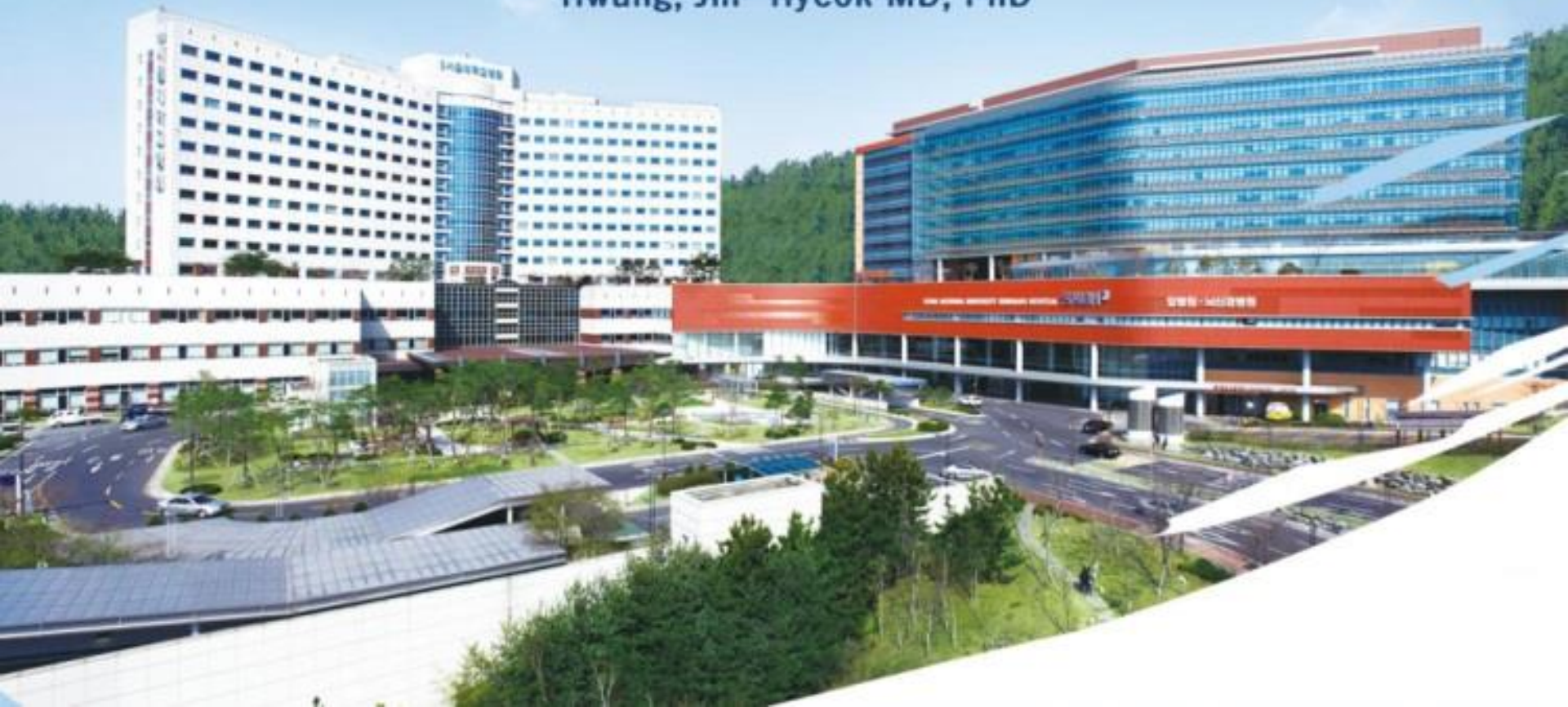
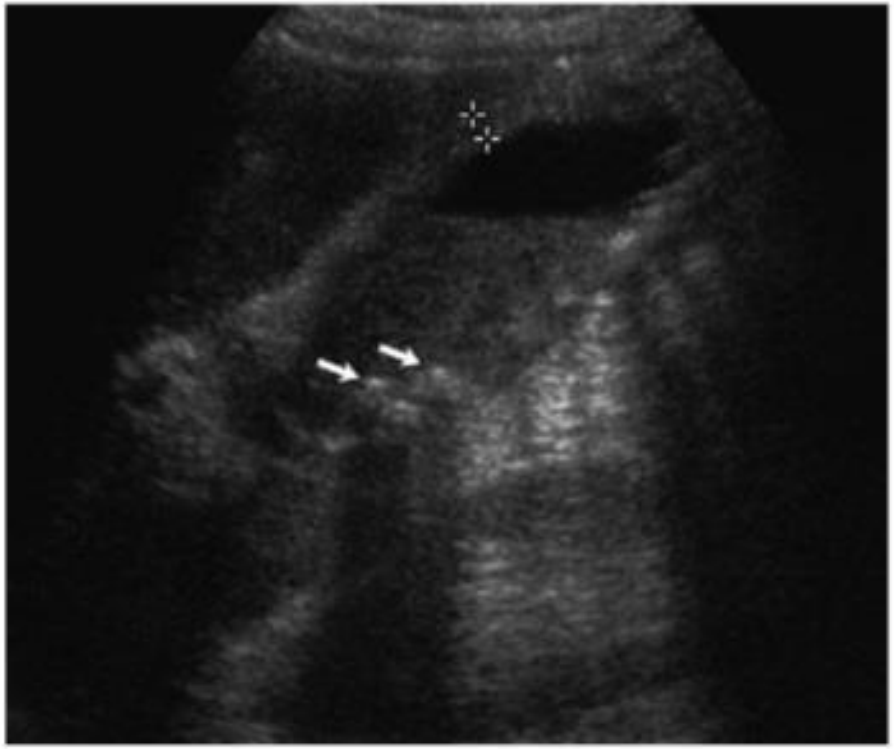


Case 1

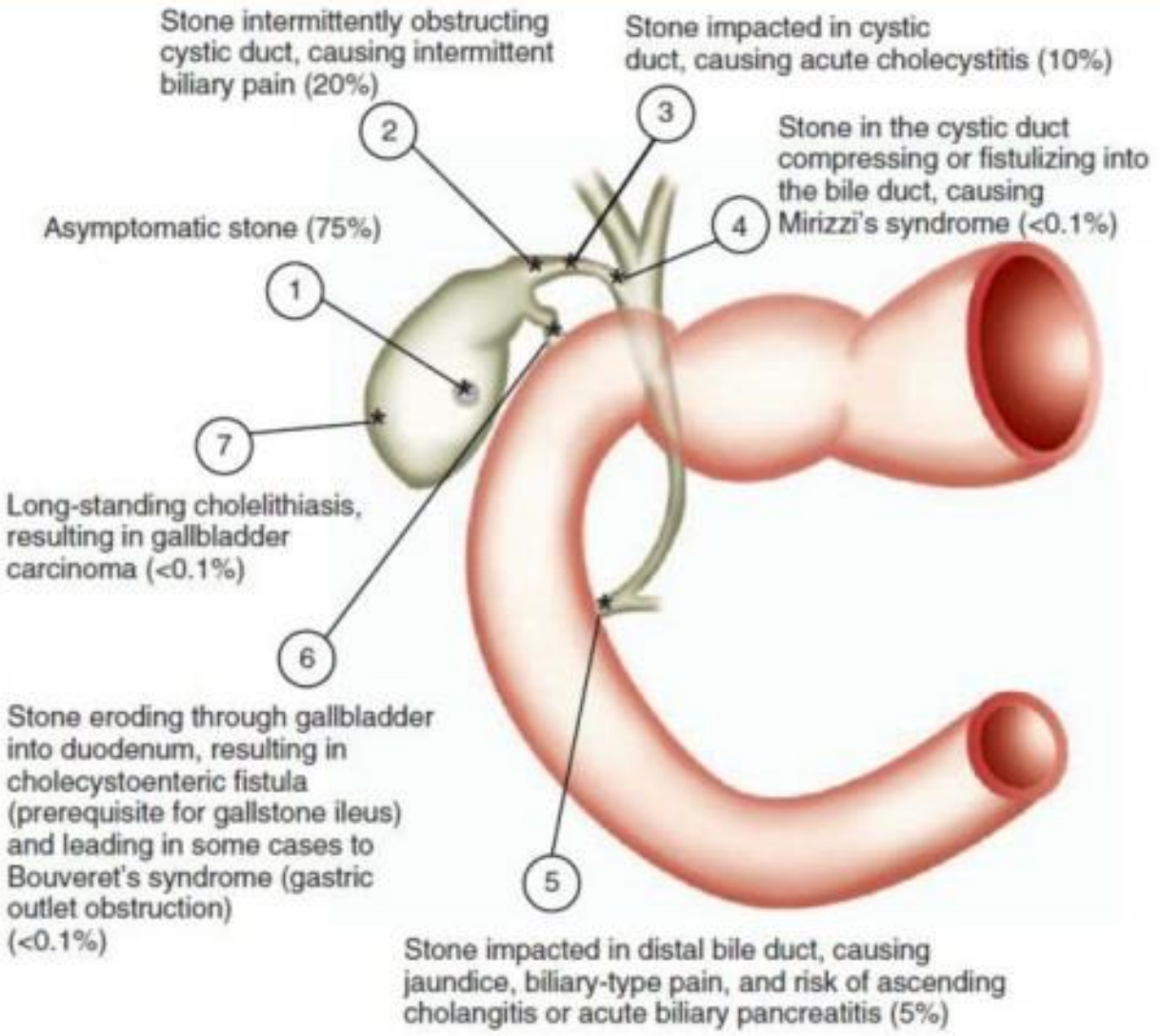
- F/65
- C/C : RUQ pain (2DA)
- V/S : 110/80-115-20-37°C
- CBC: 9,420-10.8-230k CRP: 8.8
- AST/ALT: 25/12 T/D-bil: 1.4/0.4 ALP/GGT : 85/13
- RUQ tenderness(+)



What is the presumptive diagnosis?

1. Biliary pain
2. Acute acalculous cholecystitis
3. Acute calculous cholecystitis
4. Chronic cholecystitis
5. Emphysematous cholecystitis

Natural history and complications of gallstones



Ref. Sleisenger and Fordtran's Gastrointestinal and Liver disease 9th edition, 1106p

Diagnostic criteria for acute cholecystitis

Table 1 TG13 diagnostic criteria for acute cholecystitis

A. Local signs of inflammation etc.
(1) Murphy's sign, (2) RUQ mass/pain/tenderness
B. Systemic signs of inflammation etc.
(1) Fever, (2) elevated CRP, (3) elevated WBC count
C. Imaging findings
Imaging findings characteristic of acute cholecystitis
Suspected diagnosis: One item in A + one item in B
Definite diagnosis: One item in A + one item in B + C
Acute hepatitis, other acute abdominal diseases, and chronic cholecystitis should be excluded

RUQ right upper abdominal quadrant, *CRP* C-reactive protein, *WBC* white blood cell

Ref. Updated Tokyo Guidelines for acute cholangitis and acute cholecystitis, 2013

Abdomen ultrasonography

- Thickening of the GB wall (>0.3 cm)
- Pericholecystic fluid
- Enlarged gallbladder
- Gallstones
- Ultrasonographic Murphy's sign
  - ➢ Superior to the ordinary Murphy's sign (∵ possible to press the GB accurately)
- Sensitivity : 50~88%
- Specificity : 80~88%

Clinical features of Gallstone disease

	Biliary pain	Acute cholecystitis
Pathophysiology	Intermittent obstruction No inflammation	Impacted stones Acute inflammation
Symptoms	Poorly localized (epi/RUQ) 1-6 hours	Localized pain (RUQ) >6 hours 75% (preceding biliary pain)
Physical findings	Often normal	Fever RUQ tenderness Palpable GB

Ref. Sleisenger and Fordtran's Gastrointestinal and Liver disease 9th edition, 1107p

What is your next plan?

1. Check abdomal CT
2. Urgent gallbladder drainage
3. Emergency laparoscopic cholecystectomy
4. Early laparoscopic cholecystectomy
5. Delayed laparoscopic cholecystectomy

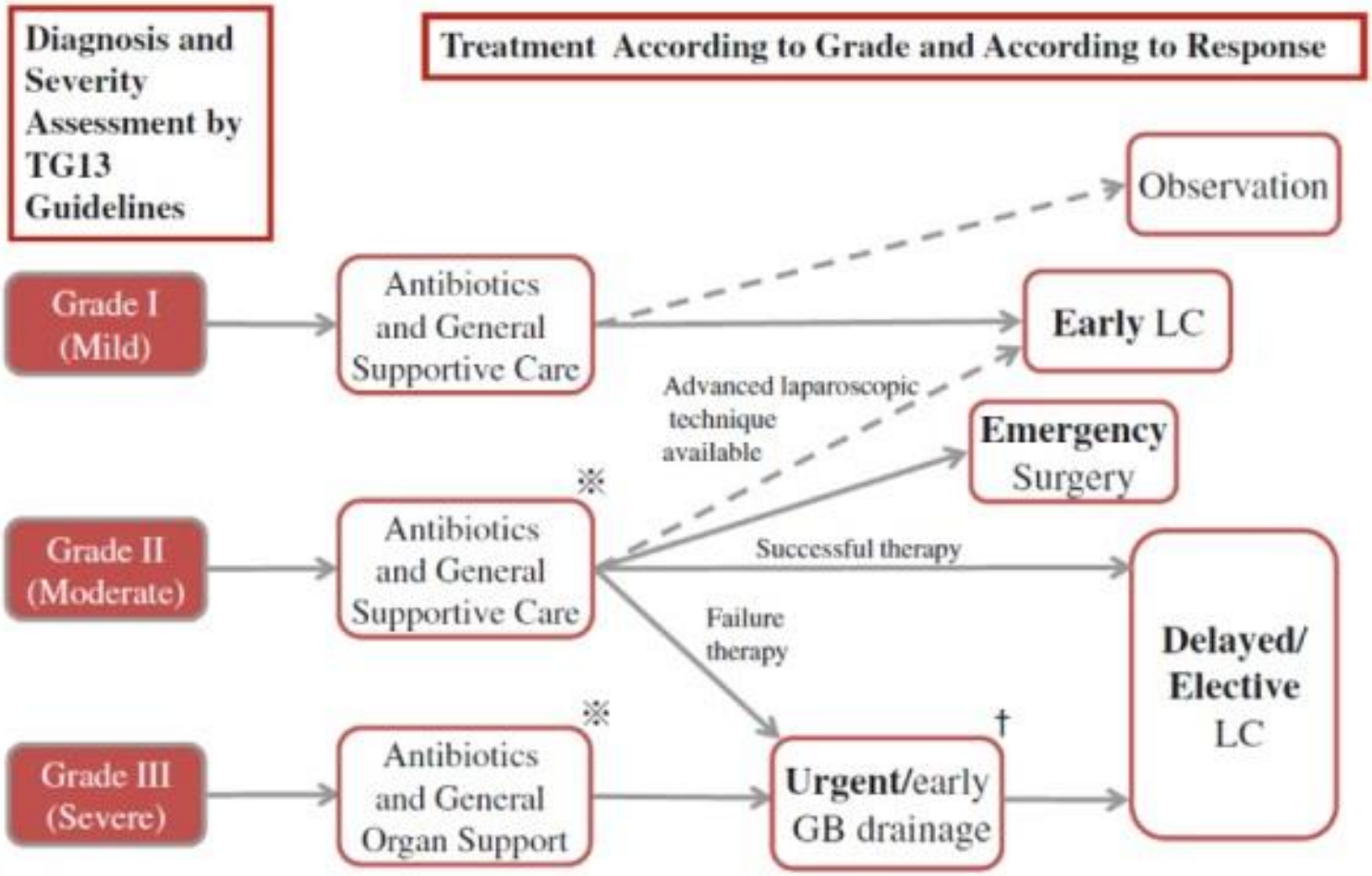
Severity grading for acute cholecystitis

Table 4 TG13 severity grading for acute cholecystitis

Grade III (severe) acute cholecystitis	
Associated with dysfunction of any one of the following organs/systems:	
1. Cardiovascular dysfunction	Hypotension requiring treatment with dopamine ≥5 μg/kg per min, or any dose of norepinephrine
2. Neurological dysfunction	Decreased level of consciousness
3. Respiratory dysfunction	PaO_2/FiO_2 ratio <300
4. Renal dysfunction	Oliguria, creatinine >2.0 mg/dl
5. Hepatic dysfunction	PT-INR >1.5
6. Hematological dysfunction	Platelet count <100,000/mm^3
Grade II (moderate) acute cholecystitis	
Associated with any one of the following conditions:	
1. Elevated white blood cell count (>18,000/mm^3)	
2. Palpable tender mass in the right upper abdominal quadrant	
3. Duration of complaints >72 h	
4. Marked local inflammation (gangrenous cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis, emphysematous cholecystitis)	
Grade I (mild) acute cholecystitis	
Does not meet the criteria of "Grade III" or "Grade II" acute cholecystitis. Grade I can also be defined as acute cholecystitis in a healthy patient with no organ dysfunction and mild inflammatory changes in the gallbladder, making cholecystectomy a safe and low-risk operative procedure	

Ref. Updated Tokyo Guidelines for acute cholangitis and acute cholecystitis, 2013

Management



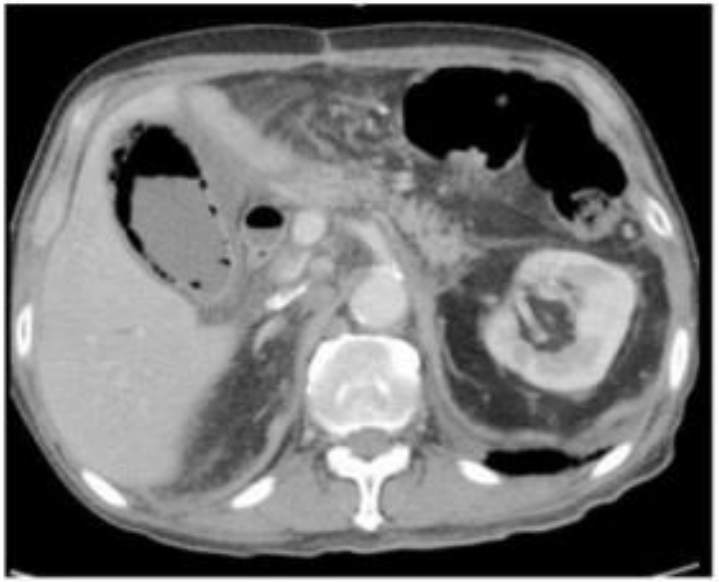
LC: laparoscopic cholecystectomy, GB: gallbladder
※ Performance of a blood culture should be taken into consideration before initiation of administration of antibiotics.
† A bile culture should be performed during GB drainage.

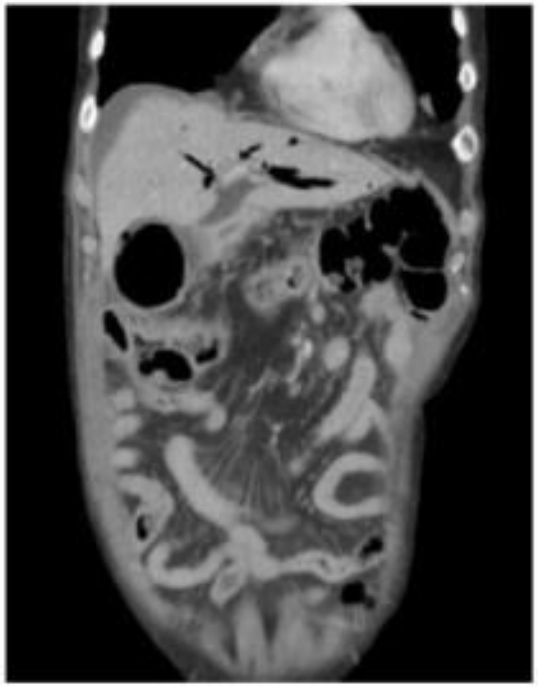
Ref. Updated Tokyo Guidelines for acute cholangitis and acute cholecystitis, 2013

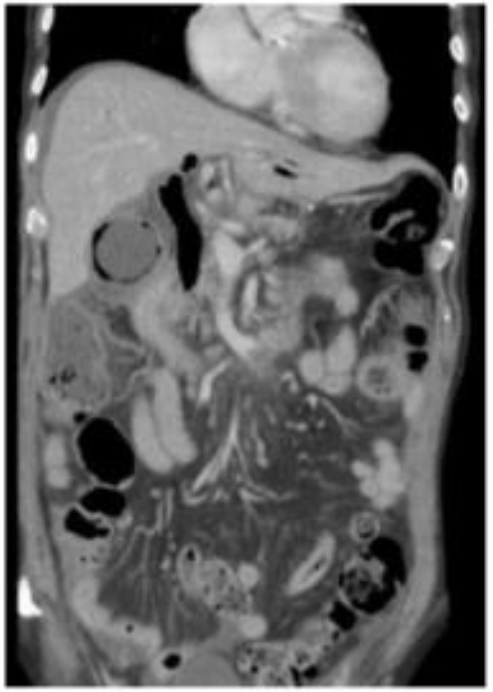
Case 2

- M/72
- C/C : RUQ pain (2DA)
- HT/DM (-/+)
- V/S : 90/70-115-20-36.4°C
- CBC : 11,800-11.3-147k CRP : 24.9
- BUN/Cr : 38/1.13 AST/ALT : 294/530 TB/DB : 4.0/2.9 ALP/GGT : 273/105

AP－CT







What is the most likely diagnosis?

1. Biliary pain
2. Acute acalculous cholecystitis
3. Acute calculous cholecystitis
4. Chronic cholecystitis
5. Emphysematous cholecystitis

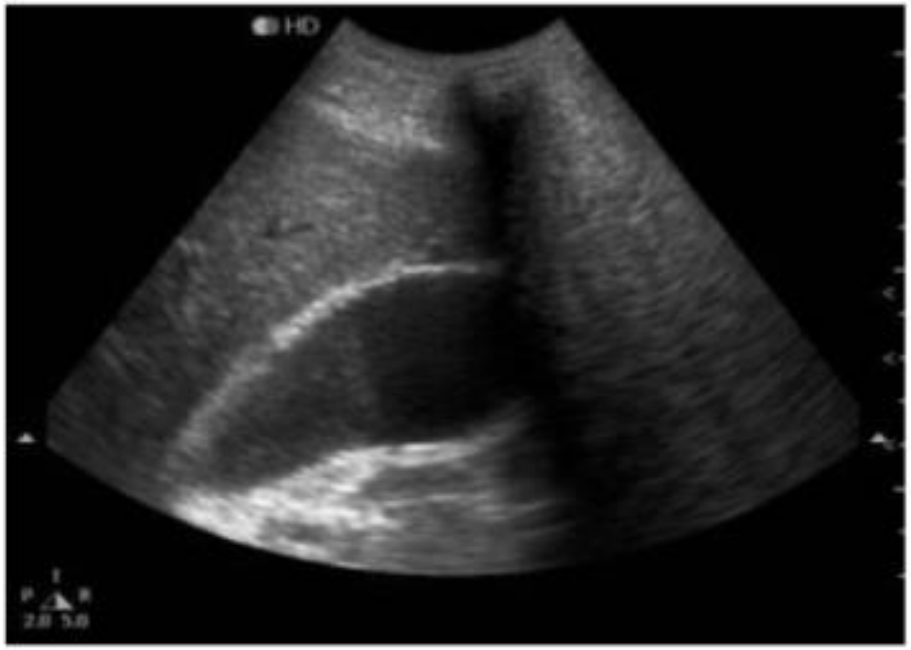
Emphysematous cholecystitis

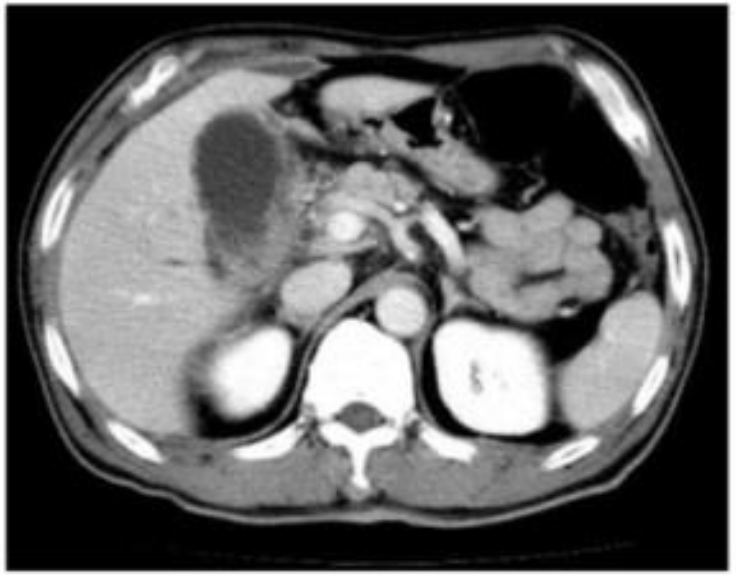
- ✓ **DM, Elderly (∵ Atherosclerosis of the cystic artery → Ischemia)**
- ✓ Ischemia or gangrene of the gallbladder wall and infection by **gas-producing organisms (*C. welchii, C. perfringens, E. coli*)**
- ✓ Imaging
  - ➢ Gas within the gallbladder lumen
  - ➢ Dissecting within the gallbladder wall to form a gaseous ring
  - ➢ Gas forming in the pericholecystic tissues
- ✓ Treatment
  - ➢ Cholecystectomy + antibiotics

Case 3

- F/47
- C/C : RUQ pain, colicky (2DA)
- Multiple trauma d/t car accident (1WA)
- V/S : 160/75-98-24-38.3°C
- CBC : 16,420-11.8-330k CRP : 33.20
- BUN/Cr : 16/1.4 OT/PT : 48/42 TB/DB : 1.4/0.3 ALP/GGT : 95/43 PT-INR : 1.28
- RUQ tenderness (+)

Hepatobilliary US and AP–CT





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Acute acalculous cholecystitis

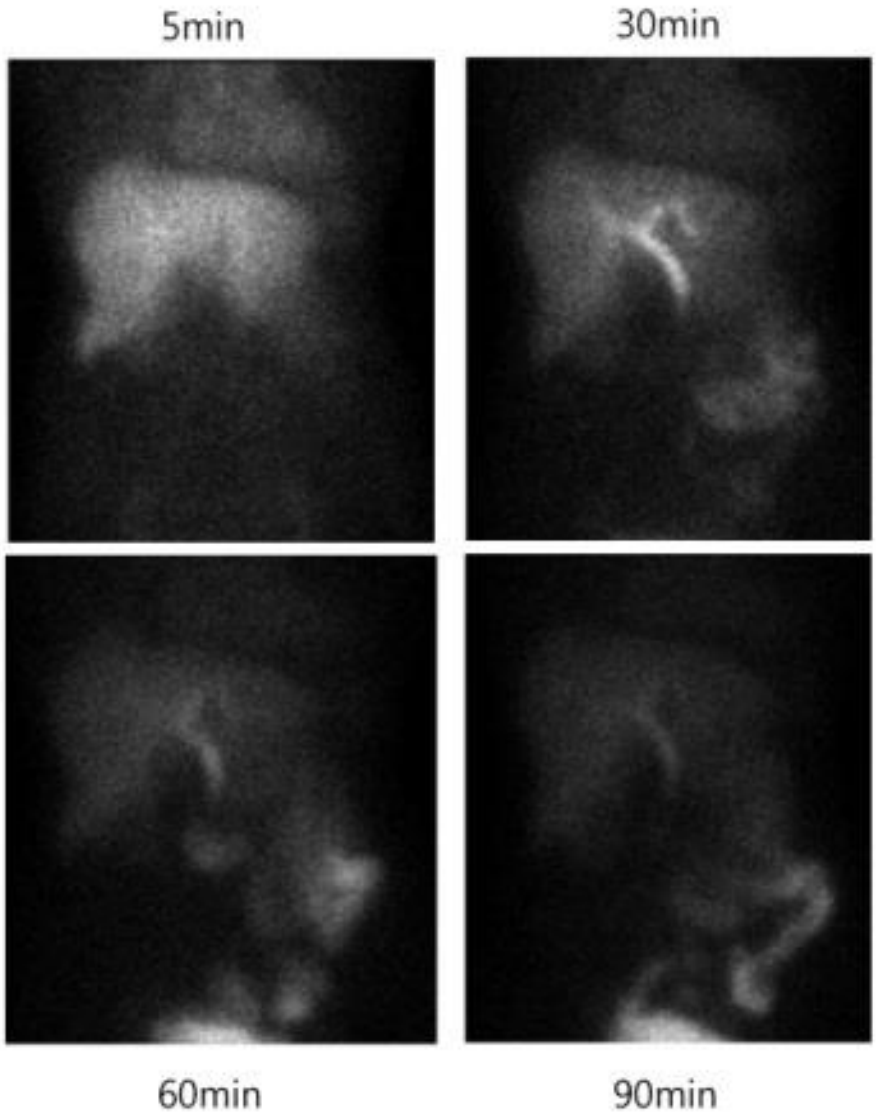
Table 67-2 Diagnostic Criteria for Acute Acalculous Cholecystitis

TECHNIQUE	FINDINGS
Clinical examination	Right upper quadrant tenderness is helpful, if present, but is lacking in three quarters of cases Unexplained fever, leukocytosis, or hyperamylasemia is frequently the only finding
Ultrasonography	Thickened gallbladder wall (defined as >4 mm) in the absence of ascites and hypoalbuminemia (defined as serum albumin <3.2 g/dL) Presence of sonographic Murphy's sign (maximum tenderness over the ultrasonographically localized gallbladder) Pericholecystic fluid collection *Bedside availability is a major advantage*
Computed tomography	Thickened gallbladder wall (defined as >4 mm) in the absence of ascites and hypoalbuminemia Pericholecystic fluid, subserosal edema (in the absence of ascites), intramural gas, or sloughed mucosa *Best test for excluding other intra-abdominal diseases but requires moving the patient to a scanner*
Hepatobiliary scintigraphy	Nonvisualization of the gallbladder with normal excretion of radionuclide into the bile duct and duodenum indicates a positive result for acute cholecystitis Results in critically ill, immobilized patients may be falsely positive because of viscous bile Morphine augmentation may reduce the number of false-positive results (see text) *Better at excluding than confirming acute cholecystitis*

Next confirmative diagnostic test?

1. EUS
2. ERCP
3. MRI with MRCP
4. Radioisotope scan
5. No need for further test

Radioisotope scan



Radioisotope scans (HIDA, DIDA, etc)

- Technetium-labeled hepatobiliary iminodiacetic acid (HIDA)
- Uptake by the liver, excreted into the biliary tract, and concentrated in the gallbladder.
- The failure of the gallbladder to fill within 60 min after administration → cystic duct obstruction (Normal : within 30 min)
- Sensitivity : 80–90 % for acute cholecystitis
- Most specific test for acute cholecystitis
- US is preferred as the first test
  - ✓ Immediate availability and easy access
  - ✓ A lack of interference by elevated serum bilirubin levels (since cholestasis interferes with biliary excretion of the agents used for scintigraphy)
  - ✓ The absence of ionizing radiation
  - ✓ Provide information regarding the presence of stones

Acute acalculous cholecystitis

TABLE 158-8 RISK FACTORS AND ORGANISMS ASSOCIATED WITH ACALCULOUS CHOLECYSTITIS

RISK FACTORS
Fasting
Total parenteral nutrition
Septicemia, biliary infections
Major trauma
Burns
Major nonbiliary surgery
Childbirth
Multiple blood transfusions
Mechanical ventilation
Opiates
Immunosuppression—chemotherapy, HIV infection, transplantation
Diabetes
Ischemic heart disease
Malignancy
ORGANISMS IMPLICATED AS A PRIMARY CAUSE
Salmonella typhi
Vibrio cholerae
Staphylococcus
Leptospira
Listeria
Pneumocystis carinii
Mycobacterium spp
Cytomegalovirus
Candida
Ascaris
Echinococcus

- 3.7-14% of acute cholecystitis
- Treatment
  - ✓ IV fluid, antibiotics
  - ✓ Urgent cholecystectomy

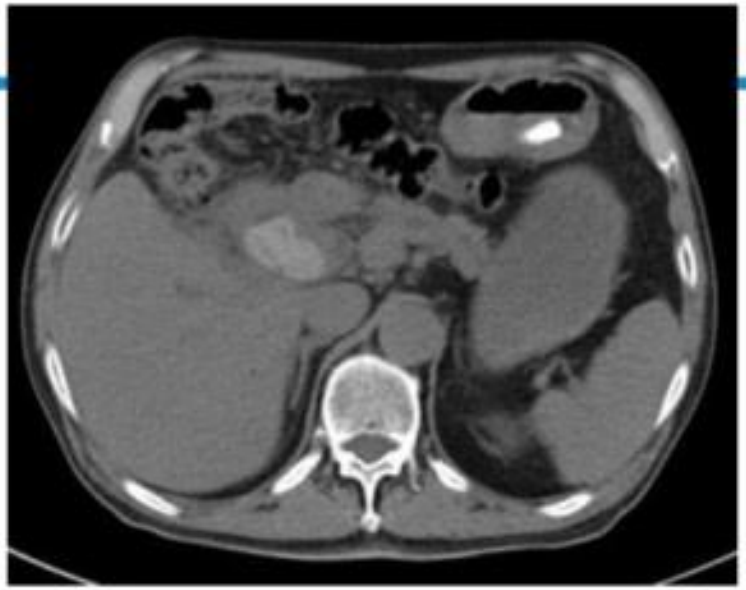
  ± Cholecystostomy

  (∵ gangrene and perforation are more common)
- Mortality : 5-20%

Case 4

- M/82
- C/C : Epigastric pain (1MA) & fever (1DA)
- S/P pacemaker insertion for sick sinus syndrome (7YA)
- CVA (10YA), DM (+)
- V/S : 84/50-87-19-38.8°C
- CBC : 17,550-16.9-197k CRP : 27.80
- BUN/Cr : 36/2.1 AST/ALT: 45/32 TB/DB : 2.1/1.4 ALP/GGT : 90/48 PT-INR : 1.33

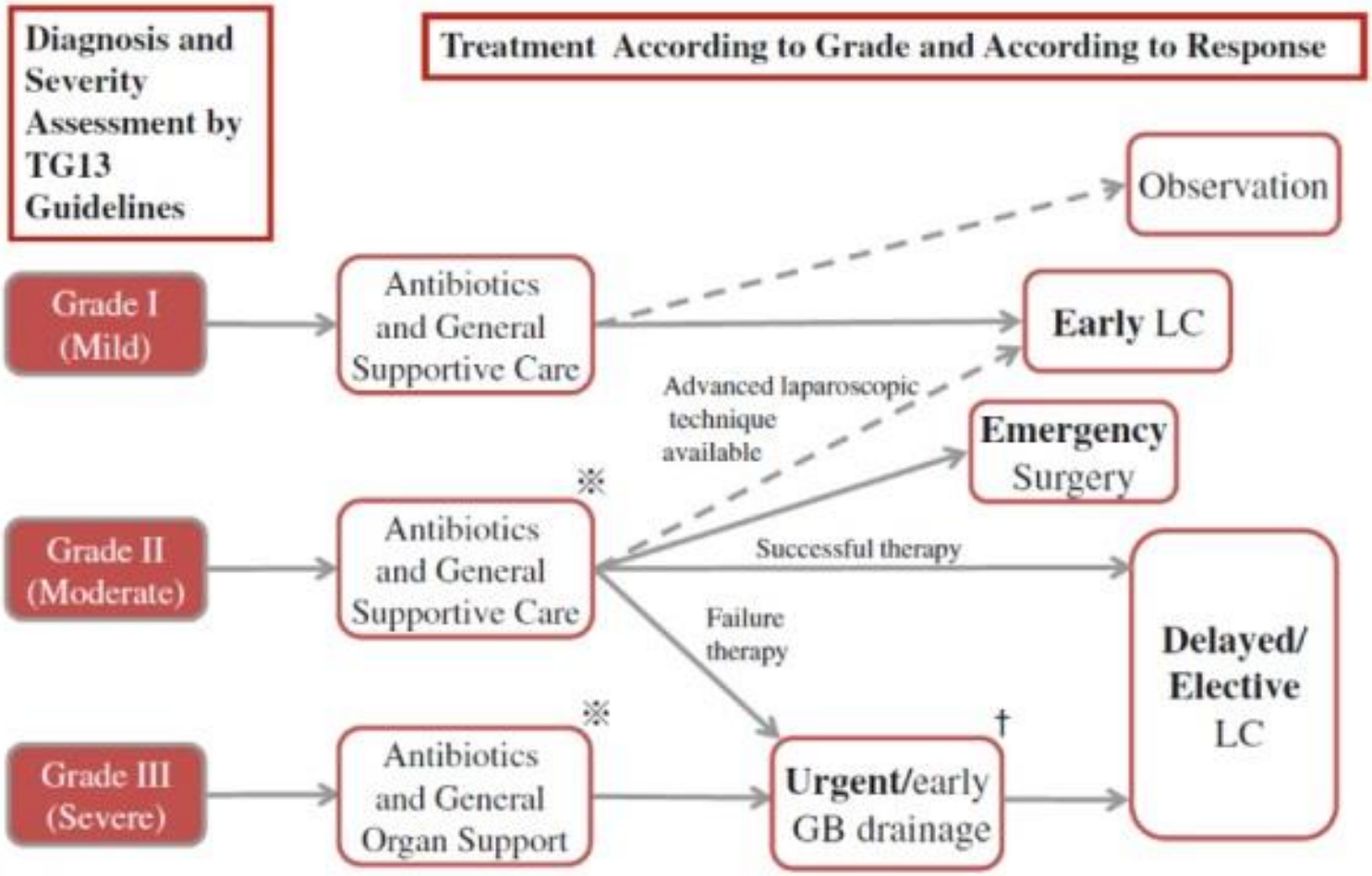
AP－CT



What is your next plan?

1. ERBD (Endoscopic retrograde biliary drainage)
2. ENBD (Endoscopic nasobiliary drainage)
3. PTBD (Percutaneous transhepatic biliary drainage)
4. PTGBD (Percutaneous transhepatic gallbladder drainage)
5. Emergency laparoscopic cholecystectomy

Management



LC: laparoscopic cholecystectomy, GB: gallbladder
※ Performance of a blood culture should be taken into consideration before initiation of administration of antibiotics.
† A bile culture should be performed during GB drainage.

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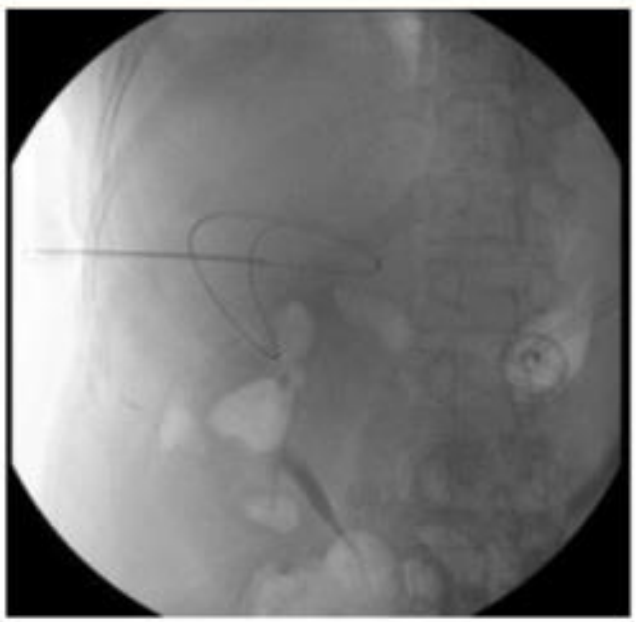
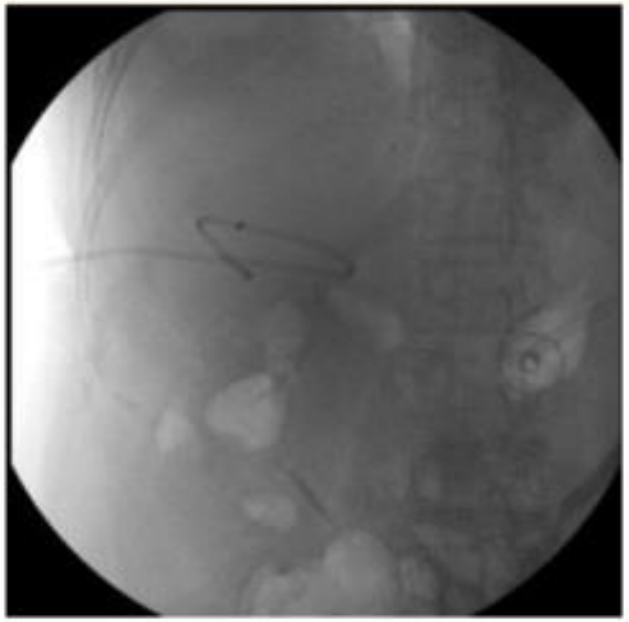
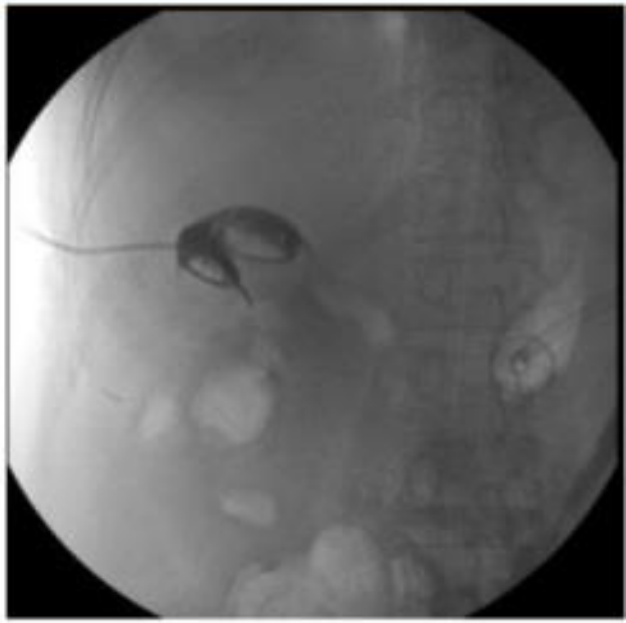
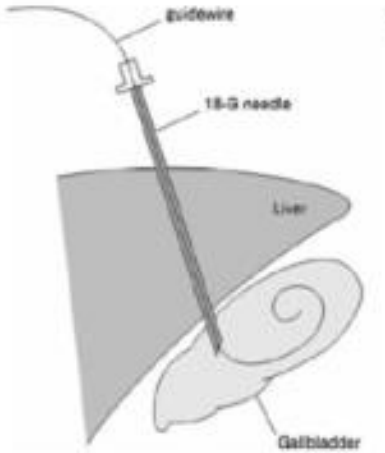
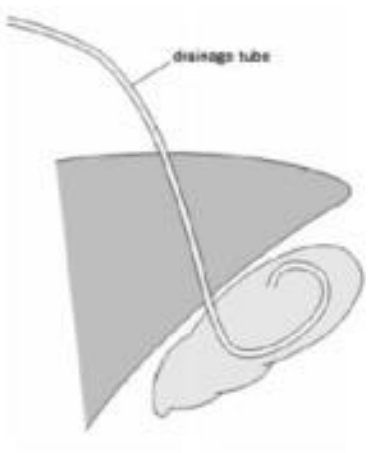
PTGBD









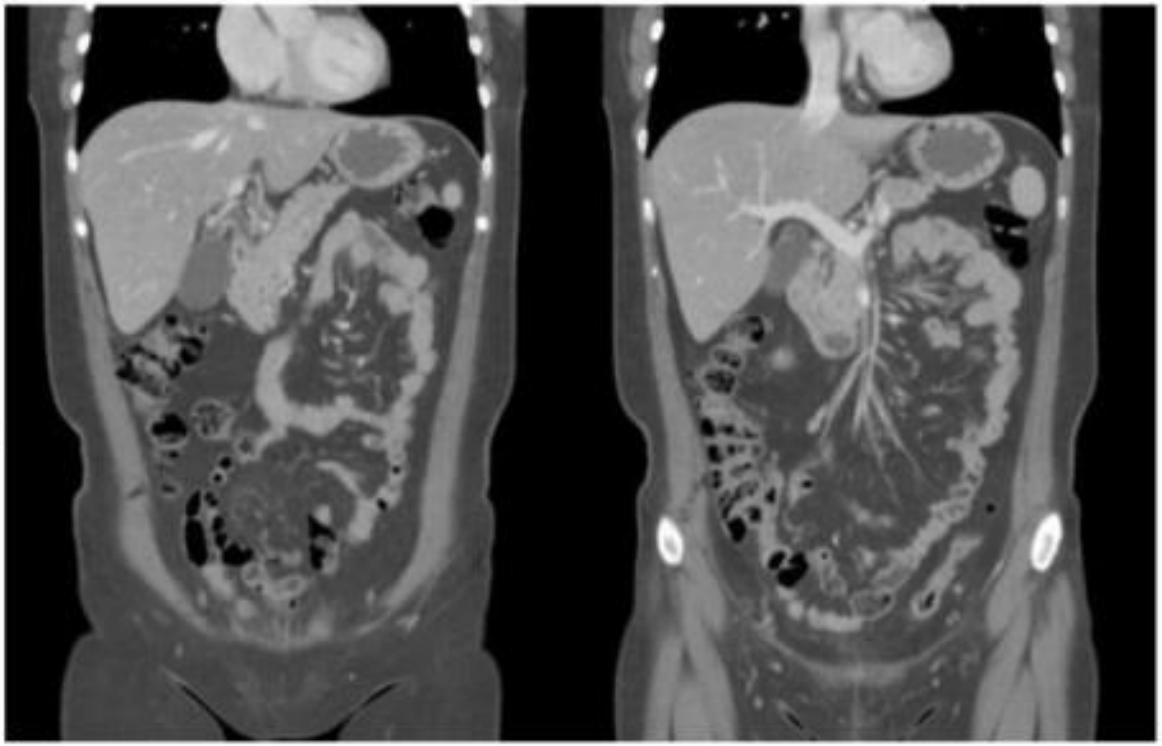


Case 5

- F/28
- C/C : epigastric pain (3HA)
- s/p hysterectomy, appendectomy
- Postprandial recurrent epigastric pain with febrile sense, 6 months age
- V/S : 126/71-70-18-36.7°C
- CBC : 7,990-14.7-321k CRP : 1.3
- BUN/Cr : 11/0.59 AST/ALT : 74/103 TB/DB : 2.2/1.5

  ALP/GGT : 77/405 PT-INR : 0.94 Amy/lipase : 71/97

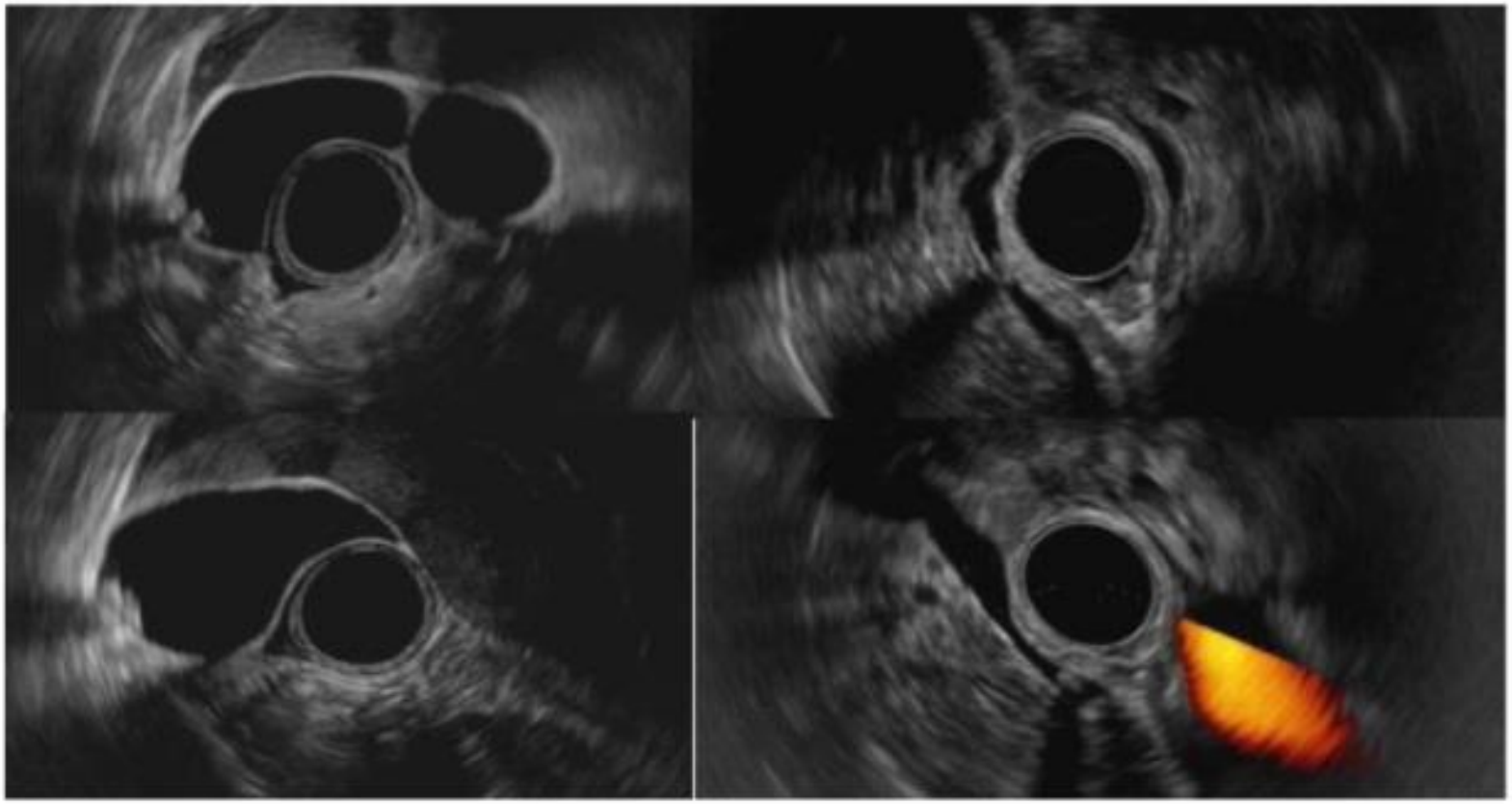
AP－CT



What is your next plan?

1. EUS
2. MRCP
3. ERCP
4. AOV manometry
5. Hepatobiliary scintigraphy

EUS



Imaging studies of the biliary tract

TECHNIQUE	CONDITION TESTED FOR	FINDINGS/COMMENTS
Ultrasonography	Cholelithiasis	Stones manifest as mobile, dependent echogenic foci within the gallbladder lumen with acoustic shadowing Sludge appears as layering echogenic material without shadows Sensitivity rate >95% for stones >2 mm Specificity rate >95% for stones with acoustic shadows Rarely, a stone-filled gallbladder may be contracted and difficult to see, with a "wall-echo-shadow" sign *Best single test for stones in the gallbladder*
	Choledocholithiasis	Stones are seen in BD in only ≈50% of cases but can be inferred from the finding of a dilated BD (>6 mm diameter), with or without gallstones, in another ≈25% of cases *Can confirm, but not exclude, BD stones*
	Acute cholecystitis	Ultrasonographic Murphy's sign (focal gallbladder tenderness under the transducer) has a positive predictive value of >90% in detecting acute cholecystitis when stones are seen Pericholecystic fluid (in the absence of ascites) and gallbladder wall thickening to >4 mm (in the absence of hypoalbuminemia) are nonspecific findings but are suggestive of acute cholecystitis
EUS	Choledocholithiasis	Highly accurate for excluding or confirming stones in the BD Concordance of EUS with the ERCP diagnosis ≈95%; many studies suggest slightly higher sensitivity rates for EUS than for ERCP Specificity rate ≈97% Positive predictive value ≈99%, negative predictive value ≈98%, accuracy rate ≈97% With experienced operators, EUS can be used in lieu of ERCP to exclude BD stones, particularly when the clinical suspicion is low or intermediate *Considered for patients with a low-to-moderate clinical probability of choledocholithiasis*

Ref. Sleisenger and Fordtran's Gastrointestinal and Liver disease 9th edition, 1108p

Imaging studies of the biliary tract

ERCP	Choledocholithiasis	ERCP is the standard diagnostic test for stones in the BD, with sensitivity and specificity rates of ≈95% Use of ERCP to extract stones (or at least to drain infected bile) is life-saving in severe cholangitis and reduces the need for BD exploration at the time of cholecystectomy Recommended for patients with a high clinical probability of choledocholithiasis
	Cholelithiasis	When contrast agent flows retrograde into the gallbladder, stones appear as filling defects and can be detected with a sensitivity rate of ≈80%, but ultrasonography remains the mainstay for confirming cholelithiasis
MRCP	Choledocholithiasis	Rapid, noninvasive modality that provides detailed bile duct and pancreatic duct images equal to those of ERCP Sensitivity rate ≈93% and specificity rate ≈94%, comparable with those for ERCP Useful for examining nondilated ducts, particularly at the distal portion, which often is not well visualized by ultrasonography Adjacent structures such as liver and pancreas can be examined at the same time *Recommended for patients with a low-to-moderate clinical probability of choledocholithiasis*
CT	Complications of gallstones	Not well suited for detecting uncomplicated stones, but excellent for detecting complications, such as abscess, perforation of the gallbladder or BD, and pancreatitis Spiral CT may prove useful as a noninvasive means of excluding BD stones; some studies suggest improved diagnostic accuracy when CT is combined with an oral cholecystographic contrast agent

BD, bile duct; CT, computed tomography; ERCP, endoscopic retrograde cholangiopancreatography; EUS, endoscopic ultrasonography; MRCP, magnetic resonance cholangiopancreatography.
*Performed infrequently nowadays.

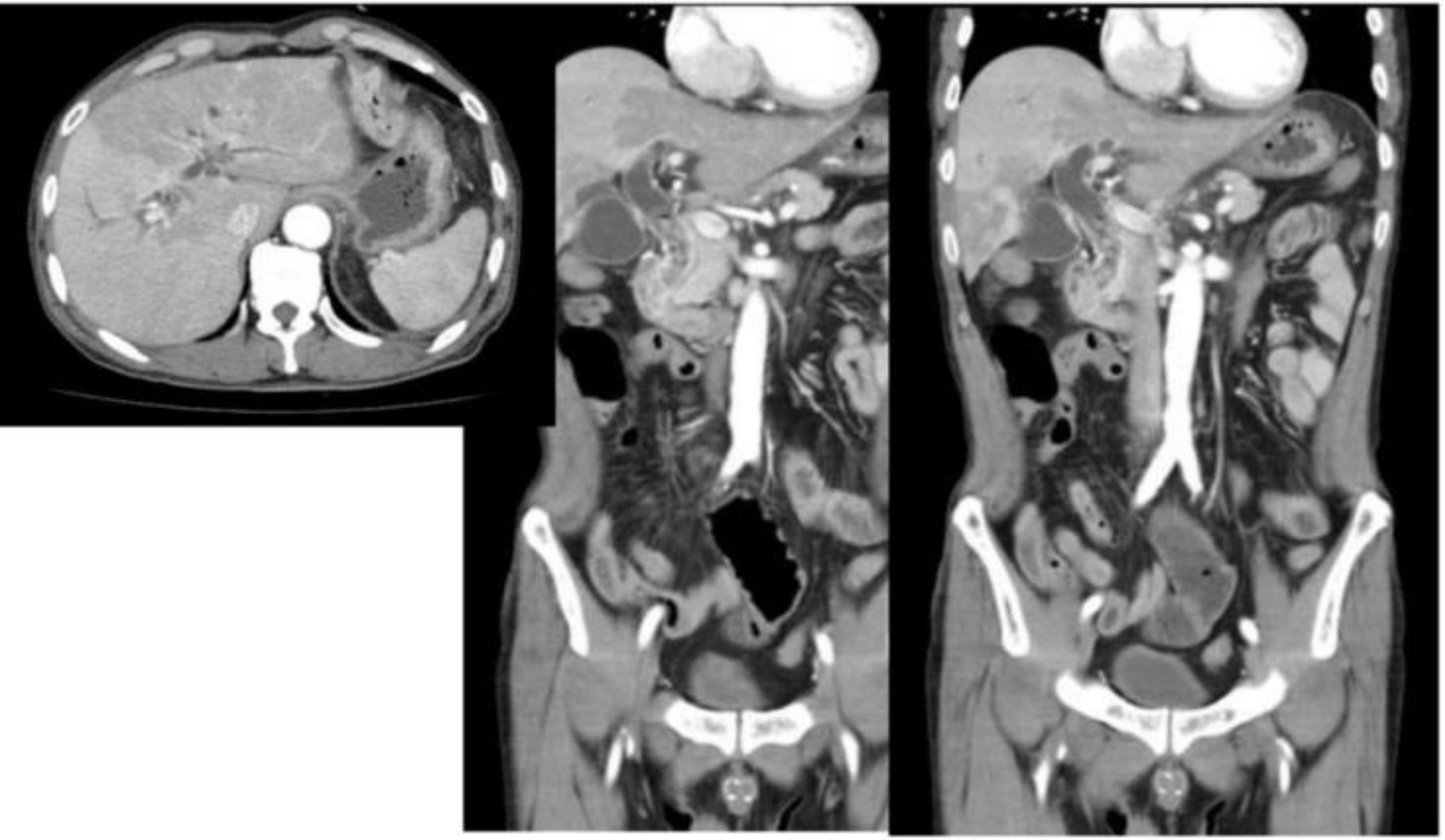
Ref. Sleisenger and Fordtran's Gastrointestinal and Liver disease 9th edition, 1108p

Case 6

- M/75
- C/C : Epigastric pain(3DA)
- S/P TG with Roux-en-Y anastomosis d/t EGC (10YA)
- V/S : 79/56–75–22–36.7°C
- CBC : 28,500-13.7-103k CRP : 18.00
- BUN/Cr : 30/1.02 AST/ALT : 412/403 TB/DB : 8.1/5.0

  ALP/GGT : 142/455 PT-INR : 1.39

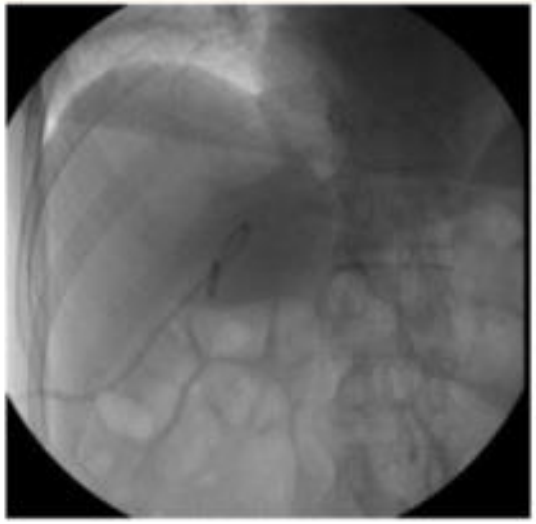
AP－CT

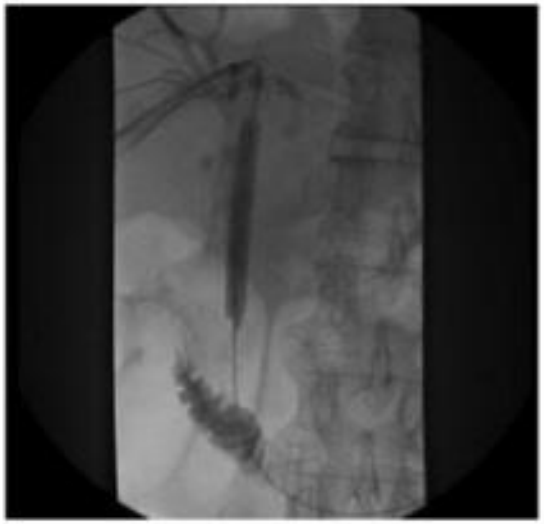
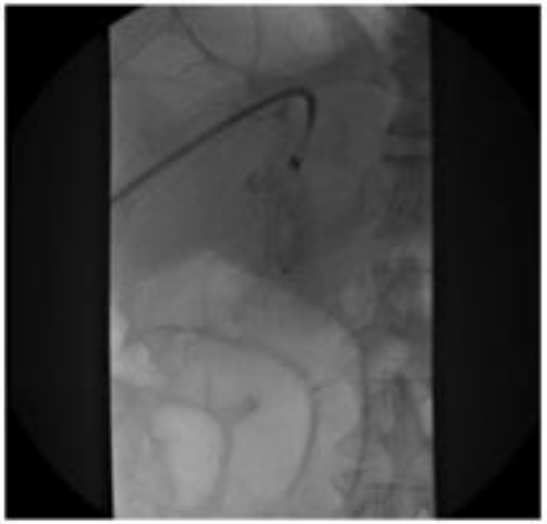


What is your treatment plan?

1. PCD
2. ERCP
3. PTBD
4. PTGBD
5. Emergency operation

PTBD and stone extraction



Ref. Updated Tokyo Guidelines for acute cholangitis and acute cholecystitis, 2013

Diagnostic criteria for acute cholangitis

Table 1 TG13 diagnostic criteria for acute cholangitis

A. Systemic inflammation

A-1. Fever and/or shaking chills

A-2. Laboratory data: evidence of inflammatory response

B. Cholestasis

B-1. Jaundice

B-2. Laboratory data: abnormal liver function tests

C. Imaging

C-1. Biliary dilatation

C-2. Evidence of the etiology on imaging (stricture, stone, stent etc.)

Suspected diagnosis: One item in A + one item in either B or C

Definite diagnosis: One item in A, one item in B and one item in C

Note:

A-2: Abnormal white blood cell counts, increase of serum C-reactive protein levels, and other changes indicating inflammation

B-2: Increased serum ALP, γGTP (GGT), AST and ALT levels.

Other factors which are helpful in diagnosis of acute cholangitis include abdominal pain [right upper quadrant (RUQ) or upper abdominal] and a history of biliary disease such as gallstones, previous biliary procedures, and placement of a biliary stent.

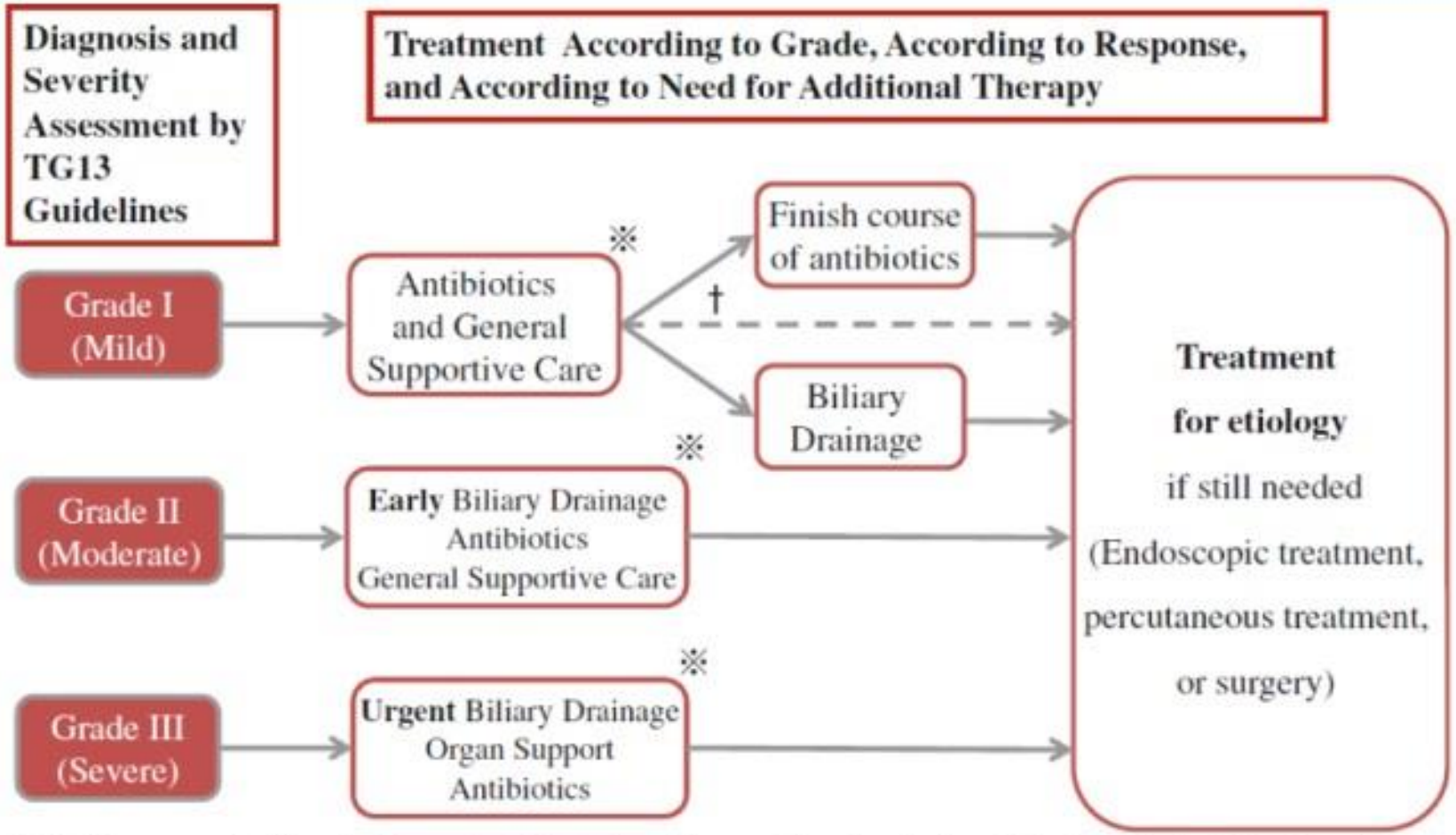
In acute hepatitis, marked systematic inflammatory response is observed infrequently. Virological and serological tests are required when differential diagnosis is difficult.

Thresholds

A-1	Fever		BT >38 °C
A-2	Evidence of inflammatory response	WBC (×1000/μL)	<4, or >10
		CRP (mg/dl)	≥1
B-1	Jaundice		T-Bil ≥2 (mg/dL)
B-2	Abnormal liver function tests	ALP (IU)	>1.5 × STD
		γGTP (IU)	>1.5 × STD
		AST (IU)	>1.5 × STD
		ALT (IU)	>1.5 × STD

Ref. Updated Tokyo Guidelines for acute cholangitis and acute cholecystitis, 2013

Management



※ Performance of a blood culture should be taken into consideration before initiation of administration of antibiotics. A bile culture should be performed during biliary drainage.

† Principle of treatment for acute cholangitis consists of antimicrobial administration and biliary drainage including treatment for etiology. For patient with choledocholithiasis, treatment for etiology might be performed simultaneously, if possible, with biliary drainage.


Thank you for listening