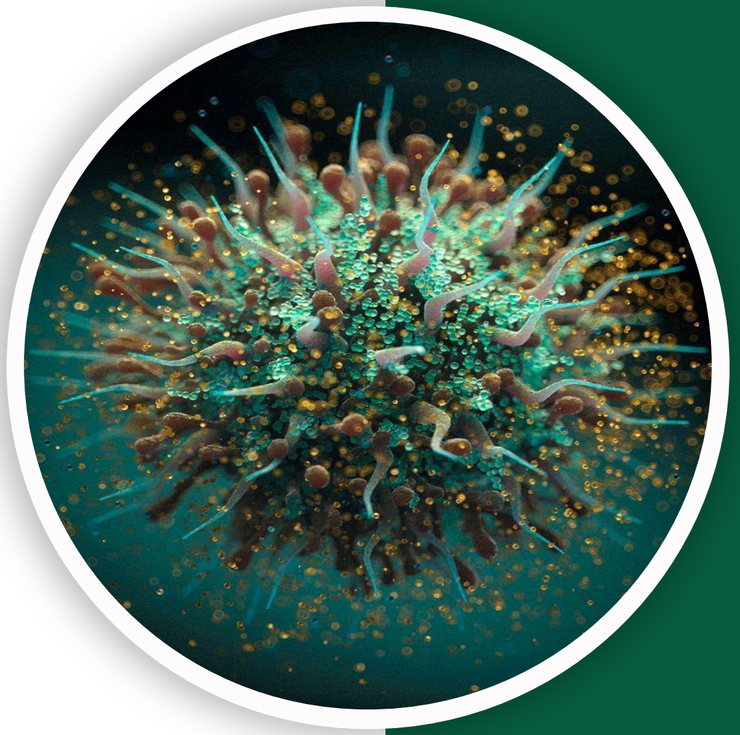
بسم الله الرحمٰن الرحيم

(وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ)

GIS Pathology | MID 9

Gallbladder Diseases

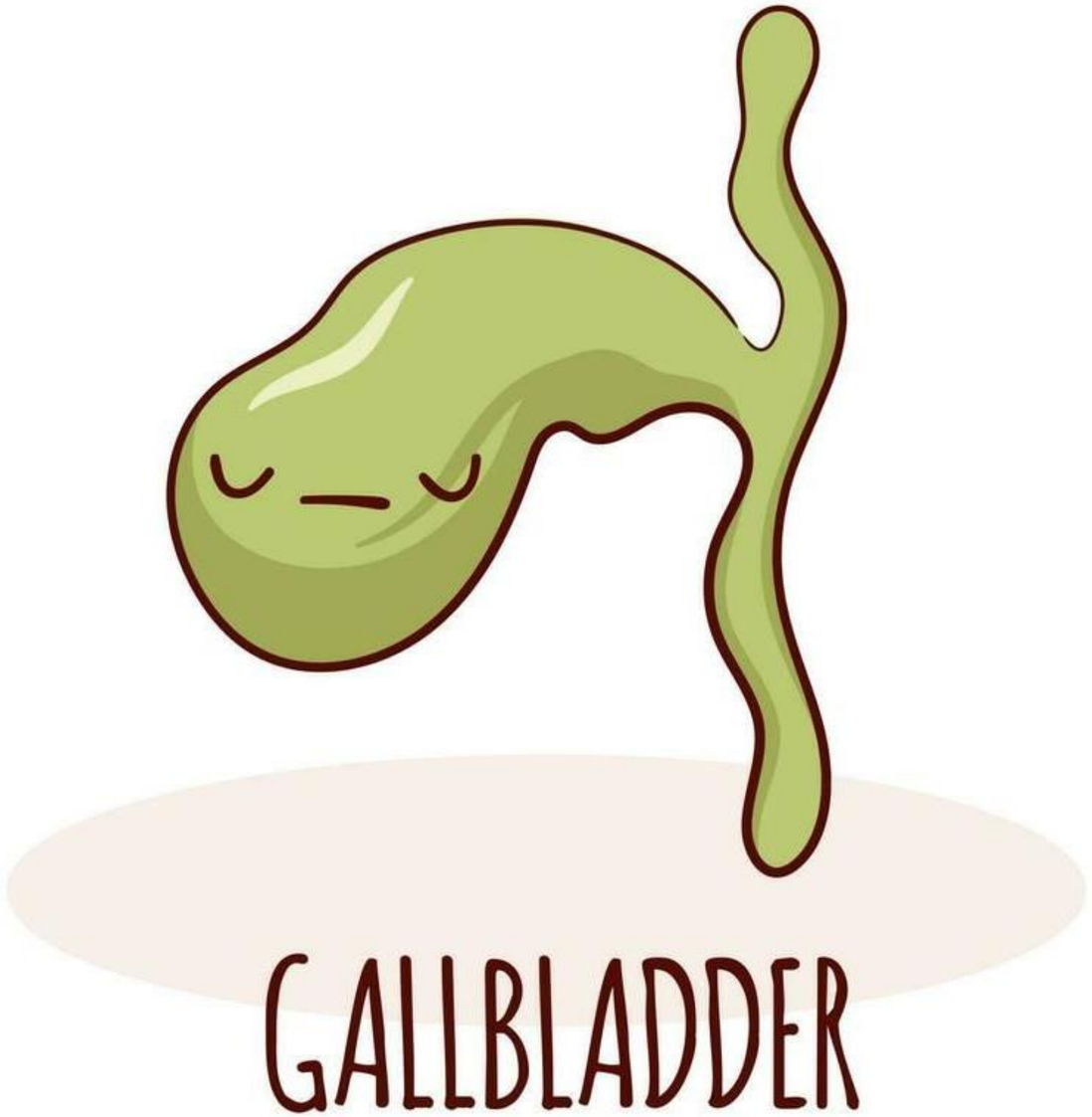


Written by : DST

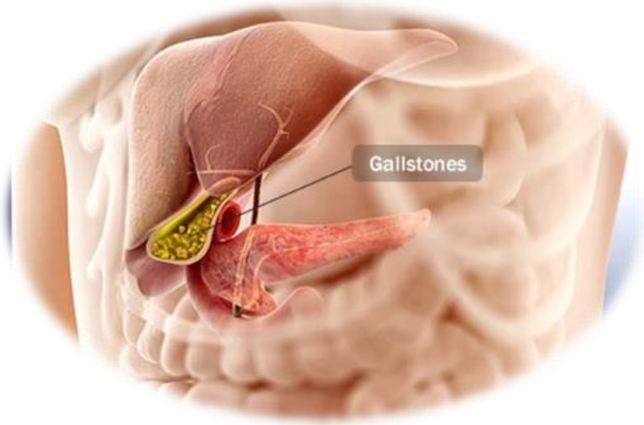
Reviewed by : Batool Zayed
Lujain Al-Qadi

Disorders of the Gallbladder

- **Cholelithiasis (formation of the gallstones)**
- **Cholecystitis (inflammation of the gallbladder)**
- **Tumors**



Cholelithiasis



- Common disease affecting 10-20% of adults
- >80% of cases are asymptomatic
- Two main types of gall stones:
  1. Cholesterol stones (80% in western pop.) (most common)
  2. Bilirubin calcium salts stones (pigmented stones)
- Pathogenesis:
  - Bile supersaturation with cholesterol
  - Nucleation, which is related to the (stasis) of bile salts within the gallbladder, this process is promoted by gallbladder hypomotility
  - Cholesterol crystals remaining long enough to aggregate

Appearance

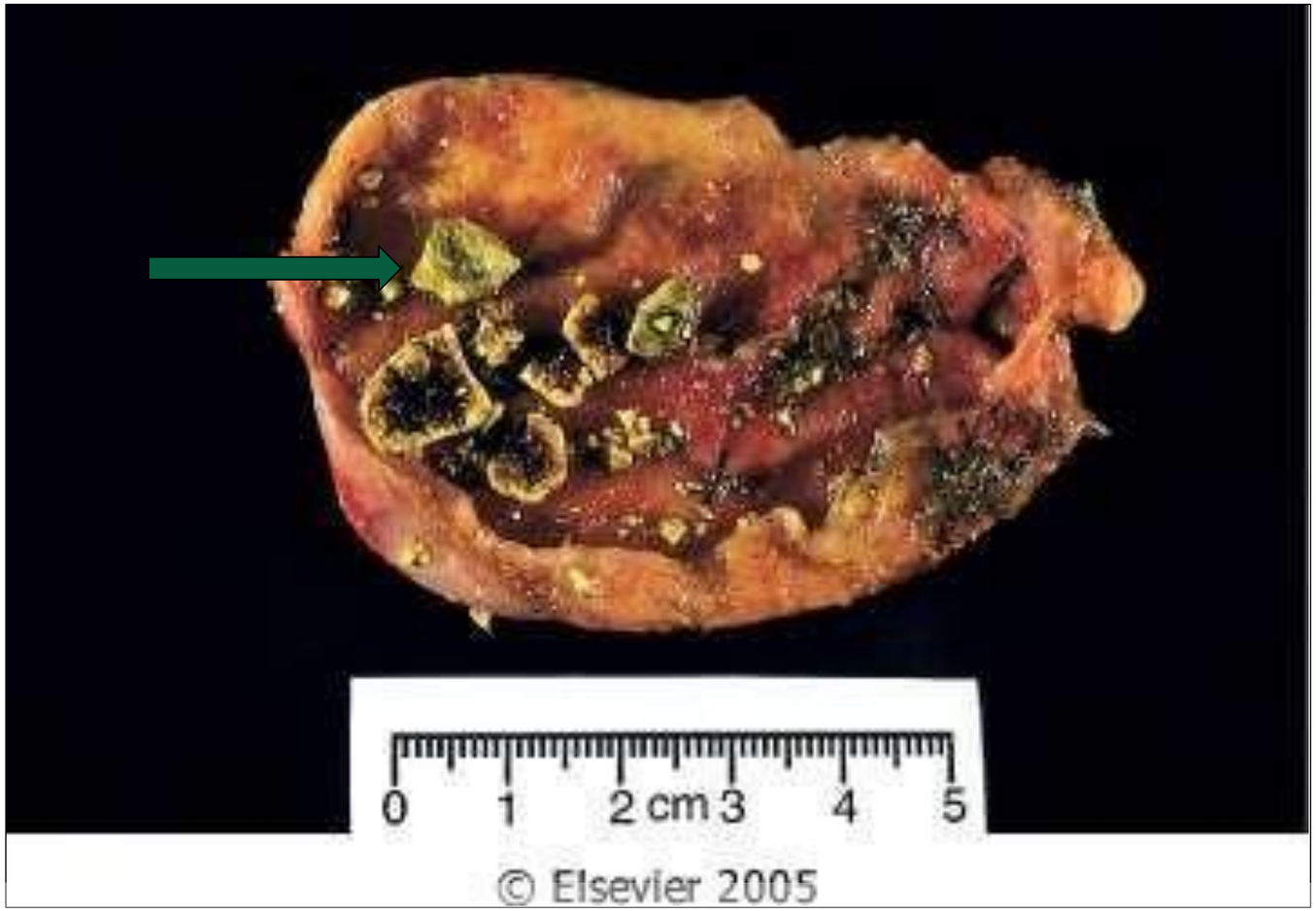
- **Cholesterol stones:** they are formed exclusively in the gallbladder and not in the bile ducts. They are (1) single/multiple, (2) multi-faceted, (3) most are radiolucent. They could be:
  - **Pure:** pale yellow color
  - **Mixed** with calcium carbonate, phosphates & bilirubin, which gives them a gray-white to black color
- **Pigmented stones**: they are formed anywhere in biliary tree, contain calcium salts of unconjugated bilirubin **(calcium bilirubinate)**. Also, mucin, glycoproteins & cholesterol can be added up to the contents . They are:
  - **Black** in sterile GB bile. In this occasion they are small, numerous, friable, 50-75% are radiopaque
  - **Brown** in infected bile ducts. They are single or few, soft, greasy & radiolucent.

- **Radiolucent:** Cannot be seen on X-ray
- **Radiopaque** can be seen on X-ray

GB: Gallbladder

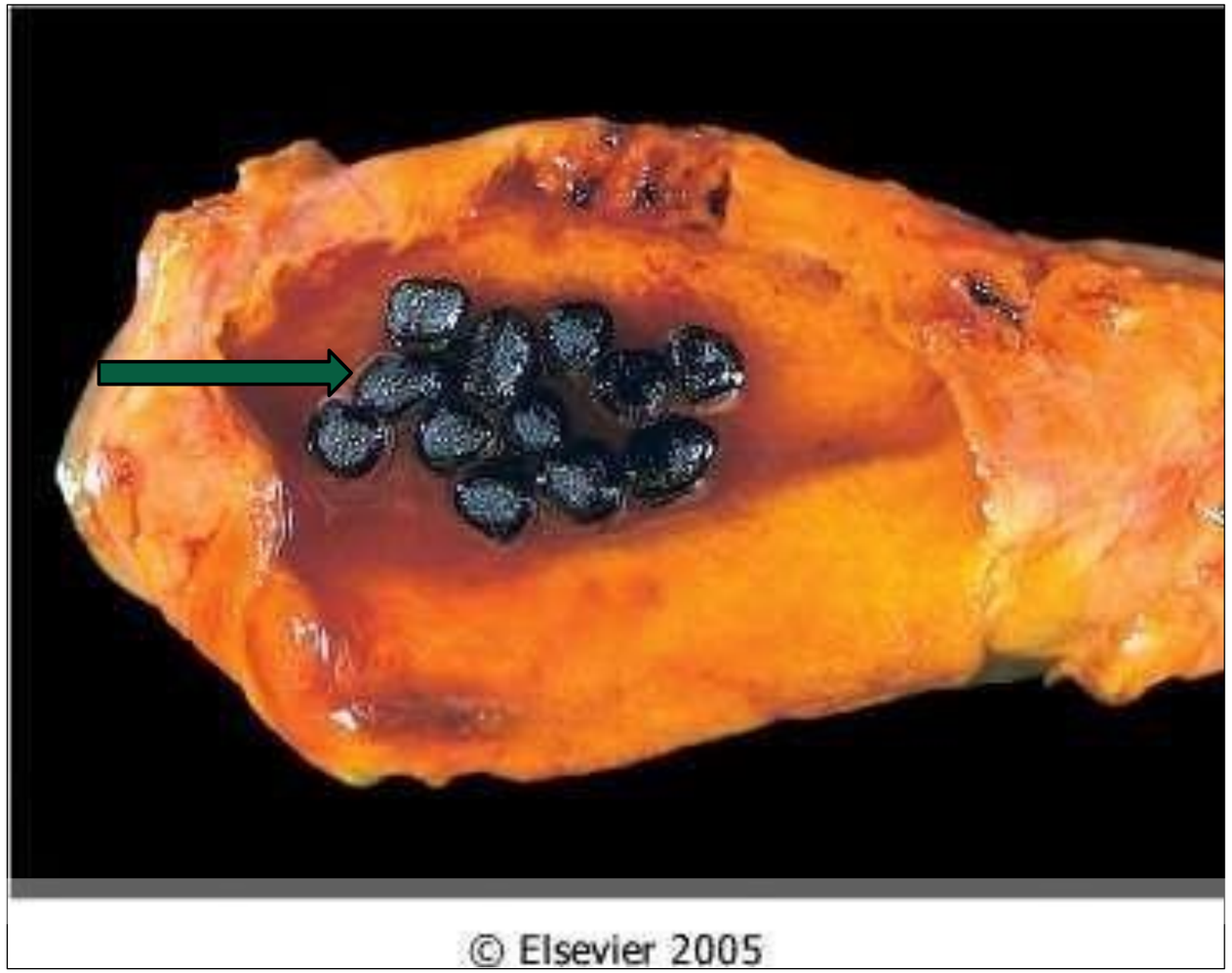
Cholesterol Gallstones

- ✓ They are characterized by the yellow color, especially the pure cholesterol gallstones
- ✓ Sometimes they are mixed with other solutes, which gives them different colors.



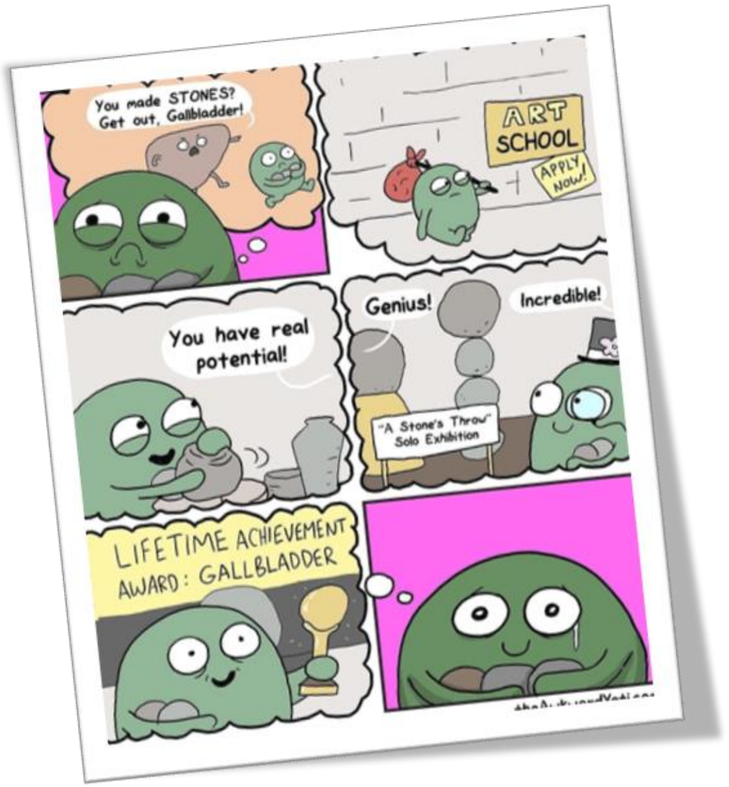
Pigmented Gallstones

- ✓ As you see, these are pigmented gallstones of the black subtype, which are **small**, **numerous**, **friable** and **radiopaque**



Risk Factors of Cholelithiasis

- Affects 80% of people
- **In most cases, n**o identifiable risk factors other than age and gender
- Risk factors for **cholesterol** stones:
  - Age: elderly > young adults **(>40 years old)**
  - Gender: females (2:1)
  - Oral contraceptives (OCPs), pregnancy
  - Demography: Western World;
  - Gallbladder stasis
  - Family history.
  - Inborn disorders of bile acid metabolism
  - Obesity
  - Hyperlipidemia
  - Rapid weight loss
  - Treatment with **lipid lowering agents, like** the hypocholesterolemic drugs



Risk Factors of Cholelithiasis

- Risk factors for **pigment** stones
  - Demography: Asians, rural areas
  - **strongly associated with patients of** Chronic hemolytic syndromes, **like sickle cell anemia & thalassemia.**
  - Biliary infection
  - Gastrointestinal disorders **associated with malabsorption of bile salts:**
    - Ileal disease, e.g. Crohn's disease
    - Ileal resection or bypass
    - Cystic fibrosis with pancreatic insufficiency

Clinical Features of Cholelithiasis

- **Clinical Presentation:**
  - 70-80% are asymptomatic
  - **Biliary pain** — typically constant or colicky pain, resulting from obstruction of the gallbladder or biliary tree. This is a classical presentation of **acute cholecystitis**, often associated with **inflammation of the gallbladder**.

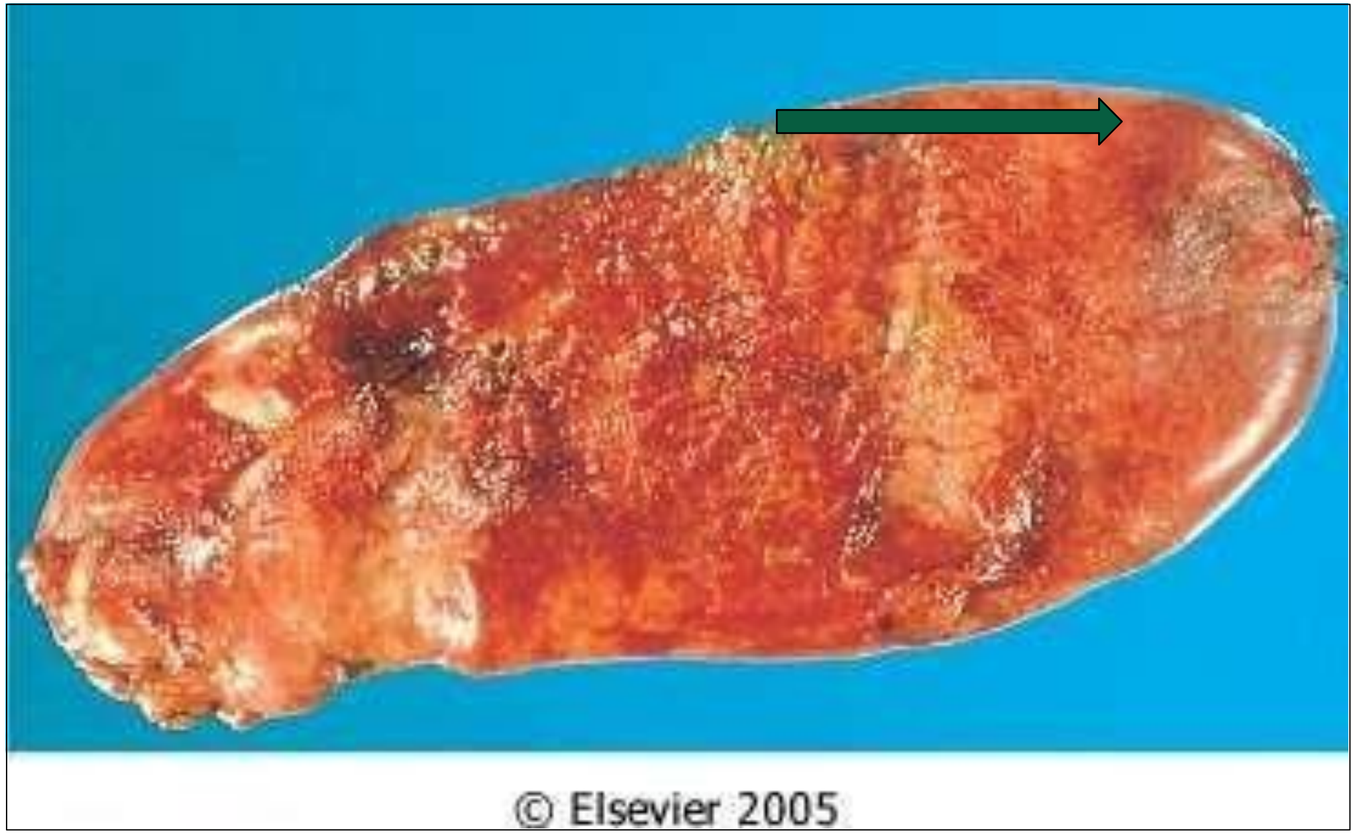
- **Complications:**
  - Gallbladder Empyema (puss in the GB)
  - Perforation
  - Fistulae between GB or biliary track and adjacent organs, induced by gallstones
  - Inflammation of biliary tree (cholangitis)
  - Obstructive cholestasis leading to jaundice
  - Obstruction of the pancreatic duct leading to Pancreatitis
  - Gallstones may escape from the gallbladder through **the cystic duct** into **the bile duct**, eventually reaching **the small bowel** and causing intestinal obstruction **("gallstone ileus").**

Cholecystitis

- Inflammation of the gallbladder
- **Almost always associated with gallstones**
- One of the most common indications for abdominal surgery
- Epidemiologic distribution similar to cholelithiasis
- Classification:
  1. Acute calculous **(related to gallstones)**
  2. Acute acalculous **(not related to gallstones)**
  3. Chronic
  4. Acute on top of chronic

Types of Acute Cholecystitis

- **Acute calculous cholecystitis:** caused by obstruction of GB neck or cystic duct by stones
  - Chemical irritation & inflammation of GB wall leading to distension of the GB, which will cause Blood flow compromise
  - Symptoms may be mild or sudden & severe
  - Most common reason for emergency cholecystectomy.
  - Mostly in absence of bacterial infection.
- **Acute acalculous cholecystitis** (5-12% of cases):
  - **Seen in** 1) post-operative states, 2) severe trauma, 3) severe burns, 4) sepsis, 5) postpartum
  - **Factors:** 1) dehydration, 2) GB stasis & sludging, 3) vascular compromise GB, 4) bacterial contamination



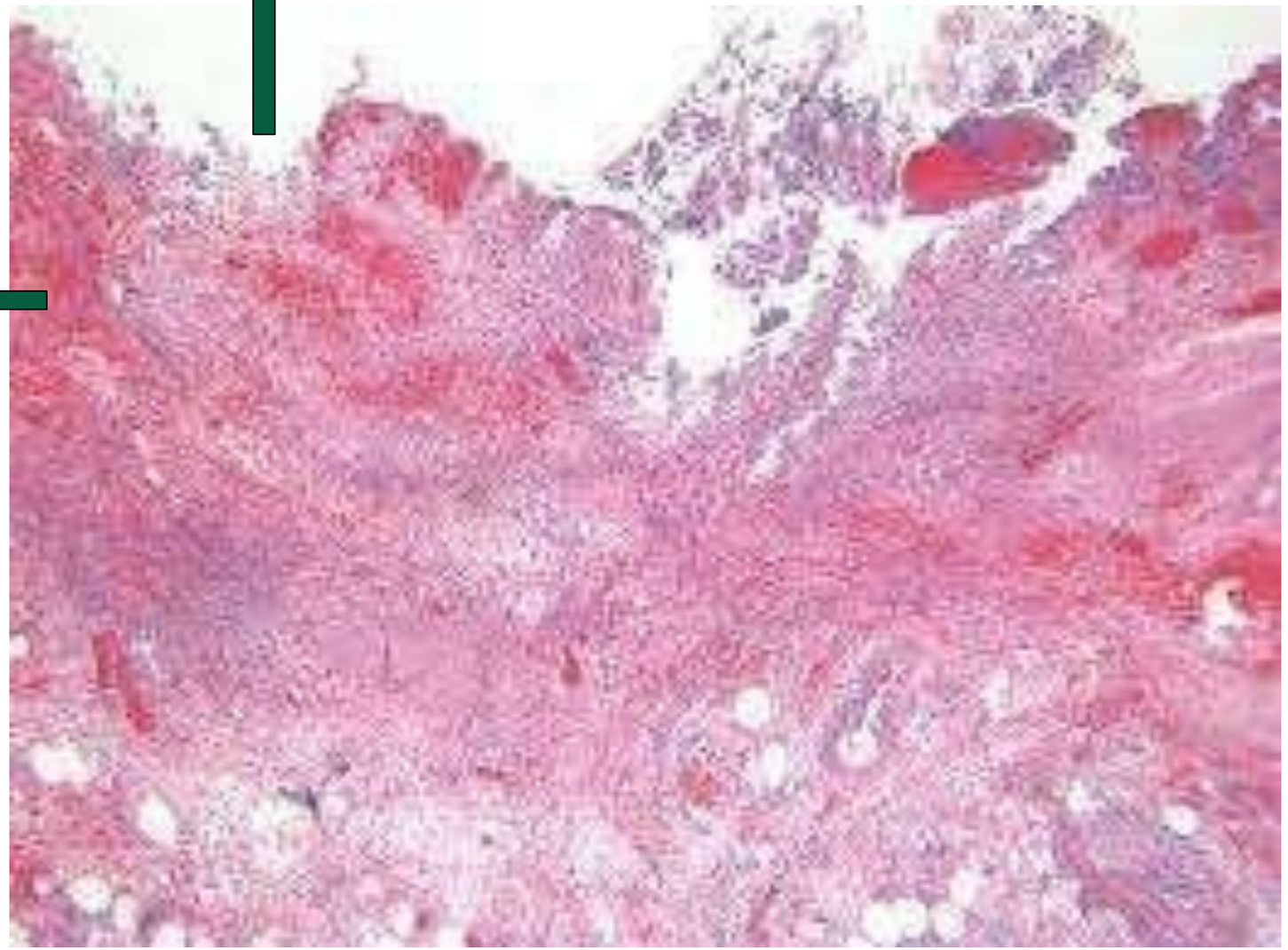
* As you see, The serosa of the gallbladder is **inflamed**, **congested**, and **hemorrhagic**, indicating **acute cholecystitis.**

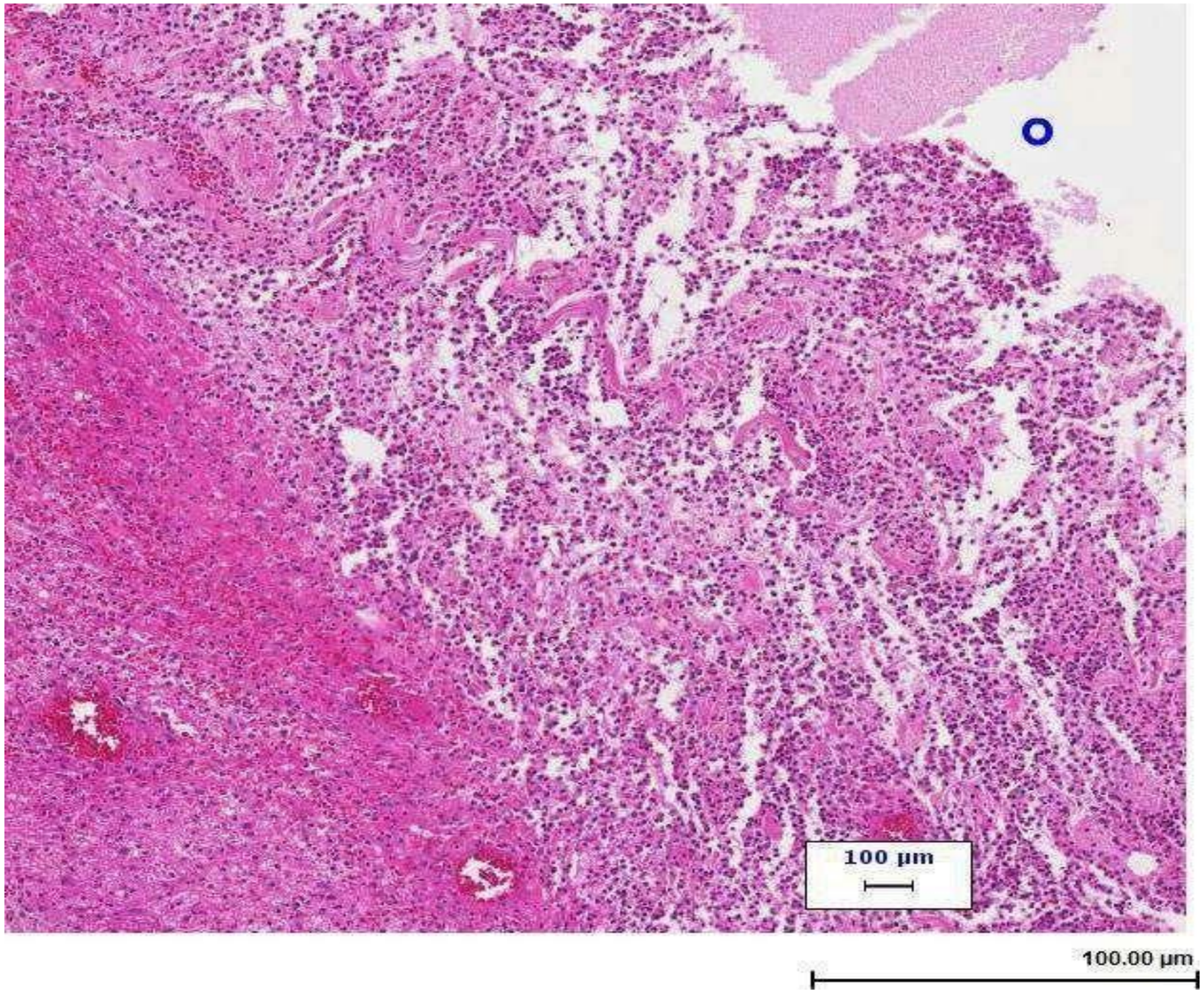
Pathology of Acute Cholecystitis

- Enlargement of the GB (2-3x), tense GB filled with fluids, discolorations due to subserosal hemorrhages.
- Serosal fibrinous or suppurative exudate
- Stones obstructing GB neck or cystic duct in 90%
- GB lumen filled with turbid bile, +/- fibrin, hemorrhage & pus
- Empyema of gallbladder can be superimposed, so the GB will be full of pus
- Thickened edematous hyperemic wall
- Gangrenous cholecystitis: black necrotic GB
- Histology: edema, WBC infiltration especially neutrophils, congestion, abscess, hemorrhage & necrosis

✓ The mucosa is sloughed and ulcerated

✓ Here, you can see the hemorrhage



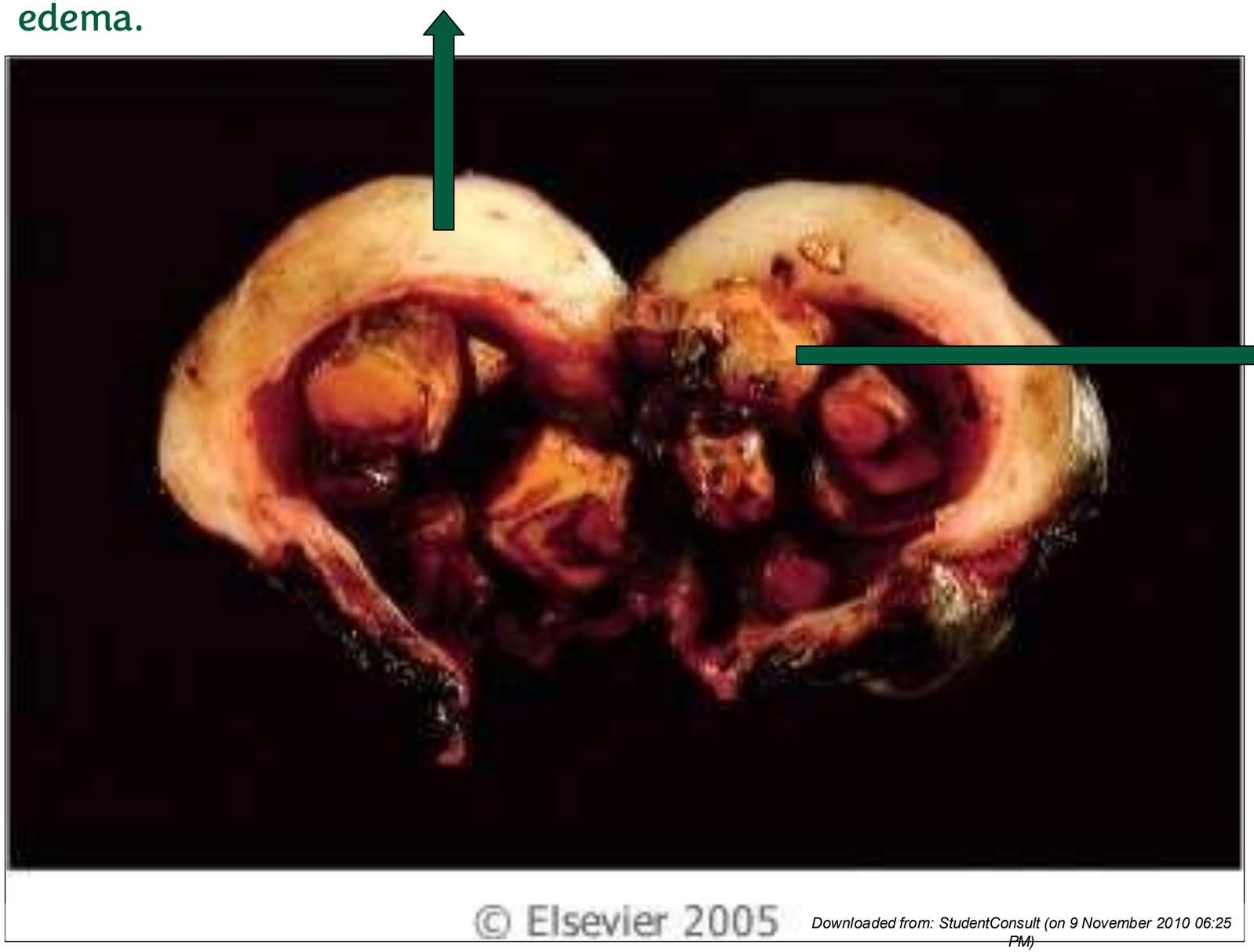


- ✓ Here, you can see the infiltration of the WBC especially neutrophils

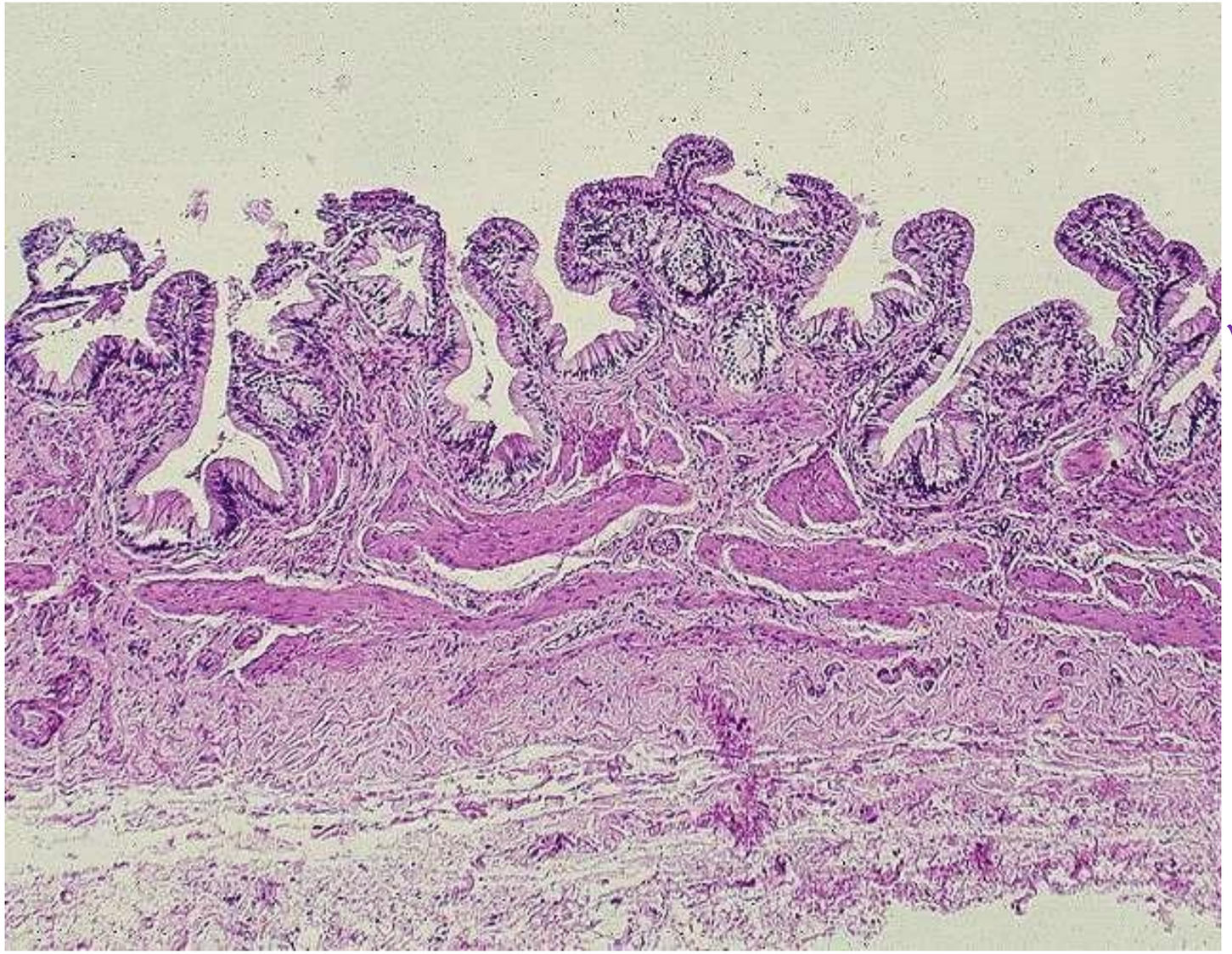
Chronic Cholecystitis

- +/- history of acute cholecystitis, as patients may not always report or recognize previous episodes due to mild or atypical symptoms.
- Gallstones almost always present
- There is a **supersaturation of bile**, this will predispose to chronic inflammation & stone formation, so, it is NOT caused by the obstruction, instead, it is related to the irritation and inflammation.
- Variable morphologic appearance can be seen, for example: minimal changes, contracted GB, enlargement of GB, mucosal ulceration or wall thickening. These features are non-specific.
- Histology: Mucosal ulcerations are infrequent; **the submucosa and subserosa often are thickened from fibrosis (the most important feature)**, lymphocytes may be the only clue of inflammation.

✓ In **chronic cholecystitis**, gallbladder wall thickening is due to fibrosis, in contrast to **acute cholecystitis**, where the thickening results from edema.



- ✓ Thickening due to fibrosis in case of chronic cholecystitis



- Here, the mucosa appears normal, without ulceration or hemorrhage—unlike in acute cholecystitis—and is accompanied by fibrosis.

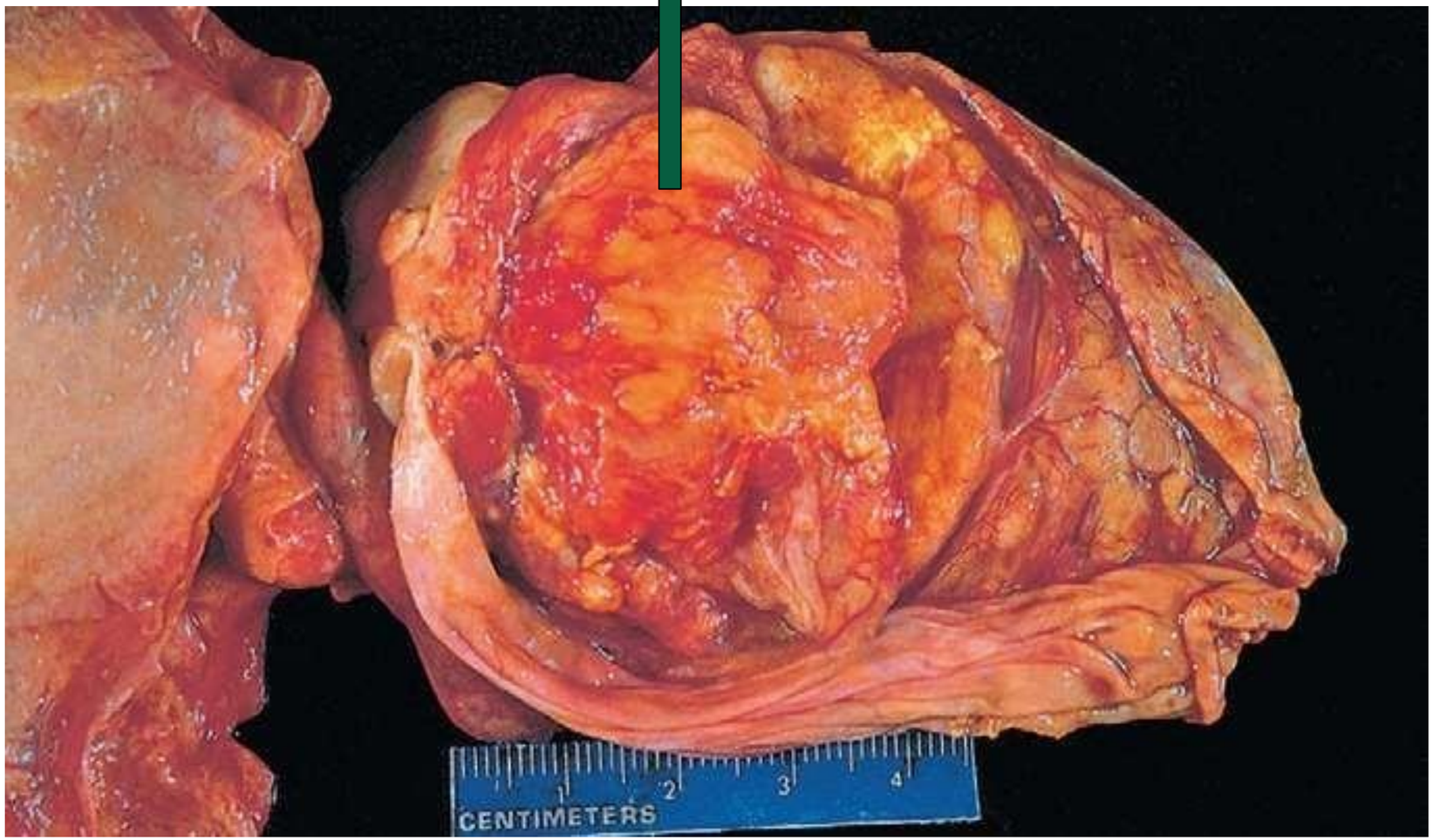
Clinical Features of Cholecystitis

- Acute & chronic calculous cholecystitis have similar & variable symptoms:
- Minimal nonspecific symptoms (for example: upper abdominal pain or epigastric pain) to biliary colics to severe **RUQ pain (most prominent)**
- Sometimes fever, nausea, vomiting & leukocytosis in acute inflammation.
- Acute acalculous cholecystitis: symptoms obscured by general condition,
- because the patient is usually dehydrated, bedridden and debilitated.
- **Dx: Ultrasonography**
- **Complications**: cholangitis, sepsis, GB perforation, abscess, rupture,
- cholecystoenteric fistulas, intestinal ileus, etc.

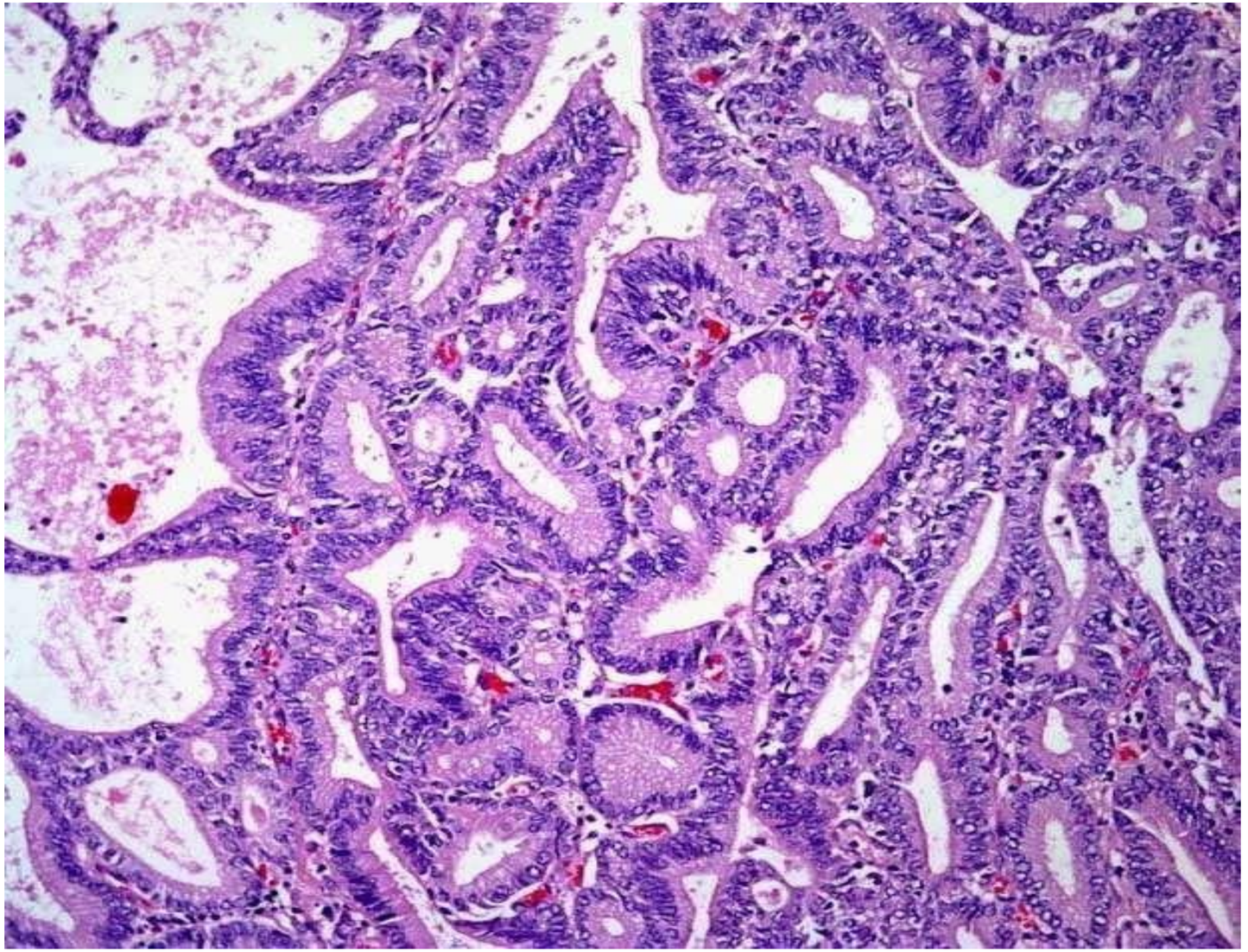
Tumors of the Gallbladder: Gallbladder Carcinoma

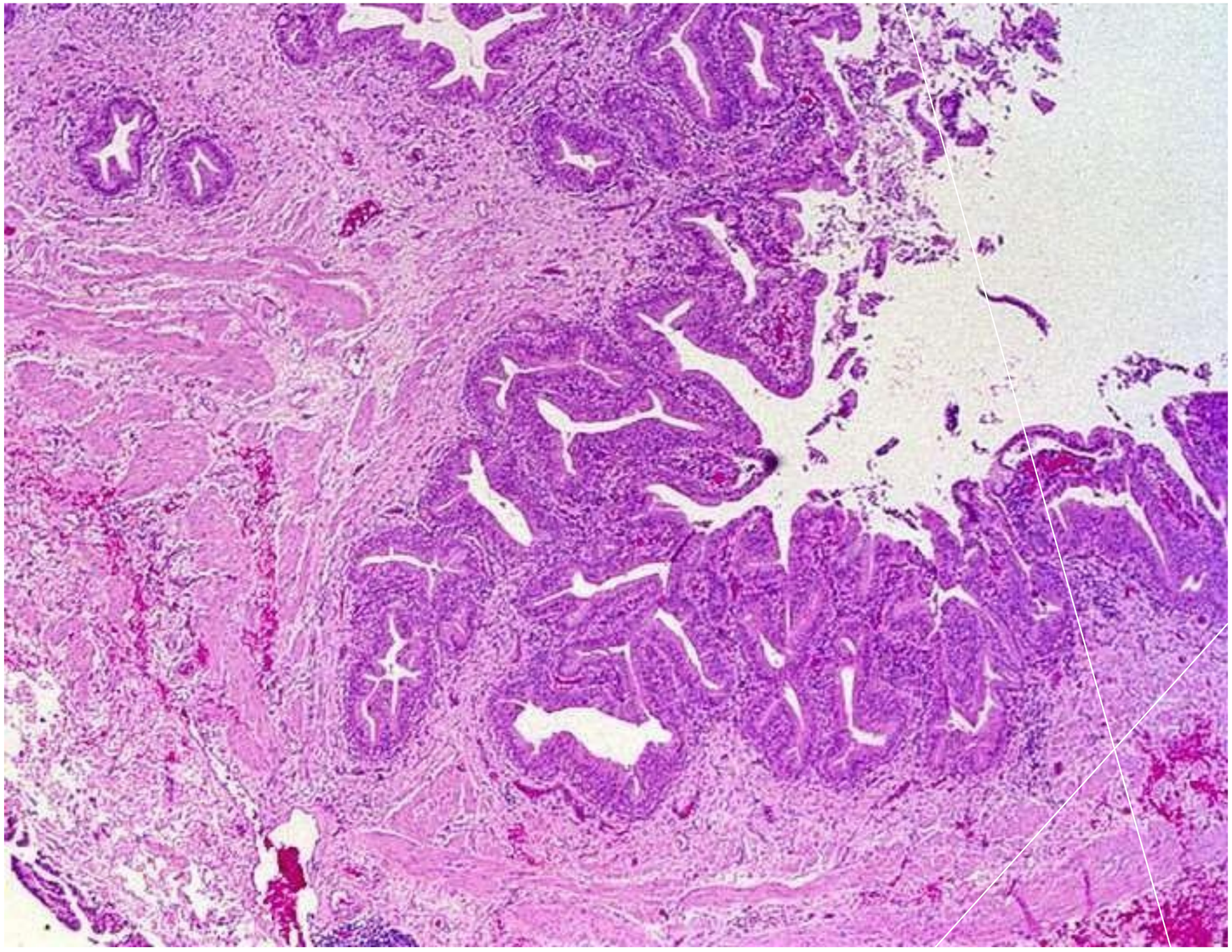
- **Commonest extrahepatic biliary tract cancer**
- More common in women; peak 7th decade
- Due to recurrent trauma and inflammation: usually associated with stones;
- Morphology: **Infiltrating or fungating growth pattern of lesions into the lumen of GB.**
- Most are adenocarcinoma.
- Insidious and gradual symptoms similar to cholelithiasis or chronic cholecystitis, which leads to late diagnosis.
- If obstruction develops early: early diagnosis and treatment.
- Advance stage at diagnosis (late) in most cases.
- Seeding (metastasis) to peritoneum, GIT and lungs
- **Prognosis: dismal, 5-year survival: 1%**
- Gallbladder carcinoma is most diagnosed incidentally during examination of gallbladders removed for acute or chronic inflammation.

Fungating mass inside the lumen of the GB

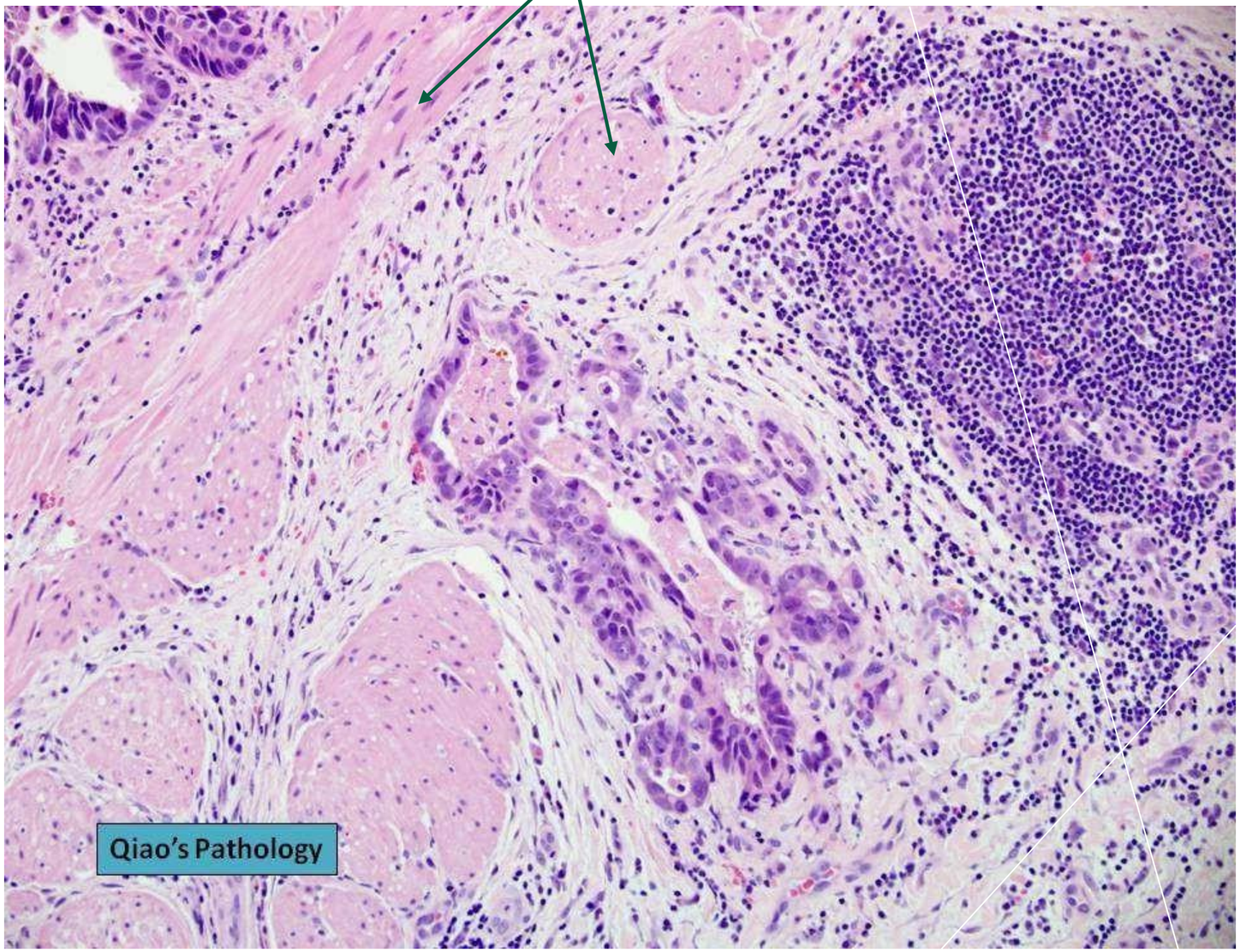


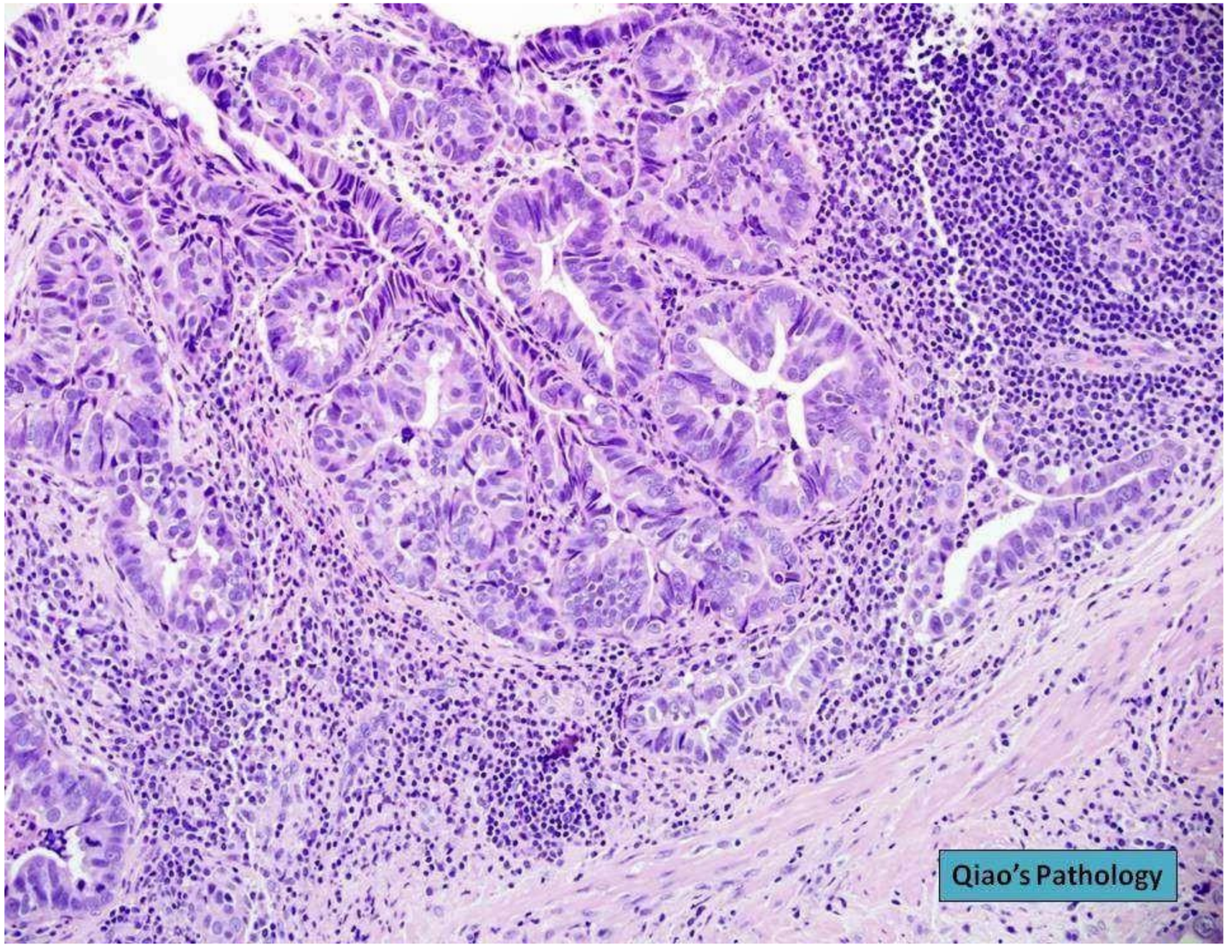
In the following images, you will observe infiltration of gallbladder adenocarcinoma into the muscular layer, nerves (perineural spaces), and the full thickness of the gallbladder wall.





Muscle layers




Qiao's Pathology

- Which of the following is a risk factor for cholesterol-type gallstones?
  A. Age less than 25 years
  B. Asian ethnicity
  C. Male sex
  D. Obesity
  E. Sickle cell anemia
- Which of the following is the most common cause of extrahepatic biliary obstruction?
  A. Bile duct carcinoma
  B. Gallstones
  C. Carcinoma of the ampulla of Vater
  D. Carcinoma of the head of the pancreas
  E. Phrygian cap
- Which of the following is associated with chronic cholecystitis?
  A. Atrophy of the gallbladder wall
  B. Decreased risk of pancreatitis
  C. Increased risk of carcinoma of the gallbladder
  D. History of major trauma and burns
  E. Infection with *Salmonella typhi*

ANSWERS : DBC

Additional Resources:

رسالة من الفريق العلمي:

﴿ وَاذْكُر رَّبَّكَ إِذَا نَسِيتَ ﴾

- لآ آلهَ الا الله.

- سبحَان الله وَبحمده.

- سبحَآن الله العظيم.

- استغفرالله واتوب إليه

For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1			
V1 → V2			