

# GALLBLADDER

## MUSEUM CATALOGUE

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## GALLBLADDER

### INTRODUCTION

A significant proportion of the world's population are affected by disorders of the biliary tract, the vast majority being related to gallstones.

The gallbladder is a sac attached to the undersurface of the right hepatic lobe. The free inferior surface is covered by serosa that is continuous with that covering the liver. In an adult the gallbladder measures approximately 10cm in length and 3cm in diameter and its volume is approximately 50ml. Its function is to store and concentrate bile. The wall of the gallbladder is composed of 3 layers: mucosa (epithelium and lamina propria), muscularis (single layer of smooth muscle) and serosa (or adventitia where it connects to the liver). The mucosa is folded and covered by simple columnar mucus secreting epithelium. The epithelium of the bile ducts is similar. Bile drains via the cystic duct that joins with the common hepatic duct to form the common bile duct (usual arrangement).

Any comments on this catalogue are welcome. Please contact a member of the department.

### HOW TO USE THIS CATALOGUE

This catalogue can be used as a tool to develop your knowledge, as well as provide an opportunity for revision.

It is divided into:

- Introduction and approach to gallbladder specimens (pages 122-123).
- Index (pages 124-125). Examples of specific diagnoses can be found via the index.
- Core and classic disease processes of the gallbladder (pages 126-132). This gives examples and discussion of core and/or classic diseases of the gallbladder. These are the specimens that students should focus on being able to identify initially. However, it depends to some extent on what you have covered in lectures and practical classes or resource sessions as to what you should know. Some of the specimens and discussion are directed more towards clinical medical students.
- Main catalogue (pages 133-139). This section covers the specimens in numerical order. Questions and/or comments accompany some of the specimens to help you expand your knowledge. In order to fit more specimens in the museum, not all of the pots are in numerical order on the shelves, and large specimens are often found on the bottom shelves.

You might find it useful to work quietly with a few friends and to have a few textbooks handy (e.g. pathology, medical, anatomy). You will also find that you can learn some anatomy and clinicopathological correlation from the specimens and information given.

You do not have to examine every single specimen in the museum. However, just as in clinical practice, you will not become proficient in diagnosing something if you have only seen one case. Exposure to a variety of cases (specific diagnoses can be found via the index) to experience the variability in morphology will help your learning greatly. In general red and blue dots indicate basic and straightforward cases, whereas yellow dots indicate a more complex case. This is not a hard and fast rule, and you will find yellow dot specimens turning up in resource sessions/practical classes and even exams, if they represent classic pathology.

In general

- read the clinical information given
- look at the entire specimen, not just the front
- identify and orientate the organ or tissue (when possible)
- from your knowledge of pathology (which will come with time) look for relevant features to help you make the diagnosis. Of course to appreciate the abnormal you first need to have an appreciation of normal anatomy to be able to recognize and orientate the organ/tissue and the abnormalities
- make a diagnosis or differential diagnosis using any clinical information given to you – it is often relevant – sometimes the diagnosis is only made with knowledge of the clinical features. Even when you know the diagnosis, attempt to identify relevant features in the specimen and understand why this is the diagnosis.
- attempt to correlate the pathological features with the clinical features (clinico-pathological correlation) i.e. explain how the pathological features have caused the patients symptoms and signs (when relevant)
- try to answer any questions presented yourself before reading the answers.

You may prefer to look at the specimen 'blind', without reading the clinical information given first. Remember that some of these specimens are very old, and some of the investigations and treatments mentioned may be out of date.

Limits to diagnosis on macroscopic examination

In all cases a diagnosis is given in the catalogue, sometimes it was made based on the stated clinical history and histopathological findings. In some cases the macroscopic appearance is classic and even without the clinical information and histopathological findings you should be able to make the diagnosis from the appearance, in others, it might only be possible for you to give a list of differential diagnoses or a more general diagnosis.

## BASIC APPROACH TO INTERPRETATION AND DESCRIPTION OF GALLBLADDER PATHOLOGY SPECIMENS

Students are expected to be able to give a brief succinct description of relevant macroscopic features of a specimen using appropriate terminology, as well as to arrive at a diagnosis or differential diagnosis. Even if not asked for a description, identification of relevant features is helpful in the diagnostic process. Your descriptive skills will improve with practice.

In any aspect of medicine, one needs to approach things in a systematic manner; otherwise important points may be omitted.

- Read the clinical history, it will often provide relevant information (although sometimes it is helpful to look at the specimen without any information and work out what is going on for yourself)
- Look at the front of the pot first (i.e. the one with the number and the dot), but always make sure to look at the back and sides as well.
- Identification of and description of the abnormality.
  - Decide and state whether the gallbladder is of normal size, too small or too large. Is it dilated?
  - Is the abnormality focal or diffuse? Most abnormalities of the gallbladder are diffuse. There may be thickening of the wall from oedema in acute inflammation or from fibrosis in 'chronic cholecystitis'. Is there evidence of acute inflammation? Focal lesions are uncommon, but include carcinoma. Of course also look and see if there are gallstones, which may have fallen out of the gallbladder. It may be difficult to tell what type they are macroscopically and probably doesn't matter in most situations. Are other tissues present such as bile ducts, into which gallstones have travelled? If so, do they appear normal?

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# CORE AND CLASSIC DISEASE PROCESSES

## GALLBLADDER: CHRONIC CHOLECYSTITIS AND GALLSTONES

### CASE 6987

#### Clinical information

The patient was a woman aged 63 with mitral stenosis who died in congestive cardiac failure.

#### Specimen description

The specimen is a portion of liver with attached gallbladder of reasonably normal size but with a thickened wall. It contains two large pale stones, one impacted in the neck and the other at the fundus, lying behind an encircling mucosal ridge that prevents it moving into the body of the viscus. The liver shows some congestion.

#### Diagnosis

Chronic cholecystitis and gallstones

What are the different types of gallstone and what is their pathogenesis?

Stones may be pure or mixed. Most are mixed. The pure stones are cholesterol stones and calcium bilirubinate or pigment stones.

Cholesterol is rendered soluble in bile by bile salts. In certain conditions, the bile becomes supersaturated with cholesterol that can no longer be kept in solution and begins to deposit resulting in the formation of cholesterol and many mixed stones. Calcium salts may serve as nucleation sites for cholesterol deposition and hypomotility of the gallbladder may contribute. These are the commonest type of stone in developed countries.

Risk factors include:

- Increased hepatic secretion of cholesterol
  - Increasing age
  - Higher oestrogen levels i.e. females, pregnancy
  - Obesity
  - Familial/genetic
  - Certain ethnic groups
  - Diet/high blood cholesterol
- Decreased secretion of bile salts e.g.
  - Impaired enterohepatic circulation of bile salts
  - Biliary stasis

Pigment stones contain insoluble calcium salts of unconjugated bilirubin and are more common in developing countries. They result from excessive amounts of unconjugated bilirubin in bile. Risk factors include chronic haemolysis, biliary tract infection and cirrhosis.

#### Comment

It is not always possible (or important) to distinguish the different types of gallstone. Pigment stones are often small and dark brown or black and cholesterol stones often white or pale yellow. Mixed stones appear variable.

Gallstones are often accompanied by variable degrees of chronic inflammation, fibrosis and muscular hypertrophy of the gallbladder wall resulting in variable thickening, the changes being known as chronic cholecystitis, the pathogenesis of which is unclear. It usually develops insidiously. Irritation of the wall by stones and supersaturated bile may be important. A small proportion of cases may result from recurrent bouts of acute inflammation. Clinical features are probably related to the presence of stones rather than the chronic inflammation.

## GALLBLADDER: ACUTE CHOLECYSTITIS AND GALLSTONES

### CASE 22645

#### Clinical information

This patient was a woman aged 58 who had had repeated attacks of pain in the right upper quadrant and fever. There was no jaundice but there was transient urobilinogen in the urine. A cholecystectomy was performed.

#### Specimen description

The specimen consists of a gallbladder measuring 10cm in length and 4.5cm across the fundus. Its wall is thickened up to 1cm and haemorrhagic with the serosa showing a haemorrhagic and fibrinous exudate. Five large faceted variably white and brown stones about 1.5cm in diameter are present in the lumen.

#### Diagnosis

Acute cholecystitis and gallstones

#### What is the pathogenesis of acute calculus cholecystitis?

Acute calculus cholecystitis results from more than transient blockage of the gallbladder neck or cystic duct by a stone. The exact pathogenesis is unknown but may relate to both

- changes in the composition and concentration of bile in the obstructed viscus leading to chemical injury and
- altered blood flow caused by altered pressures in the wall leading to ischaemic injury.

#### What are the potential outcomes of acute cholecystitis and how do they develop?

- Gangrenous cholecystitis with perforation: with ongoing acute inflammation there will be some necrosis due to release of lysosomal contents of dead neutrophils. Impaired blood flow within the inflamed wall may contribute to necrosis as may secondary bacterial infection from bacteria (ascending from the GIT) entering the wall following mucosal damage. Once necrosis is transmural the wall is extremely weak and perforates. Perforation may lead to diffuse acute peritonitis or pericholecystic abscess formation.
- Inflammatory adhesions may form between the gallbladder and adjacent structures e.g. small intestine, which when associated with necrosis can lead to the formation of a cholecystenteric fistula. Such fistulae may also arise insidiously.
- Some cases subside spontaneously

#### Comment

The changes here really represent an organising acute cholecystitis (as the histology reportedly showed marked replacement by vascular and fibrous granulation tissue) and have probably been going on for some days - weeks. Acutely inflamed gallbladders are very haemorrhagic and oedematous and the mucosa becomes ulcerated. If not removed straight away as is sometimes the case (and probably the case here), vascular and later fibrous granulation tissue proliferates in the wall, contributing to the thickening.



## GALLBLADDER: MUCOCELE/HYDROPS

### CASE 151

#### Clinical information

No clinical information is available.

#### Specimen description

The specimen consists of a greatly dilated and elongated gallbladder 17cm in length and 6cm in diameter. The wall is thin and translucent and the contents are mucinous secretion containing no bile pigment.

#### Diagnosis

Mucocele or hydrops of the gallbladder

#### Comment

Acute inflammation does not always develop following obstruction of the cystic duct by a stone. Continued secretion by the lining epithelial cells and absorption of bile pigment results in the accumulation of clear mucinous fluid with distension of the gallbladder, forming a mucocele or hydrops of the gallbladder.

## GALLBLADDER: CHOLECYSTENTERIC FISTULA WITH GALLSTONES

### CASE 50006/83

#### Clinical information

The patient was a woman aged 61.

#### Specimen description

The specimen consists of a segment of liver, the gallbladder, duodenum and part of the pancreas. The gallbladder is contracted and its wall fibrotically thickened. Its lumen contains 2 mixed calculi. One stone has eroded through the wall of the gallbladder and established a fistula into the adjacent duodenum seen from the reverse of the specimen.

#### Diagnosis

Choleduodenal fistula with gallstones

#### Comment

Inflammatory adhesions may form between the gallbladder and adjacent structures e.g. small intestine, and stones may erode through, leading to the formation of a cholecystenteric fistula and the classic gallstone ileus.

## GALLBLADDER AND BILE DUCTS: GALLSTONE BLOCKING COMMON BILE DUCT

### CASE 24700

#### Clinical information

The patient was a man aged 83 with a 5-month history of abdominal pain, nausea, vomiting, anorexia and loss of weight. On admission he was jaundiced and the gallbladder was palpable. He refused diagnostic laparotomy and died while being managed conservatively. At post-mortem there was an infected ascites with much green foul murky fluid in the peritoneal cavity. The liver was markedly enlarged (weight 2360gm).

#### Specimen description

The specimen consists of the gallbladder, bile ducts, duodenum and a fragment of liver. The gallbladder is dilated but its wall is not significantly thickened. A large irregular black stone 4cm in diameter has fallen out of the gallbladder and is present at the base of the pot. A dark calculus 1.5cm in diameter is impacted in the ampulla of Vater and above this the common bile duct and other ducts are greatly dilated. There is antemortem thrombus in the trunk of the portal vein next to the common hepatic duct. The orifice of a duodenal diverticulum, 2cm in diameter, is visible 3cm above the ampulla of Vater.

#### Diagnosis

Gallstone blocking common bile duct

#### Comment

When gallstones leave the gallbladder they can lodge in the common bile duct (CBD), particularly at the ampulla of Vater, and cause obstructive jaundice. Dilatation of the bile ducts may develop, as may infection of the ducts which can spread up into the liver (ascending cholangitis). Gallstones lodged in the ampulla of Vater are also a common cause of acute pancreatitis. Chronic obstruction of the CBD by a gallstone can cause cirrhosis.

## GALLBLADDER: CARCINOMA

### CASE 106

#### Clinical information

The patient was a woman aged 70 who came to operation in 1934. She had a 4-day history of colicky abdominal pain and a mass could be felt beneath the right costal margin. The gallbladder was removed surgically.

#### Specimen description

The specimen is a normal sized gallbladder opened to show a fungating fleshy irregular tumour 6cm in diameter occupying the distal half of the organ. The overlying peritoneal surface is congested.

#### Diagnosis

Carcinoma of the gallbladder

#### Comments

Carcinoma of the gallbladder occurs in older people and is more common in females. There is an epidemiologic association between this disease and gallstones. It generally has a poor prognosis due to late detection. Most are adenocarcinomas.