CASE SIX

Short case number: 3_3_6
Category: Gastrointestinal & Hepatobiliary
Discipline: Surgery
Setting: Emergency Department
Topic: Biliary tree disorders_acute cholecystitis and biliary colic

Case:

Annette Everley, aged 42 years presents with acute right upper abdominal pain. She is screaming in the waiting room and demanding pain relief. On examination she has a temperature of 37.2^0 C, and has marked tenderness in the right upper quadrant.

Questions

1. What is your differential diagnosis (list the 5 most likely options)?
2. Outline the pathogenesis of the three common forms of gallstone
3. Outline the key elements of the epidemiology of gallstones.
4. What features on history and examination would help you distinguish the cause of Annette's pain in this case?
5. What laboratory and imaging tests would you order and why?
6. What percentage of individuals with asymptomatic gallstones found incidentally on imaging tests will develop symptoms?
7. Compare and contrast the clinical presentation, laboratory and radiological findings and management of a patient with biliary colic and acute cholecystitis.

Suggested reading:

1. Henry MM, Thompson JN, editors. Clinical Surgery. 3rd edition. Edinburgh: Saunders; 2012. Chapter 20.
2. Garden OJ, Bradbury AW, Forsythe JLR, Parks RW, editors. Davidson's Principles and Practice of Surgery. 6th edition. Philadelphia: Churchill Livingstone Elsevier; 2012. Chapter 14.

ANSWERS

1. **Differential diagnosis: (list only 5 options)**
   - biliary colic
   - acute cholecystitis
   - choledocholithiasis / acute cholangitis
   - biliary (gallstone) pancreatitis
   - peptic ulcer disease (perforated colon)

2. **Pathogenesis of the three common forms of gallstone**
   - mixed (75%) – contain a high proportion of cholesterol. precipitation of cholesterol as crystals tends to occur if the bile is lithogenic and super saturated with cholesterol. these crystals in the presence of enucleating factors (an imbalance between nucleation-inhibiting and nucleation-promoting proteins) may agglomerate to form gallstones and entrap other components of bile (e.g. bilirubin, mucus, Ca++) in the process. Most mixed stones do not accumulate enough ca++ to render them radiopaque; thus they are usually not seen on plain radiographs.
   - black pigment stones (20%) – commonly associated with haemolytic diseases & cirrhosis. In chronic haemolysis there is hypersecretion of bilirubin conjugates in the bile and greater secretion of monoglucuronides compared with diglucuronides which favours the precipitation of pigment stones
   - brown pigment stones (5%) – associated with infected bile

3. **Outline the key elements of the epidemiology of gallstones**
   - genetics (e.g. POSITIVE FAMILY HISTORY) & environment
   - incidence increases with age
   - women affected 3x more than men
   - environmental factors include: obesity (excessive cholesterol biosynthesis)l multiparity (altered steroid metabolism, lithogenic bile, gall bladder hypomotility); high dose oestrogen oral contraceptives; some cholesterol lowering agents (alteration of cholesterol & bile acid biosynthesis); rapid weight loss (increased bile saturation index and gall bladder stasis); prolonged TPN (hyper-concentration of bile and gall bladder stasis) all predispose to the formation of stones
   - Crohn's disease of terminal ileum (diminish bile acid pool)
   - haemolytic disorders and alcoholic cirrhosis predisposes to pigment stone formation
   - biliary tract infections

4. **What features on history and examination would help you distinguish the cause of Annette's pain in this case?**
   - history ?typical or not
   - local signs (RUQ tenderness, guarding, Murphy's sign)
   - jaundice, fever and nausea and vomiting)

5. **What laboratory and imaging tests would you order and why?**
   - FBCC/serum lipase/LFT's/UEC's and CMP
   - Ultrasonography
   - CXR/AXR

6. **What percentage of individuals with asymptomatic gallstones found incidentally on imaging** tests will develop symptoms?
   - approx. 1% to 2% per year will develop symptoms of complications of gallstone disease
   - thus 2/3rds of these people remain free of symptoms or complications after 20 years
   - note: the risk of gall bladder carcinoma in patients with gallstones is too low to justify cholecystectomy for asymptomatic gallstones; however discuss with the patient especially if <40

7. Compare and contrast the clinical presentation, laboratory and radiological findings and management of a patient with (biliary colic) and acute cholecystitis:

Biliary colic

History

A stone impacted within the gallbladder-usually in Hartmann's pouch or the cystic duct-causes pain. Although often referred to as colic, the pain is usually constant in the epigastrium and right upper quadrant and may radiate through to the back in the region of the inferior angle of the scapula. Such pain is better called obstructive. Attacks last for a few minutes to half an hour and may be exacerbated by ingestion of fatty food which stimulates the release of cholecystokinin (CCK) and consequent gallbladder contraction. Vomiting is common. Fever is absent. The pain spontaneously settles when the stone either becomes disimpacted or, less commonly, is passed into the common bile duct.

Physical findings

The patient is apyrexial. Abdominal tenderness is absent, although a gallbladder that has become distended may cause slight signs of peritoneal irritation.

Investigation

Blood examination

The white cell count and liver function tests are normal.

Acute cholecystitis:

History

The symptoms are similar to those of biliary colic, but the pain is more severe and persistent. Nausea and vomiting are common, and low grade fever is usually present.

Physical findings

Tenderness and guarding are present in the right upper quadrant. In less severe instances, laying the hand lightly on the upper right abdomen and asking the patient to take a deep breath cause a catch in breath because of pain when the inflamed gallbladder impacts on the examining hand-Murphy's sign. Hyperaesthesia of skin over the right ribs 9-11 posteriorly (Boas's sign) may also be present. If inflammation spreads beyond the gallbladder, a mass, composed of the enlarged gallbladder and adherent omentum and bowel, may be palpated under the right costal margin.

Investigation

Blood examination

There is leucocytosis and elevated CRP. Bilirubin is normal in most cases. Elevation suggests complication.

Imaging

Ultrasound shows the gallbladder with stone(s), a thickened wall and a surrounding rim of fluid from local oedema, and enhanced vascularity.

Management

Initial treatment is non-operative, with gut rest, pain relief and systemic antibiotics. Intravenous fluids are required initially. Most attacks resolve, and definitive treatment by cholecystectomy can be done later 94-6 weeks following the acute attack if not as an inpatient). However, a few do not settle and without operation, go on to either perforation or the formation of an empyema. If progression is thought to be taking place, as judged by failure of symptoms to subside and the persistence of local signs, exploration by either laparoscopy (occasionally laparotomy) should be undertaken. Beware patients with diabetes and patients who smoke, as the cystic artery is an end-artery and they may progress rapidly to gangrenous cholecystits.

Chronic cholecystitis

This pathological entity is the outcome of recurrent attacks of obstruction and inflammation which result in the changes of chronic inflammation in the gallbladder wall and often in the adjacent liver.

Clinical features
There may be a past history of attacks of acute cholecystitis. Frequently there is chronic discomfort in the right upper quadrant, which is often punctuated by intermittent acute exacerbations.

Gallstones are detected on ultrasound with a thickened gall bladder wall. Cholecystectomy is recommended.