

Chapter 2 Liver, Biliary Tract and Pancreas

Rajiv Lochan and Richard Charnley

Multiple Choice Questions

[Each single best answer (SBA) question comprises a stem and a number of answers. You are asked to decide which single item represents the best answer to the question.]

1. Obstructive jaundice is not caused by

- a) Bile duct stones
- b) Viral hepatitis
- c) Tumours of the pancreas
- d) Duodenal tumours
- e) Enlarged lymph nodes at the porta hepatis

[Best Answer = b]

Explanation

Obstructive jaundice can occur due to bile duct stones and tumours of the head of pancreas and biliary tract. Duodenal and pyloric tumours can also cause obstructive jaundice by directly involving the bile duct or by metastasising to the lymph nodes around the duct and the porta where they can cause obstruction (mainly in stomach neoplasms/lymphomas). Severe viral hepatitis can cause a mixed hepatocellular/cholestatic picture of LFTs but the clinical picture and the severe elevation of transaminases should make the distinction straightforward. Drugs can also sometimes cause a cholestatic elevation in LFTs but they are also not causes of obstructive jaundice.

2. Obstructive jaundice due to carcinoma of the pancreas is not usually associated with

- a) Yellow colouration of skin and mucous membranes
- b) Itching
- c) Dark coloured urine

- d) Pale clay-like stools
- e) Abdominal pain

[Best Answer = e]

Explanation

Depending on the cause, jaundice can be associated with various other symptoms. Obstruction to the outflow of bile from the liver results in the absence of bile in the gut leading to pale, clay-like stools. Dark urine (“tea” or “cola” coloured urine) results from excretion of conjugated bilirubin, which occurs in obstructive jaundice. Itching results from the deposition of bile salts in the dermis. Abdominal pain with or without fever suggests an underlying inflammatory or infective pathology. Painless jaundice is often an indicator of a neoplastic cause.

3. In a patient with jaundice, your first investigation would be:

- a) ERCP
- b) Liver function tests and abdominal ultrasound
- c) CT scan
- d) Laparoscopy
- e) MRCP (magnetic resonance cholangio-pancreatography)

[Best Answer = b]

Explanation

After a history and clinical examination, your first line investigations would be liver function tests and an ultrasound scan (USS) of the liver and biliary tract. The results of which will guide further investigation in a patient with jaundice. A predominant elevation of transaminases amongst the liver enzymes along with normal bile ducts on the USS will suggest a medical cause for the jaundice such as viral hepatitis. Elevated alkaline phosphatase and/or γ -glutamyl transferase levels and dilatation of the whole or a portion of the biliary tract will indicate a

surgical cause for the jaundice. Axial imaging such as computed tomography and or MRI/MRCP are further tests which may be needed. ERCP is invasive and is not a first-line test.

4. The following may be indications for the performance of ERCP

- a) Diagnosis of a bile duct calculus
- b) Removal of a bile duct calculus
- c) Assessment of biliary stent patency
- d) Diagnosis of pancreas divisum
- e) Diagnosis of chronic pancreatitis

[Best Answer = b]

Explanation

Endoscopic retrograde cholangio-pancreatography is an invasive procedure which is, with a few exceptions, reserved for therapeutic procedures such as known bile duct stones, lower biliary stricture requiring drainage and complications of chronic pancreatitis requiring stenting or stone extraction. This is because of the significant complications (8%–10% morbidity and 0.3%–1% procedure related mortality) associated with it. These include acute pancreatitis, bleeding (from the site of sphincterotomy), biliary infection and perforation of the duodenum. High definition imaging modalities such as magnetic resonance cholangio-pancreatography (MRCP) (for the diagnosis of pancreas divisum and CBD stones), endoscopic ultrasound (for bile duct stones, chronic pancreatitis and pancreatic and periampullary tumours) and thin-slice CT (for pancreatic masses) are preferred to invasive modalities like ERCP. ERCP should therefore be reserved for therapy.

5. Ultrasound scanning is poor at identifying the following in a patient with obstructive jaundice

- a) Dilated intra-hepatic ducts
- b) Dilated extra-hepatic ducts
- c) Gall bladder stones

- d) Pancreatic masses
- e) Intra-hepatic masses

[Best Answer = d]

Explanation

Ultrasound scanning uses sound waves to image the internal structures of an organ. Although reliable in the identification of gall bladder stones, biliary dilatation and liver tumours, 80%–90% of patients with CBD stones and 50% of patients with pancreatic tumours remain undiagnosed following abdominal ultrasound. This is because there is significant interference due to the presence of gas-filled bowel loops in the vicinity of the lower bile duct.

6. Which of the following is not part of the pre-op preparation of a deeply jaundiced patient for ERCP?

- a) Adequate hydration (overnight maintenance IV fluids)
- b) Check and confirm normal coagulation parameters
- c) Prophylactic antibiotics
- d) Informed consent
- e) Oral vitamin “K”

[Best Answer = e]

Explanation

Adequate hydration of jaundiced patients is essential because renal impairment can easily occur in these patients, especially when they are being fasted on multiple occasions for various procedures during their hospital stay. Obstructive jaundice results in impaired absorption of fat soluble vitamins including vitamin “K” which can lead to impaired coagulation reliably corrected by parenteral not oral vitamin “K”. Impaired coagulation must be corrected before intervention since these procedures are associated with a significant incidence of bleeding. Instrumentation of the biliary tract is associated with a high incidence of biliary sepsis, which can easily result in septicaemia.

7. Which of the following is not a cause of acute pancreatitis?

- a) Trauma
- b) ERCP
- c) Bile duct stones
- d) Hypomagnesaemia
- e) Mutations in the cystic fibrosis transmembrane regulator gene

[Best Answer = d]

Explanation

In the UK, nearly 60% of all cases of acute pancreatitis are caused by biliary calculi and 20% by alcohol. Bouts of excessive consumption (binge drinking) are often responsible. ERCP is thought to be responsible for about 4%–5% of cases. Trauma, drugs and infections (mainly viral e.g. mumps) are each responsible for about 1%–2%, biochemical abnormalities such as hypercalcaemia and hypertriglyceridaemia each for about 2%–4%. Genetic abnormalities such as mutations of the CFTR gene and hereditary pancreatitis (secondary to mutations in the cationic trypsinogen gene) cause 2%–3% of cases and it is likely that this cohort of patients will be increasingly identifiable in the future with many more genetic abnormalities being recognised. Ten per cent of cases are presently labelled as idiopathic. Hypomagnesaemia might be a result of malabsorption but is not a known cause of pancreatitis. The mnemonic GET SMASH'N is often used by students — gallstones, ethanol, trauma, steroids (and other drugs including asathioprine), mumps (and other viral infections including coxsackie B), autoimmune diseases (e.g. SLE), scorpion bites (rare and not in the UK), hyperlipidaemia (and hyperparathyroidism, hypothermia and hereditary causes) and neoplasia.

8. Which of the following are not indicated in the initial management of a patient with acute pancreatitis?

- a) Resuscitation with intravenous fluids and maintenance of intra-vascular volume
- b) Urgent CT scan of the abdomen
- c) Close monitoring of urine output

- d) Pain relief
- e) Arterial blood gases

[Best Answer = b]

Explanation

The initial manifestation and early complications of acute pancreatitis are due to a massive systemic inflammatory response (SIRS) which results in “leaky capillaries”. This causes significant fluid and electrolyte losses into the “third space” — which is not visible or quantifiable externally. The identification and correction of this is the most important initial phase of management. The micro-circulation in the lung is extremely sensitive to SIRS and this is the first organ to decompensate following acute pancreatitis and hence close attention to respiratory status is important. Intravenous antibiotics do not prevent the development of pancreatic necrosis. Prophylactic antibiotics are only indicated in predicted severe acute pancreatitis and only for seven days unless a positive culture is obtained. A contrast CT within the first three days is not indicated but in severe cases a CT three to ten days after the onset of the attack is useful to diagnose necrosis if present. Enteral nutrition as soon as ileus settles has been proven to be of benefit in acute pancreatitis. TPN is indicated following the initial resuscitation only if enteral feeding is contraindicated.

- 9. Which of the following would not normally be carried out in an outpatient setting, for a patient who was discharged three weeks ago following an apparently idiopathic attack of mild acute pancreatitis?**
- a) Take a detailed family history
 - b) Estimate serum lipids
 - c) Check serum calcium
 - d) Repeat the Ultrasound scan of the abdomen
 - e) ERCP

[Best Answer = e]

Explanation

The common and easily identifiable causes should be investigated initially and this is done by a detailed life-style and family history. Past history of abdominal trauma should be specifically looked for. Evidence of biliary calculi and biochemical abnormalities are easily documented with simple investigations — blood tests and ultrasonography of the biliary tract. Hypercalcaemia is a known cause of pancreatitis). An ERCP or CT scan is not initially indicated following a complete recovery from acute pancreatitis.

10. Which of the following are not independent risk factors for pancreatic cancer?

- a) Increasing age
- b) Tobacco smoking
- c) Coffee consumption
- d) Chronic pancreatitis
- e) Hereditary non-polyposis colorectal cancer (HNPCC)

[Best Answer = c]

Explanation

Increasing age, male gender and tobacco smoking are strong risk factors for pancreatic cancer. Hereditary non-polyposis colorectal cancer is an autosomal dominantly inherited disorder of DNA mismatch repair proteins in which colorectal cancers occur. This syndrome is responsible for about 5% of hereditary pancreatic cancers. Ten percent of all cases of pancreatic cancer are thought to have a hereditary basis. Consumption of coffee has been disproven to play a role in cancer of the pancreas. Alcohol consumption by itself is not an independent risk factor although chronic pancreatitis is responsible for about 5%–10% of cases of pancreatic cancer. However, the development of malignancy in a chronically inflamed pancreas is exceedingly difficult to prove.

11. Which of the following is not a complication of biliary calculi?

- a) Acute cholecystitis
- b) Empyema of gall bladder
- c) Liver abscesses
- d) Chronic hepatitis
- e) Acute cholangitis

[Best Answer = d]

Explanation

Gall bladder calculi can cause acute or recurrent chronic inflammation of the gall bladder and hence cholecystitis. They can cause a complete obstruction to the neck of the gall bladder and the resulting bacterial infection can cause an empyema (“collection of pus within a natural body cavity”) of the gall bladder. Calculi within the bile ducts can do the same and result in acute cholangitis. Ascending infection results in seeding of the liver and subsequent abscess formation. Chronic hepatitis is not a result of biliary calculi.

12. Which of the following are not associated with the aetiology of chronic pancreatitis?

- a) Alcohol abuse
- b) Tobacco smoking
- c) Tropical pancreatitis
- d) Autoimmunity
- e) A positive family history

[Best Answer = b]

Explanation

Acute biliary pancreatitis usually does not progress to chronic pancreatitis unlike alcohol induced pancreatitis. Microlithiasis of the biliary tract however is thought to cause chronic pancreatitis by repeated subclinical inflammation of the pancreas. Apart from alcohol the

other major cause of chronic pancreatitis is genetic mutations which include mutations of the cationic trypsinogen gene (causing hereditary pancreatitis) and CFTR gene. Tropical pancreatitis is a type of chronic inflammation found in Southern India, the aetiology of which is unclear. Tobacco smoking by itself is not a causative factor, but plays an additive role.

13. The following are true of liver abscesses

- a) A viral source of infection should be looked for
- b) Pyogenic abscesses are often caused by staphylococcus epidermidis
- c) Open operation is invariable
- d) Colonic tumours can occasionally present as liver abscesses
- e) Amoebiasis is the most common cause of liver abscess in the UK

[Best Answer = d]

Explanation

Liver abscess are usually secondary to a bacterial infection in the peritoneal cavity, most usually the colon (diverticulitis), appendicitis or biliary sepsis and hence an intra-abdominal source of infection should be looked for. When the biliary tree is the source of infection enteric Gram-negative aerobic Bacilli and Enterococci are common isolates. In a significant proportion of cases the primary cause is not found and these are usually colonised by *Streptococcus mileri*. Although Staphylococcus can be a cause (especially in those where haematogenous spread is the cause) this is in fact rare. Primary amoebic liver abscesses are rare in the Western world, but common in the Middle-East, Southern and Eastern parts of Asia and Africa. Percutaneous drainage is the first line of treatment, but open drainage or liver resection may be necessary in selected cases. Colonic tumours can present as an abscess in the liver.

14. Pancreatic tumours

- a) Are usually associated with abdominal pain at an early stage
- b) Acinar cell carcinoma is the most common histological type

- c) Metastases to the pancreas are likely to be from the kidney or breast
- d) Tumours in the body and tail are more common than those situated in the head of the organ
- e) Chemotherapy is effective

[Best Answer = c]

Explanation

The presentation of pancreatic neoplasms depends upon their anatomical situation. Tumours in the head of the pancreas classically present with painless obstructive jaundice and are more common (60%–70% of all cases) than those arising within the body/tail of the organ, which present in an advanced state usually with back-ache and weight loss. Metastasis to the pancreas is uncommon, but is usually from a primary in the kidney or breast. Ductal adenocarcinoma is the most common histological type of pancreatic cancer. The others are rare and are: acinar cell carcinoma, adenosquamous carcinoma, various cystic tumours and neuro-endocrine neoplasms. Chemotherapy by itself is not very effective, but recent trials have demonstrated a survival benefit for patients who have received adjuvant chemotherapy following a successful resection of the primary pancreatic neoplasm.

15. Liver tumours

- a) Are usually primary neoplasms
- b) Hepatocellular carcinoma (HCC) is rarely associated with cirrhosis
- c) Usually present with severe derangement of liver function tests
- d) Are usually symptomatic
- e) Surgical removal of metastases from colo-rectal tumours is accepted treatment for solitary tumours

[Best Answer = e]

Explanation

Most malignant neoplasms of the liver are metastases, mainly from the lung, breast, colon or pancreas. Resection of liver metastases from a previous colorectal primary is accepted treatment for solitary metastases and selected patients with multiple metastases. However these patients have to be carefully staged and surgery forms a part of multi-disciplinary treatment. Hepatocellular carcinoma is the most common primary liver neoplasm and commonly occurs in a cirrhotic liver, though the fibro lamellar variety which is more common in young/middle females occurs in a normal liver and is associated with a better prognosis. Most liver masses can be asymptomatic for a long time and severe derangement of liver function is unusual except in the case of HCC occurring in a cirrhotic liver.

Case Studies

Case 1

A 55-year-old woman presents with a three-day history of upper abdominal pain radiating through to the region of her right scapula, which was intermittent initially, but has been constant for the past day. On examination she is febrile and has tenderness and guarding in the RUQ.

- a) What is your clinical diagnosis?
- b) What is the clinical sign which is usually thought to clinch the diagnosis?
- c) How will you investigate this patient?
- d) What is the confirmatory investigation?
- e) What are the initial steps in the management?
- f) What complications will you expect and look out for?
- g) What is the definitive treatment option?

Answers

- a) The most likely diagnosis would be acute cholecystitis. The initial intermittent nature of the pain would be compatible with biliary colic. As the gall bladder becomes progressively obstructed, inflammation occurs resulting in constant pain. Associated pyrexia indicates the likelihood of bacterial infection.
- b) A positive Murphy's sign is the clinching clinical finding. This is elicited by applying gentle pressure in the right hypochondrium with the flat of the right hand and asking the patient to breathe in deeply. A positive sign causes the patient to catch his/her breath due to irritation of the peritoneum lining the exterior of the gall bladder. Eliciting this sign results in great discomfort to the patient.
- c) Routine investigations would include FBC, LFTs, U + Es and serum amylase. Some abnormalities of LFTs are seen in 20% of patients mainly as raised alkaline phosphatase with or without raised bilirubin levels.
- d) An ultrasound scan of the abdomen may demonstrate oedema and thickening of the gall bladder wall associated with the presence

of peri-cholecystic fluid. Gall bladder stones are visualised in 90% of patients.

- e) Initial treatment is conservative — pain relief with opiates, I.V. rehydration and antibiotics — usually a broad spectrum cephalosporin in combination with metronidazole. Patients are restricted to clear fluids for the initial one to two days. About 10% of patients do not settle with this treatment and will need early cholecystectomy.
- f) The complications which can occur with acute cholecystitis are cholangitis, acute pancreatitis, empyema of the gall bladder, gangrenous cholecystitis, Mirizzi syndrome and chronic cholecystitis.
- g) The definitive treatment in patients who settle with conservative treatment is laparoscopic cholecystectomy which is usually performed six to eight weeks following the acute episode. Immediate surgery, however, is gaining in popularity and is as safe as delayed surgery.

Case 2

A 35-year-old male is brought to the A&E by the ambulance crew, who were called to his house by his wife. She reports that he was well six hours previously when he complained of sudden onset of severe upper abdominal pain radiating to the back. He subsequently started vomiting and has become progressively unwell. On examination he is conscious but severely dehydrated and shocked with a pulse of 120 beats per minute, BP 80/40, RR 26, SaO₂ 94% (room air). He has severe upper abdominal tenderness and guarding with no masses.

- a) What are your initial steps in the management of this patient?
- b) What are the differential diagnoses you would entertain and what investigations will you request?
- c) If this patient was diagnosed with acute pancreatitis what will be your next step?
- d) What investigations will this patient need once he is stable?
- e) How will you predict the severity of an attack of acute pancreatitis?
- f) What are the complications of acute pancreatitis?

Answers

- a) The priority is to resuscitate this patient. Assess airway breathing and circulation. The essentials are to achieve good secure venous access, send peripheral blood off for investigations and commence resuscitation with boluses of crystalloids. Supplemental oxygen is essential. Adequacy of resuscitation is assessed by estimating tissue or end organ perfusion. A urinary catheter to monitor urine output is essential. If haemodynamics do not improve with two to four litres of fluid replacement an intensivist should be involved, sooner rather than later.
- b) The differential diagnoses are acute pancreatitis, hollow viscus perforation, myocardial infarction, a dissecting aortic aneurysm and acute mesenteric ischaemia. The investigations (in addition to routine haematology and blood biochemistry) which will help in this situation are serum amylase, ECG, erect chest X-ray and an urgent contrast CT. A serum amylase level of three to four times more than the upper limit of normal laboratory value will confirm the diagnosis of acute pancreatitis in this setting. Free air under the diaphragm makes the diagnosis of perforated hollow viscous in 70% of cases. In a clinical situation where you very strongly suspect this and an erect CXR is normal, a CT scan will make the diagnosis. Acute MI can be diagnosed with its classical changes on an ECG, and elevated troponin “T” levels, however various ECG changes can occur in acute pancreatitis and an MI can occur in patients who have suffered an acute attack of pancreatitis. Most major vascular catastrophes can be diagnosed on a contrast CT scan.
- c) Following adequate resuscitation, including transfer to an intensive care/high dependency unit, the next step will be to assess severity of the episode of pancreatitis and to ascertain the cause of the attack.
- d) An urgent ultrasound scan within 24 hours of admission is indicated. This is because urgent ERCP is beneficial in severe acute biliary pancreatitis.
- e) The level of elevation of the serum amylase does not correlate with severity of the attack. Individual patient factors and biochemical measurements have been used to predict severity — increasing age, high BMI, biliary aetiology, elevated CRP, left-sided pleural effusion are all associated with a poorer prognosis.

However scoring systems which amalgamate various risk factors are much more reliable and there are various acute pancreatitis specific systems — Ranson’s score, Imrie’s score (Glasgow score) and the Balthazar CT grading system.

- f) The complications of acute pancreatitis can be classified as intra-abdominal and systemic. The systemic complications are the failure of various organ systems — ARDS, renal failure, cardiovascular failure and systemic sepsis which usually secondary to intra-abdominal sepsis. The intra-abdominal complications are acute peri-pancreatic fluid collections, pancreatic necrosis, infection within the pancreatic necrosis, development of pseudocysts and vascular complications like formation of pseudoaneurysms mainly of the gastro-duodenal and splenic arteries and portal/splenic vein thrombosis.

Case 3

A 68-year-old retired factory worker has been referred to the hospital with a three-week history of progressively deepening yellow colouration of eyes, dark urine and pale stools. He denies any pain. On examination he is icteric and a smooth mass is felt in the right upper abdomen.

- a) What is the most likely diagnosis?
- b) What investigations will be of use in confirming this?
- c) What is the pathophysiological basis for his symptoms?
- d) What are you able to feel on abdominal examination? State the relevant “law”.
- e) What are the treatment options?

Answers

- a) The most likely diagnosis is a malignancy of the head of the pancreas, the most common variety of which is a ductal adenocarcinoma of pancreas. A distal bile duct neoplasm (cholangiocarcinoma) or an ampullary adenocarcinoma could also occur but they are less common.
- b) A triple-phase contrast CT scan of the pancreas is usually able to confirm the diagnosis although endoscopic ultrasound may be necessary.

- c) This classical history can be summarised as “painless obstructive jaundice”. Dark urine results from urinary excretion of conjugated bilirubin. Pale stools indicate the absence of bile-derived pigments. All these can be explained by biliary obstruction, either intra-hepatic cholestasis (mainly due to drugs and due to severe viral hepatitis when the liver swells within its capsule causing compression of intra-hepatic biliary radicals) or extra-hepatic obstruction to bile flow usually due to calculi or tumours.
- d) The smooth palpable abdominal mass is most probably the gall bladder. Courvoisier’s law states that — if, in the presence of obstructive jaundice, the gall bladder is palpable, then the cause of jaundice is unlikely to be stones. If the jaundice is due to a common duct stone, then it is likely that recurrent episodes of previous inflammation would have caused fibrosis of the gall bladder wall, which would have prevented the gall bladder from distending to a size that is palpable.
- e) Surgical resection of the tumour is the best treatment. However many patients present late and are inoperable (80%). The location of the tumour dictates the type of operation. The most common location of pancreatic ductal adenocarcinoma is the head of the pancreas and the usual operation in this situation is a Pylorus Preserving Pancreatico-Duodenectomy (PPPD). These operations are major procedures and in addition to this being a resectable tumour, the patients have to be fit. For ductal adenocarcinoma, the five-year survival following resection is only 10% to 15%. If this tumour in the head of the pancreas is not operable (usually due to it involving the portal/superior mesenteric veins and/ arteries) then a self-expanding metal stent is used to relieve biliary obstruction. If gastric outflow obstruction is present due to duodenal stenosis (due to tumour growth) then biliary stenting can be combined with laparoscopic gastro-jejunostomy or a double bypass (gastric and biliary) can be performed at open operation. In patients who cannot undergo surgery, chemotherapy can be used but treatment is usually palliative.

Case 4

A 32-year-old male with a long history of intermittent binge drinking is referred by his GP when he develops progressive upper abdominal pain which was initially episodic. The pain is now constant and he has lost about two stones in weight over

the past month. On examination there is evidence of recent loss of weight. Abdominal examination is unremarkable.

- a) What would your working diagnosis be?
- b) What other symptoms could be present?
- c) What are the specific investigations of use in this patient?
- d) What are the causes for this disease condition?
- e) How would you treat him?

Answers

- a) The combination of chronic excessive alcohol consumption, upper abdominal pain and weight loss are classical of chronic pancreatitis. This is a disorder of the pancreas characterised by irreversible changes in its parenchyma and its ductal system. The abdominal pain is thought to result from chronic inflammation in the retro-peritoneum and also raised pressure in the pancreatic ductal system. There is loss of both exocrine and endocrine function of the gland causing malabsorption and insulin deficiency.
- b) Steatorrhea, that is bulky, greasy, offensive stools which float indicate exocrine deficiency. Insulin deficiency can cause weight loss, polyuria and polydipsia. Jaundice can occur due to biliary stricturing.
- c) A fasting blood sugar level, Hb1Ac, nutritional markers such as serum albumin, levels of trace minerals, vitamin B12, folic acid and iron levels. A faecal elastase estimation to confirm pancreatic exocrine deficiency. A triple phase contrast CT scan of the pancreas demonstrates the parenchymal changes. An MRCP can be used to image the ductal system of the pancreas. Endoscopic ultrasound scanning is very sensitive in detecting early changes of chronic pancreatitis and is used in screening for pancreatic cancer in high-risk patients (familial pancreatitis).
- d) Chronic excessive alcohol consumption is the main cause (70%). It is increasingly recognised that intermittent binge drinking is as harmful as chronic excessive use. Cholelithiasis only rarely causes chronic pancreatitis. Hereditary pancreatitis is well recognised and is associated with early onset and an increased risk of pancreatic cancer (50 times that of the general population). Tropical pancreatitis is a calcifying condition seen in South India.

- e) Treatment is directed at preventing further deterioration of the pancreas by abstaining from alcohol. Replacement with pancreatic enzymes and control of diabetes is important. Analgesia for pain relief, which could include opiates and involvement of chronic pain specialists. Involvement of the nutritional team at the outset is very beneficial. Various surgical procedures are employed to remove foci of inflammation and drain the pancreas. The most widely used procedure is Frey's procedure which is essentially a duodenum preserving resection of the head of the pancreas with drainage of the whole length of the pancreatic duct by means of a Roux-en-Y jejunal loop.

Case 5

A 60-year-old woman has just returned from a three-week holiday in Turkey. She has been referred to the outpatient clinic with a history of having developed upper abdominal pain whilst in Turkey which lasted four days. This was associated with a yellow tinge to her eyes and she was generally unwell. All these symptoms have resolved and she is now well.

- a) What are the possible diagnoses here?
- b) What other points will you elicit on history to further refine your diagnosis?
- c) List the investigations you would request and their utility?
- d) What is the treatment?
- e) What are the significant complications you would watch out for?

Answers

- a) The clinical picture of transient painful obstructive jaundice indicates temporary biliary obstruction, most commonly due to the passage of a CBD stone across the ampulla. On occasions a small blood clot (following biliary intervention) or a fragment of a neoplasm can produce the same symptoms.
- b) History should be able to distinguish between hepatic and obstructive causes of jaundice. Hepatitis can cause similar symptoms (though the jaundice lasts longer), and in a setting of foreign travel this should be borne in mind.
- c) A full haematological and biochemical profile including LFTs are basic. A viral hepatitis screen should be performed. An ultrasound

of the gall bladder will detect gall bladder calculi and the size of the bile ducts both within and outside the liver. An MRCP is the next investigation to look for biliary ductal calculi even if the LFTs are minimally abnormal. An endoscopic ultrasound of the CBD can be performed if the probability of the presence of a CBD stone is high (dilated ducts on USS, elevated bilirubin and liver enzymes). The advantage is that along with diagnosis, an ERCP and extraction of ductal calculi can be performed in the same sitting.

- d) If CBD stones are present then the options are between ERCP, sphincterotomy and CBD stone extraction followed by laparoscopic cholecystectomy and laparoscopic cholecystectomy, intra-operative cholangiography and laparoscopic CBD stone extraction.
- e) A spiking temperature may indicate the development of cholangitis which can be life-threatening. Acute cholangitis needs urgent treatment with intravenous antibiotics and relief of biliary obstruction by ERCP and further procedures as necessary. Acute pancreatitis is another potential complication.

Extended Matching Questions

EMQ 1

- a. Liver function tests
- b. Ultrasound scan of abdomen
- c. Clotting studies
- d. Full blood count
- e. Hepatitis viral serology
- f. MRCP
- g. ERCP
- h. CT scan of abdomen
- i. Liver biopsy
- j. Upper GI endoscopy
- k. Faecal elastase
- l. Serum amylase

Select the investigation of choice from the list above, which will aid in diagnosis of further management for the following descriptions of patients:

- 1) A young male presented to his GP with a five-day history of fever and non-specific ill health associated with RUQ pain. His GP found abnormal LFTs and organised an USS of the abdomen, which was normal. The patient has now recovered and has been referred to the hospital for further investigation.
- 2) An elderly female patient is due to undergo an ERCP the following morning. You have been given a message by the doctor previously on-call to “take a blood test”. What will you specifically request?
- 3) A middle-aged female patient has been admitted through the A&E with obstructive jaundice confirmed biochemically. What is your next investigation?
- 4) A 70-year-old female presented with back pain and extreme weight loss. Her GP organised an USS, which has suggested a mass in the body of the pancreas.
- 5) A middle-aged patient with an eight-month history of abnormal LFTs but normal USS and normal MRCP.
- 6) A young male presents with a 12-hour history of upper abdominal pain. The nurse practitioner in the A&E has organised an erect CXR which is normal. Other routine investigations are awaited. What test will you ensure has been requested?

Answers

1) e.

Viral hepatitis is a common cause of this clinical picture. It would of course be usual that the LFTs would be repeated in the outpatient setting to confirm they had returned to normal.

2) c.

Identification and correction of clotting abnormalities is essential before any invasive procedure.

3) b.

An USS is the first investigation in a patient with jaundice.

4) h.

A CT scan with pancreatic protocol will stage this lesion in the pancreas accurately and will direct further investigation.

5) i.

This patient's history is strongly suggestive of chronic hepatitis as evidenced by LFTs being abnormal for more than six months. A liver biopsy will determine the cause of chronic hepatitis.

6) l.

Acute pancreatitis is high on the list as an alternative diagnosis and a serum amylase estimation will help to diagnose it.

EMQ 2

- a. Biliary colic
- b. Head of pancreas malignancy
- c. Chronic pancreatitis
- d. Liver abscess
- e. Hepatitis
- f. Acute pancreatitis
- g. Cholangitis
- h. Oesophagitis
- i. Mallory-Weiss syndrome

Select the most appropriate diagnosis from the list above for the individual description of patients below:

- 1) A 70-year-old male is referred with a six-week history of feeling unwell and a week's duration of yellow colouration of the eyes associated with pale stools and dark urine.
- 2) A 40-year-old publican presents with steatorrhea associated with progressive loss of weight.
- 3) A middle-aged female reports intermittent episodes of right upper abdominal pain radiating through to the back. Examination is unremarkable.
- 4) A 55-year-old accountant who works for a financial institution has returned from a six-month period of work in the Africa. He has been suffering intermittent fever associated with chills for the past few weeks. Persistent dull upper abdominal pain has prompted him to seek medical opinion. He is febrile with a tender fullness in the RUQ.
- 5) A university student has self-presented to the A&E with a 12-hour history of severe epigastric pain radiating to the back associated with numerous episodes of vomiting. He is afebrile but significantly dehydrated and demonstrates tenderness in the epigastrium.
- 6) A 60-year-old woman who is known to have a benign biliary stricture with a plastic stent in the common bile duct presents with a spiking temperature. On examination she is icteric and has a pulse of 100 beats per minute with a blood pressure of 100/60.

Answers

1) b.

Painless obstructive jaundice usually signifies a malignancy in the region of the head of the pancreas.

2) c.

Chronic pancreatitis can cause both exocrine and endocrine deficiency of the pancreas. The former is manifested by diabetes mellitus and the latter by steatorrhea. Weight loss can be a symptom of both.

3) a.

Cholelithiasis typically causes colicky RUQ pain which radiates posteriorly to the angle of the scapula.

4) d.

A liver abscess is likely. If the abscess is pyogenic, then a search for the cause of the abscess will be needed. Percutaneous drainage and appropriate antibiotics is the initial management.

5) f.

The differential diagnoses here include acute gastritis and a perforated peptic ulcer.

6) g.

Any foreign body in the biliary system predisposes to infection. She will need replacement of the biliary stent.

EMQ 3

- a. Laparoscopic cholecystectomy
- b. Percutaneous transhepatic cholangiography and biliary drainage (PTC and PTBD)
- c. Endoscopic retrograde cholangio-pancreatography (ERCP)
- d. Pancreatoduodenectomy (Whipple operation)
- e. Insertion of metal biliary stent
- f. Palliative treatment
- g. Frey's procedure
- h. Investigate for other causes of symptoms

With regard to the following patients, select the appropriate treatment from the list above:

- 1) A localised head of pancreas mass with radiological and cytological features of malignancy.
- 2) An inoperable mass in the body of the pancreas.
- 3) A large mass in the head of the pancreas with metastases to the liver causing biliary obstruction.
- 4) Documented common bile duct stones in a patient who has undergone laparoscopic cholecystectomy 12 years ago.
- 5) A young woman with lower abdominal pain whose ultrasound scan demonstrates gall bladder stones.

Answers

1) d.

Surgery is the best treatment option, as it affords the best chance of long-term survival. Chemotherapy is mainly used in the palliative setting. However recent trials have demonstrated its usefulness in an adjuvant setting in patients who have undergone a complete resection of the tumour.

2) f.

Pain is a significant symptom in advanced pancreatic malignancies and its relief demands opiates and on occasion procedures such as coeliac plexus block or splanchnicectomy.

3) e.

This patient will invariably have biliary obstruction which is best palliated by a metal stent

4) c.

Laparoscopic bile duct exploration is another option if ERCP fails.

5) h.

Around 15%–20% of the population have asymptomatic gall stones and only one in ten of these will develop symptoms over the five years following the detection of gall bladder stones. Lower abdominal pain is not a manifestation of biliary tract stones.

EMQ 4

- a. Progressive weight loss
- b. Worsening back pain
- c. Rapid worsening of liver function tests
- d. Unrelenting RUQ pain in a patient with known gall bladder stones
- e. Itching
- f. Jaundice associated with fever, chills and rigours in a patient awaiting laparoscopic cholecystectomy
- g. Loss of appetite
- h. Worsening jaundice
- i. Oedema
- j. Spiking temperature

Suggest the most relevant symptom from the above list for the following diagnosis:

- 1) Onset of diabetes in a patient with chronic pancreatitis.
- 2) Development of hepatocellular carcinoma in a patient with cirrhosis.
- 3) Development of pancreatic necrosis in a patient being treated for acute pancreatitis.
- 4) Onset of acute cholecystitis.
- 5) Onset of cholangitis.
- 6) Malignant change in chronic pancreatitis.

Answers

1) a.

Progressive weight loss in spite of adequate supplementation of pancreatic exocrine enzymes indicates onset of diabetes. The other cause is development of malignant change in the pancreas.

2) c.

This may be difficult to detect and specialised imaging may be needed — MR/lipoidol CT/contrast enhanced USS.

3) j.

A contrast CT is indicated. Radiological, endoscopic or surgical treatment may be needed.

4) d.

Treatment is conservative either followed by delayed surgery or immediate laparoscopic cholecystectomy.

5) f.

The triad of jaundice, abdominal pain and fever is pathognomonic of cholangitis and aggressive antibiotic treatment along with prompt treatment of the cause is indicated.

6) b.

Back pain is characteristic alongside progressive weight loss. The change to neoplasia from inflammation is difficult to prove and the disease is usually inoperable in these patients.

EMQ 5

- a. Insulinoma
- b. Hyperlipidaemia
- c. Pancreas divisum
- d. Adenoma of liver
- e. Metastatic carcinoid tumour
- f. Haemangioma of liver
- g. Cirrhosis
- h. Hilar cholangiocarcinoma
- i. Multiple endocrine neoplasia-1 (MEN1)

Select the most appropriate diagnosis from the list above for the following clinical presentations:

- 1) A middle-aged male presents with recurrent episodes of altered behaviour for which he has been laid off from his job as a clerk in a government office. He has high serum C-peptide levels.
- 2) Dilated intra-hepatic ducts with non-visualisation of the extrahepatic biliary tree on ultrasound scan in a jaundiced 50-year-old previously fit female.
- 3) Recurrent episodes of acute pancreatitis in a 40-year-old who does not drink alcohol and has no gall stones but has a strong family history of early onset cardiovascular disease.
- 4) Recurrent sudden episodes of flushing and sensation of warmth all over the body in a patient who has undergone a right hemicolectomy many years ago.
- 5) A liver mass picked up on ultrasound scanning for lower abdominal pain in a young woman. She has been on the oral contraceptive pill for the past eight years.

Answers

1) a.

Whipple's triad was described by Allen O. Whipple in the 1930s in order to identify which patients would benefit from surgery for an insulinoma. The three conditions that needed to be met were:

- Symptoms and signs of hypoglycaemia, i.e. confusion, personality changes, tachycardia, seizure, stupor, coma, with or without focal neurologic findings.
- Blood sugar levels below 50 mg per 100 ml, measured at the time of the symptoms.
- Recovery from an attack following the administration of glucose.

2) i.

Malignancy of the biliary epithelium is most common in the hilum of the liver. Treatment involves relief of jaundice followed by surgical resection which is usually extremely complex.

3) b.

Biochemical causes of recurrent pancreatitis should always be sought and treated.

4) e.

The primary was probably located in the segment of bowel excised many years ago, but the possibility of a synchronous primary should be investigated.

5) d.

Patient should discontinue hormonal methods of contraception. Adenomas have the potential for malignant change and are prone to bleed spontaneously and therefore need careful surveillance or surgical resection.