

'Fully updated in line with
new MRCP exam format'

CASE HISTORIES FOR THE MRCP

Second Edition



**Paul Goldsmith
Robert Semple**

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MRCP**

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MRCP**

Second edition

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Introduction



The dramatic changes in medical training over the past six years have included an overhaul of the MRCP examinations. To address this, *Case Histories for the MRCP* has been completely rewritten to mirror the style of the new examination and thus to optimize the preparation of the prospective candidate. Some cases have been removed and new ones have been added. Many are now integrated cases involving case history, data handling and picture interpretation. Answers are in the new 'select from a range of possibilities' style. While the format has changed, two integral features of the first edition have been maintained. First, we make no apologies that these questions are tough: easy questions provide false reassurance. We aim to help give candidates the edge in those difficult questions that discriminate at the top end of the field. Second, we have retained in-depth explanations of why we think the given answer to be best, as engagement in the process of clinical reasoning is not only a key aim of the book but also, we believe, the best way to acquire the skills that are tested in the MRCP examination.

Robert Semple has joined me as co-author for this second edition. His extensive MRCP teaching experience and ongoing general medicine training as a medical specialist registrar at Addenbrooke's Hospital have helped ensure the value and relevance of this book.

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■ Questions ■

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Exam 1

Case 1.1

A 66-year-old retired sheep farmer presents with a persistent cough, dating from a cold some nine months ago. He has become more short of breath on exercise, and he wheezes occasionally, although he dismisses these symptoms as being due to his increasing weight following retirement. On examination, he is short, stocky and overweight. His breathing is somewhat noisy but his chest is clear on auscultation. Neurological examination is normal. There is no fatigability.

Full blood count and electrolytes are normal. ESR 7 mm/h. Static and dynamic lung volumes are normal (FEV₁ 2.8l). PEF 200 l/min.

1. Which of the following pathologies best fits this clinical scenario?
 - a) Hypersensitivity pneumonitis
 - b) Chronic obstructive pulmonary disease
 - c) Obstructive sleep apnoea
 - d) Multinodular goitre

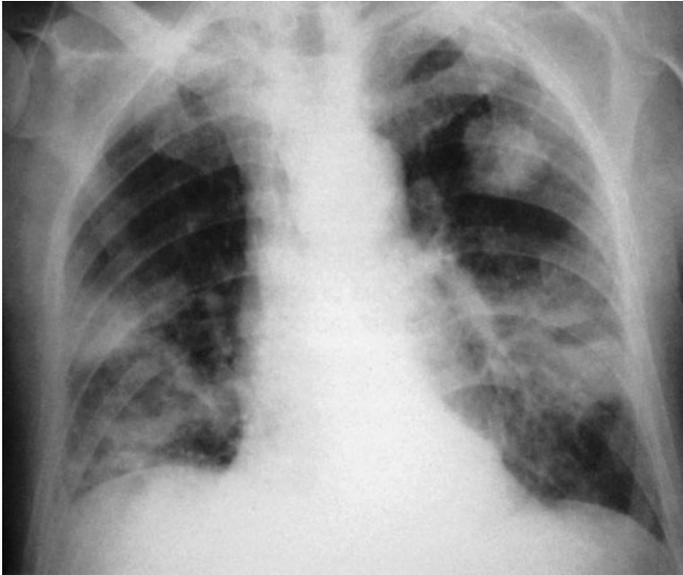
2. Choose the three initial investigations most likely to be helpful:
 - a) Plain chest radiograph
 - b) Flow-volume loop
 - c) Serum precipitins
 - d) Serum IgE
 - e) Serial peak flows
 - f) CT chest/neck
 - g) Bronchoscopy
 - h) Polysomnography

Case 1.2

A 22-year-old student presented with a three-day history of a severe sore throat. During the previous 24 hours he had developed a tender neck, rigors, increasing shortness of breath, and a cough productive of purulent sputum. There was no past medical history, infectious contacts, foreign travel or intravenous drug abuse. On examination he was extremely unwell.

Temperature 39.8 °C. Blood pressure 100/50 mmHg. Pulse 120 bpm.

He had marked pharyngitis and tender cervical lymphadenopathy. His respiratory rate was 30/min and diffuse chest crepitations were audible. The chest radiograph is shown below:



Ultrasound of the neck showed a non-compressible right internal jugular vein with no detectable blood flow.

1. Choose the single best diagnosis from the following:
 - a) Infectious mononucleosis
 - b) Vincent's angina
 - c) Group A streptococcal infection
 - d) Lemierre's disease
 - e) Lymphoreticular malignancy

2. Which of the following treatments would you institute?
 - a) Supportive care only
 - b) Intravenous benzylpenicillin and metronidazole
 - c) Intravenous benzylpenicillin
 - d) Intravenous aciclovir, ciprofloxacin and fluconazole
 - e) High-dose oral phenoxymethylpenicillin

Case 1.3

A 56-year-old lady presented with a month's history of intermittent high fevers. Her only past medical history was of type 2 diabetes controlled by tolbutamide. There were no other symptoms or features of note in the history. Specifically, she had never been abroad or exposed to TB and she had no animal exposure. On examination, she was febrile at 38.2 °C, but no other abnormality was detected.

Hb 10.2 g/dl. White cell count $8.3 \times 10^9/l$. Rheumatoid factor, ANA and AMA all negative. Syphilis, hepatitis A, B and C, HIV, *Toxoplasma*, *Brucella*, CMV, EBV and *Toxocara* serology all negative. Complement levels normal. CT abdomen and thorax normal. Repeated blood cultures and urine culture negative. Serial early morning urine samples negative for AFBs. Tuberculin testing (to one in 10) negative.

Liver function tests were abnormal, however, prompting a liver biopsy, which showed non-caseating granulomata. No bacilli were seen with the Warthin–Starry stain. Silver staining and specific immunostaining were normal. The bile ducts were preserved. There was no response to an empirical course of anti-tuberculous chemotherapy.

1. Choose the most appropriate next step from the following:
 - a) Bronchoalveolar lavage and biopsy
 - b) Indium-labelled white cell scintigraphy
 - c) Colonoscopy and biopsy
 - d) Kveim test
 - e) Analysis of T-cell receptor gene rearrangements
 - f) Withdrawal of tolbutamide
 - g) *Bartonella* serology
 - h) Course of corticosteroids
 - i) PCR of liver tissue for *Tropheryma whippelii*
2. Should the first step fail to suggest a diagnosis, choose a further course of action from the above list.

Case 1.4

A 30-year-old lady presented with increasing shortness of breath over six months. An echocardiogram supported the clinical diagnosis of a dilated cardiomyopathy. Angiography excluded an ischaemic cause. Her past medical history was unremarkable, although she had gone through the menopause prematurely two years previously. She deteriorated rapidly, and underwent an emergency cardiac transplant. The surgeon made the diagnosis.

1. Which of the following additional findings would be consistent with the unifying diagnosis?
 - a) Bitemporal hemianopia
 - b) History of postpartum haemorrhage

- c) Erythema nodosum
- d) Strongly positive thyroid autoantibodies
- e) Radiographic evidence of chondrocalcinosis

Case 1.5

A 45-year-old man presented with a four-month history of episodic dizziness provoked by sudden head movement together with a lack of co-ordination. In his past medical history, he had had an atrial septal defect (ASD) corrected surgically at age 12. More recently he had been taking sleeping tablets following the death of his mother from a renal cell carcinoma. On examination, he exhibited rotatory nystagmus on left gaze, cerebellar signs in his left arm, and an ataxic gait veering to the left. Cranial nerve and limb examination was otherwise normal.

1. Select the best diagnosis from the following:
 - a) Left-sided cerebellar haemangioblastoma
 - b) Right-sided cerebellar haemangioblastoma
 - c) Left-sided cerebellar signs secondary to sleeping tablet toxicity
 - d) Right-sided cerebellar signs secondary to sleeping tablet toxicity
 - e) Left-sided cerebellar medulloblastoma
 - f) Right-sided cerebellar medulloblastoma
 - g) Lowes syndrome (oculo-cerebro-renal syndrome)
2. Choose the single most pertinent investigation from each of the following three groups:
 - a) MRI posterior fossa
 - b) Sleeping tablet toxicity screen
 - c) Renal biopsy
 - d) Haemoglobin estimation
 - e) Creatinine levels
 - f) Creatine levels
 - g) Caeruloplasmin levels
 - h) Retinal angiography
 - i) Slit-lamp examination of cornea
 - j) Slit-lamp examination of lens
 - k) Oculonystagmography

Case 1.6

A 58-year-old builder presented with an eight-hour history of left iliac fossa pain. He felt nauseated and he had vomited once. While waiting for the ambulance he had a bout of diarrhoea, in which he thought he could see blood. He had suffered

with similar, but milder, pain over the preceding two months, which he thought was associated with food. In his past medical history, he had well-controlled angina for four years and grade 1 sarcoidosis at age 25, which settled spontaneously. On examination, his temperature was 37.8 °C. His left iliac fossa was tender, although there was no guarding. Bowel sounds were present and rectal examination was normal. No other abnormality was detected.

A plain abdominal radiograph of the patient is shown below:



1. Which of the following best describes this appearance?
 - a) Rigler's sign is positive
 - b) It is within normal limits
 - c) There is evidence of toxic megacolon
 - d) There is evidence of colonic mucosal oedema
 - e) It shows a 'drainpipe' colon
2. What is the most likely diagnosis?
 - a) Inflammatory bowel disease
 - b) Sigmoid diverticulosis
 - c) Ischaemic colitis
 - d) Colonic carcinoma
 - e) Colonic infarction

3. What is the next investigation?
 - a) Rigid sigmoidoscopy and biopsy
 - b) Double-contrast barium enema
 - c) Mesenteric angiography
 - d) Exploratory laparotomy
 - e) Colonoscopy and biopsy

Case 1.7

An 18-year-old carpenter presented with pain in his right loin. Two months previously he had passed some grit in his urine. His GP had sent a sample of urine for microscopy. This reported the presence of hexagonal crystals. His past medical history was otherwise unremarkable, and he took no medications. His uncle had a history of renal stones. Examination was normal except for a tender right flank.

Hb 13.5 g/dl, white cell count $14.6 \times 10^9/l$. Electrolytes, liver function, calcium and phosphate all normal. 24-hour urine calcium excretion normal. Intravenous pyelogram (IVP) faintly radio-opaque stag-horn calculus in right renal pelvis. No evidence of collecting system cysts.

1. What is the diagnosis?
 - a) Chronic *Proteus* infection complicated by magnesium ammonium phosphate calculus
 - b) Cystinosis
 - c) Type 1 hyperoxaluria
 - d) Cystinuria
 - e) Type 2 hyperoxaluria
2. Choose one confirmatory investigation from the following:
 - a) Urine sodium nitroprusside test
 - b) Serial midstream urine samples for culture, and culture of stones
 - c) Ehrlich's aldehyde test of urine
 - d) Urinary oxalate assay
 - e) Urinary citrate assay

Case 1.8

A 78-year-old lady was found collapsed in her bedroom at her residential home. She had got up to go to the toilet and discovered a weakness on one side of her body. Her past medical history was unremarkable except for bad osteoarthritis of her knees and hips. She smoked ten cigarettes per day and enjoyed her sherry. She took ibuprofen for pain. On examination, she had a right homonymous hemianopia and

right-sided facial weakness. She had an expressive dysphasia. The remainder of the cranial nerve examination was normal. In her limbs she had grade 3/5 weakness on the right in a pyramidal distribution, with corresponding hyperreflexia and an up-going right plantar. Her blood pressure was 170/95 mmHg and a left carotid bruit was audible. The remainder of the examination was normal.

Hb 12.5 g/dl, white cell count $12.4 \times 10^9/l$ (neutrophils 70%, lymphocytes 29%), platelets $330 \times 10^9/l$, clotting studies normal, Na 138 mmol/l, K 5.4 mmol/l, urea 28.5 mmol/l, creatinine 550 $\mu\text{mol/l}$, albumin 38 g/l, Ca 1.7 mmol/l, PO_4 2.2 mmol/l, urate 480 $\mu\text{mol/l}$ (normal: 150–390 $\mu\text{mol/l}$). CXR and ECG normal.

1. What is the likely cause of the renal failure?
 - a) Rhabdomyolysis
 - b) Hypertension
 - c) NSAID-induced damage
 - d) Hypoparathyroidism

2. Give one investigation to confirm your answer to question 1:
 - a) Renal ultrasound
 - b) Renal angiogram
 - c) Urine dipstick plus microscopy
 - d) Urine microscopy and eosinophil count
 - e) PTH level
 - f) Renal biopsy
 - g) Vitamin D level

3. Give one specific management for your answer to question 1:
 - a) Alkalinization of urine
 - b) Stop NSAIDs
 - c) Fluid restrict
 - d) ACE inhibition
 - e) Intravenous calcium gluconate

Case 1.9

A 35-year-old alcoholic was found lying in the gutter unconscious. He looked malnourished, with nicotine-stained fingers, bilateral Dupuytren's contractures and several spider naevi. His temperature was 36.8 °C, respiratory rate 24/min, blood pressure 100/60 mmHg, and pulse 80/min. Heart sounds were normal, as were chest and abdominal examinations. There was no facial or skull bruising and no neck stiffness. His GCS was 5. He extended his limbs to pain. Pupils were equal at 4 mm. Pupillary and corneal reflexes were normal. His eyes were dysconjugate, but oculocephalic reflexes were intact. Limb tone was increased, with brisk reflexes and bilateral up-going plantars. Finger-prick glucose was 3.6 mmol/l. No response to

50 ml 50% dextrose. Urea and electrolytes were normal. He remained unconscious throughout the next 24 hours. CT head scan was normal.

1. What is the most likely diagnosis?
 - a) Brainstem infarct
 - b) Hepatic encephalopathy
 - c) Herpes simplex encephalitis
 - d) Post-alcoholic seizure
 - e) Subarachnoid haemorrhage
 - f) Overdose

Case 1.10

A 50-year-old lady presented with a one-month history of fatigue and depression. She had lost her appetite and had noticed some weight loss. She complained that the shape of objects appeared distorted and out of alignment. On examination she appeared depressed, but examination was otherwise normal. Full blood count, electrolytes, calcium, phosphate, thyroid function and immunoglobulins were all normal. Syphilis and HIV serology were negative. She was commenced on fluoxetine. On review one month later, she was brought into the clinic with the assistance of her husband. She claimed to be unable to see and needed guiding to her chair. Her husband reported that she was extremely apathetic and generally unable to perform any of her normal daily tasks. On examination she sat silently, displaying little spontaneous activity except for occasional jerking of her limbs. However, she did exhibit a marked startle response to an unexpected hand-clap. Attempts at higher mental function testing were limited to three- and four-word responses, most of which were inappropriate. She said she could not see any of the picture boards. However, fundoscopy and pupillary reactions were normal. The remainder of the cranial nerve examination was normal. Limb power seemed intact, with normal reflexes but bilateral up-going plantars. General examination was normal.

CT was normal. CSF: no cells, protein 0.4 g/l, no oligoclonal bands.

1. What is the most likely diagnosis?
 - a) Variant Creutzfeldt–Jakob disease (vCJD)
 - b) Creutzfeldt–Jakob disease (CJD)
 - c) Fluoxetine side effect
 - d) Huntington's chorea
 - e) Lithium intoxication
 - f) Alzheimer's disease with myoclonus
 - g) Depressive stupor
 - h) Limbic encephalitis

Exam 2

Case 2.1

A 77-year-old retired cabinetmaker was seen in the urgent assessment clinic with a slow-to-resolve pneumonia. His GP had requested a CXR after symptoms had persisted despite a course of oral antibiotics. This was reported as showing 'collapse/consolidation of the right upper zone with a suggestion of increased density at the right hilum'. The patient himself was vague about his history, saying he had suffered with wheezy bronchitis since his teens, and more recently with a regular winter pneumonia. He smoked 20 cigarettes per day. When asked about his medication, he emptied a plastic bag full of an assortment of inhalers and a nasal spray on to the clinic desk, admitting to using them only when he felt it necessary. A repeat CXR now showed additionally some left perihilar consolidation.

Na 132 mmol/l, K 4.6 mmol/l, urea 9.7 mmol/l, creatinine 132 μ mol/l, Hb 14.8 g/dl, white cell count $14.2 \times 10^9/l$ (neutrophils $8.3 \times 10^9/l$, lymphocytes $2.4 \times 10^9/l$), platelets $356 \times 10^9/l$.

1. What is the most likely diagnosis?
 - a) Allergic bronchopulmonary aspergillosis (ABPA)
 - b) Hypersensitivity pneumonitis (woodworker's lung)
 - c) Churg–Strauss syndrome
 - d) *Mycoplasma pneumoniae*
 - e) Bronchoalveolar carcinoma
2. Choose the best of the following options for further investigation:
 - a) High-resolution chest CT and bronchoalveolar lavage with transbronchial biopsy
 - b) ANCA determination and bronchoalveolar lavage with transbronchial biopsy
 - c) High-resolution chest CT and precipitins against wood dust and *Alternaria* antigens
 - d) High-resolution chest CT and *Aspergillus* skin prick test
 - e) *Mycoplasma* IgM ELISA and cold agglutinin determination

Case 2.2

A 48-year-old man with poorly controlled diabetes presented with a five-day history of increasingly severe right-sided facial pain, fever and blocked nose. On examination

he was very dehydrated, confused and slightly drowsy. His temperature was 39.2 °C. There was swelling over the right maxilla with slight erythema, and unilateral nasal obstruction with a necrotic inferior turbinate. Palatal ulceration was evident. There was no proptosis.

Hb 13.6 g/dl, white cell count $20.4 \times 10^9/l$. Blood glucose 44 mmol/l. Urine ketones ++++. Standard diabetic ketoacidosis management was initiated.

1. What is the most likely diagnosis?
 - a) Poorly controlled diabetes, bacterial sinusitis, and cavernous sinus thrombosis
 - b) Diabetes and Wegener's granulomatosis
 - c) Diabetes and necrotizing fasciitis
 - d) Poorly controlled diabetes and rhinocerebral mucormycosis
 - e) Poorly controlled diabetes, bacterial sinusitis, and subdural empyema
2. Select the next step:
 - a) Multiple blood cultures, head CT, and empirical broad-spectrum antibacterial agents
 - b) Head CT, CSF analysis, and empirical broad-spectrum antibacterial agents
 - c) Head CT, surgical debridement and urgent histology, and intravenous amphotericin B
 - d) Head CT, cANCA, CXR, urinalysis, and intravenous steroids
 - e) Head CT, surgical debridement, and broad-spectrum antibacterial agents

Case 2.3

A 60-year-old man had his congenitally bicuspid valve replaced uneventfully with a mechanical prosthesis. Six weeks post-surgery, he developed recurrent fevers. On examination he was febrile at 38.4 °C, with a clinical small left-sided pleural effusion and soft systolic murmur in the aortic area. No other abnormality was found. In particular, there was no regurgitant murmur, the prosthetic closing sound was crisp, and there were no stigmata of infective endocarditis.

CXR: small left pleural effusion, valve prosthesis. Transthoracic echo: well-sited prosthetic valve. Moderate pericardial effusion, but no evidence of tamponade. Repeat blood cultures: no growth. MSU: no growth. Sputum culture: no growth. ECG: first-degree heart block, low voltages generally.

1. Select the three statements from the following that are most appropriate to the clinical scenario:
 - a) Transfusion-associated CMV infection is the likely diagnosis
 - b) Potential complications include constrictive pericarditis and pericardial tamponade
 - c) Perioperative infection with an organism of low virulence, such as a coagulase-negative *Staphylococcus*, is most likely
 - d) Immediate pericardial aspiration for culture is mandatory

- e) 10–20% of patients may experience a similar syndrome after cardiac surgery
- f) Intravenous vancomycin would be appropriate empirical therapy
- g) Treatment with NSAIDs is likely to lead to rapid clinical resolution
- h) First-degree heart block is strong evidence for an aortic root abscess
- i) Ultimately, a repeat aortic valve replacement is likely to be necessary

Case 2.4

A 30-year-old Indian restaurant employee presented with a four-month history of fevers. He felt quite well and had sought medical attention only on account of weight loss. He had no relevant past medical or family history. On examination he was thin and pale, with palpable lymph nodes in his axillae, cervical chain and groin. He had 4-cm smooth hepatomegaly and 15-cm splenomegaly. There were no stigmata of chronic liver disease. His ankles were swollen, but cardiovascular and respiratory examinations were otherwise normal. His temperature was 38.2 °C.

Hb 6.6 g/dl, white cell count $1.8 \times 10^9/l$, platelets $100 \times 10^9/l$. Film: normochromic, normocytic anaemia. No malaria parasites on three separate thick and thin films. Albumin 22 g/l, total protein 70 g/l.

1. Select the most likely diagnosis from the following:
 - a) Chronic brucellosis
 - b) Non-Hodgkin's lymphoma
 - c) Tropical splenomegaly syndrome
 - d) Visceral leishmaniasis
 - e) *Schistosoma mansoni* infection
 - f) Miliary tuberculosis
2. Which of the following investigations is likely to be diagnostic?
 - a) Leishmanin skin test
 - b) Heaf test
 - c) Histological examination of bone marrow aspirate
 - d) Histological examination of rectal biopsy
 - e) Prolonged culture of blood

Case 2.5

A man presents with a novel neurological syndrome. The extended family are traced and examined:

1. What is the likely mode of inheritance?
 - a) Autosomal dominant

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