

Mastering EMQs

Most of us will take an exam at some point that involves EMQs. **Ian Bickle** takes us through this new style of exam and gives advice on how best to tackle them

Extending matching questions (EMQs) have become widely used for both undergraduate and postgraduate examinations. They now feature in final examinations in the United Kingdom as they are thought to be valuable in assessing both the level and application of knowledge.

Based around a theme, such as a symptom, sign, diagnosis, set of investigations, or a topic in basic sciences, EMQs assess the ability of the candidate to process and evaluate information.

Let's go through a few questions and focus on how they should be approached. We will start with an undergraduate favourite—the clinical sign of finger clubbing.

Theme: finger clubbing

- A—Alcoholic cirrhosis
- B—Congenital cyanotic heart disease
- C—Cryptogenic fibrosing alveolitis
- D—Empyema
- E—Infective endocarditis
- F—Inflammatory bowel disease
- G—Mesothelioma
- H—Pulmonary abscess
- I—Squamous cell carcinoma
- J—Tuberculosis

The patients below all have clubbing of the fingers. Choose the most appropriate diagnosis from the above list.

(1) A 44 year old investment banker who recently spent several months working in Thailand presents to her general practitioner (GP) with weight loss, malaise, and a productive cough. Sputum culture after five days is negative.

(2) A 71 year old retired electrician presents to his GP with pleuritic chest pain and dyspnoea. After initial investigations, a computed tomography scan of the chest shows a right pleural effusion with lobular pleural thickening in the right mid-zone.

(3) A 28 year old man intravenous drug abuser presents to the emergency department feeling unwell with intermittent fevers and weight loss. He is found to have a raised jugular venous pressure, a pansystolic murmur at the left sternal edge that is accentuated by inspiration, and a pulsatile liver.

(4) An 84 year old woman who worked in a munitions factory during the second world war presents to her GP with abdominal pain, constipation, polyuria, cough, haemoptysis, and weight loss. A chest x ray film taken three years ago showed multiple pleural plaques only.

(5) A 52 year old man presents to his GP with dyspnoea. On examination he is cyanosed and mildly dyspnoeic at rest, with fine late inspiratory crackles heard bilaterally in the chest.

Approaching the EMQ

There are several processes to go through (see box 1).

To start with, identify clearly the theme, in this case finger clubbing. Then carefully read the introductory statement. In the above example, the key points to take away are that the patients all have finger clubbing and that you should choose the most appropriate diagnosis. This in itself implies that several diagnoses may be suitable, but one is superior, that is to say, most correct. Finally, you must match each of the vignettes (1-5) with one of the options (A-J). Note that each option may be used once, more than once, or not at all. On occasion, more than one option may be correct for any one vignette, but you should choose the best option available.

Two main approaches can be taken, which to some extent depend on your level of knowledge and confidence.

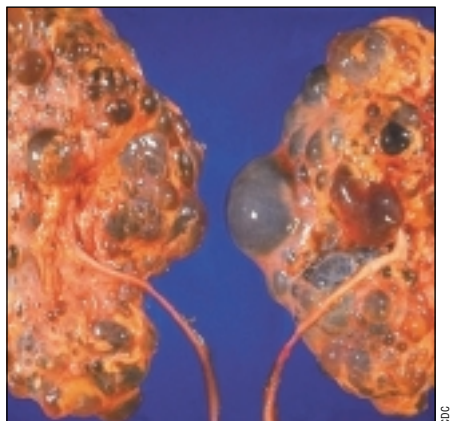
The first approach is to read the vignettes—in this case clinical scenarios—and write down an answer or differential diagnosis, without viewing the options available. Then, refer to the options and see if your preferred diagnosis or one of the differentials appears in this list. If you wrote only a single answer down and it appears in the option list it is very likely to be the correct answer.

The second approach is to review the

Box 1: General approach to an EMQ

- (1) Identify the theme
- (2) Read the introductory statement
- (3) Read the first vignette and try to write down an answer
- (4) Select the correct answer from the list of options
- (5) Repeat steps three and four with the remaining vignettes

potential options after reading the vignettes, then match appropriately. This is the method that you might resort to when your knowledge of a particular theme is limited.



Polycystic kidneys

Narrowing down the answer

To make the task more straightforward, take advantage of all the information on offer. Use the pointers offered in the vignettes to narrow down the potential answers and return to the modified list for further more refined thinking. Similarly, do not be caught by the distracters slipped into statements.

In the above EMQ, vignette three gives the clinical scenario of a 28 year old. This in itself immediately narrows the list down to half. The only likely conditions for someone of this age from the list of options are congenital cyanotic heart disease, infective endocarditis, inflammatory bowel disease, tuberculosis, and pulmonary abscess. You are also told that the patient has cardiovascular signs. This information narrows the options further to either congenital cyanotic heart disease or infective endocarditis.

Now apply your knowledge of cardiology. A pulsatile liver is a sign of tricuspid regurgitation, which also causes a murmur at the lower left sternal edge. This is a right sided valve, and intravenous drug misusers are predisposed to infective endocarditis affecting right sided valves. You have the answer.

In vignette four, a much older patient is outlined. Again, you should extract the key pointers from this—she is 84 years of age, worked in a munitions factory and a chest x-ray taken three years ago showed pleural plaques. All this suggests occupational exposure to asbestos.

Without looking at the options you may recall types of asbestos related lung disease—bronchial carcinoma, mesothelioma, and asbestosis (lung fibrosis). As only two of these appear in the options—squamous cell carcinoma and mesothelioma—you have narrowed it down to the last two. Now you have to find the final clue.

The respiratory symptoms the patient complains of don't help. Haemoptysis and cough could occur in both conditions, as could weight loss. But there are other symptoms too—polyuria, constipation and abdom-

inal pain. These are likely to be due to hypercalcaemia, a paraneoplastic feature of squamous cell carcinoma attributable to secretion of ectopic parathyroid hormone (PTH). Hypercalcaemia occurs more often in squamous cell carcinoma than in other subtypes of bronchial carcinoma. You have the answer.

The following EMQ looks at the details of a specific diagnosis—hypertension.

Theme: secondary causes of hypertension

- A—Acromegaly
- B—Coarctation of the aorta
- C—Conn's syndrome
- D—Cushing's syndrome
- E—Diabetic nephropathy
- F—Pheochromocytoma
- G—Polyarteritis nodosa
- H—Polycystic kidney disease
- I—Pregnancy
- J—Renal artery stenosis

The patients below have all presented with secondary hypertension. Choose the most appropriate diagnosis from the above list.

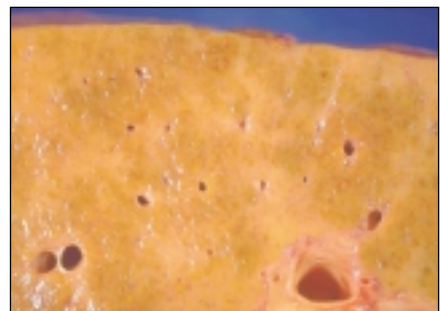
(1) A 61 year old man with diet controlled type 2 diabetes mellitus and coronary artery disease develops asymptomatic hypertension. Urine taken at 24 hours is negative for protein. Urea and electrolytes are normal. Treatment with lisinopril is started, and the patient is seen again a week later. Repeat blood tests show concentrations of urea of 19.2 mmol/l and of creatinine of 287 [μ mol/l].

(2) A 30 year old woman presents to her GP with fatigue and ankle swelling. Blood pressure is 200/120 mmHg, Na 141 mmol/l, K 2.8 mmol/l, Cl 100mmol/l, HCO⁻ 35mmol/l, urea 6.9 mmol/l, Cr 84 [μ mol/l]. Plasma concentrations of adrenocorticotrophic hormone 22 pg/ml (=4.8pmol/l). Plasma rennin is undetectable. Computed tomography of the abdomen shows a nodule of 1.2 cm in diameter in the left adrenal gland.

(3) An 18 year old man is found to be hypertensive during a routine medical examination. Examination shows radiofemoral delay, an ejection systolic murmur, and tortuous retinal arteries.

(4) A 31 year old man presents to his GP with a three week history of malaise, weight loss, abdominal pains, and ankle swelling. Urine dipstick is strongly positive for blood and protein. Blood pressure is 190/110 mmHg. Blood tests show a white cell count of $15.2 \times 10^9/l$, an erythrocyte sedimentation rate of 67 mm/hr, C reactive protein 80g/l and positive pANCA.

(5) A 43 year old woman presents to her GP with frequent, rapid palpitations associated with a pounding headache, sweating, and a feeling of impending doom. Measurements of urinary catecholamines over 24 hours are elevated on three separate occasions, but a



Cirrhotic liver

computed tomography scan of the adrenals does not show any abnormalities.

This question poses the candidate with a series of biochemical, haematological, imaging, and other test results, which require analysis and interpretation.

From vignette four in the EMQ above, it would be difficult for any clinician to establish the diagnosis from the symptoms provided alone. In this type of question, the assessor is looking for the ability of the candidate to interpret the list of results obtained from investigations provided in making a diagnosis, as you would do as a practising doctor.

The urine dipstick is strongly positive for protein and blood, which suggests renal pathology. The erythrocyte sedimentation rate and concentration of C reactive protein are markedly raised for a young man, indicating an inflammatory process. These are all pointing towards the option of polyarteritis nodosa. This answer is almost confirmed in the last sentence—a positive pANCA, which is highly suggestive of this condition.

Vignette five of this EMQ also serves to illustrate the use of a distracter. The patient scenario gives symptoms highly suggestive of a pheochromocytoma, which is an option in the list above. Raised catecholamines are also stated. According to the last sentence, however, the computed tomography scan of the adrenals does not show abnormalities. A candidate with limited knowledge about pheochromocytomas may be distracted by this statement. However, a well prepared candidate will recall that 10% of pheochromocytomas exist in the sympathetic nervous system, outside the adrenal gland.

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