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<http://student.bmj.com/student/view-article.html?id=sbmj.i4512> The ABCDE approach explained

An emergency objective structured clinical examination (OSCE) is a common station assessed at UK medical schools as the General Medical Council (GMC) requires that junior doctors are competent in the recognition and initial management of the acutely ill patient.[1] This type of assessment is also common in academic foundation programme and postgraduate interviews.[2,3] Its aim in medical school finals is to assess students' ability to manage patients safely and effectively, at the level that would be expected of a Foundation doctor.

This station frequently worries medical students as it is perceived to be unpredictable, demanding on the spot decision making. However, you can pass any station by taking a systematic approach. This article aims to provide you with the tools to help you maximise your marks and highlights the common errors to avoid.

<ahead> Station variation

OSCE designs vary between medical schools. In some examinations you may be asked to undertake all the steps demonstrated in figure 1, whereas in others you may be given a specific clinical scenario and asked only about certain parts of the process. Some medical schools use high-fidelity simulation mannequins in emergency OSCEs. High-fidelity mannequins are used to test your ability to examine patients, recognise specific clinical signs such as tachycardias, altered breath and heart sounds, and provide immediate life support. In any station, you may be expected to provide immediate lifesaving support by following the systematic Airways, Breathing, Circulation, Disability, Exposure (ABCDE) approach to managing acutely unwell patients as demonstrated in figure 2. [4,5]

<ahead> History

If you are asked to take a history, consider how much time you have to complete this task and prioritise your questions appropriately. Introduce yourself, confirm the patient's identity and gain consent. Start with a minimum of two open questions then switch to closed questions to narrow down your differential diagnosis. If you are asked to take a brief focused history, concentrate on the presenting complaint, drug history (including allergies), and past medical / surgical history. If time permits, a systems review ensures you have covered all areas.

<bhead> Common pitfall: forgetting to ask about allergies.

Asking about allergies is essential, yet in the heat of the examination this detail is often forgotten by students. Avoid this pitfall by always double checking allergies at the end of a history. Remember, such an omission in clinical practice can be life threatening and examiners will treat it as such.

<ahead> Investigations

Start with basic ward observations - you may be asked to provide or interpret these values as part of a National Early Warning Score[6] or similar, so familiarise yourself with these commonly used tools. Then proceed to more invasive tests. The BOXES mnemonic (Bloods, Orifices, X-rays, ECG, Special Tests) is one approach to discussing investigations systematically, demonstrated in figure 1.[7] Another commonly used approach for discussing investigations is by their location: bedside, laboratory and radiology. Make sure you can justify the tests you order and explain how the investigation will aid your management plan. For example, the management of acute abdominal pain is drastically altered if a patient has a positive pregnancy test.

<bhead> Common pitfall: skipping the basics

Do not skip the basic tests and go straight on to specialist tests. For example, it is unacceptable to order only a computed tomography pulmonary angiography (CTPA) in a patient presenting with chest pain even if you think that a pulmonary embolism is the most likely diagnosis. You must also request basic blood tests, a chest X-ray and an ECG.

<ahead> Data interpretation

You should be well practised at interpreting the results of basic blood tests, urinalysis, chest and abdominal X-rays, ECGs, and some specialist tests such as cerebrospinal fluid analysis and cardiac biomarkers. Comprehensive interpretation of CT scans remains a specialist skill, but you may be asked to recognise common findings such as the crescent shape of an acute subdural haematoma compared to the biconvex shape of an extradural haematoma.[8]

<bhead> Common pitfall: reading out results without commenting on their significance

Demonstrate a methodical approach and talk the examiner through how you have arrived at your conclusions. Do not simply read the values without commenting whether and how these results will influence your differential diagnosis.

<ahead> Differential diagnosis

Do not panic if you do not get the diagnosis straight away. Try to list all possibilities in your differential. Concentrate on common and important differentials rather than rare 'fine print' diagnoses. First, make it clear which diagnosis you think is most likely and why, followed by high-risk alternatives that need to be excluded.

<bhead> Common pitfall: making things up

If you are completely unsure of what is happening, do not be afraid to admit it: the examiner might guide you back on track.

<ahead> Management

It is good practice to say that you would resuscitate the patient first using the ABCDE approach and this may be required from the beginning of the station if the patient is critically unwell, as in the scenario of figure 2. Overall, your management plan should aim to stabilise the patient and control their symptoms, but you may also need to initiate definitive treatment. You should therefore familiarise yourself with common emergencies such as those listed in boxes 1 and 2.

Box 1: Common Medical Emergencies

A non exhaustive list based on the authors' experience

- **Upper GI bleed** – variceal or non-variceal
- **Respiratory** – pulmonary embolism, (tension) pneumothorax, asthma attack, acute exacerbation of COPD, anaphylaxis
- **Cardiac** – acute coronary syndromes (STEMI, NSTEMI, unstable angina), tachycardias, acute pulmonary oedema
- **Neurological** – stroke, meningitis, extradural / subdural / subarachnoid haemorrhage, status epilepticus
- **Endocrine** – diabetic ketoacidosis, hyperglycaemic hyperosmolar state, Addisonian crisis
- **Renal** – acute renal failure, hyperkalaemia
- **Overdose** – paracetamol / opiate / benzodiazepine overdose
- **Sepsis of unknown origin**

Box 2: Common Surgical Emergencies

A non exhaustive list based on the authors' experience

- **Acute abdomen** – acute appendicitis, acute pancreatitis, acute cholecystitis and cholangitis, perforated intra-abdominal viscus, ruptured abdominal aortic aneurysm, acute diverticulitis, ischaemic intestine, (impacted) nephrolithiasis
- **Abdominal swelling** – intestinal obstruction, acute urinary retention
- **Gynaecological** – ruptured ectopic pregnancy, ovarian / cyst torsion, toxic shock syndrome
- **Obstetric** – antepartum and postpartum haemorrhage
- **Urological** – testicular torsion
- **Trauma** – splenic rupture, fractured neck of femur, fractured long bone with fat embolism, cauda equina syndrome

For example, sepsis: junior doctors are often the first point of contact for a patient, so they must be able to recognise and treat sepsis effectively.[9] The 'Sepsis Six' is a useful and nationally recognised method for managing the acute stages of sepsis and consists of: giving high flow oxygen; taking blood cultures; giving intravenous antibiotics; measuring serum lactate and haemoglobin levels; providing a fluid challenge; and, recording an accurate fluid balance.[10]

For top marks, discuss the importance of reassessment and demonstrate your patient focussed care by offering to manage the patient's pain with appropriate analgesia. Medical emergencies require senior support and it will be down to you to decide when to tell the examiner that you would alert a senior doctor.

<bhead> Common pitfall: starting with C instead of doing A and B first

When resuscitating a patient whom you suspect to have an underlying circulatory problem, manage their airway and breathing before treating their circulation.

<ahead> Practical clinical skills

If your station involves a clinical skill, take nothing for granted. Tackle this part of the station as if you were seeing a new patient: confirm their name, date of birth and recheck allergies where appropriate. Make sure that you gain informed consent. These skills are commonly selected from the thirty-two diagnostic procedures listed by the GMC.[11] If your medical school includes prescribing in these assessments, it is vital that you know the layout of the locally used prescription charts so that you do not waste precious time trying to ascertain this during the OSCE.

<bhead> Common pitfall: forgetting hand hygiene rules

Do not ignore the alcohol hand gel in the corner of the room.

<ahead> Staying safe

Staying safe is the key to passing this station. There is a basic level of knowledge that is mandatory to be able to practice medicine safely, but you will not be expected to know everything. Recognising your limitations is an important part of practising safely, so if the patient is rapidly deteriorating - more likely in a station involving a high fidelity simulation mannequin - do not be afraid to put out a crash call.

Prescribing is one of the most dangerous activities a junior doctor will undertake.[12]

Practise prescribing common drugs used in medical emergencies using the British National Formulary (BNF), such the dose and route of administration of adrenaline in anaphylaxis. Write clearly and legibly, and do not use unapproved abbreviations – for example, the abbreviation of UNITS to 'U' that results in an incorrect dose of insulin is recognised as a 'never event'.[13]

Also remember your own safety and use personal protective equipment when indicated.

<bhead> Common pitfall: guessing the dose.

If you are unsure about a prescription, propose that you would consult the BNF and seek senior support. This is hopefully what you would do in a real life situation but moments of OSCE madness are common amongst medical students.

<ahead> Prepare to pass

Spend time in A&E and on the surgical and medical assessment units; you will find it easier to recall the management of a condition when you have been actively involved in a patient's care and spoken to them about their treatment. It has also been demonstrated that students who create and practice their own emergency stations achieve higher grades in this type of assessment.[14] Finally, believe in yourself and always remember: stay safe and systematic.

<u>Scenario 1</u>
You are the first doctor to see this patient in the emergency department.
<p>History: 34-year-old woman presents with sudden onset left sided pleuritic chest pain and shortness of breath. She returned 2 days ago from Australia, has a small amount of haemoptysis and right calf pain. No known allergies.</p> <p>Examination: right calf erythema and swelling, equal chest expansion, resonant chest percussion, bilateral vesicular breath sounds.</p> <p style="text-align: center;">↓</p>
<u>Investigations</u>
<p>Basic observations: pulse rate (115), blood pressure (134/86), respiratory rate (24), oxygen saturations (93% on room air), temperature (37.8°C), level of consciousness (alert)</p> <p>B – Bloods: FBC, U&E, CRP, LFT, glucose, blood cultures, ABG</p> <p>O – Orifices: consider sputum sample, urinalysis & pregnancy test</p> <p>X – X-rays: erect chest X-ray</p> <p>E – ECG</p> <p>S – Special tests: bilateral lower limb Doppler, two-level pulmonary embolism Wells' score then CTPA if scoring more than 4 points, otherwise consider D-dimer, consider cardiac troponins and echocardiogram</p> <p style="text-align: center;">↓</p>
<u>Differential Diagnosis</u>
<p>Primary diagnosis: pulmonary embolism</p> <p>Differentials: pneumothorax, pneumonia, pericarditis, aortic dissection, acute coronary syndrome</p> <p style="text-align: center;">↓</p>
<u>Data Interpretation</u>
<p>ABG: pH 7.38, PaO₂ 7.5 kPa, PaCO₂ 5.1 kPa, HCO₃⁻ 25 mmol/L</p> <p>Interpretation: type 1 respiratory failure</p> <p>Bilateral lower limb Doppler: confirms right sided DVT, awaiting CTPA</p> <p style="text-align: center;">↓</p>
<u>Management</u>
<p>Resuscitation (ABCDE): assess and maintain airway, prescribe 15 L/min oxygen via a non-rebreather mask, establish IV access and consider fluids</p> <p>Get senior medical review and provide analgesia based on pain score</p> <p>Case specific: treatment dose of low molecular weight heparin</p> <p style="text-align: center;">↓</p>
<u>Clinical Skill</u>
<p>Prescribe appropriate therapy using the BNF and drug chart provided</p> <p>Enoxaparin 1.5mg/kg once daily by subcutaneous injection</p>

Figure 1

Example of an emergency OSCE station set in the medical assessment unit. Observation results are provided in round brackets. BOXES mnemonic used with permission.[7] Wells' scoring and treatment with low molecular weight heparin (enoxaparin) based on NICE guideline for venous thromboembolic disease.[15]

Scenario 2

Please see this 52-year-old male patient, who has been in hospital since a right hemicolectomy 5 days ago and is complaining of severe abdominal pain.

Initial Steps

- **Go immediately to the patient** and make an end of bed assessment (patient lying in bed, appears alert and breathing but in severe pain)
- **Wash hands, introduce self, confirm patient's identity**

Airway

- **Ask patient how they are feeling** (patient repeatedly cries out that they are in severe tummy pain - indicates that the airway is currently patent)

Breathing

- **Apply pulse oximeter** (oxygen saturation is 92% on room air)
- **Give Oxygen:** 15L/min via a non-rebreather mask
- **Examine:** respiratory rate (28), chest inspection, tracheal alignment, chest expansion, chest percussion, auscultate breath sounds (all normal)

Circulation

- **Record blood pressure** (90/50)
- **Insert large bore IV cannula:** take bloods (FBC, U&E, CRP, LFT, amylase, calcium, coagulation screen, venous blood gas, blood cultures, group & save)
- **Give fluid bolus:** Crystalloid fluid (e.g. 0.9% sodium chloride) 500ml IV stat
- **Examine:** pulse for rate (120), rhythm (regular) and character (normal), feel peripheral temperature (cold), JVP (not visible), sternal capillary refill (4 seconds), auscultate heart sounds (normal)
- **Review:** catheter output chart (20ml/h), abdominal drains (sanguineous 200ml)
- **Prescribe analgesia & anti-emetic:** morphine 2.5mg IV & ondansetron 4mg IV

Disability

- **Assess:** patient's conscious level (alert)
- **Examine:** pupillary reflexes (equal / reactive to light)
- **Measure:** blood glucose level using rapid glucose meter (6.7mmol/L)

Exposure / everything else

- **Examine:** full body examination focussing initially on abdominal inspection (midline laparotomy wound), palpation (generalised tenderness), percussion (tenderness), auscultation (bowel sounds absent)
- **Measure:** body temperature (38.7°C)
- **Review:** current antibiotic therapy (piperacillin / tazobactam 4.5g TDS IV day)

Further steps

- **Use the telephone provided to call the surgical registrar on-call**
-Communicate using the Situation, Background, Assessment, Recommendation (SBAR) format [16]

Figure 2

Example of an emergency OSCE station using a high-fidelity simulation mannequin and the ABCDE approach. The most likely diagnosis is an anastomotic leak. Clinical findings are provided in round brackets. Management based on Resuscitation Council (UK) guidelines [5].

Box 3: Further Reading

From Student BMJ and The BMJ:

- **Common OSCE mistakes to avoid** - Student BMJ
<http://student.bmj.com/student/view-article.html?id=sbmj.j5386>
- **Identification and management of sepsis** - Student BMJ
<http://student.bmj.com/student/view-article.html?id=sbmj.h1367>
- **Early management of acutely ill ward patients** - The BMJ
<https://www.bmj.com/content/345/bmj.e5677>

Other websites:

- **OSCEstop** - www.OSCEstop.com. Free educational website that provides information about how to pass medical school OSCE exams
- **Geeky Medics** - www.geekymedics.com. Free educational website that includes demonstration videos useful for OSCE revision

Books:

- **Advanced Life Support 7th Edition** - Resuscitation Council (UK)
- **Data Interpretation for Medical Students 3rd Ed (PasTest)**

Appendix Box: Additional Abbreviations

Advanced life support (ALS), arterial blood gas (ABG), b-human chorionic gonadotropin (b-HCG), full blood count (FBC), C-reactive protein (CRP), computed tomography (CT), chronic obstructive pulmonary disease (COPD) deep vein thrombosis (DVT), electrocardiogram (ECG), intravenous (IV), jugular venous pressure (JVP), liver function tests (LFT), non / ST-elevation myocardial infarction (N/STEMI), urea and electrolytes (U&E).

Key words: OSCE, emergency medicine, medical education, medical finals

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