# Self-assessment/CPD answers

*Below, you can find the answers to the self-assessment questions published in this chapter.*

## Answers

### Staphylococcal and streptococcal infections

#### Question 1

**Correct answer: B.** As there is growth in both sets of cultures, it is very unlikely that this is a contaminant. Given the clinical context, *Staphylococcus aureus* is the most likely organism.

The clinical scenario suggests metastatic disease involving heart (endocarditis) and lungs (pneumonia or abscess). This is all to familiar with invasive *Staph. aureus* disease and required urgent investigation and antimicrobial therapy. In addition, the swelling in his leg likely reflects a thrombus (risk factors including IVDU and malnutrition). If bacteraemic with *Staph. aureus* (particularly if prolonged over 5 days) this thrombus is almost certainly infected. *Staphylococcus lugdunensis* is a coagulase-negative staphylococci that can produce a clinical phenotype similar to *Staph. aureus*, in particular its association with endocarditis. Yet the questions ask for the most likely organism and in this scenario it remains *Staph. aureus*.

#### Question 2

**Correct answer: D.** Removal of the prosthetic material, i.e. the line, is the most important course of action here. There is no benefit to adding additional agents (A), although vancomycin (B) may be tried if the central line is very precious; however, this approach often fails because to failure to clear bacterial biofilm on the surface of the line. Persistent bacteraemia and a need to remove the focus of infection have already been demonstrated, so more cultures (C) are unlikely to aid management at this stage. Although the neutrophil count is not known, the issue is infected plastic rather than a lack of innate immune function (E).

#### Question 3

**Correct answer: D.** Invasive infections (and therefore culture from a normally sterile site, i.e. A, B and E) and scarlet fever are notifiable. Laboratories often notify the public health service when there is a sterile site culture of *Streptococcus pyogenes*, but most cases of scarlet fever are not culture-proven. As a result clinicians need to be aware that they are obligible to notify all clinically diagnosed cases of Scarlet fever, even if cultures do not yield *Strep. pyogenes*. Patients with clinical toxic shock (E) usually have a deep infection that may not be proven microbiologically. It is reasonable for the clinician to notify public health of such cases.

### Pertussis

#### Question 1

**Correct answer: B.** Chemoprophylaxis should be offered to household contacts who meet the risk criteria as soon as possible after pertussis is suspected. The infant should be given antibiotics because she is >2 months of age, so the antibody derived from her mother will have begun to wane, but she is not yet old enough to have completed her vaccinations. The local health protection team should also be informed, but only informing them and not also providing chemoprophylaxis is incorrect (D). The woman does not need antibiotic treatment as she has been given a vaccination within the last 5 years (C). There is no need to wait for confirmatory results before taking further action (A). Advice to restrict contact with household contacts (E) is impractical and inappropriate.

#### Question 2

**Correct answer: B.** Paroxysms of coughing are a typical feature of the spasmodic phase of the illness and these can be associated with facial discolouration. None of the other features are typical of pertussis.

#### Question 3

**Correct answer: D.** The infant should be given a 7-day course of clarithromycin. Erythromycin (A) should be avoided in infants <1 month of age because of the association with hypertrophic pyloric stenosis. Amoxicillin (B) is not effective against Gram-negative *Bordetella* spp. Antibiotic treatment should be given (so C is incorrect); although it will not affect the course of the illness, it should be given to clear the organism and prevent transmission. In infants <1 month of age, clarithromycin is preferred because of the limited data on azithromycin (E) use in this age group.

### Botulism and tetanus

#### Question 1

**Correct answer: C.** A: not commonly associated with infant botulism as an early symptom (constipation is more usual in any case). B: This is not a characteristic finding. C: correct – usually bulbar signs occur early. D: Botulism affects the neuromuscular junction and the striated musculature. E: This is a characteristic sign of tetanus.

#### Question 2

**Correct answer: A.** Tetanus toxin inhibits γ-aminobutyric acid transmission in the central nervous system by cleavage of vesicle associated membrane-protein-2 (VAMP-2, also known as synaptobrevin). This prevents presynaptic release of neurotransmitter and consequently disinhibition of the motor and autonomic nervous systems.

**Question 3**

**Correct answer: E.** Although not diagnostic, sub-protective roles of antibody would support the diagnosis. *Clostridium tetani* cannot be grown in blood cultures (A), although in some situations it can be cultured from wounds using anaerobic media. An electrocardiogram (ECG) may be helpful in differentiating autonomic nervous system dysfunction from other causes of cardiovascular instability, but there are no characteristic features, and the ECG would not be expected to be abnormal early in the course of the disease. Wound culture of *C. tetani* (C) would support the diagnosis of tetanus although in approximately 25% of cases no wound can be found. Muscle biopsy (D) has no role in the diagnosis of tetanus.

## Extrapulmonary tuberculosis

**Question 1**

**Correct answer: C.** National Institute for Health and Care Excellence guidelines recommend that *any* patient starting biological drugs should undergo screening for active and latent tuberculosis.

**Question 2**

**Correct answer: D.** All of these are potentially correct, but D is the most appropriate first step as paradoxical reactions are common in patients with TB lymphadenitis; they are usually seen 4–8 weeks after starting treatment, with increased lymph node size. In most instances, this settles after a couple of weeks of treatment, so regular reviews are appropriate. If, however, the lymphadenopathy does not start to reduce, some patients require an adjuvant course of prednisolone (C) to reduce the inflammation, which is safe if the patient is on appropriate therapy. If there are any other concerning 'red flags', consider an alternative additional diagnosis such as lymphoma (A), as other conditions, although rarely, can occur concurrently. If the patient has been compliant with medication and GeneXpert testing is negative for *rpoB* mutations, resistance is unlikely; however, drug resistance should be considered (E). You should never change to a MDRTB treatment regime without having access to the genomic or phenotypic sensitivities of the isolate and discussion with an expert in treatment of MDR TB (B).

**Question 3**

**Correct answer: E.** It is always important to check for pulmonary TB in anyone diagnosed with EPTB as TB can be present at more than one site and pulmonary disease has infection control implications. The patient should have a CXR (A), but the most appropriate investigation to assess infectivity is sputum for AAFB.

Tuberculin test (B) and Interferon-y release assay (C) are helpful in looking for latent TB, but do not differentiate between latent and active TB, therefore are not helpful in this clinical context as we already know the patient has TB. E- Early morning urines are used to look for urogenital TB and do not have infectivity implications.

## *Nocardia* and *Actinomyces*

**Question 1**

**Correct answer: A.** 4 years after renal transplant on significant immunosuppression and out with PCP prophylaxis (often stopped at 6 months) yields the patient vulnerable to *Mycobacteria*, PCP, *Toxoplasma, Nocardia, Listeria, Legionella*, fungi and CMV. Of those *Mycobacteria*, *Nocardia* and fungal infections (such as *Aspergillus*) are more likely to produce discrete lesions on the CXR. CMV and *Legionella* can also present in a similar fashion. PCP often produces diffuse ground glass changes on imaging. Polyomavirus can cause infection in renal transplant patients but is not associated with lung infection.

**Question 2**

**Correct answer: E.** For complicated cases of cervico-facial actinomycosis with extensive sinus formation, surgery is required for excision of fibrotic lesions and marsupialization of sinus tracts. This is then followed by intravenous and then oral penicillin. For mild infections, as in this patient, a prolonged course of an oral penicillin with good bioavailability can be given for 2–6 months. This is usually preceded by an initial course of intravenous benzylpenicillin as in E. B is incorrect as the duration of amoxicillin is too short. Metronidazole and co-trimoxazole are not active against actinomyces (ruling out C and D).

**Question 3**

**Correct answer: B.** *Actinomyces* can be part of the normal genitourinary flora. *Actinomyces*-like organisms can occasionally be seen as an incidental finding in cervical smears of patients with an intrauterine device (IUD). In the absence of symptoms the risk of developing actinomycosis is very low (<0.01%), and similar to other women who have an IUD. In the absence of symptoms, the IUD should remain in situ (B). All patients with an IUD should be counseled of their slightly elevated risk of actinomycosis. Removal of the IUD and/or antibiotic therapy is unnecessary (ruling out A, C, D and E).

## Toxoplasmosis

**Question 1**

**Correct answer: D.** Follow-up testing is required to investigate possible seroconversion. Advice is also correct re: precautions to avoid infection, as a seronegative mother is susceptible. Reassurance is not acceptable (A). Negative NAAT result on EDTA blood does not exclude acute infection (B). Testing of earlier blood from a seronegative patient will be of no help (C). Measurement of IgG avidity would not be possible in the absence of any IgG response (E).

**Question 2**

**Correct answer: C.** NAAT cannot distinguish between latent and active infection, so that a positive finding in a tissue where latent tissue cysts might be expected, for example, brain, does not confirm active infection. (A). Reactivated *Toxoplasma* infection in the CNS often occurs in the absence of a detectable systemic reactivation (B). IgG concentrations

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