



1.

A 22-year-old woman presented in India with two hypopigmented skin lesions and a 14-week history of weakness in her left hand.

On examination, she had a thickened tender ulnar nerve, and anaesthesia within her skin lesions.

Leprosy was suspected.

What is the most appropriate treatment?

- A azithromycin 400 mg and minocycline 100 mg daily
- B rifampicin 450 mg daily and isoniazid 300 mg daily
- C rifampicin 450 mg daily, ethambutol 500 mg and isoniazid 300 mg daily
- D rifampicin 600 mg monthly and dapsone 100 mg daily
- E rifampicin 600 mg monthly, dapsone 100 mg daily, and prednisolone 30 mg reducing over 4 months

Answer: E

Explanation:

The clinical picture is of a relatively acute mononeuritis in a patient with likely indeterminate or paucibacillary leprosy. The likely aetiology of the neuritis is a type 1 lepra reaction. This reflects a strengthening of specific cellular immunity against *M. leprae*. As well as drugs against *M. leprae*, prednisolone is essential, to reduce the inflammation in the nerve and improve the chances of neurologic recovery.



2.

A 48-year-old rice farmer from north-east Thailand presented with a 7-day history of fever, headache and painful urination. She has diet-controlled diabetes mellitus.

On examination, her temperature was 38.7°C, her pulse was 142 beats per minute and her BP was 72/34 mmHg. She had reduced consciousness and was tender over her renal angle. Urinalysis was positive for leukocytes and nitrates.

What is the most likely causative organism?

- A *Burkholderia pseudomallei*
- B *Burkholderia thailandensis*
- C *Escherichia coli*
- D *Klebsiella oxytoca*
- E *Proteus mirabilis*

Answer: C

Explanation:

The clinical picture is that of pyelonephritis and sepsis; the urinalysis findings are significant, too. *E. coli* is the most common cause of urinary infections, even in the tropics.

Klebsiella oxytoca and *Proteus mirabilis* are less common as causes of urinary infection.

Melioidosis, caused by *Burkholderia pseudomallei*, is a form of septicaemia but rarely affects the urinary system.

Burkholderia thailandensis is an environmental organism that seldom causes disease in humans.



3.

A 25-year-old man presented to a clinic in Cameroon with irritation of the eye.

On examination, there was inflammation and oedema of the conjunctiva in the left eye, with a serpiginous swelling of 2.0×0.2 cm.

What is the most accurate statement regarding the treatment of this condition?

- A a single course of diethylcarbamazine is curative in over 80% of cases
- B albendazole is active predominantly against macrofilaria
- C doxycycline improves treatment outcomes
- D ivermectin is the preferred treatment
- E microfilaria quantification on a midnight skin snip aids treatment choice

Answer: B

Explanation:

The diagnosis is loiasis with eye worm.

Albendazole is *macrofilaricidal*, ie active against the adult worms or macrofilaria.

Diethylcarbamazine is effective against *microfilariae* in longer courses

Doxycycline is ineffective against in *Loa loa*, because this species of filaria is not affected by endosymbiotic *Wolbachia*.

Ivermectin can only be used once onchocerciasis has been ruled out and the *microfilarial* burden quantitated.

Skin snips for onchocerciasis do not need to be taken at midnight.



4.

What is the most accurate statement regarding rabies infection in humans?

- A it can be excluded if it has been more than 1 year after a potential exposure
- B it is readily transmitted person to person
- C mortality is low if treatment is commenced as soon as symptoms start
- D the incubation period is the same irrespective of the site of the bite
- E timely post-exposure vaccination after a bite from a rabid dog is reliably effective

Answer: E

Explanation:

If commenced within 24 hours of the bite, approved protocols for post-exposure rabies vaccination +/- rabies immune globulin have not had any recorded failures in the developed world.

Rabies incubation period is on average 2–3 months but can be as long as several years, and as short as a few days in bites on the face, if from an animal with a high viral load.

Once symptoms of rabies occur, the disease is generally fatal.

Person-to-person transmission is rare.



5.

Nifurtimox is used for the treatment of human African trypanosomiasis.

Which statement regarding nifurtimox is most accurate?

- A eflornithine and nifurtimox combination therapy (NECT) is licensed for late (meningoencephalitic) stage of *Trypanosoma brucei gambiense*
- B it is extremely well tolerated and adverse effects rarely reported
- C it is recommended as monotherapy in late (meningoencephalitic) stage of *T. b gambiense*
- D it is recommended as monotherapy in late (meningoencephalitic) stage of *T. b rhodesiense*
- E its mechanism of action is via inhibition of trypanothione reductase and generation of toxic free radicals

Answer: E

Explanation:

Scrutinizing the precise wording of answers remains important.

Nifurtimox is “licensed/registered” for *T. cruzi* but used “off label” in form of NECT for late meningoencephalitic state of *T. b gambiense*.



6.

A 2-week-old baby girl was brought to hospital in rural Mali with a 4-day history of poor feeding and 'spasms'. On examination the baby had a low-grade fever and globally increased tone with opisthotonus, but a normal fontanelle. Examining her provoked generalised spasms.

Which of the following strategies is most likely to be effective in preventing other cases of this disease?

- A antibiotics during labour
- B exclusive breastfeeding
- C improved sanitation
- D maternal vaccination
- E neonatal vaccination

Answer: D

Explanation:

The clinical presentation is typical of neonatal tetanus. While bacterial meningitis might be a differential diagnosis, 'generalised spasms' are characteristic of tetanus but not typical of meningitis. A bulging fontanelle is also a common finding in severe neonatal meningitis, but the fontanelle in this case is described as normal.

Maternal immunization passively immunises the baby against tetanus toxoid. It generally occurs within a few days of life, before neonatal immunisation would be feasible or effective.

In neonatal tetanus, the site of entry of spores of *Clostridium tetani* is usually the umbilicus. Spores are introduced at the umbilicus some time after delivery. Breast feeding and sanitation have no effect on neonatal tetanus.



7.

The 2013–16 Ebola epidemic in West Africa was the largest Ebola outbreak in history.

Which of the following statements about our understanding of the disease is true?

- A once over the acute illness, survivors were shown to be non infectious
- B randomised controlled trials during the epidemic clarified the optimal fluid replacement regimes
- C ring vaccination was proven to be an effective control strategy
- D the epidemic was probably caused by multiple introductions from fruit bats and bushmeat
- E up to 60% of patients died from haemorrhagic complications

Answer: C

Explanation:

Immunisation of contacts, and of contacts of contacts, led to a fall in transmission. The epidemic seemed to have a single source. The high fatality rate was from multi-organ failure and shock rather than from haemorrhage. The epidemic did not lend itself to randomised clinical trials. Infective Ebola virus can be found in various fluids for weeks to months after recovery.



8.

A 22-year-old man was admitted with 3 days of high fever, arthralgia and an erythematous rash 24 hours after returning to the UK following a 3-week tour of Thailand, Laos, Vietnam and Cambodia.

Full blood count revealed a mild thrombocytopenia but renal and liver function tests were normal. He was treated empirically with intravenous ceftriaxone. Malaria films were negative on 3 consecutive days.

On day four his temperature was settled and a definitive diagnosis was made by PCR from a peripheral blood taken on admission.

He was discharged without any further treatment and made a full recovery.

What is the most likely diagnosis?

- A dengue fever
- B enteric fever
- C influenza
- D leptospirosis
- E primary Epstein–Barr virus infection

Answer: A

Explanation:

This is a typical presentation of uncomplicated dengue fever. While normal renal and liver function tests are consistent with enteric fever and leptospirosis, 3 days ceftriaxone is insufficient therapy for enteric fever. Influenza is diagnosed with nasopharyngeal swab PCR and EBV diagnosis requires serology. Blood PCR can be used to diagnose leptospirosis but none of the others.



9.

A 17-year-old Zulu child received a painful bite on her foot while gathering firewood at dusk near her village. She did not see what caused it, but thinks it was a snake. She arrived at your hospital 4 hours after the bite; her leg was diffusely swollen to the groin and her foot was severely swollen, with blistering and dusky discolouration of her toes.

Under what circumstances should polyvalent antivenom be given?

- A after surgical debridement
- B if her blood pressure is low
- C if her whole blood clotting test is prolonged
- D once intubated and ventilated
- E on the basis of the appearance of her leg

Answer: E

Explanation:

In snakebite, antivenom is indicated for signs of local envenoming that is rapidly spreading or involves more than half the bitten limb or digits, within 24h of the snake bite. If local signs are less severe, antivenom would also be indicated if there were signs of systemic envenoming. A is incorrect, since it would involve delaying antivenom for no good reason. B, C and D are incorrect, since they all mean withholding antivenom until signs of systemic envenoming are present.



10.

You are attempting to control a large outbreak of visceral leishmaniasis among refugees in a camp in remote rural South Sudan.

What is the best approach to diagnosis of visceral leishmaniasis in this setting?

- A admit and observe all household contacts of cases
- B confirm all clinical suspects by rK39 dipstick
- C confirm all clinical suspects by splenic aspirate
- D screen all refugees by palpating spleens
- E screen all refugees for anti-*Leishmania* antibodies

Answer: B

Explanation:

The rk39 dipstick test has high sensitivity and specificity for anti-*Leishmania* antibodies and is accurate in the context of a clinical illness compatible with visceral leishmaniasis. Splenic aspirate carries risks of bleeding - thus A is incorrect.

The incubation period for visceral leishmaniasis is long and variable - thus C is incorrect.

In an endemic area, a significant proportion of healthy individuals will have anti-*Leishmania* antibodies, either from having past treatment for visceral leishmaniasis or having had subclinical infection, so the presence of antibodies is not diagnostic of active disease – thus D is incorrect.

As well as being a characteristic feature of visceral leishmaniasis, splenomegaly can also be a feature of malaria and hepato-splenic schistosomiasis, which are common in the region - thus E is incorrect.



11.

A 45-year-old woman from Bihar in North India presented with a long history of fever, weight loss and heaviness in the abdomen. Examination revealed pallor and massive splenomegaly. Laboratory tests revealed anaemia and hypergammaglobulinemia.

Which vector is likely to have led to infection causing to this clinical picture?

- A *Anopheles latens*
- B *Lutzomyia verrucarum*
- C *Phlebotomus argentipes*
- D *Simulium* spp
- E tsetse fly

Answer: C

Explanation:

The clinical picture and the geographical location suggest a diagnosis of visceral leishmaniasis (kala-azar). Phlebotomine sandflies are the vectors of all forms of leishmaniasis: *Lutzomyia* species in the Americas and *Phlebotomus* species in the “old world”. Tsetse flies are vectors of human African trypanosomiasis; *Anopheles* are vectors of malaria; *Simulium* are vectors of onchocerciasis.



12.

Which of the following statements about measles is correct?

- A general immunosuppression follows measles infection
- B measles has been eliminated from the Western Pacific region
- C measles is a zoonosis that also infects cattle
- D the commonest cause of death following measles is encephalitis
- E vaccine population coverage must exceed 66% to eliminate measles

Answer: A

Explanation:

Measles causes profound and prolonged loss of immune memory. Measles still occurs in the Western Pacific, though is eliminated in much of the Americas. Measles exclusively affects humans, though it has similarities to some animal viruses. Measles encephalitis is less common and less often fatal than post-measles pneumonia. WHO considers that to maintain the interruption of measles virus circulation, immunization programs must provide measles vaccine to at least 95% of each new birth cohort of infants before the age of 2 years.



13.

Which of the following statements about sickle cell disease in a 3-year-old child in rural Tanzania is most accurate?

- A antimalarial prophylaxis should be provided until the age of 5
- B hydroxycarbamide is an affordable and widely available therapy
- C pneumococcal vaccination should be given
- D prophylactic splenectomy should be performed to prevent acute sequestration
- E stem cell transplantation is a realistic curative option

Answer: C

Explanation:

Individuals with sickle cell disease remain susceptible to malaria life-long, since they have no functioning spleen. Hydroxycarbamide (hydroxyurea) is of use in selected patients but is unaffordable in many low and middle income countries. Pneumococcal vaccination is highly effective in preventing bacteraemia. These patients have no functioning spleen. Stem cell transplantation is unaffordable and not widely available.



14.

A 62-year-old Senegalese man with a long history of haematuria is diagnosed with squamous cell carcinoma of the bladder.

What is the underlying cause of the carcinoma?

- A exposure to agrochemicals
- B infection with *Schistosoma haematobium*
- C infection with *Schistosoma intercalatum*
- D infection with *Schistosoma mansoni*
- E urinary stone disease

Answer: B

Explanation:

Severe chronic urinary schistosomiasis caused by *Schistosoma haematobium* predisposes to bladder cancers which are squamous, carcinomas rather than adenocarcinomas, and which occur earlier in life. Squamous carcinoma is not related to chemical exposure, other forms of schistosomiasis, or bladder stones.



15.

A plague outbreak has been reported in rural Democratic Republic of Congo. You have been asked to talk to healthcare workers in the area.

What is the most important thing they should know?

- A antibiotic treatment is effective, so early diagnosis and treatment are important
- B pneumonic plague is the most common presentation
- C rats are the reservoir for infection so urgently killing rats is important for preventing other cases
- D the incubation period can be more than 6 weeks
- E vaccination of the population is important to prevent further cases

Answer: A

Explanation:

The plague bacillus, *Yersinia pestis*, is susceptible to many common antimicrobials. Pneumonic plague is a rare and very severe form. Killing rats may displace fleas to other hosts to feed on, such as humans. The usual incubation period of plague is 1 to 6 days. A plague vaccine is available for human use but is not used routinely. The vaccine should be considered for high-risk professionals whose work brings them into close contact with *Y. pestis*, such as laboratory technicians in plague reference and research laboratories and persons studying infected rodent colonies.



16.

A Tanzanian man with HIV infection presented with a chronic cough. His CD4 count was 40 cells/mm³.

What do the WHO guidelines suggest you do?

- A only start tuberculosis (TB) therapy if culture positive
- B send serum lateral flow urine lipoarabinomannan assay (LF-LAM)
- C send sputum for Xpert[®] MTB/RIF test and start TB therapy if positive
- D send sputum for Ziehl–Neelsen (ZN) stain and start TB therapy only if positive
- E start TB therapy in all patients

Answer: C

Explanation:

The Xpert[®] MTB/RIF test is a sensitive PCR assay for M tuberculosis which gives a rapid answer. Sputum culture may take 2-6 weeks for a result, and sputum smear is insufficiently sensitive. LF-LAM is not suitable for a screening test for TB but can be used to assist the diagnosis.



17.

A Zimbabwean man with advanced HIV presented with profound weight loss and oral thrush but no other obvious opportunistic infection or cancer. He comes from a village 100 miles away.

What do the WHO guidelines say you should do?

- A send a CD4 and viral load and bring him back for the results
- B send for adherence counselling and ask him to return in 2 weeks to start treatment
- C start antiretroviral therapy (ART) once you have seen him again in 1 month to ensure that he doesn't have TB
- D start co-trimoxazole and ART on the same day if he agrees
- E start fluconazole and co-trimoxazole and review him in 1 month to start ART

Answer: D

Explanation:

Options A, B, C and E all involve unacceptable delay in a patient at imminent risk of death. A low CD4 count is not required before ART is commenced.



18.

A patient with newly diagnosed HIV and a CD4 count of 150 cell/mm^3 presented to hospital in rural Botswana with a 3-week history of headaches, progressive right-sided weakness and fevers.

What is the most likely treatable diagnosis?

- A cryptococcal disease
- B Kaposi's sarcoma
- C primary CNS lymphoma
- D pyogenic brain abscess
- E toxoplasmosis

Answer: E

Explanation:

Bacterial (pyogenic) brain abscess is a rare cause of an intracranial space occupying lesion in patients with HIV. Cerebral lymphoma and Kaposi sarcoma do not respond well to treatment in this setting. Over 90% of HIV patients with cryptococcal disease have less than $100 \text{ CD4 cells/mm}^3$.



19.

A 12-year-old girl presented to your clinic in Niger with a single painless ulcer on her left leg. The diagnosis of Buruli ulcer was suspected. The ulcer was >20cm in diameter.

What treatment is likely to be necessary?

- A antibiotics alone
- B antibiotics and dressings
- C dressings alone
- D surgery alone
- E surgery and antibiotics

Answer: E

Explanation:

Buruli ulcer responds well to several weeks of rifampicin plus either streptomycin, a fluoroquinolone or azithromycin. Because all layers of the skin are lost, an ulcer >20 cm diameter will require skin grafting.



20.

Niacin (vitamin B₃) deficiency may have which dermatological effect?

- A angular stomatitis
- B glossitis ('cherry-red tongue')
- C haemorrhagic gingivitis
- D perifollicular haemorrhages
- E photosensitive dermatitis

Answer: E

Explanation:

Pellagra is a disease caused by a lack of niacin (vitamin B₃). Symptoms include inflamed skin in sun-exposed areas; diarrhoea; dementia.



21.

What is the most important strategy in controlling a cholera outbreak in a refugee camp?

- A cholera beds
- B clean water supply
- C effective hand washing
- D external aid
- E supply of tetracycline

Answer: B

Explanation:

Outbreaks of cholera arise from ingestion of contaminated water, rather than person-to-person spread. Thus, while A, C, D and E are all logical, they will not lead to a cessation of cholera cases.



22.

A 20-year-old Sudanese farmer presented with weight loss, fever and left upper abdominal pain, and was found to have massive splenomegaly (extending beyond the umbilicus).

What is the most likely diagnosis?

- A chronic myeloid leukaemia
- B kala azar
- C myelofibrosis
- D portal hypertension
- E tropical splenomegaly syndrome

Answer: B

Explanation:

Large areas of Sudan are endemic for visceral leishmaniasis (kala azar), and the illness described is characteristic of this. Portal hypertension and tropical splenomegaly syndrome (hyperreactive malarial splenomegaly) are not associated with fever and weight loss. Myelofibrosis and chronic myeloid leukaemia would be rare in this age group.



23.

A 50-year-old Vietnamese man presented with a chronic dry cough. He denied fever. Chest X-ray showed an area of cavitation in the left lung. His blood test results are shown below.

	result	reference range
CRP	2 mg/L	1–5
haemoglobin	134 g/L	137–172
white cell count	$5.5 \times 10^9/L$	4.0–11.0
neutrophils	$3.3 \times 10^9/L$	1.5–7.0
eosinophils	$1.3 \times 10^9/L$	0.04–0.40

Other than tuberculosis, infection with which other organism should also be considered?

- A *Ascaris lumbricoides*
- B *Burkholderia mallei*
- C *Klebsiella pneumoniae*
- D *Paragonimus westermani*
- E *Schistosoma japonicum*

Answer: D

Explanation:

Paragonimus species produce pulmonary cavitating lesions that on X rays are similar to those of tuberculosis. Eosinophilia is characteristic of an invasive worm infection, not with *Klebsiella* or *Burkholderia* infection. Lung lesions as described are not recognised features of schistosomiasis or ascariasis.



24.

In an area of rural Bangladesh five members of a family became ill with respiratory illness and encephalitis, of whom three died. The family was renovating an old house and water well, with reports of displacement of bats during the works.

What is the most likely cause of the illness?

- A enterovirus infection
- B influenza
- C Japanese B virus infection
- D Middle East respiratory syndrome coronavirus (MERS-Co-V) infection
- E Nipah virus infection

Answer: E

Explanation:

This is based on a real outbreak. The source was bats living in the house and water-well. The high (60%) mortality, overt link to animals living in the house and geography are not in keeping with the other infections being a likely cause.



25.

A report is received from a remote region in rural South Sudan of three deaths in herdsmen who had symptoms of haemorrhage and 20 other people are reported seriously ill. In the same region there are reports of deaths and abortions in goats and sheep.

What is the most likely cause?

- A *Brucella melitensis*
- B Congo-Crimean haemorrhagic fever
- C *Coxiella burnetii*
- D *Listeria monocytogenes*
- E Rift Valley fever

Answer: E

Explanation:

This is based on a real outbreak. The combination of mortality in the herdsmen, particularly with haemorrhagic symptoms, and overt illness in goats and sheep are not in keeping with the other alternatives.



26.

Choose the correct statement regarding schistosomiasis?

- A diagnosis is best made by microscopy of a warm stool sample
- B *Schistosoma haematobium* can be acquired from an infected partner through sexual intercourse
- C *Schistosoma mansoni* can be acquired through the ingestion of snails
- D swimmer's itch is due to skin penetration by infective stage cercariae
- E the egg of *Schistosoma haematobium* is distinguished by its lateral spine

Answer: D

Explanation:

Infection with schistosomiasis is acquired when schistosome cercariae penetrate the skin during swimming in fresh water; this often causes cercarial dermatitis or "swimmer's itch". Although schistosome ova can be found on the cervix uteri and in semen, ova are not infectious to humans without undergoing part of the life cycle in a snail host. The snails themselves are not infectious. Microscopy of a warm stool sample is useful in the diagnosis of amoebiasis, not schistosomiasis. *Schistosoma haematobium* has a terminal and not a lateral spine.



27.

Which of the following is the most accurate statement regarding *Aedes aegypti* mosquitoes?

- A differentiation from *Culex* and *Anopheles* species is by the angle of the proboscis relative to the body
- B females lay their eggs to form a raft
- C females take a single blood meal
- D males are distinguished from females by a silver lyre-pattern on the dorsal scutum
- E they are the principal vectors for chikungunya and yellow fever viruses

Answer: E

Explanation:

Aedes aegypti transmits chikungunya, yellow fever, dengue and zika viruses. *Aedes* females lay eggs singly. The angle of the proboscis to the body will not distinguish *Aedes* from *Anopheles* or *Culex*. Females take multiple blood meals. Males and female both have the silver lyre pattern on the dorsal thorax.



28.

Which of the following is that most accurate statement about scabies?

- A itch may persist up to 3 weeks after successful treatment
- B itch usually begins within an hour of contact exposure
- C mites are resistant to ivermectin
- D mites in unused furniture may remain viable for up to 6 months
- E systemic treatment should be repeated after 2 days

Answer: A

Explanation:

Scabies mites do not survive more than 2-3 days away from human skin. Ivermectin provides a high cure with 2 doses at a 2-week interval. Symptoms appear 1-4 days after exposure. It is common for itchiness to persist for 4 to 6 weeks after scabies has been treated as outlined above. An itch/ rash often continues after treatment, e.g. because the allergic reaction to mites and their products takes several weeks to settle, or because the treatment causes an irritant dermatitis.



29.

A study was carried out to investigate the relationship between HIV infection and hypertension in sub Saharan Africa. Data on the prevalence of hypertension derived from a systematic review of literature from 25 African countries were sex and area-matched with corresponding national estimates on HIV prevalence.

What epidemiological study design best describes this work?

- A cohort study
- B cross-sectional study
- C descriptive study
- D ecological study
- E matched case-control study

Answer: D

Explanation:

Ecological study because the unit of analysis in this case is at the level of the population/community or group as opposed to the other study designs, for example cross-sectional where individuals are the unit of analysis.

In this case the unit of analysis is the national pooled estimates of HIV and an aggregated population prevalence of hypertension not values of BP or HIV in individuals.



30.

The validity of using random capillary blood glucose (RCBG) measurement as a more affordable screening test for type 2 diabetes in Dar es Salaam was assessed by comparing it to the current gold standard method of glycated haemoglobin. The specificity of RCBG was 82% and the positive predictive value was 65%.

What is the most accurate statement about RCBG as a screening test?

- A 65% of cases without diabetes had a positive screening test
- B 65% of people with a positive screening test had diabetes
- C 82% of cases with diabetes had a negative screening test
- D 82% of cases with diabetes had a positive screening test
- E 82% of cases without diabetes had a positive screening test

Answer: B

Explanation:

The specificity of a test is the probability of testing negative if not diseased, so 82% of people who had a negative RCBG test did not have diabetes.

Positive predictive value is the probability of being diseased if the test is positive.

A positive predictive value of 65% implies that 65% of people with a positive screening test had diabetes. (answer B)

The sensitivity of a test is the probability of testing positive if diseased.