



Optimizing Vaccination in CKD: A Case-Based Approach

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CASE VIGNETTE

Sourabh, a 31-year-old male farmer, presents with a history of Stage 5D Chronic Kidney Disease (CKD) secondary to suspected chronic glomerulonephritis (CGN) and diabetic kidney disease (DKD). He is on maintenance hemodialysis (MHD) through a left AV fistula. His medical history includes systemic hypertension (diagnosed 1.5 years ago), poorly controlled diabetes mellitus with HbA1c of 14.1%, diabetic retinopathy (moderate NPDR), and anemia related to CKD and chronic disease. The patient was recently hospitalized for diabetic ketoacidosis (DKA) precipitated by community-acquired Pneumonia. During the hospital stay, he was treated with appropriate antibiotics, optimized blood sugars, and underwent two sessions of dialysis.

On follow-up, the patient reports significant improvement. He continues to receive twice-weekly dialysis. Considering his medical condition, he is at increased risk of recurrent infection due to impaired immunity from CKD, diabetes, and regular dialysis. His immunization history was reviewed and he received the Tdap vaccine in childhood.

Q. Choose the most appropriate vaccination regimen for this patient, according to CDC 2024 guidelines.

A. Pneumococcal vaccine, Hepatitis B vaccine, Influenza vaccine, Tetanus-diphtheria-pertussis (Tdap) vaccine, MMR, Varicella, COVID-19.

B. Pneumococcal vaccine, Hepatitis B vaccine, Influenza vaccine, Hepatitis A, Tetanus-diphtheria-pertussis (Tdap) vaccine, MMR, Varicella, COVID-19.

C. Pneumococcal vaccine, Influenza vaccine, Tetanus-diphtheria-pertussis (Tdap) vaccine, MMR, Varicella, COVID-19.

D. Pneumococcal vaccine, Influenza vaccine, Tetanus-diphtheria-pertussis (Tdap) vaccine, MMR, Varicella, COVID-19. Haemophilus Influenza B, Meningococcal vaccine.

ANSWER: A. Pneumococcal vaccine, Hepatitis B vaccine, Influenza vaccine, Tetanus-diphtheria-pertussis (Tdap) vaccine, MMR, Varicella, COVID-19.

COMMENTS

Patients with Stage 5D CKD (on maintenance hemodialysis) are at significantly higher risk for infections due to immune dysregulation, dialysis-related exposures, and comorbidities such as diabetes mellitus. Vaccination is a critical component of their preventive care. The most appropriate vaccination regimen for this patient, based on CDC 2024 guidelines for CKD patients are the Pneumococcal vaccine, Hepatitis B vaccine, Influenza vaccine, Tetanus-diphtheria-pertussis (Tdap) vaccine, MMR, Varicella, COVID-19 vaccines.

Option B: This includes the Hepatitis A vaccine, which is not specifically indicated for CKD patients unless they have chronic liver disease or are at high risk for Hepatitis A exposure (e.g., travelers, MSM, illicit drug use) which are absent in our patient. This option is appropriate for individuals with cirrhosis or alcohol-related liver disease, which is not the primary concern in this case.

Option C: This regimen omits the Hepatitis B vaccine, which is essential for patients on hemodialysis due to their increased risk of HBV transmission. It may be suitable for individuals with heart failure or chronic lung disease, where Hepatitis B vaccination is not universally recommended unless other risk factors are present.

Option D: This adds *Haemophilus influenzae* type B (Hib) and Meningococcal vaccines, which are generally not indicated for CKD. These are recommended for individuals with functional or anatomic asplenia (e.g., sickle cell disease, splenectomy) or hemoglobinopathies to prevent severe bacterial infections.

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Eschar as a diagnostic marker for scrub typhus

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CASE VIGNETTE

A 47-year-old woman from rural India presented to the emergency department with a 5-day history of high-grade fever, headache, and abdominal pain. The fever was associated with a dull aching pain in the epigastric region. 3 days into her illness, she developed a dry cough and progressive shortness of breath. Over the last 24 hours, she had become confused, disoriented, and unable to recognize her family members.

On examination, the patient appeared ill and was febrile with a temperature of 103°F, pulse rate of 112 beats per minute, and blood pressure reading of 80/66 mmHg. The respiratory rate was 32 breaths per minute, and the Glasgow Coma Scale (GCS) score was 8. The patient's airway was secured via endotracheal intubation, and she was placed on mechanical ventilation. Vasopressor support was provided for hypotension resistant to bolus fluid therapy. A small lesion with central necrosis surrounded by erythema (image 1) was noted on her left flank. An abdominal examination revealed hepatomegaly, while the rest of the findings were unremarkable. Blood investigations (table 1) showed neutrophilic leucocytosis with thrombocytopenia, mildly deranged liver enzymes, elevated c-reactive protein and troponin levels.

Table 1: Relevant investigations of the patient

Investigations	Reference range	Patient's value
Haemoglobin (g/dL)	12.0 - 15	12.0
Total Leucocyte Count ($\times 10^3/\mu\text{L}$)	4.0 - 11.0	15.18
Neutrophils (%)	40 - 75	66
Platelets ($\times 10^3/\mu\text{L}$)	150 - 450	25
Serum Creatinine (mg/dL)	0.6 - 1.2	0.92
SGPT (U/L)	7 - 56	92
SGOT (U/L)	8 - 48	621
Serum ALP (U/L)	44 - 147	166
CRP (mg/L)	< 5	228.5
Troponin I (ng/L)	< 34.2	360.13



Ques. All of the following statements are true except?

- A.** Eschar is absent in many cases, especially in endemic regions.
- B.** Hidden locations like axilla, groin, and perineum require careful examination.
- C.** Eschar does not indicate severity but aids early diagnosis.
- D.** It can mimic other conditions like anthrax, spider bite, or necrotizing fasciitis.
- E.** Serology is crucial in early diagnosis.

ANSWER: E. Serology is crucial in early diagnosis.

COMMENTS

The most likely diagnosis for this patient is scrub typhus, a rickettsial disease caused by *Orientia tsutsugamushi*, which is transmitted through the bite of an infected chigger. Serology is not crucial in early diagnosis. The patient was started on empirical antimicrobial treatment, which includes meropenem 1 gram administered three times daily and vancomycin 1 gram administered twice daily according to the survival sepsis guidelines. Additionally, 100 mg of doxycycline was added twice daily due to the presence of eschar.

Tropical workup was positive for scrub typhus (IgM antibodies to *Orientia tsutsugamushi* by IgM ELISA) and negative for malaria, dengue, leptospirosis, and enteric fever. Blood, urine, and ET aspirate cultures were sent but yielded no growth. Viral serology for human immunodeficiency virus, hepatitis B, and C was non-reactive. The cerebrospinal fluid analysis was acellular. Non-contrast computed tomography of the brain was non-contributory. The patient responded significantly to treatment, with improved hemodynamic stability and successful weaning from ventilatory support. Broad-spectrum antimicrobials were de-escalated to more targeted therapy. By day 6, the patient was successfully extubated and transferred to the high-dependency unit for further monitoring and care. She was discharged on day 10 and came for follow-up after 10 days.

Eschar is a key diagnostic feature of scrub typhus in patients with acute febrile illness in endemic areas. It has a sensitivity of 97% and specificity of 100% for diagnosing scrub typhus, which makes it pathognomonic for this disease.¹ According to a recent systematic review and meta-analysis, approximately 30% of individuals diagnosed with scrub typhus exhibit eschar. Clinician awareness and response play a crucial role in the identification of eschar, which is always accompanied by regional tender lymphadenopathy. After the bite of an infected chigger, *Orientia tsutsugamushi* invades the macrophages in the skin, initiating inflammatory cascades that lead to both local and systemic manifestations. Initially, eschar appears as an ulcer, which then enlarges and eventually undergoes central necrosis, forming a black crust surrounded by erythema. This process can also facilitate bacterial spread through a phenomenon known as the Trojan horse phenomenon.² The most common locations for eschar are the groin in males and the mammary and inframammary regions in females. However, the least common area is the head and neck. Recognizing these distribution patterns can aid in early diagnosis and prevent misdiagnosis, especially in atypical presentations. In the above clinical situation, an empirical trial of doxycycline can be helpful in avoiding unnecessary investigations or treatment delays.

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