

07 – Antibacterial Drugs I: Key Points and Questions That Could be on the Exam

Speaker: David Gilbert, MD



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Disclosures of Financial Relationships with Relevant Commercial Interests

- Consultant: Biomerieux
- Research Grant on Diagnostics: Biofire

ARQ #1

- 60 y.o. female smoker, admitted, intubated, and ventilated due to severe COPD with Acute Respiratory Failure.
- Chest X-Ray: New bibasilar infiltrates and Emphysema
- Empiric ceftriaxone and azithromycin
- Sputum positive for both rhinovirus and *Klebsiella pneumoniae* resistant to both ceftriaxone and azithromycin
- Also “Resistant” to: all fluoroquinolones, aminoglycosides, pip/tazo, and **all carbapenems**

ARQ #1

- Which one of the following antibiotics is most likely to have activity vs. this KPC infection ?
 - A. Tigecycline
 - B. Ceftazidime-avibactam
 - C. Aztreonam
 - D. Ceftolozane-tazobactam

ARQ #2

- Which one of the following would you recommend for empiric therapy of *Pseudomonas aeruginosa pneumonia* ?
 - A. Ampicillin-sulbactam
 - B. Ertapenem
 - C. Piperacillin-tazobactam
 - D. Fosfomycin

ARQ #3

- 40 y.o. surgeon has surgical repair of torn anterior cruciate ligament of his knee. A single dose of cefazolin was given as a prophylactic antibiotic.
- Three days post-op: Purulent knee exudate. GNB on gram stain. Ceftriaxone (CTX) started
- Five days post-op: Growing *Klebsiella (Enterobacter) aerogenes* suscept. To CTX
- Ten days post-op: Knee still inflamed. Repeat culture: *K.(E.) aerogenes* resistant to CTX

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ARQ #3

- Which one of the following is the most likely explanation of the *Klebsiella(E.) aerogenes* resistance to ceftriaxone ?
 - A. Spontaneous Mutation in Cephalosporin cell membrane binding protein
 - B. Activation of a Cephalosporin efflux pump
 - C. Activation of an inducible chromosomal cephalosporinase
 - D. Expression of constitutive plasmid cephalosporinase

ARQ #4

- A COPD KPC pneumonia patient is started on Ceftazidime-avibactam with a good initial clinical response.
- Patient is Extubated and sent to general nursing unit
- Two days later, despite continuing Ceftaz/avibactam, return of respiratory distress with increased sputum production, fever, elevated WBC, new CXR infiltrates
- **Repeat sputum culture again positive for KPC but now resistant to Ceftazidime-avibactam**

ARQ #4

- Which one of the following treatment regimens would you select ?
 - A. Meropenem-vaborbactam
 - B. Tobramycin
 - C. Polymyxin E (colistin)
 - D. Ertapenem + Imipenem-cilastatin

ARQ ? #5

- 63 y.o. female presents with nausea, vomiting, fever, flank pain and dysuria.
- Known to have IDDM and obstructing ureteral calculi
- Urinalysis notable for many WBCs and pH of 9
- Urine and blood cultures and removal of calculi are pending.
 - Based on the most likely etiologic bacteria, what is your choice for empiric therapy ?
 - A. Polymyxin E (Colistin)
 - B. Eravacycline
 - C. Gentamicin
 - D. Delafloxacin

ARQ ? #6

- A 45 y.o. married monogamous male requires a trans-rectal prostate biopsy for evaluation of an elevated PSA. As instructed, he took one "prophylactic" dose of levofloxacin, 750 mg, po with a multivitamin prior to driving to the hospital.
- 18 hrs. post-biopsy he returns with urinary frequency, dysuria,, decreased urinary stream, and perineal pain.
- On exam: Temp 38 degrees C. Prostate is tender.
- Urinalysis: Positive for microscopic pyuria and hematuria. Urine and blood cultures are pending.

ARQ ? #6

- Which one of the following would you select for empiric IV therapy ?
 - A. Ceftriaxone
 - B. Moxifloxacin
 - C. Aztreonam
 - D. Trimethoprim-sulfamethoxazole

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ARQ Q #7

- A 51 y.o. male alcoholic with known cirrhosis is admitted with seizures. Two days ago, he had witnessed aspiration of oropharyngeal and gastric contents during a protracted seizure. He is now producing purulent sputum. He is febrile, the WBC is 16,000, and the serum procalcitonin is 3.0 ng/ml with a serum creatinine of 2.
- The sputum culture is positive for multi-drug resistant *Serratia* species
- The seizures are controlled with fosphenytoin and Keppra
- The *Serratia* is sensitive to all of the following antibacterials.

ARQ Q # 7

- Which one of the following antibacterials can lower the seizure threshold ?
- A. Levofloxacin
- B. Piperacillin-tazobactam
- C. Tobramycin
- D. Polymyxin B