



OUTBREAK: CHANGING EPIDEMIOLOGY OF HAIs AND CAIs

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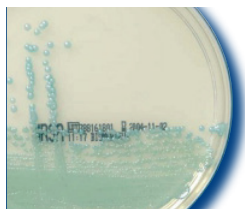
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This CE test covers the cover story. The Cover Story, Clinical Issues, and Lab Management, published in this month's MLO are peer-reviewed.

Cover story objectives/CE questions written by Cynthia B. Schofield, MPH, MT(CAMT), approved by Shirley Richmond, EdD, Dean, College of Health and Human Sciences, Northern Illinois University, DeKalb, IL.

CE QUESTIONS

- Distinguishing multidrug-resistant HAI from CAI requires**
 - phenotypic and genotypic characterization.
 - biochemical identification and antibiotic-susceptibility testing.
 - patient's clinical history and culture reports.
 - knowledge of risk factors and time of admission.
- Likely transmission of "superbugs" occurs at**
 - outpatient clinics 72 hours after admission.
 - healthcare centers from indwelling catheters.
 - healthcare centers and/or community settings.
 - nursing homes after antibiotic therapy.
- Defense mechanisms in MDR Gram-negative bacteria**
 - relate to virulence factors and toxin production.
 - depend on the size of the bacterial cell wall.
 - depend on environmental contaminant factors.
 - relate to enzymes derived from TEM-1, SHV-1, or OXA.
- Outbreak #1 studies found predominant MRSA strains were**
 - multidrug resistant from 2003 to 2006.
 - susceptible to vancomycin, linezolid, and daptomycin.
 - susceptible to gentamicin from 1997 to 2003.
 - resistant to >4 non-beta-lactam antibiotic drugs.
- Isolates in Outbreak #1 were screened**
 - by rapid latex-agglutination testing.
 - with the cefoxitin disk-diffusion test.
 - with 6 µg/mL oxacillin and 4% salt in MHA.
 - by molecular testing with PCR for PVL genes.
- In Outbreak #1 a change in epidemiology appeared when**
 - clones were separated using multilocus sequence typing.
 - PCR determined the presence of PVL genes.
 - specimens from the respiratory tract were implicated.
 - increased resistance appeared in the CA-MRSA isolates.
- Outbreak #2 studies of *A baumannii***
 - used phenotypic and molecular methods of identification.
 - proved the organism is tolerant to high temperatures.
 - used PFGE fingerprinting to identify the isolates.
 - confirmed contamination of medical devices and equipment.
- Laboratory identification of *A baumannii* is most accurate by**
 - Gram stain, culture, and susceptibility testing.
 - oxidase, catalase, and nitrate tests.
 - commercial kit or automated system.
 - rRNA gene sequencing.
- Susceptibility testing in Outbreak #2**
 - mandated standard methods of broth dilution.
 - required serial dilutions of 10 antibiotics.
 - proved most of the isolates susceptible to tigecycline.
 - confirmed fluoroquinolone resistance in 50% of the isolates.
- Search for mechanisms of resistance to ciprofloxacin in Outbreak #2**
 - found distinct lineages in the 20 isolates.
 - proved point mutations responsible for selective pressure.
 - confirmed a major role for efflux pumps.
 - confirmed PAβN created environmental pressure.
- Infection from *A baumannii***
 - is reported in 40 to 64% of military casualties.
 - is determined by ICU surveillance in the U.S.
 - increases morbidity in European military patients.
 - increases mortality in community-associated pneumonia.
- In Outbreak #3, carbapenem resistance was detected by**
 - PCR-based methods with high sensitivity.
 - ESBL antibiotic-susceptibility testing.
 - epidemiologic methods for *Klebsiella pneumoniae* Carbapenemase (KPC).
 - screening nursing-home and hospital patients.



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13. Screening for KPC in Outbreak #3

- a. determined the presence of four genotypes.
- b. implicated healthcare workers in transmission.
- c. was based on an MIC ≥ 1 $\mu\text{g/mL}$ for imipenem.
- d. reported 58 patients with chronic disease.

14. Surveillance of patients in Outbreak #3

- a. revealed one half or more had a CAI.
- b. indicated identical fingerprinting in 29 isolates.
- c. determined disk-diffusion testing was performed.
- d. revealed patients were infected >48 hours after admission.

15. Laboratory identification of KPC requires

- a. specimens collected from sterile sites.
- b. attention to growth and temperature requirements.
- c. automated system analysis or enzymatic panels.
- d. unique biochemical- and susceptibility-testing methods.

16. Susceptibility testing of KPC

- a. is similar in all ESBL-producing organisms.
- b. requires disk-diffusion testing for quantitative accuracy.
- c. poses a dilemma regarding cephalosporin activity.
- d. requires the Modified Hodge Test for screening.

17. Molecular technology for KPC

- a. is provided by most clinical laboratories.
- b. includes PCR testing for the bla_{KPC} gene.
- c. can determine carbapenem breakpoints.
- d. can determine patient treatment options.

18. In Outbreak #3, the mortality rate was presumed to

- a. decrease in patients treated with tigecycline.
- b. increase in patients treated with polymixin.
- c. increase in patients treated with imipenem.
- d. decrease in patients treated with imipenem.

19. Screening methods were recommended to detect KPC

- a. prior to outbreaks in New York and New Jersey.
- b. by rectal swab or stool culture on MAC agar.
- c. by PCR to increase sensitivity and decrease turnaround time.
- d. with the 2009 guidelines prescribed by SHEA.

20. Improved strategies to control MRSA, A baumannii and KPC include

- a. in-depth knowledge of microbiology.
- b. forming an antibiotic-stewardship team.
- c. susceptibility testing for MDR diseases.
- d. rRNA sequencing and real-time PCR.

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CE Test on OUTBREAK: CHANGING EPIDEMIOLOGY OF HAIs AND CAIs

January 2011

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