CANDWAN 2013: Antimicrobial Resistance in Pathogens Isolated from Canadian Hospital Clinics, Emergent Rooms, Medical/Surgical Units and Intensive Care Units

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OBJECTIVES

The CANDWAN study assesses the pathogen's ability to identify patients infected with Canadian hospitals and evaluates the prevalence of antimicrobial resistance in these isolates.

METHODS

15 tertiary-care centres across Canada submit pathogen isolates from patients attending clinics (C), emergency rooms (ER), medical and surgical wards (M/S), and intensive care units (ICU). Susceptibility testing was performed by CLSI method.

RESULTS

A total of 3,511 isolates were collected: 41.8%, 30.5%, and 39.5% from blood, respiratory, urine and wound/IV site specimens, respectively. Isolates were from hospitals in 90.2%, ER, 89.6%, and 94.8%, respectively. The most common pathogens were: E. coli: 18.7%, S. aureus (MRSA) 18.0%, P. aeruginosa 11.9%, K. pneumoniae 8.6%, S. pneumoniae 5.4% and H. influenzae 4.0%. Resistance rates (RR) for E. coli were: 0% for tigecycline (TG), 0.3% (minimum) (ERT), 0.3% (minimum) (SXT). P. aeruginosa (ATCC), 12.7% for colistin (CIP), 2.8% for meropenem (MEM), 3.4% for linezolid (LZD), 6.7% for Gentamicin (GEN), 7.2% for ceftriaxone (CXR). CNN, 11.1% for Macrolide (MAC), 18.8% vancomycin (VAN), 19.0% trimethoprim (TMP), 32.0% clindamycin, 74.2% clarithromycin, and 76.0% CIP. Overall, the prevalence of MRSA was 20.7%.

CONCLUSIONS

In Canada, resistance rates for E. coli remain lowest for M/P, ERT, TG, and PTZ, while for P. aeruginosa, resistance rates were lowest with COL, PTZ, and GEN. No resistance was observed in MRSA with VAN, LZD, or G/P.

BACKGROUND

Infections caused by antimicrobial-resistant pathogens are a serious issue in Canada, and many parts of the world. Resistant pathogens include methicillin-resistant Staphylococcus aureus, vancomycin-resistant enterococci (VRE), multidrug-resistant tuberculosis, antipsychotic-resistant Staphylococcus aureus, and carbapenem-resistant Enterobacteriaceae and Pseudomonas aeruginosa. Treatment options for these infections are often limited as these pathogens are frequently multidrug-resistant (MDR).

MATERIALS & METHODS

Participating Sites: Fifteen central hospital sites in major population centers in 9 of the 10 provinces in Canada were recruited. These sites were geographically distributed in a population-based manner.

Methods: 15 tertiary-care centres across Canada submitted pathogen isolates from patients attending clinics (C), emergency rooms (ER), medical and surgical wards (M/S), and intensive care units (ICU). Susceptibility testing to antimicrobial agents was performed by CLSI methods.

Objectives: The CANDWAN study assesses the ability of antimicrobial resistance in pathogenesis associated with respiratory, urinary, bacteremic, and wound/IV site infections in patients infected with Canadian hospitals.

Conclusions: In Canada, resistance rates for E. coli remain lowest for M/P, ERT, TG, and PTZ, while for P. aeruginosa, resistance rates were lowest with COL, PTZ, and GEN. No resistance was observed in MRSA with VAN, LZD, or G/P.

Ongoing, population-based surveillance study. CANDWAN, a study initiated in 2006, is a tertiary-care hospitals study.

The authors would like to thank the investigators and laboratory staff at each of the central sites.

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Table 1. Top Pathogens Isolated in Canadian Hospitals in 2013

Organism | Organism | Organism | Organism | Organism | Organism | Organism | Organism
--- | --- | --- | --- | --- | --- | --- | ---
E. coli | S. aureus (MRSA) | P. aeruginosa | K. pneumoniae | S. pneumoniae | H. influenzae | S. enterica | P. mirabilis
--- | --- | --- | --- | --- | --- | --- | ---
72.1 | 57.5 | 15.2 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6

Table 2-4. Antimicrobial Activities Against Common Gram Negative and Gram Positive Pathogens

Organism | Organism | Organism | Organism | Organism | Organism | Organism | Organism
--- | --- | --- | --- | --- | --- | --- | ---
E. coli | S. aureus (MRSA) | P. aeruginosa | K. pneumoniae | S. pneumoniae | H. influenzae | S. enterica | P. mirabilis
--- | --- | --- | --- | --- | --- | --- | ---
≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06

Table 3. Breakdown of Antimicrobial Activities Against Common Gram Negative and Gram Positive Pathogens

Organism | Organism | Organism | Organism | Organism | Organism | Organism | Organism
--- | --- | --- | --- | --- | --- | --- | ---
E. coli | S. aureus (MRSA) | P. aeruginosa | K. pneumoniae | S. pneumoniae | H. influenzae | S. enterica | P. mirabilis
--- | --- | --- | --- | --- | --- | --- | ---
≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06

Table 4. Breakdown of Antimicrobial Activities Against Common Gram Negative and Gram Positive Pathogens

Organism | Organism | Organism | Organism | Organism | Organism | Organism | Organism
--- | --- | --- | --- | --- | --- | --- | ---
E. coli | S. aureus (MRSA) | P. aeruginosa | K. pneumoniae | S. pneumoniae | H. influenzae | S. enterica | P. mirabilis
--- | --- | --- | --- | --- | --- | --- | ---
≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06 | ≤ 0.06

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CONCLUSIONS

The CANDWAN study is a national, ongoing, population-based surveillance study. CANDWAN, a study initiated in 2006, is a tertiary-care hospitals study.

To determine the pathogen's ability to identify patients infected with Canadian hospitals.

To determine the prevalence of antimicrobial resistance in pathogenesis associated with respiratory, urinary, bacteremic, and wound/IV site infections in patients infected with Canadian hospitals.

To assess the activity of antimicrobials against respiratory, urinary, bacteremic, and wound/IV site pathogens in patients affiliated with Canadian hospitals.

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