Differences in Susceptibilities for Multidrug Resistant Gram Negative Organisms Between Urine and Blood Cultures in Solid Organ Transplant Recipients: Implications for Transplant Antimicrobial Stewardship

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BACKGROUND

Solid organ transplant recipients (SOTR) are at an increased risk of colonization and infections with multidrug resistant organisms (MDROs), which can then become an obstacle for the timely initiation of adequate antibiotics in this often critically ill population.

Antibiograms (ATB) are valuable tools in guiding empiric antimicrobial selection, and also provide insights into the development of antibiotic resistance patterns.

Antimicrobial stewardship strategies emphasize that empiric antimicrobial therapy should be patient specific, guided by local data and the presumptive site of infection.

We constructed antibiograms for selected Gram-negative rods isolated from blood and urine samples of SOTR, and compared the proportion of bacterial susceptibility by source, and with the hospital wide pooled antibiogram.

METHODS

Retrospective review of the microbiology surveillance system (Vigilanz®) conducted at Jackson Memorial Hospital (JMH), a nonprofit, 1550 bed acute care hospital in Miami, FL, with more than 260,000 patient visits per year and multiple specialties including trauma, oncology, and transplant (kidney, pancreas, multi-visceral, heart, lung), from 01/01/2013-12/30/2014.

Only the first positive isolate of per patient was included.

Antibiograms were categorized by source (blood and urine).

Proportions of bacterial susceptibilities to specific antibiotics were compared between cultures categorized by source (urine versus blood), and also with the hospital-wide antibiogram.

Differences in proportions were tested using Chi-square of Fisher’s exact test as appropriate.

RESULTS

1005 unique patient isolates in SOTR were identified, 606 (60.3%) from urine, and 399 (39.7%) from blood.

The most frequently isolated GNR by SOURCE: Urine Escherichia coli 183/606 (30.2%), and Klebsiella pneumoniae (48/399 (12%) in blood.

Among E. coli isolates, ceftriaxone susceptibilities were urine 52%, blood 46% and hospital-wide ATB 85% (p<0.0001) (Fig. 1).

E. coli susceptibilities to fluoroquinolones: <60% in urine, blood, and hospital-wide ATB.

K. pneumonia, both urine and blood isolates had significantly different susceptibilities to all antibiotics compared to the hospital-wide ATB (Fig. 2)

Differences were also seen when comparing susceptibilities to cefepime in urine vs blood (79% vs 59% ;p=0.02), and meropenem (urine 85% vs. blood 65% [p=0.002]).

P. aeruginosa susceptibilities to meropenem were urine 60%, blood 42% vs. hospital-wide ATB 76% (p=0.03) (Fig. 3).

CONCLUSION

Antimicrobial resistance in SOT is a growing problem in our patient population. We found significant differences in susceptibilities between isolates from blood and urine cultures in our SOTR compared to the hospital-wide antibiogram, with a high proportion of organisms resistant to fluoroquinolones and carbapenems.

SOTR specific antibiograms with further analysis by source, could guide more appropriate empiric antimicrobial therapy in this group of patients at high risk for MDR infections.

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