ABSTRACT

Background: Fosfomycin (FOS) has recently attracted increasing interest, largely because of its good activity in vitro against multidrug-resistant (MDR) pathogens. However, there have been few studies of FOS in North America, mostly with Enterobacteriaceae, and few studies of FOS susceptibility testing in the community to assess the resistance rate of FOS among community urinary isolates. These results provide support for FOS as a useful agent for the treatment of UTIs caused by various organisms.

Methods: Consecutive isolates were identified by conventional methods from urine cultures processed over a 9 week period ending on January 30, 2015. Organisms not recommended for routine testing (e.g., streptococci) were excluded from the study. Isolates were tested by disk diffusion or by the Vitek 2 system (bioMérieux), in accordance with CLSI guidelines, against ampicillin (AM), cefazolin (KZ), ciprofloxacin (CIP), nitrofurantoin (FM), trimethoprim/sulfamethoxazole (SXT), and FOS. Due to lack of FOS interpretive criteria for all organisms, CLSI E. coli and E. faecalis breakpoints were applied for all organisms, similar to recently published investigations.

Results: Of 11,853 urine specimens processed, a total of 2,455 non-duplicate isolates were tested, including E. coli (n = 1,617), E. faecalis (n = 356), Klebsiella (n = 243), Proteus mirabilis (n = 144), Citrobacter (n = 96), Enterobacter (n = 38), Morganella (n = 35), Staphylococcus aureus (n = 34), Providencia (n = 25), and Enterococcus faecalis (n = 2). FOS R rates for all organisms, except E. coli, varied from 2% (Klebsiella spp.) to 1% (Proteus mirabilis), respectively. FOS R rates among MDR isolates that were R to ≥ 3 antimicrobial classes (n = 286) and ESBL producing isolates were 6%, 25%, 12%, 10%, 30%, and 2%, respectively. FOS R rates among MDR isolates that were R to ≥ 3 antimicrobial classes (n = 286) and ESBL producing isolates were 6%, 25%, 12%, 10%, 30%, and 2%, respectively. The resistance rate among community urinary isolates, in comparison to those of other oral antimicrobial agents commonly used for the treatment of uncomplicated urinary tract infections (UTIs) in non-hospitalized patients.

RESULTS & DISCUSSION

Antimicrobial Resistance: Of 11,853 urine specimens processed, a total of 2,455 non-duplicate isolates were included in this evaluation (Table 1). As can be seen from Figure 1, FOS had the lowest resistance rate (2%), compared to those of the other antimicrobial agents, namely, AM (45.8%), CIP (15.8%), FM (36.4%), SXT (30.4%), and KZ (25.2%). FOS resistance among MDR isolates. Figure 1 also shows the resistance rates of the MDR isolates that were resistant to at least lean antimicrobial classes (n = 286), showing FOS with a low resistance rate of 6.3%. Of these isolates, 90 E. coli and 2 Klebsiella strains were identified as ESBL-producing, with a combined FOS resistance rate of 11.1%. Included in the MDR data. No carbapenemase-producing isolates were identified during this period.

Comparative Resistance per Organism: For most organisms, FOS retained a low resistance rate per organism, ranging from <1% to 9% (Figure 3). Taken together, the vast majority of isolates isolated to organisms that had a low FOS resistance rate, an observation that supports the usefulness of FOS for the empirical treatment of UTIs caused by various organisms in the community.

Table 1: Organisms Tested in This Study

<table>
<thead>
<tr>
<th>Organism</th>
<th>Number of isolates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escherichia coli</td>
<td>1,617 (100%)</td>
</tr>
<tr>
<td>Enterobacter species</td>
<td>356 (14%)</td>
</tr>
<tr>
<td>Proteus mirabilis</td>
<td>144 (5%)</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>35 (2%)</td>
</tr>
<tr>
<td>Morganella morganii</td>
<td>33 (2%)</td>
</tr>
<tr>
<td>Providencia rettgeri</td>
<td>32 (1%)</td>
</tr>
<tr>
<td>Proteus faecalis</td>
<td>31 (1%)</td>
</tr>
<tr>
<td>Enterococcus faecalis</td>
<td>10 (0.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>2,455 (100%)</td>
</tr>
</tbody>
</table>

REFERENCES


ACKNOWLEDGMENTS

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CONCLUSIONS

• Of the five oral antimicrobial agents tested in this study, FOS had the lowest resistance rate among community urinary isolates, including multidrug resistant strains.
• Among the various patient ages groups, FOS continued to retain the lowest resistance rate in each age group.
• These results support the usefulness of FOS for the treatment of uncomplicated lower UTIs that may be caused by various organisms in the community.