Antimicrobial Resistance in Canine Urinary Tract Infections

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In the Literature

Yu Z, Wang Y, Chen Y, et al. Antimicrobial resistance of bacterial pathogens isolated from canine urinary tract infections. *Vet Microbiol*. 2020;241:108540.

FROM THE PAGE ...

Although UTIs are relatively common in female dogs and other reviews have been published, the authors of this study from Beijing, China, recognized a possibility for variance in the local and regional population. To further understand the prevalence and antimicrobial resistance of bacteria associated with canine UTIs, analysis of urine samples from dogs with UTIs or other urinary tract diseases was performed.

In processing 326 samples, 129 bacterial isolates were identified from 103 samples. The isolated organisms were similar to other reports[1]; *Escherichia coli* was identified most commonly but only represented approximately one-third of total positive cultures. A variety of other gram-positive and gram-negative organisms comprised the remaining isolates, with *E coli, Klebsiella* spp, and *Staphylococcus* spp comprising ≈70% of positive cultures. More than one pathogen was isolated in ≈33% of positive cases. Resistance to common antimicrobials was also common in positive samples. In *E coli* isolates, the highest rates of resistance were recorded for ampicillin, ceftazidime, and florfenicol. The highest rates of resistance in *Staphylococcus* spp isolates were recorded for erythromycin, trimethoprim/sulfamethoxazole, and penicillin. These results reinforce the importance of culture and antimicrobial susceptibility testing when planning appropriate UTI treatment.

The results of this study suggest the existence of rampant multidrug-resistant urinary tract pathogens in the region in which the study took place; however, they are also fairly consistent with what is seen in typical small animal practice.[1] Even with expert screening of urine sediment, only ≈33% of urine cultures grew organisms; negative urine cultures may represent prior antimicrobial treatment, true negatives, or misidentification of sediment artifacts. However, samples from dogs with signs of UTI but unremarkable sediments were not cultured; thus, other infected dogs may have been missed. In addition, although *E coli* may be expected to cause a proportion of UTIs, two-thirds of cases are caused by other bacteria, and a significant variance in antimicrobial susceptibility can be expected.

… TO YOUR PATIENTS

Key pearls to put into practice:

1. This study provides a glimpse of the value of antibiograms and the need for antimicrobial stewardship. An antibiogram assimilates the susceptibility patterns from large numbers of samples at a single laboratory, region, or hospital. Antibiograms are particularly pertinent for hospital-acquired infections, both for planning treatment and tracking resistance patterns. Although an antibiogram does not replace individual susceptibility testing in the management of infection, it does provide some generalizable information to guide empiric treatment selection.

2. Nearly all urinary pathogens in this study remained susceptible to amikacin and meropenem; however, cost, toxicity, and practicality of these medications limit their clinical value. Similarly, doxycycline appears promising based solely on the antibiogram in this study, but it is not excreted at high levels in urine and is usually reserved for infections resistant to other treatment options.

3. Antimicrobial stewardship entails limiting antimicrobial exposure and reducing the risk for resistant organisms. Consensus guidelines are available for shorter, targeted, and selective management of UTIs in dogs and cats[2]; although these guidelines rely heavily on human medical literature and practice and are yet to be tested in veterinary practice, they provide a conservative view of antimicrobial treatment worth adopting. By prioritizing stewardship, reasonable empiric antimicrobial choices, and short treatments based on culture and susceptibility results, the veterinary profession can help support good patient care while blunting induced resistance.

References

1. Barsanti J. Genitourinary Infections. In: Greene C, ed. *Infectious Diseases of the Dog and Cat*. 4th ed. St. Louis, MO: Elsevier Saunders; 2012:1013-1044.
2. Weese JS, Blondeau J, Boothe D, et al. International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. *Vet J*. 2019;247:8-25.