Evaluation of a Rapid Immunoassay for Point-of-Care Detection of Bacteria in Cat Urine

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Lower urinary tract signs in cats (LUTS) are more frequently due to sterile inflammation rather than infection. Practitioners may forgo microbiological culture due to cost, and prescribe antimicrobial agents empirically, incurring unnecessary selection pressure and side effects on most patients. Therefore, a rapid screening test for detection of bacteria in cat urine could direct appropriate therapy.

A "dip-stick" style immunoassay to detect bacteria was performed on feline urine (n = 100) submitted for routine bacterial culture in a Veterinary Teaching Hospital. The immunoassay was performed according to manufacturer instructions and culture was performed quantitatively on Columbia agar with 5% sheep's blood, with a maximum 72 hour incubation time at 35˚C in ambient air. Bacteria were identified using matrix-assisted laser-desorption time-of-flight mass spectrometry.

Eleven samples yielded ≥ 100,000 cfu/ml in culture, ten of which (90.9%) were positive on the immunoassay, and consisted of E. coli (n = 5), Enterococcus spp. (n = 5), and Staphylococcus felis (n = 1). Three samples yielded ≤ 200 cfu/ml, one of which (33.3%) was positive on the immunoassay, and consisted of E. coli (n = 2), and Staphylcoccus felis + E. coli (n = 1). The immunoassay was positive for two (2.3%) culture negative samples. The immunoassay correctly categorized the bacteria as gram-negative or gram-positive for eleven (100%) of the concordant samples.

When samples with ≤ 1000 cfu/ml were considered negative, sensitivity and specificity of the immunoassay were 90.9% and 96.6% respectively, with positive and negative predictive values of 76.9% and 98.9%. Given the low prevalence of bacterial cystitis in cats, these data suggest that the immunoassay is a useful screening tool for cats presenting with LUTS.

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Diagnostic accuracy of a rapid immunoassay for point-of-care detection of urinary tract infection in dogs

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OBJECTIVE: To determine the diagnostic accuracy of a rapid immunoassay (RIA) for point-of-care detection of urinary tract infection (UTI) of dogs, compared with criterion-referenced diagnosis with bacterial culture.

SAMPLE: 200 urine samples obtained from dogs and submitted to a veterinary microbiology diagnostic laboratory for routine bacterial culture and antimicrobial susceptibility determination.

PROCEDURES: Samples were evaluated by use of quantitative bacterial culture and the RIA. Sensitivity, specificity, and positive and negative predictive values of the RIA were calculated; results of bacterial culture were the criterion-referenced outcome. A κ statistic was calculated to determine agreement between bacterial culture and RIA results.

RESULTS: 56 of 200 (28%) urine samples had positive results for bacterial growth by use of culture methods; there were 38 (19%) positive results likely to be associated with bacterial UTI on the basis of sample collection method and bacterial concentration. Sensitivity and specificity of the RIA for detecting samples likely to be associated with UTI (≥ 1,000 CFUs/mL) were 97.4% and 98.8%, respectively. The positive and negative predictive values of the RIA for bacterial cultures with likely UTI were 0.949 and 0.994, respectively. Agreement between bacterial culture and RIA outcome for UTI was substantial (weighted κ, 0.718).

CONCLUSIONS AND CLINICAL RELEVANCE: The RIA test evaluated in this study accurately detected UTI of dogs, compared with detection with the criterion-referenced bacterial culture method. Use of this point-of-care RIA could allow clinicians to diagnose UTI at the time of a patient visit and provide information useful for immediately initiating empirical antimicrobial treatment. (Am J Vet Res 2016;77:162–166)

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