Role of Molecular Testing in UTI Management

by Vladimir Kakitelashvili, MD

Background

Recurrent and complicated urinary tract infections (UTIs) account for a significant cost on the health care system and cause significant morbidity in the US.[1,2] In the management of UTI, standard urine culture (SUC) is regarded as the gold standard; however, this test has now been determined to have limitations which include a lengthy turnaround time, and its difficulty identifying fastidious uropathogens or multiple organisms within a polymicrobial infection. These limitations may lead to poor outcomes such as repeated clinic and emergency room visits, and UTI complications.[2,3]

These shortcomings of SUC could be addressed by using other highly sensitive advanced molecular tests.

Clinical evidence

There are multiple peer reviewed publications that have shown how advanced molecular tests can improve the detection of uropathogens and improve the management of recurrent and complicated UTIs.

One study focused on the clinical impact of treatment decisions on polymicrobial or non-*E. coli* infections of Complicated UTIs (cUTIs) which are more likely to be missed by SUC.[2] The polymicrobial infections may be called out as contaminated or mixed flora while the slow growing fastidious organisms may not be detected by SUC.[2] The outcome of this paper showed that patients with cUTIs treated based on the advanced molecular test had significantly improved symptom reduction and clinical cure rates compared to the untreated cohort.[2]

Another review paper also highlighted the bias that SUC has toward fast-growing Gram-negative aerobic species at the expense of slow growing fastidious organisms and non-aerobic uropathogens.[4] This was consistent with other studies that showed the advantages of M-PCR in the detection and identification of uropathogens in the diagnosis of UTI.[5]

Additionally, Multiplex Polymerase Chain Reaction (M-PCR) has demonstrated a greater ability to detect pathogens that may be missed by SUC and may considerably affect the choice of antimicrobial therapy.[5] The use of advanced molecular testing when compared to SUC in a retrospective study by Daly A et al found a 13.7% reduction in hospital admissions and Emergency Room (ER) visit in a group of 66383 patients divided into 2 cohorts, one treated with advanced molecular testing and the other using SUC.[6]

Another factor which is important in the management of patient with UTIs is the diagnostic turnaround time (TAT) which could potentially lead to prompt initiation of effective therapy.[3] The use of SUC often takes 2 days or more.[3] Advanced molecular test results are often obtained at a shorter TAT, and this could lead to a crucial “time win” and favorable outcome.[3]

Conclusion

Given all these clinical data, advanced molecular testing has been shown to address the limitations of SUC and it would be imperative to consider its use by more health care providers. This could potentially be a game changer in the management of complicated and recurrent UTIs.

About the author

Dr. Vladimir Kakitelashvili is a board-certified urologist with over 30 years of experience and serves his patients at La Plata Urology Center. Dr. Kakitelashvili completed residencies at the Institute of Urology, Moscow, Russia, as well as The Union Memorial Hospital, Baltimore, MD, and University of Nebraska Medical Center, Omaha, NE. In addition to winning several awards throughout his career, Dr. Kakitelashvili has published many papers and presented at AUA on several urologic topics of interest.

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