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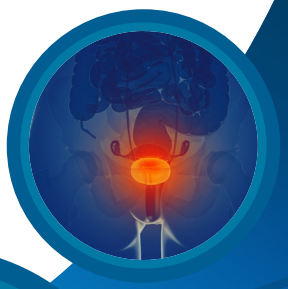
URINARY TRACT INFECTIONS

UTI was once a simple-to-treat infection which has become more challenging to treat over the last 25 years. (1) Half of the population can expect to get a UTI at least once in their lifetime. This common community or hospital-acquire infection accounts for considerable morbidity and health-care expenditure with an estimated annual cost of US$3.5 billion in USA.



The majority of UTIs are caused by Gram-negative pathogens, primarily from the Enterobacteriaceae family including E. coli, Proteus, Klebsiella, and Enterobacter species. Gram positive and fungal organisms also cause UTI in certain populations, such as patients with indwelling catheters, diabetes, or recent anti-biotic use. Multidrug-resistant organisms (MDROs) are becoming more common due to antibiotic overuse. MDROs limit empiric treatment failures, Untreated UTI can lead to pyelonephritis, bacteremia and sepsis.

LIMITATIONS OF DIPSTICK TESTING

Urine dipsticks are quick and easy for point-of-care testing, but do not provide a microbiological diagnosis. Urine dipsticks can give false-negative results in the case of non-nitrite-producing pathogens, such as Enterococcus and Staphylococcus spp., making them less sensitive in screening fo UTI in the elderly and pregnant patients who havehigher rates of gram positive infections.

LIMITATIONS OF URINE CULTURE

Potential UTI urine samples are cultured on agar plates to grow and identify uropathogens. Standard 24 hr urine culture fails to spot a high proportion of uropathogens that may be clinically relevant, especially gram positives and fungal pathogens (12% detection rate of non-E. coli pathogens) (2.6). Expanded Quantitative Urine Culture (EQUC) method identifies more pathogens but takes 48 hours of growth time (6). If a pathogen is isolated and identified with culture, antimicrobial susceptibility testing (AST) takes an additional 1 to 2 days.

Even the most common uropathogen, E. coli may be missed by standard culture. In a recent Belgian study, one quarter of women symptomatic for UTI had a negative urine culture result, and almost all of these symptomatic women (95%) actually had an E. coli infection, as determined by quantitative PCR. In addition, 90% of asymptomatic women were negative for E. coli by qPCR (this matches the 10% asymptomatic bacteriuria rate) indication high specificity of the test. (3)

WHAT IS PCR?

PCR, short for polymerase chain reaction, is a lab technique that takes small quantities of DNA and amplifies or increases their number. Utilizing TaqMan probes, DNA is amplified using a targeted approach to identify pathogens down to the species level. Our PCR techniques are highly sensitive specific, and reproducible, allowing for rapid analysis of biological samples.

WHY PCR TESTING?

Fast, accurate identification of uropathogens and antimicrobial susceptibility is paramount to effectively treat UTIs. Ipsum Diagnostics RESIST-UTITM panel targets pathogens and antibiotic resistant (ABR) genes commonly found in UTIS. This includes gram positive and gram negative pathogens as well as fungal species. Real-time PCR takes less than 8 hours, is more sensitive and more likely to identify polymicrobial infections. Rapid turn-around time coupled with detection of ABR markers supports intelligent prescribing, better antibiotic stewardship and better patient care.

Ipsum offers our providers comprehensive consultation services from Infectious Disease Specialists to review test results for clinical significance.

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UTI: Molecular Assessment

PCR Testing for Bacteria, Fungi and Antibiotic Resistant Genes

Antibiotic Resistant Genes:

Quinolone and fluoroquinolone Resistance:
QnrA
QnrB

Vancomycin Resistance:
vanA1
vanB
vanC1

Carbapenem Resistance:
VIM
KPC
IMP-2 group
OXA-48

Macrolide Resistance:
ErmA
ErmB
ErmC

Methicillin Resistance:
MecA

Extended-Spectrum-Betalactamase:
SHV
CTX-M group 1

Fungi

Yeast
Candida albicans
Candida glabrata
Candida parapsilosis
Candida tropicalis
Candida aureus

Bacteria

Gram Negative
Acinetobacter baumannii
Providencia stuartii
Pseudomonas aeruginosa
Citrobacter freundii
Enterobacter aerogenes
Enterobacter cloacae
Escherichia coli
Klebsiella pneumoniae
Morganella morganii
Proteus mirabilis
Proteus vulgaris
Klebsiella oxytoca

Gram Positive
Enterococcus faecalis
Enterococcus faecium
Staphylococcus aureus
Staphylococcus epidermidis
Staphylococcus saprophyticus
Streptococcus agalactiae
(Group B)
Streptococcus pyogenes
Streptococcus pneumoniae

Anaerobic
Clostridium Perfringens
Peptostreptococcus anaerobius
Bacteroides fragilis
Fingoldia magna
(Peptostreptococcus magnus)