

Please read this bit first

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a “Journal Club” activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out “correct” answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

Cycle 23 Organism 4:

Escherichia coli

Background

The genus *Escherichia* is named after Theodor Escherich, who isolated the type species of the genus. They are gram-negative bacilli occurring singly or in pairs. *Escherichia coli* is facultatively anaerobic with both a fermentative and respiratory type of metabolism. They are either nonmotile or motile by peritrichous flagella. *E coli* is a major facultative inhabitant of the large intestine.

Urinary tract infections

The urinary tract is the most common site of infection by *E coli*. *E coli* accounts for more than 90% of all uncomplicated UTIs. The recurrence rate after a first *E coli* infection is 44% over 12 months. *E coli* UTIs are caused by the uropathogenic strains of *E coli*. *E coli* causes a wide range of UTIs, including uncomplicated urethritis/cystitis, symptomatic cystitis, pyelonephritis, acute prostatitis, prostatic abscess, or urosepsis. Uncomplicated cystitis occurs primarily in females who are sexually active and are colonized by a uropathogenic strain of *E coli*. Subsequently, the periurethral region is colonized from colon contamination, and the organism reaches the bladder during sexual intercourse.

E coli is the leading cause of both community-acquired and nosocomial UTI. As many as 50% of women have had at least one episode of UTI in their lifetime. Patients who are symptomatic have dysuria and may have low-grade fever. Patients with pyelonephritis or complicated UTI present with localized flank or low back pain, high fever, and urinary frequency and urgency. Findings also include rigors, sweating, headache, nausea, and vomiting. Patients with diabetes or urinary obstruction can also develop bacteremia and septicemia.

Physical

Factors that predispose to UTI include female sex. This predisposition is because of anatomy and changes during sexual maturation, pregnancy, and childbirth.

Young boys are predisposed to UTIs by posterior urethral valves. Elderly men are predisposed to UTIs by the presence of prostatic hypertrophy.

S A N A S



PROFICIENCY
TESTING

SANAS Accredited to ISO Guide 43 / ILAC G13

Other factors are catheterization or mechanical manipulation, obstruction, or diabetes.

Patients present with a wide spectrum of symptoms ranging from asymptomatic cystitis to pyelonephritis/perinephric abscess.

Uncomplicated acute cystitis may manifest as low-grade fever, dysuria, and increased urinary frequency.

Lab Studies

All patients thought to have *E coli* infection should have a routine CBC count with differential to evaluate for leukocytosis or a left shift. Gram stain results determine if the organism is gram-negative, but findings do not distinguish among the other aerobic gram-negative bacilli that cause similar infectious diseases. *E coli* is a gram-negative bacillus that grows well on commonly used media. It is lactose-fermenting and beta-hemolytic on blood agar. The majority of strains are nonpigmented. Definitive diagnosis is based on the isolation of the organism in the microbiology laboratory from clinical specimens.

For urinary tract infections, a urine dipstick test may be performed to rapidly determine if the patient has pyuria or bacteriuria based on the detection of leukocyte esterase and nitrites, respectively. Definitive diagnosis is based on urine culture results. Collect the specimen from a midstream clean void or from the catheter in the presence of an indwelling Foley catheter. Colonization must be differentiated from infection based on urinalysis results. In cases of infection, pyuria is usually present.

Treatment

The treatment of UTI 's is best guided by antimicrobial susceptibility results. Lower uncomplicated UTI 's in non-pregnant women can be treated with a single dose of a quinolone. Complicated UTI 's require longer treatment between 7-14 days depending on the site of infection, other complicating factors and antibiotic used. Most *E. coli* isolates are amoxicillin, 1st generation cephalosporin and cotrimoxazole resistant but remain susceptible to a variety of other agents. ESBL production in these bacteria are on the increase.

CPD Questions:

1. Why are women more likely to suffer from a UTI than men?
2. Consider your own lab's incidence of UTIs. What is the distribution between males and females; and what age predominates, if any?