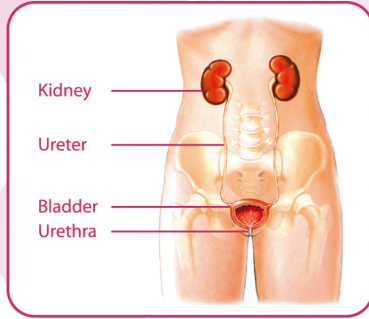


## UTI: A common and serious disorder



- Urinary tract infections (UTI) are common community-acquired and nosocomial diseases.<sup>1</sup>
- UTIs are among the most common bacterial infections in women. As many as 60% of women will suffer a UTI at some point in their life.<sup>2</sup>
- *Escherichia coli* is the most common cause, accounting for roughly 80% of infections; other cases are caused by *Staphylococcus saprophyticus*, *Klebsiella*, *Enterobacter*, *Serratia* and *Staphylococcus aureus*.<sup>2</sup>
- *E. coli* adhere to and colonize the mucosal uroepithelium, cause inflammation and eventually migrate from the lower urinary tract to the kidney.<sup>1</sup>

## The issue of antibiotic resistance is real

- The standard treatment for urinary tract infections is antibiotic therapy.
- Prophylactic antibiotic therapy is sometimes recommended in high-risk patients. This treatment eliminates recurrence of UTI but is costly and increases risk of side effects and antibiotic resistance.<sup>2</sup>
- The consumption of antibiotics is directly correlated to resistance in uropathogens.<sup>1</sup>



## UTI and Pregnant women



- A urinary tract infection is a very common medical complication of pregnancy, if left untreated can cause serious problems.
- Pregnant women are at increased risk for UTIs. The incidence of UTI in pregnant can be as high as 8%.<sup>3,4</sup>
- During pregnancy, there are normal changes in the urinary tract that contribute to an increased susceptibility to bladder infections, such as:
  - **The anatomical changes:** the growing uterus causes kidney enlargement and compression of the ureters and bladder;<sup>3</sup>
  - **The functional changes:** the bladder does not empty completely; the urine is not as acidic as normal and it contains more sugars (this encourages bacterial growth in the urine), protein and hormones (may lead to a decreased ability of the lower urinary tract to resist invading bacteria).<sup>5</sup>

- In general, pregnant patients are considered immunocompromised UTI hosts because of the physiological changes associated with pregnancy, increasing the risk of serious infectious complications from symptomatic and asymptomatic urinary infections in a healthy pregnant woman.<sup>6</sup>
- The organisms that cause UTIs during pregnancy are the same as those found in non-pregnant patients. *Escherichia coli* accounts for 80 to 90 percent of infections. Other gram-negative rods such as *Proteus mirabilis* and *Klebsiella pneumoniae* are also common. Gram-positive organisms such as Group B *Streptococcus* and *Staphylococcus saprophyticus* are less common causes of UTI. Less common organisms that may cause UTI include *Enterococci*, *Gardnerella vaginalis* and *Ureaplasma ureolyticum*.<sup>7,8</sup>
- UTIs during pregnancy are a common cause of serious maternal and perinatal morbidity; with appropriate screening and treatment, this morbidity can be limited.
- A UTI may manifest as asymptomatic bacteriuria, acute cystitis or pyelonephritis.
- All pregnant women should be screened for bacteriuria and subsequently treated with appropriate antibiotic therapy.<sup>12</sup> However, antimicrobial treatment and prophylaxis has resulted in increasing resistance to anti-microbials among uropathogenic bacteria.<sup>10</sup> It is also unknown whether antibiotics might have adverse effects on fetal development.
- Cranberry provides an alternative tool for prevention of urinary tract infection that could result in decreased use of antimicrobials. Cranberry appears to be a safe, herbal choice for UTI prophylaxis and has relatively good tolerability.<sup>9</sup>

## UTI and Senior Citizens



- Urinary tract infections (UTI) are very common in the elderly. It is the most frequent bacterial infection recorded in the elderly, followed by pneumonia and skin/soft tissue infections.
- Bacteriuria is present in less than 5% of women and less than 0.1% of men in the young to middle-age age range, compared with at least 30% of women and 10% of men over the age of 65.<sup>10</sup>

## RISK FACTORS

There are several factors that place senior citizens at greater risk of developing UTI:<sup>11,12</sup>

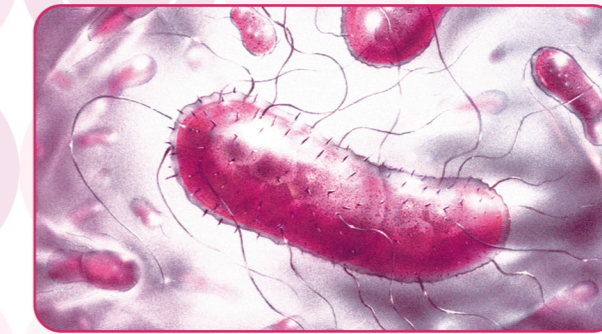
- Age-associated anatomical problems (such as narrowing of the urethra or ureters)
- *Urine retention*: a condition where the bladder does not empty completely. Commonly observed in elderly women who have an increased incidence of bladder prolapse. In both sexes, stagnant urine becomes a potential culture medium for the growth and colonization of bacteria. Under normal conditions, regular voiding and complete bladder emptying clear bacteria from the bladder, serving as an important defense mechanism. But in elderly men and women, bladder muscles weaken, resulting in an increased residual urine volume, less efficient bladder emptying and incontinence.
- *Vesicoureteral reflux*: the abnormal flow of urine from the bladder back to the ureters.
- Kidney stones
- Bladder catheterization (especially long term)
- Spinal cord injuries
- Diabetes resulting in adverse changes to the immune system, damage to the kidneys and often results in increased sugar in the urine – promoting the growth of bacteria.
- Kidney disease and/or reduced kidney function (it is observed in older patients that the kidney is less able to excrete high urea loads and concentrate the urine. This reduces the antibacterial properties inherent in urine).
- Prostate enlargement in men may lead to obstruction of the urine flow and urinary stasis. Prostatic secretions that usually help prevent infection are also reduced with age.
- *Immuno-suppressant* conditions:
  - Age-associated changes in immune function can contribute to elderly patients' vulnerability to infections in two ways:
    - 1) As a person ages, the total number of T-lymphocytes stays the same, but the proportion of T-cells that can generate a functional effect declines. Maintaining high levels of naive T-cells requires a functioning thymus but normal aging results in morphologic and functional involution of the thymus.
    - 2) Antibody production by B-cells declines with age, impairing the body's immune response to new antigen and thus increasing the risk of infection.

## EPIDEMIOLOGY AND ETIOLOGY<sup>13</sup>



- The prevalence of UTI increases in both sexes with age; the female: male ratio is 2:1 in elderly populations.
- The annual incidence of symptomatic bacterial UTI is estimated to be as high as 10% in the elderly. However, since many of these infections are recurrent, the percentage of newly infected patients is lower.
- Asymptomatic bacteriuria is a common finding in the elderly, especially in women; the estimated cumulative prevalence is 30% in women and 10% in men.
- More types of urinary pathogens are isolated from elderly patients with UTI than from younger patients.

- The following pathogens most commonly associated with UTI in elderly are the following:
  - *Escherichia coli* accounts for  $\leq 70\%$  of bacteriuria in elderly female outpatients with uncomplicated sporadic cystitis and for about 40% in patients with in-dwelling bladder catheters, complicated infections or nosocomial infections.
  - *Enterobacteriaceae*, *Enterococci* and *Staphylococci* are often found.
  - *Klebsiella sp.*, especially *K. pneumoniae* are the second most commonly isolated gram-negative, aerobic pathogens.
  - *Proteus mirabilis*, *P. vulgaris*, *P. inconstans* and *Morganella morganii* are more common in men than in women because these species tend to dominate the normal aerobic preputial flora. They are also commonly isolated from the urine of patients with calculi, because they grow best in an alkaline milieu and from patients with urogenital tumors. *Proteus sp.*, *M. morganii* and *Providencia sp* are commonly isolated from patients who are chronically catheterized.



- *Serratia*, *Enterobacter*, *Citrobacter*, *Acinetobacter* and *Pseudomonas sp* are isolated mainly from patients with nosocomial UTIs.
- Resistant gram-negative bacteria other than *E. coli* and gram-positive bacteria tend to be predominant in patients with recurrent infections. Of the latter, *Enterococci*, coagulase-negative *Staphylococci* and Group B *Streptococci* are commonly isolated; enterococcal superinfection often results from frequent use of antibiotics that are inactive against these organisms (eg, quinolones, cephalosporins, sulfonamides).
- Anaerobes may be rarely isolated from patients with rectovesical fistulas or other abnormal communications between the urinary tract and bowel, which allow anaerobic fecal flora direct access to the urine.

## TREATMENT AND COUNTER-INDICATIONS

- Symptomatic UTIs are usually treated with broad-spectrum antibiotics such as cephalosporins or quinolones. Beta-lactam antibiotics (including cephalosporins and penicillins) are generally safe and well-tolerated in elderly patients. However, some dose adjustments may be needed based on the patient's renal function.
- Although aminoglycosides are among the most effective drugs against gram-negative organisms, they aren't often used in the elderly because of the potential nephrotoxic and ototoxic effects.<sup>14</sup>
- The decision to treat elderly patients with antibiotics can often be a complex matter with potentially serious implications. When deciding on the use of antibiotics the following factors need to be considered:
  - A higher risk of adverse drug reactions to antibiotics is often observed in elderly populations.
  - Efficiency of antibiotic metabolism and excretion often deteriorate as patients get older.
  - Physiological or anatomical changes as a result of aging compromise the immune response.
  - Likelihood of multiple concomitant diseases is higher in elderly patients.
  - Potential risk of promoting emergence of drug-resistant bacteria is increased due to associated conditions.

## ROLE OF CRANBERRIES

- Compelling scientific and clinical evidence has demonstrated that cranberry consumption may be useful in preventing UTIs amongst elderly patients.
- A large, double-blind, placebo-controlled randomized clinical trial carried out at Harvard University in 1994 found that daily intake of cranberry reduced asymptomatic bacteriuria (defined as  $>10^5$  colony-forming units [cfu]/ml urine) and pyuria (white blood cells in urine) by nearly 50% in 153 elderly women over a six month period compared with those who took a placebo.<sup>15</sup>
- The use of cranberry in the treatment of UTI amongst elderly provides a viable and effective alternative to antibiotics, in turn posing fewer short and long term risks for the patients.



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