

## Singhealth

### **What is UTI?**

Urinary tract infections (UTIs) occur when bacteria is present within the urinary tract in significant numbers. UTIs are common in women, with 1 in 5 adult women aged 20-65 years experiencing a UTI at least once a year. Approximately 50% of women will experience UTIs at least once in their life.

Cystitis (bladder infection) makes up the majority of these infections. Involvement of the upper urinary tract (pyelonephritis) is less common compared to that of cystitis but can be associated with more serious complications.

### **What happens when UTI is left unattended?**

If UTI is left untreated, the infection can spread upwards to the kidneys, causing infection in the kidneys and even renal failure. It can also spread via the bloodstream (septicaemia) to affect the body in general, which may be fatal.

### **What are the symptoms of UTI?**

The onset of UTIs can be associated with one or more of the following symptoms:

- Pain on passing urine (dysuria)
- Urinary urgency
- Passing urine more frequently than normal
- Passing foul-smelling urine
- Sensation of bladder fullness or lower abdominal discomfort
- Fever
- Blood in the urine (haematuria)
- Flank pain and tenderness over the lower back area next to the spine (may suggest involvement of the upper urinary tract)

As UTI is a common occurrence in women, one should be aware of its symptoms. If you have any of the above symptoms, it is advisable to see a doctor early. Early recognition and appropriate treatment is necessary to prevent complications.

### **How to prevent UTI?**

Although UTIs can be easily treated with antibiotics, the prevention of UTIs or the avoidance of further infection is more important. About 25% of women with acute cystitis develop recurrent UTIs. Most recurrent infections are from bacteria present in the faecal or periurethral reservoirs. Some strategies can be undertaken to reduce the risk of recurrent infections.

1. Lifestyle changes
  - Sexually active women should attempt to avoid it immediately after intercourse to reduce the risk of coitus-related introduction of bacteria into the bladder.

- As the source of the bacteria comes from one's own bowel, it is important to wipe yourself from front to back in order to avoid faecal contamination of the urinary tract (especially during an episode of diarrhoea) after going to the toilet.
  - Daily consumption of cranberry juice or cranberry tablets.
  - Avoid use of diaphragms and spermicide by considering other forms of contraception.
  - Potential irritating vaginal deodorants and bubble baths should be avoided and a high standard of personal hygiene should be maintained at all times. This involves washing the genital area with water during baths and especially after intercourse.
  - Drink plenty of water. In order to prevent recurrent UTI, a minimum fluid intake of two litres a day is recommended (more if exercising strenuously or on hot days). Oral fluids should be increased to three litres or more a day if symptoms of UTI are suspected, irrespective of the degree of frequency of urine. Regular and complete bladder emptying is advisable to prevent the accumulation of infected urine in the bladder.
2. Prophylactic antibiotics
    - A once-daily dose of an appropriate antibiotic may be indicated in patients with a history of multiple episodes of UTI to minimise the risk of recurrence of infection.
  3. Treatment of any existing structural abnormalities
    - If recurrent UTI occurs against a background of structural abnormalities in the urinary tract (e.g., stones, kidney cysts), consideration should be given to the treatment of these conditions to eradicate the source.
  4. Treatment of any vaginal / lower genital tract infection
    - These infections may spread to the urinary tract. As such, they should be treated promptly if present.

## **Urinary Tract Infection (UTI) - Causes and Risk Factors**

### What causes urinary tract infections (UTI)?

In 80-90% of cases of uncomplicated cystitis, *Escherichia coli* (*E. coli*) is involved. This bacteria is present in 70-95% of both upper and lower UTIs. Other common pathogens are *Enterococcus faecalis*, *Klebsiella* species, *Proteus* species and yeast.

### What are the risk factors for urinary tract infections (UTI)?

The largest group of patients with UTIs is adult women. Women are more prone to UTIs than men because in females, the urethra is much shorter and closer to the anus. The occurrence of UTI also varies with age. The incidence of UTI is ten times higher in adolescent girls as compared with boys and this continues throughout adult life.

Other predisposing factors include:

- **Menopause.** Rates of UTI are higher in postmenopausal women for a few reasons. For one, the presence of bladder or uterine prolapse can cause incomplete bladder emptying

and stasis (reduced flow or stoppage of flow) of urine which in turn promotes the growth of pathogens. Also, the loss of oestrogen after menopause leads to changes in the vaginal flora, especially the loss of lactobacilli, and increases your susceptibility to infection.

- **Sexual activity.** UTIs are very common in women aged 18-30 years as UTIs are associated with coitus (the so-called 'honeymoon cystitis'). In this age group, sexual intercourse is the cause of 75-90% of bladder infections, with the risk of infection being related to the frequency of sex. The use of spermicides and diaphragms for contraceptive purposes further increases the risk of UTIs as it causes a change in the vaginal flora and eradication of the vaginal lactobacilli.
- **Recent instrumentation of the urinary tract** (e.g., catheterisation, cystoscopy, urodynamic studies). The insertion of foreign instruments into the urinary tract promotes the translocation of bacteria colonised around the periurethral area into the bladder and other parts of the urinary tract. This increases the risk of developing bacteriuria (the presence of bacteria in the urine) in significant numbers eventually leading to a UTI.
- **Foreign bodies** (e.g., catheters, urinary stones). Urinary catheters are the most important risk factor for bacteriuria. Catheters introduce organisms into the bladder and promote colonisation by providing a foreign surface for bacteria to adhere to and by causing irritation of the bladder mucosa. 80% of UTIs that occur while in hospitals or healthcare institutions are related to urethral catheterisation, and 5-10% are related to manipulation of the genitourinary tract. Urinary stones similarly irritate the bladder as well as provide a nidus for bacteria to adhere to, thereby increasing the risk of developing a UTI.
- **Neurological disorders, drugs or pelvic organ prolapse.** These conditions may cause incomplete emptying of the bladder, thereby promoting stasis of urine which increases the risk of UTI development.
- **Medical conditions** (e.g., diabetes). Diabetes leading to glycosuria (sugar in the urine) makes for a fertile breeding ground for bacteria. A study showed that 9.4% of patients with type 2 diabetes had a UTI compared to only 5.7% of people without diabetes.
- **Co-existing diseases involving the pelvis** (e.g., tumours, inflammatory bowel disease).

### Urinary Tract Infection (UTI) - Diagnosis

The diagnosis of a UTI can be suspected from a well-taken history and physical examination. Specific tests to confirm a UTI include a urine dipstick, urine analysis and urine culture. The main emphasis lies with the detection of pyuria (white blood cells or pus cells in the urine) on dipstick and urine analysis.

Associated findings can include microscopic haematuria (blood in the urine which cannot be detected by the naked eye). A urine culture will help in the identification of the organism causing the infection. No imaging studies are indicated in the routine evaluation of an uncomplicated cystitis.

### Urinary Tract Infection (UTI) - Treatments

Empirical antibiotics are usually prescribed for UTIs. The patient may be prescribed alternative antibiotics after the urine culture results are available. The duration of treatment of the UTI depends on the antibiotic in use. Some common first-choice agents for the treatment of uncomplicated cystitis in women include nitrofurantoin, Bactrim or beta-lactams such as Cephalexin.

You may also be given medication to make the urine more alkaline and asked to drink more water. Most patients can be treated on an outpatient basis. However, hospital admission for management of complicated UTIs may be indicated in some patients. Complicating factors include the presence of structural abnormalities (e.g., stones, indwelling catheters), metabolic disease (e.g., diabetes, pre-existing kidney disease) or patients who are immunosuppressed and therefore more prone to serious infections (e.g., HIV, patients on chemotherapy).

### **Recurrent urinary tract infection**

Recurrent UTI is defined as having UTI three or more times in a year. This can be due to the same or different bacteria. In these cases, further investigations may need to be done (e.g., renal ultrasound, intravenous pyelogram, cystoscopy, urine for tuberculosis and cytology) to look for any underlying causes and complications of recurrent UTIs.

Patients with recurrent UTIs may be given prophylactic antibiotics for a period of six months. They will also be advised on the various preventive measures and the importance of keeping good personal hygiene.

### **Raffles Medical Group**

A urinary tract infection (UTI) is an infection in any part of your urinary tract, which consists of your kidneys, bladder, ureter, and urethra. It occurs when bacteria enter your urinary tract and start multiplying. In most cases, the infection takes place in the bladder and urethra.

You are at higher risk of a UTI if you:

- Are a woman, especially if you have had menopause
- Had kidney stones
- Are sexually active
- Use a urinary catheter
- Have other medical conditions that may cause a UTI, such as diabetes
- Underwent a recent urinary tract procedure

Not all people with UTI may show signs or symptoms, but when they do, they may include:

- Painful urination
- A strong burning sensation when urinating
- Frequent urge to urinate
- Cloudy urine
- Urine that appears pink or red

- Pain in lower part of the abdomen
- Fever

If left untreated, the infection can spread to the kidneys and cause complications such as kidney damage or even renal failure. If you suspect you may be suffering from a UTI, see a urologist for early intervention.

### **What treatments are there for UTI?**

Besides conducting a physical examination, your urologist will request for a urine sample to test for the presence of bacteria. Additional tests may also be done to eliminate other potential causes of your symptoms.

If the cause of your UTI is a bacterial infection, your urologist will prescribe antibiotics to fight against the bacteria. Remember to complete the entire course of antibiotics, even if you start feeling better. Your urologist will also advise you to drink more water, and prescribe medication to relieve the pain while urinating. Stronger antibiotics may be given intravenously if your infection is severe, or have spread to the kidneys.

If you have recurring UTIs, you will be prescribed antibiotics for a longer period of time. Your urologist may also recommend further tests to check for any underlying cause of your UTI. You can also reduce your chances of a UTI reinfection by:

- Emptying your bladder as soon as you feel the urge to urinate
- Drinking plenty of water
- Avoiding douching, or using feminine hygiene sprays
- Avoiding consuming drinks that may irritate your bladder

A urinary tract infection (UTI) is an infection in any part of your urinary system — your kidneys, ureters, bladder and urethra. Most infections involve the lower urinary tract — the bladder and the urethra. Women are at greater risk of developing a UTI as compared to men. Approximately 40% of women develop a urinary tract infection (UTI) at some point in their life. The condition is uncommon in boys and young men.

Urinary tract infections do not always have signs and symptoms, however when they appear, they may include:

- A strong, persistent urge to urinate
- A burning sensation when urinating
- Passing frequent, small amounts of urine
- Urine that appears cloudy
- Urine that appears pinkish — a sign of blood in the urine
- Strong-smelling urine
- Pelvic pain (in women) — especially in the center of the pelvis and around the area of the pubic bone

Urinary tract infections are common in women and many women experience more than one infection during their lifetime. Risk factors specific to women for UTIs include:

- Female anatomy. A woman has a shorter urethra than a man does, which shortens the distance that bacteria must travel to reach the bladder.
- Sexual activity. Sexually active women or having a new sexual partner increases your risk.
- Certain types of birth control. Women who use diaphragms and spermicidal agents may be at higher risk.
- Menopause. After menopause, a decline in circulating estrogen causes changes in the urinary tract and reduces its ability to resist bacteria invasion.
- A recent urinary procedure. Urinary surgery or an exam of your urinary tract that involves medical instruments can increase your risk.

In males, UTI can develop due to urinary tract abnormalities, blockages in the urinary tract due to kidney stones or an enlarged prostate, which traps urine in the bladder.

Your doctor will use the following tests to diagnose a urinary tract infection:

- Urinalysis: This test will examine the urine for red blood cells, white blood cells and bacteria. The number of white and red blood cells found in your urine can actually indicate an infection.
- Urine culture: A urine culture is used to determine the type of bacteria in your urine. This is an important test because it helps determine the appropriate antibiotic to use.
- Those with repeated infections may need to undergo additional tests such as an ultrasound, cystoscopy or CT scan.

## **Treatment for UTI**

Mild cases may disappear spontaneously without treatment. However, because of the risk of the infection spreading to the kidneys, antibiotics are usually recommended. Prompt treatment is recommended for the elderly due to the high mortality rate in this group.

## **Preventing UTI**

1. As the source of the bacteria often comes from one's own bowel, wipe yourself from the front to back to avoid faecal contamination of the urinary tract (especially during an episode of diarrhoea) after going to the toilet.
2. Avoid potentially irritating vaginal deodorants and bubble baths and maintain a high standard of personal hygiene. This involves washing the genital area with water while showering and especially after intercourse. Voiding soon after intercourse is also encouraged.
3. Any vaginal/ lower genital tract infection should be treated. Otherwise, the infection may spread to the urinary tract.
4. For healthy individuals, it is recommended to drink a minimum fluid intake of 2 litres a day (more if exercising strenuously or on hot days).
5. Regular and complete bladder emptying is advisable to prevent the accumulation of infected urine in the bladder.

### AARE Urocare

A urinary tract infection (UTI) is a bacterial infection most commonly occurring in the bladder or urethra. However, they can also be found in the other parts of the urinary system — the kidneys and ureters. UTIs are much more likely to affect women than men, and are typically treated with antibiotics. Fortunately, there are also a number of preventive steps that women can take to reduce their risk of getting a UTI.

UTIs can be categorised according to the location of the infection. The three types of UTIs are:

- Urethritis  
This involves the urethra and usually presents with painful urination.
- Cystitis  
This involves the bladder and can present with lower abdominal pain, fever and blood in the urine.
- Pyelonephritis  
This is the most serious type of UTI involving an infection of the kidneys. The patient may feel ill with fever, backache and nausea/vomiting. If severe, this may lead to pus forming in the kidney.

UTIs can also be either acute(resolves after treatment) or recurrent.

A recurrent UTI is widely defined as more than two episodes of uncomplicated or complicated UTI in the last six months or more than three episodes in the last 12 months, documented by urine culture.

UTI can manifest as either cystitis (involving the bladder) or pyelonephritis (involving the kidneys) and may also be classified as complicated or uncomplicated.

Uncomplicated UTIs are sporadic, community-acquired episodes of cystitis and pyelonephritis in otherwise healthy individuals.

A complicated UTI indicates structural or functional urinary tract abnormalities or an underlying pathology that makes UTIs more common for that patient. This also means that the patient may have increased risks of infection or failure of therapy.

### **Common causes**

UTIs are caused by bacteria and other microorganisms entering the urethra and bladder. If the bacteria multiply sufficiently and overwhelm our natural immune defence mechanisms, this will cause an infection. In some instances, the bacteria are able to travel to the kidneys via the ureters, resulting in pyelonephritis. Some common types of bacteria that cause UTIs are *Escherichia Coli* (E. Coli) and *Enterococcus faecalis*, commonly found in the gastrointestinal tract.

In addition, there are certain triggers that may increase a woman's likelihood of developing a UTI, including:

- Sexual intercourse
- Dehydration
- Infrequent urination
- Poor toileting hygiene
- Immunocompromised states or chronic conditions (eg; diabetes)
- Genital syndrome of menopause
- Elderly with voiding issues
- Poor mobility and constipation in the elderly
- Presence of urinary catheters

The risk factors for developing a UTI are:

- Female anatomy
- Menopause
- Sexually transmitted diseases
- Kidney stones
- Bladder stones
- Catheter usage
- Abnormalities in the urinary tract
- Immune disorders
- Recent urinary procedures

Some common symptoms to look out for when it comes to UTIs are:

- A burning sensation during urination
- Blood in the urine
- Cloudy urine
- Abnormal discharge
- Incomplete voiding of the bladder
- Frequent, painful urination
- Incontinence



- Pelvic or abdominal pain

In addition, acute pyelonephritis is known to result in high fever, pain in the back or flank, chills, as well as nausea or vomiting.

You should see a urologist if you are experiencing any of the symptoms of a UTI. If you have a high fever, flank or back pain, or nausea, it is important that you seek medical treatment as soon as possible, as these are signs of a more serious kidney infection.

### **How different are Recurrent UTIs for males?**

Male UTIs are considered complicated, and you should be investigated by a urologist because there may be an obstruction to your urination or there may be a bladder condition.

We need to assess for common conditions such as stones, benign prostatic enlargement and prostatitis (inflammation of the prostate). You may present with lower urinary tract symptoms, such as pain at the tip of the penis during urination. Other symptoms include:

- Pain in the abdomen
- Blood in the urine
- An inability to urinate
- Infection of the kidneys or in the testes

During your first consultation, you will be asked questions about your symptoms and medical history. Some of these are:

- Describe the current symptoms
- Duration of symptoms
- List of the medications you are taking (e.g. previous antibiotics prescribed)
- Previous surgical procedures, if any
- Other diseases or conditions (e.g. diabetes)
- Lifestyle (exercising, smoking, alcohol, and diet)
- Amount of fluids taken each day
- Sexual history, menopausal history for females

A urine sample will also be taken and sent to the laboratory. The results of this urine test may take a few days, during which you may be empirically prescribed various medications.

In order to better understand your condition, a general physical examination of your abdomen and genitals may be conducted.

### **How are Urinary Tract Infections (UTI) diagnosed in Singapore?**

UTIs are primarily diagnosed with a urinalysis and urine culture. The urinalysis will show the presence of white blood cells and red blood cells in the urine, both of which are signs of a UTI. A urine culture allows the growth of urinary tract bacteria in a laboratory, which will let your doctor identify the type of bacteria causing the infection and assess which antibiotics will be most effective in treating the UTI.

In cases of recurrent UTI, an ultrasound or other diagnostic imaging tests may be carried out to examine your urinary tract for any abnormalities. You may also be asked to undergo a cystoscopy.

- Urine test — You will need to provide a urine sample for tests to exclude any current urinary tract infection and traces of blood in the urine.
- Uroflowmetry — This is a simple test that electronically records urine flow rate. You will urinate into a container called a uroflowmeter. This test helps your doctor check whether there is any obstruction to the flow of urine.
- Imaging of the bladder/kidneys — You may get an ultrasound of the bladder and kidneys, which uses high-frequency sounds to create an image of your bladder/kidneys. You may also need an x-ray/CT scan at the Diagnostic Imaging Centre to exclude any causes for persistent/recurrent infections (e.g., stones in the urinary tract).
- Cystoscopy — If you have blood in the urine or an abnormal ultrasound/x-ray/CT finding of the bladder, you may be asked to undergo a flexible cystoscopy in the clinic. This day procedure allows us to look into your bladder using a telescope to assess if you have any other conditions.

## **How are Urinary Tract Infections treated?**

### **Oral antibiotics**

Oral antibiotics are the first line of treatment when it comes to UTIs. Some commonly used antibiotics include amoxicillin, nitrofurantoin, fosfomycin, and quinolones. Given the possibility of bacteria developing a resistance to any given antibiotic, it is important to follow your doctor's instructions for taking your prescribed medications and fully complete any courses of antibiotics you are prescribed.

### **Intravenous antibiotic treatment**

In cases of recurrent UTI or multi-drug resistant UTI, you may require intravenous antibiotic treatment, possibly involving a short stay in the hospital. Following this intravenous treatment, you may still be prescribed a prolonged use of oral antibiotics to clear the infection fully.

### **Procedures**

For UTIs caused by obstructions in the bladder or kidneys, a procedure to remove these obstructions will be arranged if needed.

### **Lifestyle changes**

In cases of frequent UTIs, your doctor may prescribe certain lifestyle changes, including:

- Avoid dehydration
- Urinate regularly
- Urinate after sex
- Use lubrication during sex
- Take a single dose of oral antibiotics following sexual intercourse
- Longer term antibiotics (about 6 months)
- Maintain proper toileting hygiene
- Avoid vaginal douching

- Females using spermicides or vaginal diaphragms should try alternative forms of contraception
- Get screenings for conditions such as diabetes mellitus if suspected. If diabetic, proper glucose control is essential for preventing recurrent infections

### **Drug treatment for females**

Medications may be required if self-management or lifestyle changes are inadequate to control the infections. Common medications are antibiotics, probiotics, cranberry extracts, topical estrogen cream/pessary for postmenopausal females.

- Post-coital prophylaxis — This is recommended if UTI is brought on by sexual intercourse
- Probiotics or cranberry extracts — These are health supplements that may be useful in preventing UTIs in otherwise healthy individuals
- Topical oestrogen cream — For postmenopausal females, we may recommend topical oestrogen cream/ pessary if you have dry or thin genitals. Topical oestrogen therapy improves the tissue quality of the genitalia region, prevents UTIs and relieves some symptoms such as pain when urinating.
- Intravesical therapy — For patients with severe, recurrent infections with failed treatments, I may suggest intravesical therapy using hyaluronic acid. This usually requires a few treatments performed weekly.
- UTI vaccines — This group of medications help prevent UTI in females. It uses inactivated bacteria, usually taken orally or sublingually (under the tongue) over a period of 3 months.

## UroDoc

A urinary tract infection (UTI) is a bacterial infection that can affect any part of the urinary system, including the kidneys, ureters, bladder, and urethra—the tube through which urine exits the body. While UTIs primarily impact the bladder and urethra, they can involve the entire urinary tract. Men are less susceptible to UTIs than women, largely due to the longer male urethra, which provides a barrier that prevents bacteria from reaching the bladder as easily. In this article, we will explore the symptoms, causes, and risk factors of UTIs, along with detailed information on treatment and prevention strategies.

### **Symptoms of UTIs in Males**

The symptoms of urinary tract infections in males can include:

- A burning sensation during urination: This is one of the most common symptoms of a UTI and occurs as the lining of the urethra becomes inflamed.
- Increased frequency of urination: The urge to urinate more often than usual, even though little urine is expelled each time.

- Cloudy, dark, bloody, or strange-smelling urine: Changes in the appearance or smell of urine can indicate the presence of bacteria.
- Pain or discomfort in the lower abdomen or back: This pain is typically located above the pubic bone, and sometimes extends to the lower back.
- Painful ejaculation or sexual dysfunction: These symptoms can occur if the infection has spread to the prostate.

Certain symptoms suggest a more serious infection or complication, such as:

- High fever accompanied by back pain: This could indicate that the UTI has reached the kidneys.
- Inability to urinate despite a strong urge: This could be a sign of a urinary blockage, which is a medical emergency.

## Overview of Treatment Options

Treatment for urinary tract infections in males typically involves a combination of medication, home remedies, and lifestyle adjustments to eradicate the infection and prevent recurrence. The choice of treatment depends on the severity and location of the infection, as well as the person's overall health and medical history.

## Antibiotics

Antibiotics are the primary treatment for UTIs. The choice of antibiotic and the duration of therapy depend largely on the severity of the infection and the specific pathogens identified through urine tests.

### Common Antibiotics Used:

- **Trimethoprim/sulfamethoxazole (Bactrim, Septra):** Often the first choice for treating UTIs, effective against a broad range of urinary pathogens.
- **Fosfomycin (Monurol):** A single-dose therapy that is particularly useful in treating uncomplicated UTIs and is effective against a wide array of bacteria.
- **Ciprofloxacin (Cipro) and Levofloxacin (Levaquin):** These are fluoroquinolones, powerful antibiotics that can treat more complicated UTI cases but are generally reserved for more severe infections.

## Duration of Treatment

Uncomplicated UTIs: Generally, 3-5 days is sufficient.

Complicated UTIs: Longer treatments of 7-14 days or more may be necessary.

## Non-prescription Remedies and Pain Management

While antibiotics are essential for treating bacterial UTIs, non-prescription remedies and pain management strategies can help alleviate symptoms and promote comfort during recovery.

### 1. Over-the-Counter Pain Relievers

- Ibuprofen (Advil, Motrin IB): This non-steroidal anti-inflammatory drug (NSAID) can help reduce pain and inflammation.
- Acetaminophen (Tylenol): Acetaminophen is a suitable pain relief option for those who prefer to avoid NSAIDs.

## 2. Increasing Fluid Intake

Water: Drinking plenty of water helps dilute urine and ensures frequent urination, which helps flush bacteria from the urinary tract.

## 3. Avoiding Irritants

- Caffeine: Caffeine can irritate the bladder and exacerbate symptoms.
- Alcohol: Alcohol can increase the acidity of urine and potentially worsen discomfort.
- Spicy Foods: These can irritate the bladder and should be avoided if they cause discomfort.

## 4. Heat Therapy

Heating Pads: Applying a heating pad to the lower abdominal area can help soothe the pain associated with a UTI.

These non-prescription remedies can be helpful adjuncts to antibiotic treatment, but they are not substitutes for medical evaluation and treatment for UTIs.

## **Advanced Treatments for Chronic or Complicated UTIs**

Chronic or recurrent urinary tract infections require a more comprehensive treatment approach that may involve advanced medical strategies.

### 1. Long-term Antibiotic Use

- Prophylactic Antibiotics: For men with recurrent UTIs, a low-dose antibiotic regimen may be prescribed for a period ranging from a few months to a year to prevent new infections.
- Post-coital Antibiotics: If UTIs are associated with sexual activity, a single dose of an antibiotic taken immediately after intercourse can effectively prevent recurrence.

### 2. Intravesical Therapy

- Antibiotic Instillations: For severe cases, antibiotics may be administered directly into the bladder through a catheter. This is beneficial for patients who do not respond well to oral antibiotics.

### 3. Surgical Interventions

In cases where anatomical abnormalities or obstructions contribute to recurrent UTIs, surgical options may be considered:

- Urethral Stricture Surgery: Procedures to remove or dilate urethral strictures can improve urine flow and reduce infection risks.

- Prostate Surgery: For men with enlarged prostate glands causing urinary retention, procedures to reduce prostate size can help alleviate the problem.

### **Lifestyle and Behavioural Modifications**

Additional lifestyle changes can support the effectiveness of treatments.

Bladder Training: Techniques to manage urinary urgency and frequency can improve bladder control and reduce the risk of infections.

Biofeedback: Used alongside bladder training, biofeedback helps patients gain better control over pelvic muscles, which can improve bladder function.

These advanced treatment options provide a tailored approach to managing chronic or complicated UTIs, aiming to reduce the frequency of infections.

### **Conclusion**

Urinary tract infections require careful attention and appropriate treatment due to the complexity and potential severity of the condition in men. Understanding the symptoms and having knowledge of the various treatment options available are important for effective management and recovery.

Alongside medical treatment, non-prescription remedies and pain management techniques can help alleviate symptoms and improve comfort during recovery. For chronic or complicated cases, advanced treatments may be necessary.

### **International Urology, Fertility & Gynaecology Centre**

Abnormal urinary symptoms, such as a burning sensation during urination, increased urination frequency, or cloudy/strong-smelling urine could indicate a urinary tract infection (UTI), which is quite common especially among women and the elderly.

Urinary tract infection (UTI) refers to an infection affecting the bladder, urethra, ureter and kidneys. Affecting more women than men and children, UTI is often caused by microbes such as bacteria and, in rare cases, viruses and fungi. UTI is a very common medical complaint that is easily treatable using antibiotics. However, left untreated, it can lead to kidney impairments, pregnancy complications, and even sepsis.

UTI may be classified into different types based on which part of the urinary tract is infected.

- Cystitis: This is an infection of the bladder and is the most common type of UTI.
- Urethritis: This is an infection of the urethra caused by bacteria from the gastrointestinal tract as well as sexually transmitted infections (STIs).

- Pyelonephritis: This is an infection of one or both kidneys that has spread up from the tract; it is the most serious type of UTI as it can cause serious health problems.

Symptoms of a urinary tract infection include:

- Dysuria, or burning or painful urination
- Abdominal, loin, back or flank pain
- Urinary urgency and frequency
- Bladder fullness or pressure
- Haematuria, or blood in urine
- Painful sexual intercourse
- Cloudy or milky urine
- Foul-smelling urine

The most common cause of urinary tract infections is the entry of microorganisms, especially bacteria, into the urinary tract. Most UTI cases are caused by *E. coli* bacteria. If this bacterium is carried from the rectum to the vagina, it can enter the urethra, multiply and infect the bladder. The infection can also travel up from the bladder through the ureters and eventually infect the kidneys.

While *E. coli* is the usual culprit, UTIs can also be caused by sexually transmitted microorganisms like chlamydia and mycoplasma. These infections typically affect only the urethra and genital area. Because they are spread through sexual contact, treatment for both partners is crucial to prevent re-infection.

Certain factors can also increase one's risk of developing a UTI. These include:

- Age: The elderly are more prone to UTIs because they are more susceptible to incontinence and urinary retention, which lead to infections.
- Gender: In the female anatomy, the urethra is shorter and closer to the anus, which means the distance that bacteria will travel to infiltrate the bladder is also shorter.
- Sexual Intercourse: Having frequent sexual intercourse and multiple sex partners increases the risk of coming into contact with bacteria that leads to bladder infections. Those who use birth control methods such as diaphragms and spermicides are also at a higher risk.
- Urinary Tract Obstruction: Anything that blocks the flow of urine, such as kidney stones or an enlarged prostate, can lead to UTIs.
- Urinary Tract Abnormalities: Congenital, structural or sustained abnormalities in the urinary tract increase one's susceptibility to infections.
- Suppressed Immune System: Illnesses that weaken the immune system disable the body's ability to fight off infections such as UTIs.
- Recent Urinary Surgery: Open procedures or exams that involve the insertion of medical instruments expose the urinary tract to bacteria.

## **How Is A UTI Diagnosed?**

A urinalysis is the primary test performed to diagnose a urinary tract infection as well as kidney problems. This laboratory test, which only involves a urine sample, checks the content, appearance and concentration of urine for any abnormalities. A urine culture may also be done to detect bacteria or yeast that are causing the infection.

## **UTI Treatment Singapore**

The strategy for treatment for UTI is to clear the infection with appropriate antibiotics, to remove the cause of the UTI and to prevent its recurrence. Antibiotics are the first-line treatment to address a urinary tract infection. The type of drugs prescribed and the duration of intake depend on the kind of bacteria present in the urine, the severity of the UTI and recurrence (if applicable).

The most common antibiotics used to treat UTIs are:

- Amoxicillin
- Cephalosporins
- Ceftriaxone
- Doxycycline
- Cephalexin
- Fosfomycin

Typically, simple infections go away a few days after treatment starts. In more severe cases, particularly those that already affect the kidneys, they will require a longer course of treatment. Surgery is usually not required to treat UTIs unless it is necessary to address blockages and urinary defects that increase one's risk of developing the condition and subsequent recurrence.

A recurrent urinary tract infection is defined as the occurrence of two or more acute UTIs within months or three or more UTI episodes in a year. While good hygiene is important, recurrent UTIs are not caused by a lack of it and may sometimes be due to anatomical or biological factors beyond the patient's control.

These recurrent infections can involve the same bacteria or different strains, and further evaluation may be needed to identify underlying causes.

Several measures can help prevent UTI. These include the following:

- Drink plenty of water: about 2 to 3 litres every day to flush out bacteria from your urinary tract.
- Urinate when you feel the urge: and empty the bladder fully to prevent bacterial growth in the bladder.
- Wipe your bowels from front to back: to avoid faecal contamination of the urinary tract.
- Shower and urinate after sex: to flush out any bacteria that may have been introduced.



## SMG Women's Health

### **Urinary Tract Infections (UTIs) in Singapore**

Urinary tract infections (UTIs) may affect any part of your urinary tract, which includes your kidneys, ureters, bladder and urethra. Conditions in the upper urinary tract are typically more serious (albeit less common) than those in the lower tract.

UTIs occur more often in women than men, as women have a shorter urethra. A study by the National University Hospital of Singapore found that approximately 50–60% of women report at least one UTI in their lifetime. Moreover, 25% of these ladies have at least one recurrence of a UTI within six months of the first infection.

### **What are the risk factors of UTIs?**

#### 1) Diabetes Mellitus

Having diabetes, especially if poorly controlled or suboptimal control, can predispose one to having more UTIs. Long standing diabetes can lead to neuropathy, which results in damage or dysfunction of the nerves supplying the bladder, in turn causing an inability to empty the bladder fully; a high residual urine volume left in the bladder yields a fertile ground for bacteria to infect and UTIs can arise from this. Other medical issues e.g. spine conditions can also result in incomplete bladder emptying and put one at increased risk of getting UTIs.

#### 2) Urinary Tract Diseases

These can include urinary tract stones/calculi, which can be located either in the kidneys or the bladder. Occasionally, cancers of the urinary tract can also mimic the symptoms of UTIs.

#### 3) Sexual Activity

Intercourse with new partners, or even existing partners, with improper hygiene practices during or after intercourse can increase the risk of getting a UTI following sex. Another common scenario would be peri- or postmenopausal women having UTIs after sex due to changes in their genitourinary tissues from declining estrogen levels.

### **What are the Symptoms of a UTI?**

You may have a UTI if you are experiencing one or more of the following:

- Frequent and urgent urination
- A burning sensation on passing urine
- Bloody or cloudy urine
- Urine with a strong or foul-smelling odour
- Lower abdominal pain or discomfort
- Fever

## **What are the Different Types of UTIs?**

### **1) Acute UTIs**

Acute UTIs are typically once-off infections that occur infrequently.

### **2) Recurrent UTIs**

Recurrent UTIs are defined as having two or more proven UTIs in 6 months, or 3 or more UTIs within a year.

“Proven” UTIs refer to having a formal urine culture done, which 1) allows for isolation and identification of any microorganism (bacteria) of significant growth, and 2) check the bacteria for antibiotic resistance and allow for the selection of the most appropriate antibiotic treatment.

## **How are UTIs Treated?**

If you experience any of the symptoms above, you should quickly seek medical help. A urine dipstick or microscopy is typically performed in the primary care setting (i.e. your family doctor) to quickly ascertain if there are any signs of infection in your urine if any acute UTI is suspected e.g. presence of white blood cells or bacteria. In the cases of recurrent UTIs, he/she will usually also perform a urine culture and sensitivity test. The most appropriate treatment option will then be recommended for you.

### **1) Antibiotics**

UTIs are usually treated by oral antibiotics; in certain cases whereby the bacteria shows multiple antibiotic resistance, or in cases of severe/complicated UTI e.g. affecting the upper urinary tract system, intravenous antibiotics may be required. For those with complicated/multi-resistant UTIs, you may require prolonged treatment compared to someone with an acute, uncomplicated UTI.

### **2) Treatment of Underlying Conditions**

In cases of recurrent UTIs, your doctor may recommend further investigations to delineate possible causes of your UTIs e.g. screening for diabetes or other medical conditions such as kidney stones. This is because in such cases, treatment and control of the underlying root cause (rather than just repeated antibiotic administration for UTIs) is important.

In cases of women experiencing UTIs after sex, a full sexual history is usually taken and measures to mitigate the risk of UTIs following intercourse can range from use of adequate sexual lubrication, voiding/washing up immediately after sex and topical vaginal estrogens particularly for peri- and post-menopausal women with evidence of atrophic vaginitis (where the vaginal skin becomes thin and dry due to reduced estrogen levels resulting in uncomfortable or even painful sex).

### 3) Preventive Measures

The following measures can help prevent UTIs, benefit our general health, and are easy to implement into our daily lives.

- Keep yourself well hydrated on a daily basis (1.5L to 2L daily, unless you have specific medical conditions that prohibit you from doing so)
- Maintain basic perineal hygiene (always wipe front to back to avoid faecal contamination of your urethra)
- Eat foods rich in probiotics, vitamins and minerals (this helps keep your vaginal and urinary flora in equilibrium)
- Increase your fluid intake of water (and reduce caffeinated/alcoholic beverages) once you start having UTI symptoms
- Pass urine regularly; avoid holding your bladder excessively
- Explore ways to make sex more comfortable to avoid trauma to the region, especially if you typically have UTIs triggered following intercourse

### Arthur Tseng Women's Health Services

Urinary Tract Infection (UTI) is a bacterial infection that can affect any part of the renal tract (kidneys, ureters, bladder and urethra). Most frequently, UTI is termed cystitis, as it is localised to the urethra and bladder. Occasionally, it ascends to the kidneys (causing pyelonephritis).

Urinary tract infections (UTIs) can be categorised into several types based on the part of the urinary system they affect.

1. Cystitis (Bladder Infection): This is the most common type of UTI, affecting the bladder. It often causes symptoms like a frequent urge to urinate, pain during urination, and lower abdominal discomfort.
2. Urethritis: This type involves an infection of the urethra, the tube that carries urine from the bladder out of the body. Symptoms can include a burning sensation during urination and discharge.
3. Pyelonephritis (Kidney Infection): A more serious type of UTI that affects the kidneys. Symptoms may include fever, chills, back or side pain, nausea, and vomiting.

Recurrent Urinary Tract Infection (UTI) refers to the repeated occurrence of urinary tract infections with two or more infections within six months, or three or more infections within a year. Unlike a single UTI, which is an isolated incident, recurrent UTIs are characterised by multiple episodes that may be caused by factors such as incomplete treatment of the initial infection, bacterial resistance, anatomical abnormalities, or weakened immune system responses. These infections often arise from the same bacterial strain, commonly *Escherichia coli*, and can involve the bladder, urethra, or kidneys.

In refractory cases of RUTI, where conventional treatment with repeated courses of suppression

antibiotics have failed, then there is a vaccine for RUTI called Uromune that can be used. This would need to be discussed in detail with your doctor, before commencing treatment.

## **Urinary Tract Infection Causes**

UTIs are MOST COMMONLY caused by the bacterium *Escherichia coli* (E. coli), which is commonly found in the digestive tract (CAUSING 85% OF ALL UTI'S). The bacteria enters the urinary tract through the urethra and bladder. Once inside, they can travel up to the urethra and bladder and cause an infection.

Certain lifestyle and health-related factors can significantly increase a woman's likelihood of developing a urinary tract infection (UTI) including:

- Engaging in Sexual Intercourse
- Use of Certain Contraceptives
- Genital syndrome of menopause
- Poor Hygiene Practices
- Dehydration
- Use of urinary catheters
- Existing Medical Conditions (eg. diabetes)

The symptoms of an Urinary Tract Infection may vary depending on which part of the urinary tract is affected. However, some common symptoms include:

- strong urgency to urinate
- hesitancy
- pain or burning sensation during urination
- dysuria with lower abdominal pain/discomfort
- passing small amounts of urine frequently
- cloudy or foul odour to the urine
- possible blood in the urine

In some cases, an individual may also experience fever, chills, and lower abdominal discomfort. It is crucial to seek medical attention if you experience any of these symptoms as untreated UTIs can lead to more severe complications such as kidney infections or sepsis.

UTI diagnosis process begins with a comprehensive medical history. Our urogynaecologist will inquire about:

- Past UTIs
- Current symptoms and their duration
- Any relevant medical conditions, such as diabetes, which can increase UTI risk

A detailed physical examination follows, focusing on:

- General health
- Specific areas like the abdomen and back to assess for pain

In cases of recurrent UTIs, our urogynaecologist may employ various diagnostic imaging tests to identify any abnormalities in the urinary tract such as:

- Urine test: A urine sample is tested for the presence of white blood cells, red blood cells, and bacteria.
- Uroflowmetry: This test measures the rate and volume of urine flow, which can indicate bladder obstruction or weakness.
- Urine culture: This test helps identify the type of bacteria causing the infection and guides appropriate antibiotic treatment.
- Ultrasound: This non-invasive imaging technique uses sound waves to produce images of the urinary tract, allowing our urogynaecologist to see any structural abnormalities or obstructions.
- An X-ray or CT scan might be necessary to rule out causes of persistent infections, such as urinary tract stones.

If there are indications of blood in the urine or abnormal findings from imaging, a cystoscopy may be recommended. This minimally invasive procedure allows a direct look inside the bladder using a flexible telescope, enabling the assessment of additional conditions that could contribute to recurrent UTIs.

### **How are Urinary Tract Infections treated?**

UTI treatment primarily involves the use of antibiotics, which are effective in eliminating the bacteria causing the infection. It is crucial for patients to complete the entire prescribed course of antibiotics, even if symptoms improve before finishing the medication, to ensure the infection is fully eradicated and to prevent resistance.

Common side effects of antibiotics may include nausea, diarrhoea, and yeast infections, but these should be discussed with a healthcare provider if they occur.

Preventive lifestyle changes are also recommended to reduce the risk of future UTIs such as:

- Increase water intake
- Practise good hygiene
- Urinate regularly
- Choose breathable underwear
- Avoid irritating products
- Consider probiotics

It's essential to consult our urogynaecologist for a personalized treatment plan, especially in cases of recurrent or severe infections. They can provide guidance on appropriate antibiotic use, identify any underlying conditions contributing to frequent UTIs, and suggest further preventive measures tailored to individual needs.

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- Avoid irritating products
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### **Can recurrent UTIs be a sign of cancer?**

Recurrent urinary tract infections (UTIs) are not typically a direct sign of cancer. However, some symptoms of bladder cancer can mimic those of a UTI, such as frequent urination, pain during urination, and blood in the urine. It's important to consult a healthcare professional if you experience recurrent UTIs to rule out any underlying conditions, including the possibility of cancer.

### **How to Prevent UTI**

While UTIs can be treated with antibiotics, prevention is always better than cure. Here are some tips to help prevent Urinary Tract Infections:

1. Drink plenty of water: Staying hydrated helps flush out bacteria from the urinary tract.
2. Urinate after sex: As mentioned earlier, sexual activity can introduce bacteria into the urinary tract, so it is essential to urinate after sex.
3. Practise good hygiene: Wiping from front to back after using the bathroom can help prevent bacteria from entering the urethra.
4. Avoid irritating products: Certain types of birth control methods and feminine hygiene products can irritate the urinary tract, making it more susceptible to infections.

For individuals who experience recurring UTIs, your doctor may recommend lifestyle changes or prescribe preventive medication. It is crucial to follow your doctor's instructions and continue with any prescribed preventive measures to reduce the risk of future UTIs.

### Gleneagles Hospital

A urinary tract infection (UTI) is an infection of any part of the urinary system. The urinary system consists of kidneys, bladder, ureters and urethra. Each part serves a different function:

- Kidneys filter excess fluid, electrolytes and waste from the blood, while retaining the important elements.
- Ureters (small tubes attached to the kidneys) allow urine from the kidneys to pass into the bladder.
- Bladder holds the urine.
- Urethra (tube connected to the bladder) enables urine to leave the body when the bladder is full.

UTIs usually affects the bladder or the urethra first. Left untreated, the infection can spread to the ureters and the kidneys.

UTIs are classified according to the location of the infection:

- Cystitis (bladder infection) is a common type of UTI that involves inflammation of the bladder.
- Pyelonephritis (kidney infection) is a painful kidney infection caused by cystitis. In some cases, the bacteria from the bladder can travel up towards one or both kidneys.
- Urethritis (urethra infection) involves inflammation of the urethra. It is usually caused by an infection.

UTI symptoms vary, depending on your age and type of infection. Some people may not have any symptoms at all. The usual symptoms of UTI include:

- Back pain
- Fever and chills
- Cloudy urine or blood in the urine
- Frequent and urgent need to urinate
- Incontinence (inability to control urination)
- Pain in the ribs, abdomen or above the pubic bone
- Painful and burning sensation during urination
- Malaise (feeling generally unwell)
- Nausea and vomiting

**What causes a UTI?**

Urine is usually sterile, which means it does not contain bacteria, viruses or fungi.

A UTI can occur when a microorganism enters the urinary system through the urethra.

Most infections are caused by escherichia coli (E. coli), a digestive tract bacterium that lives in the colon (large intestine), and spreads to the urethra from the anus.

Other microorganisms, such as chlamydia and mycoplasma, can cause UTIs that are usually restricted to the urethra and the reproductive system. Since these microorganisms are sexually transmitted, both partners will require treatment when infections occur.

The risk for UTI increases if you:

- Have structural abnormalities of the urinary system, urinary stones and bladder obstruction.
- Have diabetes, as your urine contains higher amounts of sugar.
- Have sexual intercourse.
- Are a man with an enlarged prostate, as the condition makes it difficult to empty your bladder completely.
- Are a woman, as women have a shorter urethra, allowing bacteria to reach the bladder more easily. The risk is usually highest if you are sexually active or after menopause, due to the dry state of the urethra and vagina. 1 in 5 women develops a UTI during her lifetime.
- Are pregnant. Changes to your urinary tract and immunologic changes during pregnancy can increase your risk of UTI.
- Do not empty your bladder completely (urinary stasis).

### **What are the complications and related diseases of UTIs?**

Left untreated, UTIs can lead to:

- Kidney damage if cystitis (bladder infection) is not treated and the infection spreads to the kidneys.
- Premature birth and hypertension (high blood pressure) if you have a UTI during pregnancy.
- Recurrent infections. The risk is higher if you experience more than 4 UTIs within a year.
- Complications in urethral narrowing in men, if you had recurrent urethritis.
- Septicaemia (serious blood infection) if the bacteria enters your bloodstream.

### **How do you prevent UTIs?**

Preventive measures, especially in women with recurrent infections, can be taken to reduce the risk of developing UTIs. These include:

- Drinking plenty of water.



- Drinking cranberry juice or taking vitamin C to increase the acidity of your urine and reduce bacterial growth.
- Not holding your bladder for a long time and urinating when needed.
- Urinating immediately after sexual intercourse.

### **How is UTI diagnosed?**

Your doctor will ask you about your symptoms. To further check if you have a UTI, your doctor may recommend the following tests and procedures:

- Urinalysis
- Urine culture
- Ultrasound scan
- Computerised tomography (CT) scan
- Magnetic resonance imaging (MRI) scan
- Cystoscopy

### **How is a UTI treated?**

An antibiotic course is usually sufficient to treat simple UTIs. The choice and duration of antibiotic treatment depends on your medical history and the type of bacteria involved. Your doctor is likely to prescribe one of these antibiotics:

- Amoxicillin
- Sulfonamides
- Nitrofurantoin
- Cephalosporins
- Trimethoprim or sulfamethoxazole
- Doxycycline
- Quinolones

It is important to complete the full course of antibiotics even after your symptoms have eased. This ensures you receive the full treatment and reduces your risk of recurrent infection.

Note: Women with recurrent UTIs may need to take antibiotics daily for 3 – 6 months or after sexual intercourse.

### **Uro Health Mount Elizabeth**

### **WHAT IS URINARY TRACT INFECTION?**

Urinary tract infection is an infection in any part of the urinary system. When it affects the lower urinary tract, it is known as cystitis, a bladder infection. When it affects the upper urinary tract, it is known as pyelonephritis, a kidney infection.

### **SYMPTOMS OF URINARY TRACT INFECTION**

Symptoms of urinary tract infection include painful urination, frequency in urination, feeling the need to urinate even though the bladder is empty, fever and pain in the flank.

**DIAGNOSING URINARY TRACT INFECTION**

A urinalysis and urine culture test are done to diagnose urinary tract infection. It will look for white blood cells, red blood cells or bacteria. If you have recurrent urinary tract infections, the doctor may obtain a detailed scan, perform a urine flow test and perform a cystoscopy using a small and narrow tube (cystoscope) to see inside the urethra and bladder.

**TREATMENTS FOR URINARY TRACT INFECTION**

Treatment for urinary tract infection includes Lifestyle modification e.g. advice on voiding habits and Medications which are usually antibiotics and hormonal tablets/creams. Supplements such as cranberries & probiotics may also be used. Patients are advised to drink plenty of water. If there is an underlying condition causing the urinary tract infection such as urinary stones, further surgical treatment may be required.

