

## OTHER CONDITIONS THAT MAY CAUSE PAIN IN THE BLADDER

### **Part I: Urinary Tract Infections**

- Bacterial Cystitis
- Diverticula
- Fistulas
- Fungal Infection (Candida)
- Kidney Infection
- Mycoplasma hominis
- Orchitis
- Pelvic Inflammatory Disease
- Schistosomiasis/Bilharzia
- Sexually Transmitted Infection
- Tuberculosis (urogenital)
- Urethritis
- Vaginitis

### **Part II: Other causes of painful bladder and/or painful urination (non-infectious)**

- Bladder Cancer
- Chemical/Drug-induced Cystitis
- Chemical irritants
- Endometriosis
- Eosinophilic Cystitis
- Radiation Cystitis
- Stones in the urinary tract
- Trauma
- Vulvodynia

### **Part III: Prostate Disorders**

- Prostatitis
- Benign Prostatic Hyperplasia/Obstruction
- Prostate Cancer

## **Part I.**

### **Urinary Tract Infections (UTI)**

A urinary tract infection (UTI) can occur anywhere in the urinary tract: in the kidneys, ureters, bladder, urethra and in men the prostate gland. The term genitourinary tract infection may also be used. This refers to an infection in the reproductive organs and urinary tract.

Infections in the kidneys are known as **pyelonephritis**, infections in the bladder as **cystitis**, infections in the prostate as **prostatitis**, infections in the urethra as **urethritis** and infections in the vagina as **vaginitis**.

An infection may be caused by a bacterium, virus, fungus, parasite or protozoa.

### **Bacterial bladder infection**

Bacterial cystitis is a common bladder infection. Both men and women may get bacterial cystitis but it is much more common in women and girls. This is because the urethra in females is much shorter than in males and therefore infections invading from outside only have a short distance to travel in order to attack the bladder. By far the most common cause of bacterial cystitis is infection by bacteria that normally live in the intestines (E. coli). In women, the anus - a constant source of bacteria - is situated

close to the short urethra. Women and girls should therefore practice hygiene by wiping from front to back after going to the toilet, to prevent intestinal bacteria having the chance to enter the urethra. Some women seem to be much more prone to infection than others. These women should also practice strict hygiene before and after sexual intercourse and empty the bladder after sex so as to reduce the risk of infection. Urination after intercourse will flush out most bacteria that may have entered the urethra.

In men, bacterial cystitis is usually a consequence of infection of the urethra or the prostate, the result of catheterisation, surgery, use of instruments such as a cystoscope during investigations or hospitalisation.

Symptoms may include:

- Burning, stinging pain, particularly when urinating
- Frequent, urgent need to urinate
- Passing frequent, small amounts of urine
- Cloudy urine, sometimes containing blood, sometimes strong-smelling
- Pain in lower abdomen or back
- Suprapubic pain or pressure
- Feverishness or chills
- Nausea/vomiting

Unlike IC/BPS, the pain symptoms of bacterial cystitis are not related to filling of the bladder.

Unlike IC/BPS, symptoms of bacterial cystitis will be relieved by appropriate antibiotics.

A **urine test** will reveal the presence of bacterial infection. This test may be a dipstick test or a urine culture. A dipstick may test for the presence of glucose (sugar), blood, protein, leucocytes and nitrite in the urine and the pH level (level of acidity) of the urine. The dipstick can detect microscopic amounts of blood that are not visible to the naked eye. Excess glucose is usually an indication of diabetes. Leucocytes show the presence of inflammation, while nitrite indicates that bacteria may be present in significant numbers. Dipsticks are not infallible: if an infection is suspected but the dipstick is negative, it may be advisable to carry out a urine culture. Dipsticks are not always reliable and may not reveal an infection until it is very advanced.

A **urine culture** requires a so-called clean-catch mid-stream urine specimen to prevent external contamination of the urine specimen. Men should pull back the foreskin and wash their penis before the specimen is taken. Women should wash around the vulva and entrance to the vagina and separate the labia (vaginal lips) before urinating to prevent contamination from the skin or vaginal discharge. The culture will reveal the type of urinary tract infection and the best antibiotic to be used.

In the case of recurrent urinary tract infection, it is important to rule out the presence of **stones** in the urinary tract since these can cause chronic infection.

#### **Treatment:**

Bladder infections should always be investigated and treated since untreated bladder infections can rise up through the ureters and cause a potentially serious kidney infection.

Treatment of cystitis consists of an appropriate antibiotic, depending on the type of infection.

#### **Special risk categories**

- Females who do not practice adequate toilet hygiene
- Pregnant women
- Women using a diaphragm (with spermicide) as contraception
- People with frequent diarrhoea and/or bowel leakage;
- People with urinary retention who are unable to empty the bladder fully (this is seen in patients with neurologic disorders e.g. spina bifida, multiple sclerosis, spinal cord injury);
- People with a congenital deformity or obstruction in the urinary tract (this is more commonly the cause of UTIs in men); men with an enlarged prostate, preventing the bladder from emptying properly;

- Stones in the urinary tract;
- Reflux: leakage of the valve between the bladder and ureter, allowing urine (containing bacteria) to flow back up into the ureters in the direction of the kidneys;
- Underlying disease such as diabetes, any disorder that suppresses the immune system increases the risk of a urinary tract infection;
- Steroid therapy;
- Infrequent voiding, giving bacteria the chance to multiply;
- People using a catheter (intermittent or indwelling);
- A fistula between the bowel and bladder or the vagina and the bladder;
- Sexual abuse/assault;
- Postmenopausal women are more susceptible to UTIs.

**Tips:**

- Drink plenty of fluids to flush out the urinary tract and give bacteria no chance to take hold.
- Make sure your bladder completely empties when urinating.
- Urinate after sexual intercourse.
- Urinate regularly. Avoiding urination for long periods can give bacteria a chance to take hold.
- Women and girls should wipe from front to back after using the toilet.
- Keep the urogenital area clean and wash genitals and hands before and after sex.
- Wear cotton underwear and loose clothing to allow the urogenital area to keep ventilated and dry, thereby helping to prevent growth of bacteria.
- If your partner has the same symptoms, consider the possibility of a sexually transmitted infection (STI) and seek immediate treatment for both of you.

## **Diverticula**

Diverticula are small pouches that form in weak areas of the wall of organs, including the bladder. They may be congenital or acquired and may be completely harmless causing no symptoms.

However, diverticula may cause problems in the bladder due to obstruction and the urine that collects in them may stagnate and become infected, causing recurrent cystitis. A chronically infected diverticulum may be a cause of inflammation. Obstruction caused by diverticula can lead to stone formation. Surgical removal is required for diverticula that are causing infection or blockage.

## **Fistulas**

A genito-urinary fistula is an abnormal connecting passage or “hole” between the bladder and other organs. This includes vesicovaginal fistulas (between the bladder and the vagina), uretero-vaginal (between ureters and vagina), cervico-vesical (between cervix and bladder), urethra-vaginal (between urethra and vagina) or an enterovesical fistula (between bowel and bladder).

Fistulas can cause infectious cystitis due to infectious organisms being passed from the bowel or the vagina into the bladder through leakage.

Vesico-uterine fistulas (between the bladder and uterus) do not lead to urinary incontinence but to loss of menstrual blood through the urethra.

Fistulas can be caused for example by:

- surgery in the pelvic area,
- bladder cancer, colon cancer,
- radiation therapy,
- diverticular disease,
- inflammatory bowel disease such as Crohn’s disease
- injury due to complications of childbirth
- difficult labour caused by genital mutilation due to traditional practices
- traditional (harmful) remedies inserted in the vagina
- accidents due to penetrating injuries
- infections
- sexual abuse or rape.

Vesicovaginal fistulas are commonly found in women in poor communities in developing countries where they are usually due to the consequences of injury caused by childbirth complications, days of being in labour and lack of adequate emergency obstetric care such as caesarians. Labour may be obstructed due to traditional practices of genital mutilation in girls, sometimes involving sewing up vulvar tissue to almost completely close the entrance to the vagina.

Treatment is surgical repair of the hole but this is not always possible if tissue damage is extensive. Some fistulas may be completely irreparable and urinary diversion may be the only solution. In practical terms, surgery is only available for the lucky few and urinary diversion – if available – is not automatically going to be a practical option in third world countries where long-term follow-up, stoma care and the necessary hygiene are likely to be non-existent.

Fistulas cause suffering, illness and often premature death. The social consequences of fistulas are often life-shattering. The accompanying continuous incontinence (faecal or urinary) leads to the women being considered unclean and consequently religious and social outcasts. The patient is caused great distress, possible divorce, stigmatisation, isolation and financial destitution, causing them even greater poverty than they already had.

Fistulas resulting from childbirth in third world countries are a neglected area of medicine and could be prevented by adequate, supervised maternal healthcare, better education and eradication of illiteracy especially among women, elimination of the custom of child brides and consequent childbirth before the girl has become reached the age where her pelvis is fully developed, and improvement of the lowly position of women in many societies. Recent years have fortunately seen the creation of fistula centres and travelling teams of experts in developing countries to treat these women.

## Fungal Infection

Fungal infections of the body, often described as yeast infections, overwhelmingly concern the **Candida** species of fungus. These infections can be acute or chronic, localised or systemic. *Candida* species are normal colonizers of the oral cavity, gastrointestinal tract and vagina and usually cause no harm in healthy people. Infection with *Candida* occurs when the normal population of *Candida* organisms present in almost everyone's body is no longer kept under control, when a change takes place or imbalance occurs in the normal flora and overgrowth occurs for some reason, giving rise to symptoms. Most of the fungal infections in the urinary tract involve *Candida albicans*, with *Candida glabrata* becoming increasingly common.

*Candida* is a monocellular fungus (yeast) that can cause disease (candidiasis) in organs with mucous membranes such as the vagina, penis and mouth (also known as thrush). *Candida* infections can be acute or chronic, localised or systemic. A serious systemic form of *Candida* is known as **Deep Candidiasis** which can lead to multi-system organ failure. **Cutaneous candida** can cause skin infections and rash in parts of the body that receive little ventilation and remain moist. **Oral Candida** or thrush is an infection of the mouth, tongue and gums caused by overgrowth of *Candida* species. It forms white plaques, under which the tissue is red and sore; it causes a burning sensation in the mouth or on the tongue, a bright red tongue and cracks in the corners of the mouth. It may lead to loss of taste and pain on eating and swallowing. **Candida esophagitis** in the esophagus can make swallowing difficult and cause pain behind the breastbone. Can be a complication of HIV/AIDS.

**Vulvovaginal Candida**, a form of vulvovaginitis, commonly occurs in women and may cause burning pain and irritation in the vagina, bladder, urethra, vulva and labia. Urine passing over this inflamed tissue may cause considerable burning or stinging. Typical of vaginal candidiasis is a thick white vaginal discharge with a cheese-like texture, pain during sex, pain passing urine, severe itching and burning red tissue at the entrance to the vagina, labia and vulva. Risk factors include: use of antibiotics, increased estrogen levels (such as use of oral contraceptives, pregnancy and estrogen therapy), corticosteroids, diabetes mellitus, HIV, diaphragm and intrauterine device use.

In men, *Candida* infection can cause burning, itching, redness and red patches under the foreskin or tip of the penis and pain on urination.

**Candida in the urinary tract** may co-exist with or follow bacterial infection. Candida is the most common type of fungal infection in the urinary tract, occurring in both men and women. Candida in the lower urinary tract can sometimes be mistaken for bacterial cystitis.

Symptoms include:

- Irritation of bladder and urethra
- Suprapubic tenderness
- Painful urination
- Blood in urine
- Frequency/urgency
- Fungus ball formation

While Candida in the urinary tract usually affects the bladder, through entry via the urethra, it may rise up via the ureters to the kidneys. Candida in the upper urinary tract may cause fever and pain in the back. It may be indistinguishable from bacterial pyelonephritis. In some patients, however, there may be no symptoms at all.

Candida disease can occur for no apparent reason but is common following use of antibiotics which may lead to overgrowth of the fungus. It is also commonly found in people with low resistance, such as patients with diabetes mellitus, SLE, Sjögren's syndrome and in immunocompromised patients such as HIV/AIDS.

Catheterisation can also be a cause of Candida overgrowth in the urinary tract. Women who catheterise and insert the catheter by mistake in the vagina instead of the urethra should change to a new sterile catheter before trying again.

Other risk factors include genitourinary tuberculosis, chemotherapy, radiation therapy, antibiotic use for bacterial cystitis, hospitalisation.

**Treatment** is important because genitourinary Candida can be transferred between sexual partners. *Candida albicans* does not usually cause any serious long-term health problems and can be easily treated using fungicidal pessaries, a special cream or tablets e.g. fluconazole and itraconazole. *Candida glabrata* is more resistant to treatment and consequently more troublesome.

**Deep Candidiasis** is when Candida infection spreads to the bloodstream. This is a serious systemic condition since it can cause a range of severe symptoms varying from fever to shock and multiple organ failure. It is particularly found in newborn babies with very low birth weights and in people with severely weakened immune systems (e.g. HIV/AIDS) or those with serious medical problems (cancer, diabetes). The kidney is the most common organ involved in systemic Candida. This severe form of Candida infection is usually treated intravenously.

### **Other fungal infections**

Although much rarer, other fungi can infect the urinary tract, for example: fungi causing the inflammatory condition **coccidiomycosis** and **blastomycosis**, a rare infection caused by inhaling a fungus which may affect bladder, kidneys, prostate and testes.

### **Kidney Infection (Pyelonephritis)**

Pyelonephritis (acute or chronic) is a bacterial infection of one or both kidneys. It generally concerns *Escherichia coli*, a type of bacteria usually found in the bowel which is a common cause of bacterial cystitis. The infection usually travels up to the kidneys via the ureters from the bladder and urethra.

Possible causes include: bladder infections, catheterisation, use of instruments (e.g. cystoscope) to examine the bladder and urethra, urinary tract surgery, obstruction caused by stones or an enlarged prostate gland, or reflux (backflow) of urine from the bladder into the ureters. Infection can also occur through organisms being carried to the kidneys from other parts of the body or the skin via the bloodstream, for example a staphylococcal skin infection.

Symptoms may begin suddenly and include:

- chills and fever;
- pain on either side of the lower back;

- pain in the pubic area and groin;
- frequent need to urinate;
- burning pain when urinating;
- nausea and vomiting;
- fever and chills;
- symptoms of cystitis/UTI;
- blood and pus in the urine.

Kidney infections should always be treated since untreated infections can lead to scarring of the kidneys and permanent kidney damage. A kidney infection can enter the bloodstream and cause a life-threatening condition. Treatment usually consists of an appropriate antibiotic. Surgery may be needed if there is an obstruction or stone.

### **Mycoplasma hominis**

*Mycoplasma hominis* is a bacterium, commonly present in the genital flora of sexually active males and females, which can cause infection in the genitourinary tract. It is associated with pelvic inflammatory disease (PID), vulvo-vaginitis, urethritis, postpartum and postabortal fever, pyelonephritis and chorioamnionitis. *M. hominis* has also been linked with non-genitourinary infections such as: septicaemia, wound infections, central nervous infections, joint infections, lower respiratory tract infections and endocarditis. Treatment of choice for *M. hominis* infections is tetracycline, doxycycline.

### **Orchitis**

Orchitis or inflammation of one or both testicles may be caused by many different bacterial or viral organisms and is often a complication of other urinary tract infections in men. Mumps is a well-known cause of viral orchitis. Other risk factors include indwelling catheters (Foley), genitourinary instrumentation or surgery, recurrent UTIs and congenital abnormalities of the urinary tract. Other causes of orchitis include sexually transmitted infections and allergic reactions.

Symptoms may include:

- swelling of the testicle and scrotum,
- pain in the scrotum,
- fever
- pain on urination.

### **Pelvic Inflammatory Disease (PID)**

Pelvic inflammatory disease is an umbrella term for inflammation of the female reproductive organs (vagina, cervix, uterus, ovary, Fallopian tubes), usually caused by bacteria entering the body through sexual intercourse (sexually transmitted infection). If untreated, it can lead to infertility. However, in some cases no bacterial cause can be found.

Symptoms may include:

- Abdominal/pelvic pain
- Abnormal vaginal discharge
- Fever
- Nausea or vomiting
- Irregular menstrual bleeding
- Pain on urination
- Pain during sexual intercourse

### **Schistosomiasis / Bilharzia**

Schistosomiasis, also known as Bilharzia, is an infestation caused by parasitic trematode flatworms also called flukes or schistosomes. There are five major species and it is *Schistosomiasis haematobium*

which affects the urinary tract (kidneys, ureters and bladder) and is mainly transmitted by *Bulinus* snails. Fluke larvae are released into water by freshwater snails. These larvae burrow into human skin where they mature into adults. Female flukes lay eggs which cause infestation. It is a disease of the tropics and can cause serious long-term illness. Schistosomiasis is endemic in 74 developing countries and is the second most prevalent tropical disease in Africa after malaria. It can affect people who bathe in rivers, lakes, canals or freshwater pools that have not been chlorinated in the tropics. Children are at greatest risk of becoming infected through playing or swimming in water and because they lack the partial immunity gradually developed by adults. However, this disease can be contracted through any contact with contaminated water while performing daily domestic tasks such as washing clothes and fetching water. Fishermen and irrigation workers are also vulnerable through being constantly in contact with infected water. When infected people, often children, urinate or defecate in the water, the eggs are released into the water source. The eggs then infect freshwater snails which serve as the intermediate host. The parasites develop and multiply inside the snails and are then able to enter the skin of new victims and continue the cycle.

Symptoms depend on the type of fluke causing the infestation. Within a few weeks, worms grow inside the blood vessels and produce eggs. Some of these eggs travel to the bladder or intestines and are then passed in the stools or urine. The rest of the eggs stay in the body where they can cause vital damage.

***Schistosomiasis haematobium*** infection, also called **bilharzial bladder disease**, specifically affects the urinary tract. Damage to the urinary tract may be revealed by blood in the urine. Urination becomes painful and is accompanied by progressive damage to the bladder (fibrosis, contracted bladder with diminished capacity), ureters and then the kidneys. In advanced cases, cancer of the bladder is common. Sometimes the only symptom is so-called “swimmer’s itch” which develops where the parasite entered the skin.

However, other symptoms may include:

- fever,
- flu-like symptoms,
- fatigue,
- muscle aches,
- burning pain when urinating,
- urinary frequency and urgency
- blood in the urine.

Eggs may be found in the urine, but their absence does not automatically exclude infestation.

Schistosomiasis infestations are treated with medication to kill the parasite. If untreated, the eggs can cause life-threatening damage to the urinary tract and liver, bladder tumours and bowel cancer. Severe infections can produce serious urinary tract lesions. In rare cases, eggs may travel to the brain or spinal cord causing lesions and neurologic complications.

A standard treatment is praziquantel in a single dose and is effective in all species of schistosomiasis.

## **Sexually transmitted infection (venereal disease)**

Sexually transmitted infections (STI) are an important cause of pain, urgency and frequency in the bladder, urethral pain and burning, inflammation of the pelvic floor and chronic pelvic pain in both men and women.

Symptoms include:

- pelvic pain/inflammation;
- pain with sexual intercourse;
- epididymitis;
- genital warts;
- genital ulcers;

- genital rash;
- urethral discharge;
- urethritis;
- unusual vaginal discharge;
- painful bladder;
- painful, burning urination.

Infections may be caused by viruses, bacteria, protozoa and fungi. Examples are: chlamydia, gonorrhoea, syphilis, herpes, ureaplasma urealyticum, human papilloma virus, trichomoniasis, HIV/AIDS. Risk factors are unprotected sexual activity, sexual assault.

## Tuberculosis

The urogenital tract is the second most common site for tuberculosis after the lungs. Primary infection may have occurred many years earlier. Once a person has become infected, the tuberculosis organisms may be harboured anywhere in the body and reactivated under suitable conditions. Infection of the kidneys may be passed from the lungs via the blood. Once tuberculosis has affected the kidneys, infected urine may then infect the ureters, bladder, epididymis, penis (very rare), urethra (very rare) and prostate (rare). Bladder tuberculosis is almost always secondary to tuberculosis in the kidneys. Tuberculosis inflames the mucosa of the bladder, forming tubercles which may ulcerate, especially around the trigone and ureters. Thickening and scarring of the bladder wall also occurs, resulting in diminished capacity. Symptoms of urogenital tuberculosis are similar to those of IC/BPS. The shrunken “thimble” bladder causes frequency/urgency and there is sometimes also pain. The patient may also have low grade evening fever, weight loss and night sweats. While it is very rare for genital TB to be passed from male to female through sexual relations, the possibility may exist of sexual transmission from female to male in the case of females with pelvic tuberculosis.

In the regions of the world where tuberculosis is very common, it is important to exclude tuberculosis in a patient with painful bladder syndrome since tuberculosis is a curable condition. The World Health Organization estimates that almost one third of the world’s population is infected with Mycobacterium tuberculosis. Furthermore, the HIV/AIDS epidemic is causing an increase in tuberculosis.

Further information:

Jha SK, Rathish B. Genitourinary Tuberculosis. [Updated 2023 Apr 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557558/>

## Urethritis

Acute or chronic urethritis (inflammation of the urethra) can occur when infectious organisms (bacterial or viral) invade the male or female urethra. The symptoms may be difficult to distinguish from cystitis. See also [sexually transmitted infection](#). It can also be caused by chemical irritants.

Symptoms may include:

- frequent need to urinate,
- pain when urinating,
- discharge of pus from the urethra.

## Vaginitis

Vaginitis is the term used to describe any inflammation or infection of the vagina. Sometimes also referred to as vulvovaginitis (inflammation of the vagina and the vulva or external genital area). The common symptoms are itching, burning and a discharge which looks different to your normal vaginal discharge and may have an odour. Burning in the vagina can also cause irritation in the bladder wall.

Some of the most common causes of vaginitis are:

- Candida “overgrowth” infections;
- Bacterial vaginosis: a common bacterial vaginal infection caused by “overgrowth” as in Candida;



- Trichomoniasis vaginitis: caused by an organism known as a protozoa, can be sexually transmitted;
- Chlamydia vaginitis: a sexually transmitted infection and may cause no symptoms in women, making diagnosis difficult;
- Viral vaginitis, including the Herpes simplex virus and human papillomavirus (HPV). These are sexually transmitted infections;
- Non-infectious vaginitis: allergic reactions or irritation from vaginal deodorants, feminine hygiene sprays, perfumed soap or bubble-bath, douches or spermicidal products, laundry detergents, hormonal changes, latex, semen;
- Forgotten tampons left in the vagina can be a common cause of vaginitis!

## Part II. Other causes of painful bladder and/or painful urination (non-infectious)

### Bladder cancer

The bladder is composed of several layers:

- the urothelium which is the mucosal lining on the inside of the bladder;
- the lamina propria, a layer of loose connective tissue;
- the detrusor or bladder muscle layer;
- an outer serosal covering layer.

Tumours can be benign or malignant. Benign tumours are not cancerous and do not spread. Malignant tumours are cancer. Bladder cancer is the most common cancer affecting the urinary tract and mainly begins in the urothelium (bladder lining).

The most common of these urothelial cancers is known as **transitional cell cancer (TCC)** which may occur anywhere in the urinary tract, but is most frequently found in the bladder. This form of cancer can develop in many different ways. Some TCC bladder cancers grow like warts on the surface of the bladder lining, known as **papillary tumours**, while others may grow into large tumours and penetrate the different layers of the wall of the bladder.

A small percentage of urothelial tumours are **squamous cell cancers (SCCs)** or adenocarcinomas. These may occur as a result of infections such as schistosomiasis and are commonly found in parts of the world where this disease is rife.

**Carcinoma in situ (CIS)** is a rarer form of flat bladder cancer that spreads over the surface of the bladder. Eventually it can progress into a more invasive form of cancer as above. **Since when viewed during cystoscopy, CIS may appear indistinguishable from Hunner's ulcer, biopsy is essential.**

If bladder cancer only affects the inner lining of the bladder, it is known as a superficial cancer. If it has spread into the muscle wall of the bladder, it is called an invasive cancer. This type of cancer can penetrate not only the bladder wall but also spread into the abdomen, the reproductive organs in the female or to the prostate gland in the male. Metastatic cancer includes tumours which have spread to sites in the body other than the bladder (e.g. lymph nodes, bone, lungs).

The most common symptoms are:

- blood in the urine (haematuria)
- pain during urination
- frequent urination
- thin urine flow
- pelvic pain

Bladder cancer may not produce any symptoms in the early stages. The first indication may be blood in the urine. The symptoms of bladder cancer can therefore sometimes closely resemble those of other

non-cancerous disorders such as urinary tract infections, prostatitis, painful bladder syndrome/interstitial cystitis and stones and benign tumours.

Diagnosis of bladder cancer includes urological tests (urine cytology) and imaging.

The radiological imaging tests (X-rays) may include an intravenous pyelogram (IVP) in which a dye or contrast agent is injected into a vein. The dye collects in the urine and gives a clear picture of the urinary tract including the bladder. Other imaging tests include computerised tomography (CT) scan, magnetic resonance imaging (MRI), bone scan and ultrasound.

Cystoscopy may be performed under anaesthesia. At the same time, the urologist may remove small samples of tissue. This is known as a biopsy. The tissue samples will be examined under a microscope by a pathologist to see if any cancerous cells are present.

The cancer is then graded and staged. The staging level depends on the degree of penetration of the different layers of the bladder. It is important for the doctor to know if the cancer has spread and if so to which parts of the body.

#### Treatment

Treatment may consist of surgery, radiation therapy, chemotherapy or immunotherapy (also sometimes called biological therapy) or a combination of these. These therapies can sometimes cause IC/BPS-type symptoms in the bladder.

The type and extent of the surgery will depend on the type and stage of the cancer. This can include: transurethral resection (TUR) when the cancerous area is burnt away in a process known as fulguration, segmental cystectomy when part of the bladder is removed, radical cystectomy where the entire bladder is removed and replaced by a stoma (with either a continent internal pouch or a pouch worn on the outside of the body).

### **Chemical/drug-induced cystitis**

In cancer patients, cystitis may be caused by treatment with chemotherapy drugs (e.g. cyclophosphamide and ifosfamide). These drugs are broken down in the body, leading to formation of metabolites. These are removed from the body in the urine and irritate the lining of the bladder. Other cancer drugs may be administered intravesically and also have the side-effect of irritating the bladder.

Symptoms may include:

- Urinary urgency/frequency
- Pain or burning when urinating
- Abdominal pain
- Partial urinary retention
- Blood in the urine
- Incontinence
- Irritation of the perineum or vulva

Tiaprofenic acid, a non-steroidal anti-inflammatory drug, is also known to cause cystitis and is often misdiagnosed as interstitial cystitis. Indomethacin, another NSAID, has also been reported as causing IC/BPS-like changes in the bladder in animal experiments.

Street ketamine abuse can cause serious damage to the bladder and whole urinary tract.

### **Chemical irritants**

Chemical irritants such as deodorants and intimate sprays in the genital area, perfumed bubble baths, perfumed soap, perfumed condoms or contraceptive creams may also give rise to symptoms of cystitis.

### **Endometriosis**

Endometriosis is an enigmatic and debilitating disease affecting females in their reproductive years. The cause of endometriosis is unknown. Genetic, environmental and immunologic risk factors have been suggested in studies. All urine cultures are negative and the symptoms do not respond to antibiotic treatment. The name comes from the term “endometrium” which is the normal layer of

tissue that lines the uterus. Each month in the menstrual cycle it builds up and is shed, responding to the rise and fall of estrogen and progesterone produced by the ovaries during the reproductive cycle. In endometriosis, endometrial tissue is found in other parts of the body, in places where it is not supposed to grow.

- Most endometriosis is found in the pelvic cavity:
- On or under the ovaries
- Behind the uterus
- On the tissues that hold the uterus in place
- On the intestines or bladder

In very rare cases, endometrial tissue can grow in the lungs or other parts of the body. If it occurs on the ovaries, it may cause cysts to form: so-called 'chocolate cysts'.

Since symptoms of endometriosis can also closely resemble those of painful bladder syndrome/interstitial cystitis, it is important to avoid the wrong diagnosis.

Symptoms:

Endometriosis can cause:

- pelvic pain
- debilitating fatigue
- pain with sexual intercourse
- infertility
- pain before and during menstrual periods
- diarrhoea and/or constipation
- nausea

Bladder endometriosis can cause:

- painful urination
- bladder pain
- blood in the urine
- urgent, frequent need to urinate.

Many patients with endometriosis also experience a range of associated disorders such as: allergies, asthma, eczema and certain autoimmune diseases.

There is no known cure for endometriosis: treatment is aimed at alleviating symptoms and may comprise medication (hormonal, pain therapy) or surgery. Oral contraceptives may relieve the symptoms. Symptoms may lessen, however, after the menopause. Severe cases of bladder endometriosis may necessitate cystectomy (surgical removal of the bladder).

## **Eosinophilic cystitis**

Eosinophilic Cystitis (EC) is a rare inflammatory bladder disorder of unknown cause characterised by "transmural" inflammation (= inflammation through all layers of the bladder wall) and numerous eosinophils. Urine cultures are usually negative. EC can mimic many other urological conditions.

Eosinophils - or eosinophilic granulocytes to give them their correct name - are white blood cells that are active and accumulate in allergic diseases, parasitic infections and other disorders including allergic reactions to medication, autoimmune diseases, asthma, hay fever. The name eosinophil comes from the fact that these cells readily absorb the red dye eosin when examined microscopically.

Symptoms of eosinophilic cystitis may include:

- Frequent urination
- Blood in the urine
- Painful urination
- Urinary retention
- Nocturia (frequent urination at night)
- Suprapubic pain
- Bladder lesions
- Oedema of the bladder wall
- Fibrotic, shrunken bladder

- Upper urinary tract dilatation

EC is equally distributed between adult men and women, but in children more boys appear to be affected than girls. Tests include urinalysis, urine culture, eosinophil count, cystoscopy, biopsy and ultrasound of the bladder and upper urinary tract. Ultrasound may reveal irregular thickening of the bladder wall and tumour-like masses. Cystoscopy and biopsy are essential diagnostic investigations to distinguish EC from cancer. Cystoscopy may show red lesions and swelling, but it may be difficult to tell the difference between eosinophilic cystitis and IC/BPS, tuberculous cystitis, carcinoma in situ (CIS) and other malignancies. Some other conditions can cause secondary eosinophilia (increased eosinophils) in the bladder wall such as tumours, injury and parasitic infections. Deep biopsy is therefore vital to establish a diagnosis of EC.

Treatment includes oral medication (corticosteroids, antihistaminics, NSAIDs), intravesical treatment, avoidance of the suspected antigen, surgical transurethral resection (TUR) or fulguration of bladder lesions and partial cystectomy. Recurrence is common. Radical cystectomy (removal of the bladder) is reserved for patients for whom all other therapies have failed.

### **Radiation cystitis**

Radiation is used to treat cancer because it damages cancer cells more than the normal cells of the body. However, radiotherapy for pelvic cancer can have the side effect of radiation cystitis or radiation-induced haemorrhagic cystitis in either an acute or delayed form. Symptoms may occur immediately after treatment or may take up to ten years to appear. Radiation cystitis presents a range of symptoms similar to UTI or IC/BPS:

- Bladder inflammation
- Pain
- Minor to very severe, life-threatening bleeding
- A frequent and urgent need to urinate.

Intravesical hyaluronic acid and chondroitin sulphate are being used with some success for both treatment and prevention of radiation cystitis. Studies have shown that intravesical treatment with HA during radiotherapy reduced radiation-induced toxicity in the bladder in some patients. Hyperbaric oxygen therapy has also been shown to be potentially useful for radiation cystitis.

### **Stones in the urinary tract**

Stones, known as *calculi*, can form in any part of the urinary tract. They may cause pain, bleeding, obstruction or infection in the kidneys, ureters or bladder. Urolithiasis is the medical term used to describe stones in the urinary tract. Stones form in the kidneys. They may stay in the kidneys but may move and cause problems anywhere in the urinary tract.

There are different types of kidney stones, formed from different combinations of chemical and minerals:

Calcium stones: may combine with oxalate or calcium phosphate to form stones;

Uric acid stone: formed by people with too much acid in the urine;

Struvite stones: may form following an infection in the urinary tract and contain magnesium and ammonia;

Cystine stones: this is a rare inherited disorder.

Stones in the bladder will be seen during cystoscopy.

Symptoms include:

- Extreme pain in the back or side, spreading to the groin
- Fever and chills
- Blood in the urine
- Abdominal distension
- Nausea and/or vomiting
- Cloudy urine or urine that smells bad
- A burning feeling when urinating

As a stone grows or moves, blood may appear in the urine. If a patient is feverish, this may indicate that the stone has caused an infection. If the stone starts moving but is too large to pass, severe pain may occur. As the stone moves down the urinary tract towards the bladder, there may be frequent need to urinate with a burning sensation during urination. Stones in the bladder can cause irritation of the bladder lining or may form an obstruction making it difficult to urinate or causing an interrupted flow or complete retention. By contrast, stones can also be a cause of incontinence.

Some stones are very small and are simply passed through the urethra. Drinking plenty of fluids will increase fluid production and flush out some stones. For others, drugs may be prescribed. Uric acid stones are sometimes gradually dissolved by making the urine more alkaline. The most commonly used treatment today is Extracorporeal Shockwave Lithotripsy (ESWL). This shock wave therapy breaks up the stones into fine grains that can easily pass through the urinary tract. Surgical treatment is reserved for cases where other options have failed. This includes percutaneous nephrolithotomy for stones in the kidneys or ureteroscopic stone removal for mid and lower ureter stones. Some stones may need to be removed by means of open surgery.

Tips:

- To help prevent the formation of stones drink plenty of liquid, preferably water.
- Diets may be recommended for people with a tendency to form specific types of stone.

## **Trauma (injury)**

Trauma following accidents to the bladder, urethra or penis may also be a cause of painful bladder and/or urethra, painful urination, incontinence or overactive bladder.

Trauma may include penetrating instruments (gunshot or stab wounds), car accidents with pelvic injury, falls, blows causing bladder perforation, rupture. Obstetric trauma includes forceps delivery, prolonged labour or Caesarian deliveries. The bladder may be perforated in biopsies or through surgery. Sexual assault can cause urogenital damage. Trauma following vigorous or prolonged “normal” sexual intercourse can cause minor damage, inflammation, bruising and cystitis-like symptoms (as in Honeymoon cystitis). Women with the problem of a dry vagina should use a lubricant to prevent vulvovaginal damage from friction.

## **Vulvodynia**

Vulvodynia (also sometimes called vulval pain syndrome) means pain in the vulva. The vulva is the external genital area in women comprising the two pairs of fleshy folds – the labia majora (large lips) and labia minora (small lips) – surrounding the opening of the vagina and urethra and extending upwards towards the clitoris. The area around the vaginal opening is called the vestibule. The area between the vaginal opening and the anus is called the perineum.

Vulvodynia is a distressing, painful condition, difficult to diagnose and difficult to treat. It is a broad term used to describe any chronic pain condition of the vulvar area and embraces a number of different types of vulvar disorder causing chronic or intermittent pain, burning, rawness and pain with intercourse. While vulvodynia is sometimes found together with IC/BPS, it can also mimic IC/BPS with pain in the bladder and urethra. When diagnosing vulvodynia, it is important to exclude all possible identifiable causes including infection and skin problems.

There are two main types of vulvar pain:

### **Localised vulvodynia (vulvar vestibulitis)**

Vulvar vestibulitis is pain or burning sensation caused by something touching the vestibule. Pain is caused by sexual intercourse, insertion of tampons, riding a bicycle, gynaecological examination, tight clothes, any situation where the vestibule is touched. There is usually no pain if the area is not touched. Vulvar vestibulitis is diagnosed by touching the vestibule with a Q-tip. Even light pressure such as this can cause pain.

### **Generalised (dysesthetic) vulvodynia**

Generalised or dysesthetic vulvodynia is pain, burning, stinging or rawness on or around the vulva, labia, vestibule, clitoris or perineum most of the time, whatever they are doing. It is not dependent upon touch or pressure but this can nevertheless exacerbate the symptoms. Urination may cause pain and burning. Sexual activity is sometimes so painful as to be impossible, while at other times there may be little or no pain. Generalised vulvodynia is diagnosed when there is a history of constant pain with no visible cause or other identifiable disorder.

Vulvodynia can have a profound sometimes devastating effect on a woman since it may affect her social, work and domestic functioning, her ability to simply sit in a chair, her sexual relationships and may cause intense depression.

Although treatment is available (local anaesthetic ointments, antidepressants, anticonvulsants), vulvodynia can sometimes be difficult to treat. Studies are looking into new treatments.

For further information:

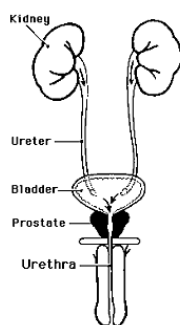
Faye RB, Piraccini E. Vulvodynia. [Updated 2023 Jul 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK430792/>

National Vulvodynia Association [www.nva.org](http://www.nva.org)

International Society for the Study of Vulvovaginal Diseases ISSVD <https://www.issvd.org/>

## Part III. Prostate Disorders

### Prostatitis



The prostate gland is a spongy, walnut-shaped organ surrounding the urethra and is located directly below the bladder neck. The main function of the prostate gland is to produce fluid which combines with semen to produce seminal fluid which is ejaculated on orgasm. Disorders of the prostate can cause pain not only in the prostate itself but also in the bladder, urethra, genital area and pelvic floor and can affect the storage and emptying function of the bladder. The relationship between chronic prostatitis and IC/BPS is currently the subject of ongoing investigation.

*Illustration courtesy of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)*

The National Institutes of Health (NIH) in the United States of America has drawn up the following classification of prostatitis into four categories:

- I Acute prostatitis (bacterial)
- II Chronic bacterial prostatitis
- IIIA Chronic prostatitis/pelvic pain syndrome, inflammatory
- IIb Chronic prostatitis/pelvic pain syndrome, non-inflammatory
- IV Asymptomatic inflammatory prostatitis

#### Acute bacterial prostatitis

This is the least common form of prostate infection affecting only 5% of patients with prostatitis but is the easiest to diagnose and treat. It may have spread to the prostate from an infection in the urethra or bladder. It is characterised by sudden onset.

Symptoms:

- Urinary urgency and frequency, including at night
- Painful or burning urination
- Worsening urinary flow or urinary retention or incomplete emptying of the bladder
- Pain in lower back or genital area

- General malaise, nausea
- Low-grade fever and chills

Urine tests show infection of the urinary tract. Treatment is an appropriate antibiotic. Risk factors include catheterisation or instrumentation, urinary tract infection, unprotected anal intercourse.

### **Chronic bacterial prostatitis**

This is a recurrent infection of the prostate gland, affecting only a small percentage of men with chronic prostatitis. Patients experience recurrent flare-ups with exacerbation of symptoms. It is characterised by gradual onset with symptoms as above. Some patients may exhibit no symptoms at all and the condition may only be discovered by chance. Chronic bacterial prostatitis may be caused by an underlying defect in the prostate. Fluoroquinolone is commonly given to treat this condition. However, chronic bacterial prostatitis does not always respond to antibiotics.

### **Chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS)**

Chronic prostatitis/chronic pelvic pain syndrome is the most common form of prostatitis and it is believed to affect some 95% of men with prostatitis symptoms, including very young men in their early twenties. The terms prostatodynia or abacterial prostatitis are also sometimes still used to describe this condition but have been officially replaced by CP/CPPS. Unlike acute or chronic bacterial prostatitis, it is not caused by any identifiable infection and therefore does not respond to treatment with antibiotics. It may be inflammatory or non-inflammatory. While its cause is unknown, one possibility that has been suggested is that it could be of autoimmune or genetic origin.

CP/CPPS is a debilitating, severely painful condition, often causing great psychological and emotional stress to the patient. It can have a devastating impact on a man's quality of life with a major effect on his social and working life. The social economic cost is consequently enormous, bearing in mind that this affects men from an early age. Like IC/BPS, it may be accompanied by other conditions such as irritable bowel syndrome, allergies etc.

Symptoms may be similar to those of bacterial prostatitis or IC/BPS and include:

- Pain in the perineum, lower abdomen, penis, testicles
- Pain on ejaculation
- Bladder irritation
- Frequent/urgent need to urinate
- Bladder outlet obstruction (incomplete emptying of the bladder)
- There may also be blood in the semen.

There is also a form of inflammatory prostatitis which is asymptomatic (i.e. the patient feels no symptoms).

Like IC/BPS, CP/CPPS is a diagnosis based on symptoms and exclusion: all other possible identifiable causes of the symptoms have to be excluded (e.g. bacterial, virus, yeast or parasitic infection or infestation, trauma, autoimmune disorder, stones, cancer/tumour, BPH, urethral stricture or allergy). There is no treatment that is effective for all patients; treatment is individual and may require a combination of therapies. In order to exclude the possibility of infection, a 2-4 week course of antibiotics is often first prescribed. If this has no effect, there is in principle little point in continuing antibiotics.

Treatment may include alpha-blockers (e.g. tamsulosin, terazosin, alfuzosin), anti-inflammatory drugs (NSAIDs), alternative therapies and sitz baths (to alleviate the pain), 5 alpha-reductase inhibitors (e.g. finasteride) may help some patients, anticholinergic drugs can be used to treat bladder irritation, sedatives and muscle relaxants to relax the muscles in the pelvic floor, dietary restrictions to avoid foods that aggravate the symptoms.

The NIH Chronic Prostatitis Symptoms Index (NIH-CPSI) can be used to evaluate symptoms and impact on the quality of life and to follow the patient's progress during treatment.

### **Benign prostatic hyperplasia (BPH), Benign prostatic obstruction (BPO)**

It is common for the prostate gland to become enlarged as a man ages. This condition, believed to be caused by hormonal changes, is known as benign prostatic hyperplasia (BPH). This can lead to benign

prostatic enlargement, benign prostatic obstruction (BPO) and/or lower urinary tract symptoms (LUTS). The cause of benign prostatic hyperplasia is as yet unknown but it may be linked to hormonal changes that occur as men age.

### Symptoms

BPH rarely causes symptoms before the age of 40, but more than half of men in their sixties and as many as 90% in their seventies and eighties have some symptoms of BPH.

As the prostate enlarges, the layer of tissue surrounding it stops it from expanding, causing the gland to press against the urethra. The bladder wall becomes thicker and irritable. The bladder begins to contract even when it contains small amounts of urine, causing more frequent urination. Eventually the bladder weakens and loses the ability to empty itself. The narrowing of the urethra and partial emptying of the bladder cause many of the problems associated with BPH.

Many symptoms of BPH stem from obstruction of the urethra and gradual loss of bladder function, which results in incomplete emptying of the bladder. The symptoms of BPH vary, but the most common ones involves changes or problems with urination, such as

- A hesitant, interrupted, weak stream
- Leaking or dribbling
- Urgent, sudden need to urinate
- Pushing or straining to begin urination
- Frequent urination, especially at night (nocturia).

The size of the prostate does not always determine how severe the obstruction or the symptoms will be. Some men with greatly enlarged glands have little obstruction and few symptoms while others, whose glands are less enlarged, have more blockage and greater problems. Sometimes a man may not know he has any obstruction until he suddenly finds himself unable to urinate at all, so-called acute urinary retention.

Severe BPH can cause serious problems over time. Urine retention and strain on the bladder can lead to urinary tract infections, bladder or kidney damage, bladder stones and incontinence.

## Prostate Cancer

Prostate cancer is the most common cancer affecting men and is one of the biggest medical problems with which the male population is faced. Although the cause is still unknown, risk factors are increasing age and possibly heredity. Treatment is most successful if the cancer is diagnosed at an early stage. However, early forms of prostate cancer are often without symptoms. This is why male population screening programmes are of such importance. The introduction of the Prostate-Specific Antigen (PSA) test has led to an increase in early diagnosis of prostate cancer.

As the cancer develops, symptoms may include:

- Increased dribbling or hesitancy (stop/start flow)
- Urinary retention (inability to urinate or to fully empty the bladder)
- Frequent need to urinate (especially at night)
- An urgent need to urinate
- Pain or burning when urinating
- Pain in the pelvic floor, lower back or upper thighs

It is important for men with bladder or urination disorders to seek medical advice at the earliest possible stage to ensure the right diagnosis and treatment since painful bladder syndrome/interstitial cystitis, bacterial and non-bacterial prostatitis, benign prostatic obstruction and cancer can all cause similar urination disorders, pain or irritation.

*The International Painful Bladder Foundation (IPBF) does not engage in the practice of medicine. It is not a medical authority nor does it claim to have medical knowledge. The IPBF advises patients to consult their own physician before undergoing any course of treatment or medication. The International Painful Bladder Foundation does not necessarily endorse any of the commercial products or treatments mentioned in this publication.*