

REVIEW ARTICLE

Dysuria

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Dysuria is defined as burning, pain, or discomfort with urination. Dysuria is a very common presenting complaint in family medicine clinics accounting for 5% to 15% of visits. It does occur more commonly in females, but may occur in males as well, especially in older males. Dysuria can be caused by infectious etiologies as well as non-infectious etiologies. Some of these are relatively benign, but some are much more serious. Many causes can be identified by history, exam, and simple in-office tests. Further laboratory tests and imaging are sometimes required to diagnose more complex or unusual etiologies. Laboratory and imaging studies include urinalysis, urine culture, vaginal smear, vaginal culture, ultrasound, CT scan, MRI, and cystoscopy. Acute cystitis is one of the most common causes, accounting for roughly 650,000 to seven million office visits per year and can usually be diagnosed accurately on history alone.

INTRODUCTION

Dysuria is defined as burning, pain, or discomfort with urination. Dysuria is a very common presenting complaint to family medicine clinics. Approximately 5% to 15% of visits to family medicine clinics are for dysuria.¹ One of the most common etiologies of dysuria is acute cystitis accounting for 650,000 to seven million office visits per year.² However, dysuria can be a presenting complaint of many other etiologies, some of which are life-threatening. The etiology can be infectious as well as non-infectious. Evaluation of dysuria begins with a thorough history to identify any possible etiology, followed by physical exam and then laboratory testing as guided by the history and physical. Urinalysis is the single most useful, yet technically easy test in evaluation of dysuria. There are several other laboratory studies and imaging that can be utilized if the history and exam dictate further evaluation.

CAUSES OF DYSURIA

Dysuria may be caused by several etiologies. The patient history will help greatly with diagnosis. One way to classify the causes of dysuria is by dividing the causes into infectious and noninfectious. While cystitis is a very common cause of dysuria, other infections, structural abnormalities, hormonal changes, inflammation, psychogenic, and even neoplastic processes have to be included in the differential. The differential depends, in part, on if the patient is male or female. Tables 1 and 2 are useful in differentiating between causes.

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Infectious

Urinary tract infections (UTIs) are one of the most common bacterial infections encountered in family medicine with estimates of 650,000 to seven million office visits per year.² It is estimated that approximately one-half of women will experience at least one urinary tract infection during their lifetime.³ A history of diabetes, abnormal bladder function, kidney stones, and enlarged prostate or current pregnancy are risk factors for UTI. UTIs are divided into two main categories: lower urinary tract infections and upper urinary tract infections.⁴ Lower UTIs are also referred to as cystitis.⁵ Pyelonephritis is an upper urinary tract infection, additional symptoms include low back pain, fever, and nausea and/or vomiting. The majorities of urinary tract infections are acute uncomplicated cystitis and are relatively easy to treat, although increased resistance to some antimicrobials have continued to occur. Pyelonephritis is more difficult to treat and if left untreated, can lead to sepsis.⁶

Other infections to consider include prostatitis, urethritis, cervicitis, epidymo-orchitis, and vulvovaginitis.

Noninfectious

Aside from infection, many other conditions can cause dysuria. In women, these include estrogen deficiency, endometriosis, and vaginal or vulvar cancer. In men, conditions include benign prostatic hyperplasia, prostate cancer, and penile cancer. A few conditions can exist in both men and women that include urethral strictures or diverticula, renal cell cancer, bladder cancer, trauma (e.g. catheter placement), inflammatory disorders, medication side effects, and psychogenic conditions such as somatization disorder anxiety, depression, and anxiety.

TABLE 1:

Differential diagnosis of dysuria in women

If Patient Has ...	Consider ...
Acute, colicky flank pain or history of kidney stones	Kidney stone, complicated cystitis
Costovertebral angle tenderness, fever	Pyelonephritis
Vaginal discharge	Sexually transmitted disease, bacterial vaginosis, candidiasis, Pelvic Inflammatory Disease
Diabetes/immunosuppression	Complicated cystitis, unusual pathogens
Vaginal atrophy	Estrogen deficiency
Joint pains	Spondyloarthropathy (i.e. Reiter or Bechet syndrome)
History of childhood UTI or urologic surgery	Abnormal anatomy, complicated cystitis
Recurrent symptoms after treatment	Abnormal anatomy; abscess; stone; chronic prostatitis; resistant organism; inadequate length of treatment; Munchausen syndrome; somatization disorder

TABLE 2:Differential diagnosis of dysuria in men⁷

If Patient Has ...	Consider ...
Acute, colicky flank pain or history of kidney stones	Kidney stone, complicated cystitis
Costovertebral angle tenderness, fever	Pyelonephritis
Urethral discharge	Sexually transmitted disease
Diabetes/immunosuppression	Complicated cystitis, unusual pathogens
Testicular pain	Torsion, epidymo-orchitis
Prostate Tenderness on exam	Prostatitis
Joint pains	Spondyloarthropathy (i.e. Reiter or Bechet syndrome)
History of childhood UTI or urologic surgery	Abnormal anatomy, complicated cystitis
Recurrent symptoms after treatment	Abnormal anatomy; abscess; stone; chronic prostatitis; resistant organism; inadequate length of treatment; Munchausen syndrome; somatization disorder

EVALUATION

As with all presenting symptoms, a thorough, detailed history and exam are vital. In many cases a history and exam will lead to an accurate diagnosis without needing further workup or only require a simple urinalysis. This is especially true in the case of acute cystitis.¹ However, as outlined above and in Tables 1 and 2, there are several complicated causes that do warrant further investigation. Possible studies include simple in-office tests such as urinalysis to MRI or cystoscopy.

HISTORY

A thorough history, including previous urinary tract infections, symptoms of dysuria, urgency, frequency, and suprapubic pain with or without hematuria should direct the clinician to the diagnosis of urinary tract infection.⁸ Family history should focus on any history of urogenital cancers and renal stones in the family. Social history should include any tobacco use, which increases cancer risk of the urinary system including renal and bladder cancer. A sexual abuse history increases the likelihood of psychogenic causes and possibly sexually transmitted infections.¹ Medication history should be reviewed (including herbal medications) that may cause dysuria including penicillin G, cyclophosphamide, ticarcillin, and saw palmetto. Vaginal douches and vaginal sprays can cause a change in vaginal flora leading to bacterial vaginosis as well as irritate the urethra causing dysuria from the inflammation. Bubble baths can also cause urethritis and thus complaints of dysuria.

EXAM

Physical examination, including vital signs and temperature aid the clinician in determining likelihood and the severity of infection as well as the possibility of pyelonephritis This is helpful in determining the need for more aggressive or prolonged treatment.⁹ Costovertebral angle tenderness suggests pyelonephritis or urinary stone. A vaginal exam is warranted if the history includes vaginal discharge, vaginal itching, vaginal pain, history of vulvovaginitis, sexually transmitted infection exposure, or dyspareunia. For men, a testicular exam or prostate exam may be warranted if the history suggests testicular or prostate etiologies. A pre- and post-prostatic massage or the Meares-Stamey 4-glass test urine sample can be obtained for analysis.¹⁰ A modified 2-glass test also can be used and is more common. However, neither one is utilized that much in practice.

In cases of urinary tract infections, distinguishing between uncomplicated and complicated infections (those which may require additional investigation and extended treatment) should be initially assessed by the clinician. Evaluation of symptoms such as such as fever (>38°C, 100.4°F), chills, flank pain, costovertebral angle tenderness and nausea and/or vomiting may point the clinician to the possibility of a more complex infection (pyelonephritis). See Table 3 (page 34).

Information obtained from the history and physical examination should provide guidance to the clinician for the appropriate treatment regimen or further workup.

TABLE 3:

Symptoms of Uncomplicated and Complicated Urinary Tract Infections

Symptoms of Uncomplicated UTI	Symptoms of Complicated UTI
Dysuria	Fever > 38° C (100.4° F)
Increased frequency of urination	Flank Pain
Suprapubic pain	Costovertebral angle tenderness
Hematuria	Nausea with or without vomiting

DIAGNOSTIC TESTS

There are a variety of diagnostic options when trying to determine the cause of dysuria in a patient. Diagnostic options include urine studies, vaginal and urethral studies, and imaging studies. The diagnostic method to be used is determined by the practitioner following information collected during patient's history and physical examination upon presentation.

Urine Studies

Urine studies are the most common and useful method of diagnosis for patients with a complaint of dysuria. These studies are inexpensive, non-invasive, and return results quickly. Urinalysis is the most commonly used diagnostic exam and can help to quickly confirm a diagnosis of urinary tract infection or aid in diagnosis of possible urinary stone.¹¹ A simple urine dipstick can show the presence of leukocyte esterase and nitrites, either of which indicate a probable UTI. One thing to keep in mind is that pyuria can be seen in infections other than UTI such as *Trichomonas vaginalis* and *Chlamydia trachomatis* as well as nephrolithiasis and urologic neoplasms. A microscopic exam of a clean-catch, mid-stream urine sample that is spun down is the gold standard. This allows visualization of white blood cells and red blood cells, as well as bacteria.¹ Other organisms such as *Trichomonas* can be seen on microscopic exam as well. Urine cultures allow for verification of UTI as well as determination of the most effective antibiotic treatment regimen and are especially useful in patients where complications can develop such as pregnant patients, patients with diabetes or in male patients with UTI. Other than cystoscopy, urine cytology is a method for detection of bladder cancer as a cause of dysuria. The only time urine studies are not used is when the history and physical findings suggest other diagnostic methods would be more appropriate.

Vaginal and urethral smears and cultures

Vaginal and urethral smears and cultures, along with ligase and polymerase chain reaction tests, are preferred when patients have dysuria with vaginal or urethral discharge or in instances of rape or child sexual abuse. Vaginal and urethral smears are useful for detection of *Trichomonas vaginalis*, *Candida* species, and with the use of gram staining the detection of *Neisseria gonorrhoeae*. Vaginal cultures are nearly 100% specific for *Neisseria gonorrhoeae* and

Chlamydia Trachomatis and are required as part of a patient work-up in cases of rape or child sexual abuse. Ligase chain reaction and polymerase chain reaction (PCR) tests also detect *Neisseria* and *Chlamydia*. They are not as specific, but results are available faster than cultures. These can also be detected by PCR in urine. This makes testing quicker and easier overall. *Chlamydia* particularly can mimic a urinary tract infection very closely and should be high on the differential list.¹²

Imaging Studies

Imaging studies, both radiologic and non-radiologic, are useful when the diagnosis is in doubt, when complications are suspected, when patients are not responding to antibiotic therapy, and in patients who are severely ill or immunocompromised. Ultrasonography and plain film radiography are relatively inexpensive and allow quick assessment of kidney stones, diverticula in the bladder or pyelonephritis that could all lead to the symptoms of dysuria.¹³ The drawbacks to these particular tests are they are not very effective in obese patients or in cases where there are obstructions that could cloud the images such as gas pockets or feces in the bowel or masses in the area of the bladder or kidneys. IV pyelography and voiding cystourethrography are useful in cases of recurrent UTI to help detect obstructions and anatomical causes of decreased urine flow leading to dysuria. CT with or without contrast and helical CT are useful in detection of tumors, cysts, abscesses and areas of infarction that could all be causing decreased urine flow, and in turn symptoms of dysuria. MRI is preferred for visualization of masses and the renal vasculature in patients with renal insufficiency or an allergy to contrast media.^{14,15} Cystoscopy is an invasive procedure, but does allow for performance of a biopsy for a histological diagnosis and also allows direct visualization of the bladder and urethra. A smoking history with persistent hematuria, either micro- or macroscopic, should raise suspicion for bladder cancer and warrant referral for cystoscopy.^{16,17}

SUMMARY

Dysuria is a very common presenting complaint to family medicine physicians. It occurs in women more often than men. Etiologies include both infectious and noninfectious causes. The most common etiology for dysuria is acute cystitis, with 650,000 to seven million clinic visits per year. History and exam are very important and in many cases can lead to an accurate diagnosis without need for extensive workup. However, there are several differentials, some of which are serious, that can cause dysuria, and thus; if the history and exam dictate it, further testing is recommended with laboratory and/or imaging studies. Urogenital cancer of both men and women can occur and should be part of the differential. Proper treatment depends on identifying the cause of the dysuria. In cases of urinary tract infection, it is important to understand resistance rates of common bacteria. Resistance rates do vary by geographic and even institutional locations and thus should be understood prior to prescribing antibiotics. Early treatment of cystitis is important to prevent complications including pyelonephritis and sepsis. Several laboratory and imaging tests are available to aid in diagnosis as outlined in this article.

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