CHAPTER 1

Assessment of the Urological Patient

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OVERVIEW

- A careful history and examination is required to elicit the correct symptoms and signs
- The majority of the urinary system is not amenable to clinical examination and further investigations are normally required

Assessment of the urological patient starts with a careful history of the presenting complaint and where appropriate assessment of the impact of these symptoms on quality of life. Clinical examination and appropriate investigation help to make a diagnosis.

Urological symptoms

- Pain
- Haematuria
- Storage LUTS
- Voiding LUTS
- Urinary incontinence
- Sexual dysfunction

Pain

Genitourinary tract pain is usually associated with obstruction or inflammation. Tumours rarely cause pain unless causing obstruction or invading surrounding nerves.

Renal pain

Renal pain is located in the costovertebral angle and may radiate anteriorly across the abdomen to the groin and genitalia. It is caused by distension of the renal capsule due to obstruction or inflammation. Pain is typically colicky in obstruction as ureteric peristalsis increases renal pelvic pressure, but steady in inflammation. Musculoskeletal disorders affecting T10–12 may also cause pain in the renal area but the pain is positional.

ABC of Urology, Third Edition.
Edited by Chris Dawson and Janine M. Nethercliffe.

Bladder pain

Bladder pain is caused by overdistension due to acute retention or inflammatory conditions. Slowly progressive obstruction causing chronic retention is painless despite residuals of over 1 litre. Inflammatory conditions of the bladder cause intermittent suprapubic pain, typically worse when the bladder is full. Cystitis can also cause sharp, suprapubic pain at the end of micturition or, in men, penile tip pain, termed strangury. Strangury is also seen in renal colic as a stone traverses the intramural part of the ureter.

Prostatic pain

Prostatic pain is due to inflammation causing distension of the prostate capsule. It is poorly localised to the lower abdomen, perineum or rectum, and frequently associated with irritative voiding symptoms.

Testicular pain

Testicular pain may be due to scrotal pathology or referred pain. Inflammatory conditions of the scrotal contents or torsion cause acute pain. Chronic pain is usually due to non-inflammatory conditions such as varicocele or hydrocele. However, renal colic can also cause pain referred to the scrotum.

Haematuria

Haematuria may be painful or painless, visible or non-visible (found on urine dipstick or microscopy). Visible haematuria increases the likelihood of finding underlying pathology.

Causes of haematuria

- Infection/inflammation
- Malignancy
- Stones
- Benign prostatic enlargement
- Trauma

Consumption of beetroot can also result in discoloured urine so haematuria should be confirmed by microscopy.

Lower urinary tract symptoms (LUTS)

Storage symptoms

- Frequency
- Nocturia
- Urgency +/- incontinence
- Dysuria

Adults normally void up to 7 times a day. Voiding once a night may be considered normal. Urinary frequency is either due to a reduced bladder capacity or due to excess urine production. Completing a 3-day bladder diary will enable objective assessment of bladder capacity and frequency. Urge incontinence is particularly bothersome as it often results in large volume urine loss and is exacerbated by reduced mobility in the elderly population. Frequency may also be due to infection.

Voiding symptoms

- Hesitancy
- Slow flow
- Intermittent flow
- Straining

Patients reliably describe needing to wait before voiding (hesitancy) or straining to achieve urine flow. They are often unaware of a decrease in their urine flow until severely restricted such that the flow no longer shoots forward but trickles down towards their toes. A sensation of incomplete bladder emptying correlates poorly with measurements of residual volume.

Incontinence

Careful questioning will usually determine the circumstances of urine loss. Patients' response to urine loss will depend on their fastidiousness but may be influenced by race and culture. Men will often dribble a small amount of urine from the meatus after voiding – post-micturition dribble. This can be eased by 'milking' the urethra. An idea of volume loss will be gained by enquiring about the number of incontinence pads used.

Types of urinary incontinence

- Stress
- Urge
- Continuous
- Overflow

Stress incontinence results from increasing intra-abdominal pressure above urethral resistance. Urine loss is in small amounts and may affect both sexes but is more common in women with a weak pelvic floor following childbirth. Urge incontinence results in larger volume loss and needs to be distinguished from stress leakage as it may indicate underlying bladder pathology. Continuous urine leakage in women is seen in vesicovaginal fistulae. Overflow incontinence is seen with a chronically distended bladder. Urine leakage usually occurs at night resulting in bed-wetting.

Sexual dysfunction

Patients often find discussing their sexual dysfunction difficult due to embarrassment but also because they lack the language to explain their symptoms. The presence of early morning erections or erection with masturbation rules out organic impotence. Retrograde ejaculation is common after prostate surgery and with the use of alpha-blockers for LUTS. Premature ejaculation is subjective and usually psychogenic.

Symptoms of sexual dysfunction

- Erectile dysfunction
- Loss of libido
- Disorders of ejaculation
- Penile curvature

Examination

Although it is tempting to skip examination in favour of radiological investigation, along with a careful history, examination is a key component in diagnostic evaluation.

Abdomen

Much of the renal tract lies deep to the examining hand and abnormalities will only be detected on imaging. However, in a thin patient it may be possible to see a grossly distended bladder although in obese patients this may be difficult to detect even with percussion.

External genitalia

The penis and scrotum lie easily accessible between the thighs. The foreskin should be retracted to examine the glans and meatus. The meatus should be gently parted to ensure there is no stenosis. Palpation of the penile shaft will reveal any Peyronie's plaques, typically found dorsally.

Scrotal examination should be carried out gently when an inflammatory condition or torsion is suspected. Each testis and epididymis should be examined for tenderness or masses. A firm or hard area in a testis should be considered a malignant tumour until proven otherwise. Masses in the epididymis are almost always benign.

Vaginal examination

With the patient's legs abducted, the introitus should be inspected for atrophic changes or inflammatory lesions, which may cause dysuria. The patient should be asked to perform a Valsalva

manoeuvre and be examined for prolapse. Stress incontinence may be elicited with coughing, but it should be remembered that patients may not leak when supine and will often empty their bladder before being examined to prevent embarrassment. Failure to elicit leakage does not mean patients do not leak. Bimanual examination should be performed in lower urinary tract symptoms to detect an abnormality of the cervix or pelvic mass.

Rectal examination

Rectal examination is undignified and uncomfortable but carried out carefully should not be painful unless there is anal pathology or prostatic inflammation present. Patients should be examined in the left lateral position with the knees brought up to meet the elbows. Anal tone and perianal sensation can be assessed. A well-lubricated index finger can be slowly inserted into the anal canal and the prostate palpated through the anterior wall of the rectum. Only a small proportion of the two prostate lobes with their midline sulcus can be felt. Thus assessment of prostate size is notoriously inaccurate. The prostate should be non-tender and smooth, with no hard, craggy areas. The finger should sweep around the rest of the assessable rectum before removing to exclude an incidental rectal tumour.

Investigation

Urine dipstick

Dipstick testing (Figure 1.1) is quick and simple, and should be performed in all patients with urinary symptoms. Glycosuria may be the first sign of diabetes in a patient complaining of LUTS. Dipstick testing is not diagnostic of infection and if suspected a midstream sample should be sent for culture before empirical antibiotics are commenced. Non-visible haematuria (dipstick or microscopic) may be intermittent and should prompt referral for further investigation.

Figure 1.1 Urine dipsticks can be read manually, as shown, or using an electronic reader.

Urine culture

Culture of a midstream sample is the only way to identify patients whose symptoms truly result from infection. Positive urine cultures in the absence of white cells probably represent contaminated samples. Sterile pyuria may be seen when a sample is taken after commencement of antibiotics or early after treatment of a urinary tract infection (UTI), but may also be seen in stones and tumours, and rarely in tuberculosis (TB). Sterile pyuria is defined as >10 white cells per mm^3 of urine.

Urine cytology

The diagnostic yield of cytology is poor except in high-grade tumours and does not replace diagnostic cystoscopy.

Biochemistry

Most hospitals now report estimated glomerular flitration rate (eGFR) based on plasma creatinine. However, creatinine is inaccurate for early renal loss and does not rise until more that half of nephron function is lost. Prostate specific antigen (PSA) testing should be offered to men with lower urinary tract symptoms after appropriate discussion about its value and limitations.

Ultrasound

Ultrasound scanning (USS) is a safe, painless and low-cost diagnostic imaging technique in adults, as well as in children. Accurate interpretation of real time images by the operator is paramount as static images rarely convey all the information.

USS is particularly useful in renal impairment and where contrast is contra-indicated. Renal size can be determined along with cortical thickness, scarring and anatomical abnormalities. Dilatation of the collecting system (hydronephrosis) may point to distal obstruction although the cause may be difficult to see with USS. Solid renal masses can be differentiated from cystic lesions. Small renal stones may be difficult to visualise, whilst it is also possible to miss a stone filling the renal pelvis. Imaging the kidney can be difficult in obese patients.

A full bladder is easily seen with transabdominal ultrasound and may detect bladder tumours or stones. USS can also be used to assess bladder capacity and post-micturition urine volume.

Transrectal USS of the prostate can be used to measure prostate volume and to look for anatomical abnormalities in infertility. Prostate biopsy and minimally invasive treatments for prostate cancer are carried out under USS guidance.

Scrotal USS (Figure 1.2) is very accurate at detecting testicular tumours. It is also useful in inflammatory conditions or tense hydroceles where clinical examination may be difficult. This should not be relied upon in suspected testicular torsion. Many men with scrotal pain are reassured by a normal USS scan.

Cystoscopy

Cystoscopy is the mainstay of investigation of bladder symptoms. Flexible cystoscopy is routinely used in the setting of the one-stop haematuria clinic but rigid cystoscopy under a general anaesthetic makes up a large proportion of the operative workload of a urology department.

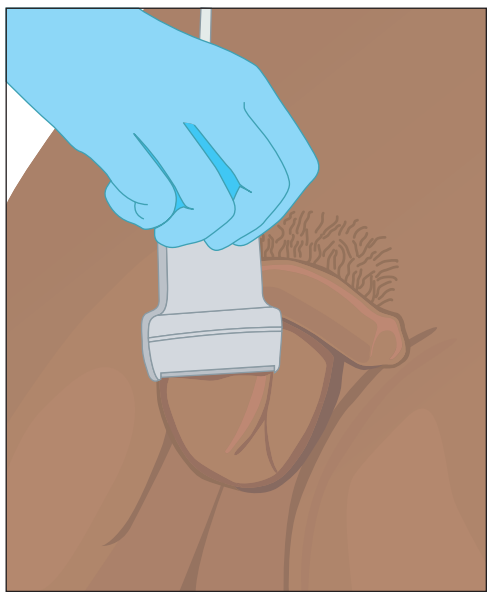
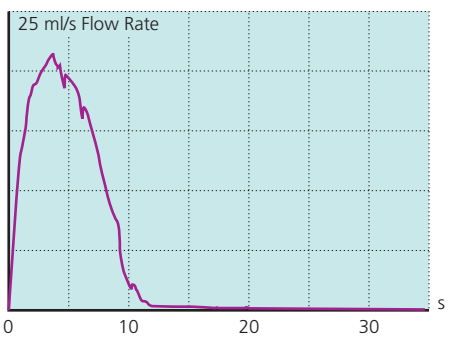


Figure 1.2 Scrotal ultrasound.

Urodynamic investigation of bladder function

A flow rate (Figure 1.3) is the basic urodynamic investigation. It is non-invasive and simply requires the patient to empty their full bladder into the machine for an objective assessment of flow. This is usually combined with measurement of residual urine with a bladder scanner. A slow flow may indicate obstruction but may also be seen in a hypocontractile bladder.

Where diagnostic concern remains pressure/flow urodynamics can be performed where a small pressure transducer is inserted into the bladder to measure bladder pressure when the patient voids.



Results of UROFLOWMETRY

Voiding Time	T100	11	s
Flow Time	TQ	11	s
Time to Max Flow	TQmax	3	s
Max Flow Rate	Qmax	21.5	ml/s
Average Flow Rate	Qave	12.6	ml/s
Voided Volume	Vcomp	144	ml

Figure 1.3 Flow-rate.

This is usually combined with filling cystometry where the bladder pressure is measured whilst being artificially filled. This is useful for investigation of incontinence or irritative LUTS.

In complex cases the bladder may be filled with contrast medium during urodynamics to look at the bladder neck and sphincter mechanism (videourodynamics).

Radiological investigation

Plain radiography (KUB) and intravenous urography (IVU)

Ninety per cent of renal calculi are radio-opaque, but a KUB on its own is of limited value in renal colic as small ureteric stones cannot be differentiated from non-urinary calcifications. Following contrast the level of obstruction will reveal the offending stone. IVU is also used in the investigation of haematuria.

Computerised tomography (CT)

In many departments, non-contrast CT has replaced the IVU as the investigation of choice in renal colic or complex stone disease.

Contrast CT is used for characterisation of renal masses, assessment of renal trauma and as a second-line investigation of haematuria. Sophisticated reconstruction of images aids planning of complex surgery.

Magnetic resonance imaging (MRI)

The primary role of MRI in urological investigation is in staging of prostate cancer. MRI is also used to differentiate adrenal adenomas from malignant tumours and to delineate the anatomy of urethral diverticula in women.

Nuclear imaging

The handling characteristics of different radiopharmaceuticals give information on both renal function and anatomy.

Static isotope renography with DMSA (dimercaptosuccinic acid) will identify renal scarring and gives split renal function. Dynamic renography with MAG3 (mercapto acetyl triglycine) is used to identify obstruction of the kidneys and will also give split renal function.

Isotope bone scans are used in uro-oncology to identify bone metastases.

Further reading

Smith's General Urology. Emil A Tanagho and Jack W McAninch. McGraw-Hill Medical, 2008.

Campbell's Urology, 8th ed. Patrick Walsh, Alan B Retik, E Darracott Vaughn Jr et al, Saunders, 2002.

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