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ASSESSMENT OF THE PATIENT WITH LOWER URINARY TRACT

ASSESSMENT OF THE PATIENT WITH LOWER URINARY TRACT SYMPTOMS History

Symptom score sheets such as the International Prostate Symptom Score (IPSS) assign a score that gives information regarding the severity of symptoms at the outset and changes over time and following intervention. The IPSS assessment should include an assessment of quality of life, which is a reflection of the degree of ‘bother’ caused by a patient’s symptoms. In addition to the IPSS, a frequency–volume diary completed by the patient before attending the clinic is invaluable in revealing fluid intake habits, diurnal variation in outputs and low-volume, frequent voiding. Summary box 84.3 Investigations of men with LUTS /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF

Essential investigations Urine analysis by dipstick for blood, leukocyte esterase, glucose and protein Urine culture for infection Serum creatinine Urinary /f_l ow rate and residual volume measurement Additional investigations PSA if indicated Pressure– /f_l ow studies

Abdominal examination

Abdominal examination

Abdominal examination is usually normal. In patients with chronic retention, a distended bladder will be found on palpa tion, on percussion and sometimes on inspection with loss of the transverse suprapubic skin crease. General physical exam impairment ination may demonstrate signs of chronic renal with anaemia, pedal oedema and dehydration. The external urinary meatus should be examined to exclude stenosis and epididymides are palpated for signs of inflammation. - - the

Figure 84.8 An abdomen with high-pressure urinary retention. Median lobe Figure 84.9 Magnetic resonance image showing an enlarged prostate and a median lobe projecting into the bladder and causing bladder out /f_l ow obstruction. Figure 84.10 Computed tomography scan showing bilateral hydro

nephrosis as a result of bladder out /f_l ow obstruction.

In benign enlargement, the posterior surface of the prostate is smooth, convex and typically elastic, but the fibrous element may give the prostate a firm consistency . The rectal mucosa can be made to move over the prostate. It should be noted that, if there is a considerable amount of residual urine present, it pushes the prostate downwards, making it appear larger than it is. It is not always possible to examine the cranial extreme of the very large prostate per rectum. An inability to get to the prostate base implies a volume of at least 50 /uni00A0 mL.

Acute retention

Acute retention

The management of retention is discussed in detail in Chapter 83 . Once the bladder has been drained by means of a catheter, the patient’s fitness for treatment is determined. If retention was not caused by drugs or constipation, then prostatectom would usually be the correct management. Unfit men or those with dementia may be treated by means of an indwelling urethral or suprapubic catheter. The role of α -adrenergic drugs followed by a trial of a catheter has been tested and found to be successful in certain groups with a short history and a low residual volume of urine, but the recurrence rate becomes cumulatively high. 5 α -reductase is given to prevent progression of symptoms in men with large (>35–40 /uni00A0 mL) prostates. Combination therapy (α -blocker and 5 α -reductase) is better for the larger gland. Patients who develop renal impairment and/or hydronephrosis after urinary retention will need to keep the catheter until definitive surgical treatment is provided, usually not less than 6 weeks afterwards to allow renal function recovery .

BENIGN PROSTATIC HYPERPLASIA Aetiology

BENIGN PROSTATIC HYPERPLASIA Aetiology

Hormones Serum testosterone levels slowly but significantly decrease with advancing age; however, levels of oestrogenic steroids are not decreased equally . According to this theory , the prostate enlarges because of increased oestrogenic e ff ects. It is likely that the secretion of intermediate peptide growth factors plays a part in the development of benign prostatic hyper-plasia (BPH). Metabolic syndrome and hereditary factors have also been implicated in its development. Summary box 84.1 Benign prostatic hyperplasia (BPH) /uni25CF /uni25CF

Occurs in men over 50 years of age; by the age of 60 years, 50% of men have histological evidence of BPH It is a common cause of signi /f_i cant lower urinary tract symptoms (LUTS) in men and the most common cause of bladder out /f_l ow obstruction (BOO) in men >70 years of age

BENIGN PROSTATIC HYPERPLASIA OR BLADDER OUTFLOW OB

BENIGN PROSTATIC HYPERPLASIA OR BLADDER OUTFLOW OBSTRUCTION

Strong indications for treatment (usually prostatectomy) include: - /uni25CF Acute retention (see Chapter 83) in fit men with no other cause for retention (drugs, constipation, recent oper - ation, etc.) (accounts for 25% of prostatectomies). a residual urine of 200 /uni00A0 mL or more, hydroureter or hydronephrosis demonstrated on ultrasound, uraemic manifestations and abnormal renal function (accounts for 15% of prostatectomies). /uni25CF Complications of BOO : stone, infection and divertic ulum formation. /uni25CF Haemorrhage : these patients present with recurrent haematuria with no obvious cause and a very vascular prostate can be seen on cystoscopy . /uni25CF Elective prostatectomy for severe symptoms this accounts for about 60% of prostatectomies. Frequen cy alone is not a strong indication for prostatectomy . The natural progression of outflow obstruction is variable and rarely gets worse after 10 years. Severe symptoms not r esponding to drug therapy , a low maximum flow rate (<10 /uni00A0 mL/s) and an increased residual volume of urine (100–250 /uni00A0 mL) are relatively strong indications for opera tive treatment. Summary box 84.4 Options for treatment of LUTS secondary to BPH /uni25CF /uni25CF α α /uni25CF

Conservative measures include watchful waiting in conjunction with /f_l uid manipulation (avoid /f_l uid binge and late night intake) and a reduction in caffeinated and alcoholic drinks Drug therapy is with -blockers or, in men with a large prostate, a 5 -reductase inhibitor, or both; combination therapy has a better outcome in glands bigger than 35 /uni00A0 g Interventional measures include transurethral resection of the prostate (TURP), which remains the gold standard; consider HOLEP (holmium laser enucleation of the prostate), open/ robotic simple prostatectomy for large glands; new minimally invasive treatment options that are available to patients include prostate artery embolisation (PAE), water vapour prostate treatment (Rezu ¯ m), prostatic urethral lift (Urolift) and water jet treatment (Aquablation)

BLADDER OUTFLOW OBSTRUCTION CAUSED BY THE BLADDER

BLADDER OUTFLOW OBSTRUCTION CAUSED BY THE BLADDER NECK Aetiology

This condition usually occurs in men but can rarely a ff ect children of both sexes and women. It may be due to muscular hypertrophy or fibrosis of the tissues at the bladder neck following TURP .

Bladder outflow obstruction

Bladder outflow obstruction

This is a urodynamic concept based on the combination of low flow rates in the presence of high voiding pressures. It can An essay on the shaking palsy in 1817. be diagnosed definitively only by pressure–flow studies. This is because symptoms are relatively non-specific and can result from detrusor instability , neurological dysfunction and weak bladder contraction. Even low measured peak flow rates (<10– 12 /uni00A0 mL/s) are not absolutely diagnostic because, in addition to BOO, weak detrusor contractions or low voided volumes (owing to instability) can be the cause. Nonetheless, flow rates provide a useful guide for everyday clinical management. Urodynamically proven BOO may result from: /uni25CF BPH; /uni25CF bladder neck stenosis; /uni25CF bladder neck dyssynergia or functional bladder neck ob struction; /uni25CF bladder neck hypertrophy; /uni25CF prostate cancer; /uni25CF urethral stricture; /uni25CF functional obstruction due to neuropathic conditions. The primary e ff ects of BOO on the bladder are as follows: /uni25CF Urinary flow rates decrease : for a voided vol ume >200 /uni00A0 mL, a peak flow rate of >15 /uni00A0 mL/s is normal (Figure 84.4); one of 10–15 /uni00A0 mL/s is equivocal; and one <10 /uni00A0 mL/s is low (Figure 84.5). /uni25CF Voiding pressures increase : pressures >80 /uni00A0 cmH are high (Figure 84.6); pressures between 60 and 80 /uni00A0 cmH O are equivocal; and pressures <60 /uni00A0 cmH 2 2 normal. The long-term e ff ects of BOO are as follows: /uni25CF The bladder may decompensate so that detrusor contrac - tion becomes progressively less e ffi cient and a residual - urine develops, leading to chronic retention. /uni25CF The bladder may become more irritable during filling with a decrease in functional capacity partly caused by detrusor overactivity (see Chapter 83), which may also be caused by neurological dysfunction or ageing, or may be idiopathic. Aside from symptoms, the complications of BOO are as follows: - /uni25CF Acute retention of urine is sometimes the first symptom of BOO. /uni25CF Chronic retention. In patients in whom the residual volume is >250 /uni00A0 mL or so (Figure 84.7), the tension in the O 2 bladder wall increases owing to the combination of a large volume of residual urine and increased resting and filling O are bladder pressures (a condition known as high-pressure chronic retention). The increased intramural tension results in functional obstruction of the upper urinary

5 m/s 100 mL Volume Figure 84.4 Normal /f_l ow rate. The voided volume is well in excess of 350

mL, and the maximum /f_l ow rate is in excess of 25 mL/s. Flow 5 m/s 100 mL Volume 10 s Figure 84.5 Diagram of a low /f_l ow rate showing a rather low voided volume of about 200 mL, but with a markedly decreased /f_l ow rate. Such a /f_l ow rate could be caused by a urethral stricture, bladder out /f_l ow obstruction or a weak detrusor. O) 120 (200) 80 (100) 40 0 Detrusor pressure (cmH ₂ Scale change 20 10 0 1 2 Flow rate (mL s- /one.numerator) 0 Time (min) Figure 84.6 Conventional urodynamic trace showing

detrusor pres

sure during voiding (voided volume 340 mL). There has been a change in scale because the pressure was so high; voiding pressures are increased with a low /f_l ow rate. This is diagnostic of bladder out /f_l ow obstruction. Figure 84.7 An ultrasonogram showing a large postvoid residual urine.

(Figures 84.8–84.10). As a result, upper tract infection and renal impairment may develop. Such men may present with overflow incontinence, enuresis and renal insu ffi ciency . These symptoms should alert the doctor to the pr esence of this condition. /uni25CF Impaired bladder emptying. If the bladder decompensates with the development of a large volume of residual urine, urinary infection and calculi are prone to develop. /uni25CF Development of storage bladder symptoms secondary to BOO that can be irreversible if BOO is not treated. /uni25CF Haematuria. This may be a complication of BPH. Other causes must be excluded by carrying out urine culture, cytology , computed tomography (CT) urography and cystoscopy .

Blood tests

Blood tests

- Serum creatinine, electrolytes and haemoglobin should be measured.

Bone scan

Bone scan

Once the diagnosis has been established, if metastatic spread is suspected (on the basis of a high PSA [>10 /uni00A0 ng/mL], locally /uni00A0 advanced disease or presence of Gleason 7 or higher) - a bone scan should be carried out. If, however, the PSA is <10 /uni00A0 ng/mL, then a bone scan would be performed only on clinical indications. The bone scan is performed by the injection of technetium-99m, which is then monitored using a gamma camera. It is more sensitive in the diagnosis of - metastases (Figure 84.20) than a skeletal survey , but false positives occur in areas of arthritis, osteomyelitis or a healing fracture.

CARCINOMA OF THE PROSTATE

CARCINOMA OF THE PROSTATE

Carcinoma of the prostate is the most common malignant tumour in men over the age of 65 years. In the UK in 2017, more than 48 000 men were diagnosed with, and more than figures in the USA were 190 000 and 33 000, respectively . If histological section of prostates at autopsy is performed, increasingly frequent foci of microscopic prostate cancers are found with increasing age. These foci of prostate cancer have variable potential for progressing clinically to metastatic disease. About 10–15% of younger men who develop prostate cancer have a positive family history of the disease, but the aetiology is unclear. Throughout the world, rates of microscopic foci of prostate cancer are constant, but rates of clinically evident disease are low in men in Japan, China and India. Carcinoma of the prostate usually originates in the peripheral zone of the prostate, so ‘prostatectomy’ for benign enlargement of the gland confers no protection from subsequent carcinoma.

Chronic prostatitis

Chronic prostatitis

Many urologists find the diagnosis of chronic prostatitis and ‘prostatodynia’ very di ffi cult as many men present with perigenital pain, testicular pain, prostatic pain exacerbated by sexual intercourse or pain that apparently renders sexual intercourse out of the question. Psychosexual dysfunction in such patients may be the underlying problem. The diagnosis of chronic prostatitis has to be based on: /uni25CF persistent threads in voided urine; ria in the absence of urinary infection. Aetiology This is thought to be the sequela of inadequately treated acute , prostatitis. While pus is present in the prostatic secretion, the responsible organism is often di ffi cult to find. Other organisms such as Chlamydia species may be responsible for chronic abacterial prostatitis. Clinical features The clinical features are extremely varied. Only men with symptoms of posterior urethritis, prostatic pain and perigenital pain accompanied by intermittent fever and pus cells or bacte - ria in the postprostatic massage specimen should be diagnosed as having chronic prostatitis. Diagnosis The three-glass urine test is valuable. If the first glass with the initial voided sample is clear and the second and third glasses show urine containing prostatic threads and leukocytes, - prostatitis is present. Rectal examination of the prostate may be normal or may show a soft, boggy and tender prostate. Examination of the prostatic fluid obtained by prostatic massage should show pus cells and bacteria. Urethroscopy may reveal inflammation of the prostatic urethra, and pus may be seen exuding from the prostatic ducts. The verumontanum is likely to be enlarged and oedematous. In many men with the symptoms described above, all investigations are normal. Treatment Antibiotic therapy should be administered only in accor - dance with bacteriological sensitivity tests. Trimethoprim or ciprofloxacin penetrate well into the prostate. If Trichomonas or anaerobes are the responsible agent, a rapid response is obtained from administration of metronidazole (200 /uni00A0 mg three times daily for 7 days to both partners). If Chlamydia is suspected, doxycycline is the antibiotic treatment of choice. α -blockers and anti-inflammatory drugs have been used with - some success. There is little evidence that prostatic massage helps in eradicating the infection.

Clinical features

Clinical features

Prostatic calculi are usually symptomless, being discovered on TRUS, on radiography of the pelvis, during prostatectomy or associated with carcinoma of the prostate or chronic prostatitis. In cases associated with severe chronic prostatic infection, the associated fibrosis and nodularity are di ffi cult to di ff erentiate - from carcinoma. On radiographs or ultrasound scans, these stones are often seen to form a horseshoe (Figure 84.13) or a circle. It is postulated that they are associated with BOO.

Figure 84.13 Endogenous prostatic calculi.

Clinical features

Only advanced disease gives rise to symptoms, but even advanced disease may be asymptomatic. Symptoms of advanced disease include: /uni25CF BOO; /uni25CF pelvic pain and haematuria; /uni25CF bone pain, malaise, ‘arthritis’, anaemia or pancytopenia; /uni25CF renal failure; /uni25CF locally advanced disease or even asymptomatic metastases, which may be found incidentally on investigation of other symptoms. Early prostate cancer is asymptomatic and may be found: /uni25CF incidentally following TURP for clinically benign disease (T1a and b); /uni25CF T1c – because of serum PSA screening; /uni25CF as a nodule (T2) on rectal examination. Summary box 84.7 The presentation of men with prostate cancer /uni25CF /uni25CF

Figure 84.15 Transrectal ultrasound scan of a T2 nodule in the pros

tate. Often men are asymptomatic and detection is by opportunistic PSA testing Cancer is detected in men describing LUTS or may present with symptoms of metastatic disease

Clinical syndromes

Clinical syndromes

Owing to muscle hypertrophy or dyssynergia Marion described a series of cases in which muscular hyper- trophy of the internal sphincter in a young person had resulted in the development of a vesical diverticulum or hydro- thought that dyssynergic contraction of the smooth muscle of the bladder neck (bladder neck dyssynergia) may account for some cases of BOO. It is also known as functional bladder neck obstruction. Owing to fibrosis The symptoms are similar to those of prostatic enlargement but are a consequence of scarring after TURP or radical prostatectomy (usually compounded by external beam radio therapy [EBRT]).

Complications of prostatec tomy

Complications of prostatec tomy

Local Haemorrhage is a major risk following prostatectomy what - ever the surgical approach. Care should be taken in applying diathermy to arterial bleeding points after TURP , and to any bleeding vessels at the bladder neck; they are often better seen - when the rate of infl o w of fl uid is decreased. Some of the venous bleeding due to deep resection can only be stopped by gentle traction via a Foley catheter balloon infl ated to 30–40 /uni00A0 mL and kept in the bladder. Sustained traction is applied by taping - the catheter to the anterior abdominal wall or thigh for 12–24 - hours. This causes compression of the prostatic tissue and veins and thus stops the bleeding. In the recovery room, one should check that the bladder is draining adequately; if it is not, this may indicate that a clot is blocking the eye of the catheter. The bladder should be promptly washed out using a strict aseptic technique. The catheter should be changed by the surgeon. Only rarely is it necessary to return the patient to - the operating room. Secondary haemorrhage tends to occur several days after the patient has been discharged. All men should be warned about this possibility and given appropriate advice to rest and to ha ve a high fl uid intake. It is usually minor in degree but if catheter passed and the bladder washed out. Perforation of the bladder or the prostatic capsule can occur at the time of transurethral surgery . This usually occurs from a combination of inexperience in association with a large prostate or heavy blood loss. If the field of vision becomes obscured by heavy blood loss, it is often prudent to achieve adequate haemostasis and abandon the operation, swallowing one’s pride on the understanding that a second attempt may be necessary . A large perforation with marked extravasation may require the insertion of a small suprapubic drain. Rectal perforation should be extremely rare. Sepsis Bacteraemia is common even in men with sterile urine and occurs in over 50% of men with infected urine, prolonged catheterisation or chronic retention. Sepsis can occur in these patients shortly after operation or when the catheter is removed. Routine use of prophylactic antibiotics is recommended based on local antimicrobial sensitivity profiles. The most worrying aspect of infection is the early rigor following surgery . If left undetected and untreated, this may progress to septic shock with profound hypotension. A blood culture should be taken and antibiotics given parenterally (e.g. amoxicillin plus cefurox ime, or gentamicin). Incontinence Incontinence is rare after BPH surgery; however, it is inevitable if the external sphincter mechanism is damaged. The bladder neck is rendered incompetent by any prostatectomy and, therefore, an intact distal sphincter mechanism is essential for continence. The verumontanum marks the proximal margin of the external sphincter. In some patients, detrusor instability contributes to the incontinence. The use of anticholinergic agents such as mirabegron/solifenacin/tolterodine may help. Mild degrees of stress incontinence usually reco ver in a few days to a few weeks. If physiotherapy is ine ff ective, then full assessment with cystoscopy and pressure studies including video urodynamics should be carried out befor e proceeding with o ff ering the patient the insertion of an artificial urinary

sphincter or a sling to increase the resistance of the urethra. One should usually wait for 6 months to 1 year before any sling or sphincter is implanted. Retrograde ejaculation and erectile dysfunction Men with prior good sexual function are less likely to have erectile dysfunction following BPH surgery , but retrograde ejaculation occurs commonly (>75%) because of disruption to the bladder neck mechanism; occasionally , anejacula tion can occur as a result of disruption of the ejaculatory ducts. This should be discussed with all men before the surgery . Urethral stricture This may be secondary to prolonged catheterisation, the use of an unnecessarily large catheter, clumsy instrumentation or Fessenden Nott Otis , 1825–1900, nineteenth century American urologist. Jean Baptiste Camile Marion , 1869–1932, Professor of Urology , The Faculty of Medicine, Paris, France. period. These strictures arise either just inside the meatus or in the bulbar urethra. An early stricture can usually be managed by simple dila tation or urethrotomy if dense fibrosis is present. If the stricture recurs then urethroplasty is considered. The use of an Otis urethrotomy in the tight urethra prior to TURP can reduce the incidence of postoperative stricture. Bladder neck contracture Occasionally , a dense fibrotic stenosis of the bladder neck occurs following overaggressive resection of a small prostate. It may be due to the overuse of coagulating diathermy . This usually happens in the early postoperative period. Transurethral incision of the scar tissue is necessary using laser or diathermy .

Considerations for elective treatment in men with

Considerations for elective treatment in men with LUTS secondary to BPH

The following questions should be answered before considering a surgical treatment: /uni25CF Have they failed a preliminary trial of medical therapy? Commonly , men will have been treated with α -blockers or 5 α -reductase inhibitors and will have failed treatment. /uni25CF Is BOO present? In many cases, the findings of significant symptoms (assessed by symptom scoring) and a benign enlarged prostate supplemented by the finding of a low maximum flow rate (<10–12 /uni00A0 mL/s for a good voided vol - ume [>150–200 /uni00A0 mL]) – will su ffi ce to make a reasonable working diagnosis of BOO. /uni25CF How severe are the symptoms and what are the risks of do - ing nothing? Severe symptoms and a large residual volume of urine will usually require treatment. Men with mild y symptoms, good flow rates (>15 /uni00A0 mL/s) and good bladder emptying (residual urine <100 /uni00A0 mL) may be safely managed by reassurance and review; such patients rarely develop se - vere complications such as retention in the long term. /uni25CF Is the man fit for operative treatment? /uni25CF What treatments are available, what are the outcomes and do the side e ff ects justify treatment? Men with symptoms attending for elective treatment (excluding acute and chronic retention) Conservative treatment It is in men with relatively mild symptoms, reasonable flow rates (>10–15 /uni00A0 mL/s) and good bladder emptying (residual urine <100 /uni00A0 mL) that careful discussion over the merits and side e ff ects of operative treatment is warranted. Waiting for a period of 6 months after careful discussion of the diagnosis is indicated. After this, a repeat assessment of symptoms and flow rates and an ultrasound scan are helpful; many men with stable symptoms will elect to leave matters be. Drugs In men who are very concerned about the development of sexual dysfunction after TURP , the use of drugs may be helpful. Two classes of drug have been used in the treatment of men with BOO. α -adrenergic blocking agents inhibit the contraction of smooth muscle that is found in the prostate. The other class of drug is the 5 α -reductase inhibitors, which inhibit the conversion of testosterone to 1,5-dihydrotestosterone (DHT), the most active form of androgen. These drugs, when taken for a year, result in a 25% reduction in the size of the prostate gland. Both groups of drugs are e ff ective; however, α -blockers work more quickly and although the 5 α -reductase inhibitors have fewer side e ff ects they need to be taken for at least 6 months and their e ff ect is greatest in patients with large (>40 /uni00A0 g) glands. Drug therapy results in improvements in maximum flow rates by about 2 /uni00A0 mL/s more than placebo and results in a mild (20%) improvement in symptom scores. Another drug class that has improved patients’ symptom scores but not their maximum flow rate are the phosphodiesterase 5 inhibitors, which reduce smooth muscle tone and possibly the inflammation in the prostate gland. These drugs are particu larly useful if patients have concomitant erectile dysfunction. TURP , however, results in improvements in maximum flo rates from 9 to 18 /uni00A0 mL/s and a 75% improvement in symptom scores. These drugs are expensive in comparison with their e ff ectiveness, and a significant proportion of men who try

these drugs will subsequently undergo surgical treatment. Operative treatment Apart from the strong indications for operative treatment mentioned above, the most common reason for TURP is a combination of severe symptoms and a low flow rate of <12 /uni00A0 mL/s. The key is to assess the symptoms carefully and to counsel men about side e ff ects and likely outcome before advising operative treatment.

Corpora amylaceae

Corpora amylaceae

Corpora amylaceae are tiny calcified lamellated bodies found in the glandular alveoli of the prostates of elderly men and apes, but not in the prostates of animals lower in the phylo - genetic /uni00A0 scale than anthropoids. Corpora amylaceae are prob - ably the forerunners of endogenous prostatic calculi.

Counselling men undergoing prostatectomy

Counselling men undergoing prostatectomy

Men undergoing prostatectomy need to be advised about the following: /uni25CF Retrograde ejaculation or anejaculation . This occurs in about 65–85% of men after prostatectomy . /uni25CF Erectile dysfunction . This occurs in about 5–10% of men, usually in those whose potency is waning. /uni25CF Success rate . On the whole, men with acute and chron - ic retention do well from the symptomatic point of view . Ninety per cent of men undergoing elective operation for severe symptoms and urodynamically proven BOO do well in terms of symptoms and flow ra tes. Only about 65% of those with mild symptoms or those with weak bladder con - traction as the cause of their symptoms do well. Men who are unobstructed and have detrusor instability do not re - spond well to TURP; in fact, their storage symptoms could accentuate postoperatively . Patients who have concomitant BOO and secondary detrusor ov eractivity may need an anticholinergic drug for a few months if the y have per - sistent irritative symptoms. /uni25CF Risk of reoperation . After TURP , this is about 15% - after 8–10 years. /uni25CF Morbidity rate . Death after TURP is infrequent w (<0.5%); severe sepsis is found in about 6%; and severe haematuria requiring transfusion of more than 2 units of blood occurs in about 3%. After discharge, about 15–20% of men subsequently require antibiotic treatment for symptoms of urinary infection. /uni25CF Incontinence . Although the risk is rare and is about 1%, the risk is higher in older patients and those with a very large prostate.

1 4 Figure 84.11 The surgical approaches to the prostate. (For key see text.)

Cross-sectional imaging with magnetic resonance im

Cross-sectional imaging with magnetic resonance imaging and transrectal ultrasound

MRI with a high-tesla magnet (1.5–3 /uni00A0 T) is the most accurate method of staging local disease. mpMRI is used preoperatively to assess pelvic lymph nodes as well as local stage, although the sensitivity of mpMRI to detect small areas of capsular spread is limited, even in the best hands. As well as preoperative staging, mpMRI plays an important role in active surveillance and localisation of recurrent prostate cancer after surgery . Low-grade tumours are frequently not seen on MRI and are often clinically insignificant. TRUS scanning can also be used to stage prostate cancer. Locally extensive disease (T2) can be diagnosed with increased sensitivity by TRUS (Figure 84.15) compared with rectal examination, but many tumours will still be missed. This prob - lem remains a real one in screening for early prostate cancer; in comparison with breast cancer, with mammography detecting 70–80% of tumours, TRUS plus rectal examination and mea - surement of PSA will detect only 30–50% of cancers that are known to be present on autopsy studies (although it may detect the larger, more significant cancers).

Cystourethroscopy

Cystourethroscopy

Inspection of the urethra, the prostate and the urothelium of the bladder should be done immediately prior to prosta - tectomy to exclude a urethral stricture, a bladder carcinoma and the occasional non-opaque vesical calculus. This should be based on the patient’s symptoms, signs and investigations. Direct inspection of the prostate is not used as an indicator to establish the pr esence of BOO and the need for surgery .

Effects of benign prostatic hyperplasia

Effects of benign prostatic hyperplasia

It is important to realise that the relationship between anatom - ical prostatic enlargement, LUTS and urodynamic evidence of BOO is complex (Figure 84.2). Summary box 84.2 Consequences of BPH /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF

No symptoms, no BOO No symptoms, but urodynamic evidence of BOO LUTS, no evidence of BOO LUTS and BOO Others (acute/chronic retention, haematuria, urinary infection and stone formation)

Anatomically , the e ff ects are as follows: /uni25CF Urethra . The prostatic urethra is lengthened, sometimes to twice its normal length, but it is not narrowed anatom ically . The normal posterior curve may be so exaggerated that it requires a curved catheter to negotiate it. When only one lateral lobe is enlarged, distortion of the prostatic ur thra occurs. /uni25CF Bladder . If BPH causes BOO, the musculature of the bladder hypertrophies to overcome the obstruction and ap pears trabeculated (Figure 84.3). Significant BPH is asso ciated with increased blood flow , and the resultant veins at the base of the bladder are apt to cause haematuria.

Symptoms BPH BOO Figure 84.2 Diagrammatic representation of the relation between symptoms of prostatism, benign prostate hyperplasia (BPH) and urodynamically proven bladder out /f_l ow obstruction (BOO).

Examination of urine

Examination of urine

The urine is examined for glucose, leukocyte esterase and blood; a midstream specimen should be sent for bacteriological examination and cytological examination may be carried out if carcinoma in situ is thought possible.

FURTHER READING

FURTHER READING

Mundy AR, Fitzpatrick J, Neal DE, George NJ (eds). The scientific basis of urology , 3rd edn. London: Informa Healthcare, 2010. Partin AW , Peters CA, Kavoussi LR, Dmochowksi RR, Wein AJ. Campbell–Walsh–Wein urology , 12th edn. Philadelphia, PA: Elsevier, 2021. Scardino PT , Linehan WM, Zelefsky MJ, V ogelzang NJ. Comprehensive textbook of genitourinary oncology , 4th edn. Philadelphia, PA: Lippincott Williams & Wilkins, 2012.

Flow rate measurement

Flow rate measurement

For this to be meaningful, two or three voids should be recorded using a special flow meter, usually found in urology outpatient clinics; the voided volume should be in excess of 150–200 /uni00A0 mL. A typical history and a flow rate <10 /uni00A0 mL/s (for a voided volume of >200 /uni00A0 mL; Figure 84.5) will be su ffi cient for most urologists to recommend treatment. Usually , a flow rate measurement will be coupled with ultrasound measurement of postvoid residual urine. There are pitfalls in the measurement of flow rates. The machine must be accurately calibrated. The patient must void volumes in excess of 150 /uni00A0 mL and two or three recordings ar needed to obtain a representative measurement. Decreased flow rates and LUTS may be seen in: /uni25CF BOO; /uni25CF low voided volumes (characteristically in men with detru sor instability); /uni25CF men with weak bladder contractions (low pressure–flow voiding), also known as underactive detrusor. Details of these studies are outlined in Chapter 81 . They should be performed on the following patients: /uni25CF men with suspected neuropathy (Parkinson’s disease, dementia, longstanding diabetes, previous strokes, multi - ple sclerosis); /uni25CF men with a dominant history of irritative symptoms and men with lifelong urgency and frequency; /uni25CF men with a doubtful history and those with flow rates in the near normal range (~ or >15 /uni00A0 mL/s); /uni25CF men with invalid flow rate measurements (because of low voided volumes); /uni25CF high residual/chronic retention; /uni25CF men with recurrence of LUTS after previous BPH surgery (in the absence of urethral or bladder pathology); /uni25CF young men (<50 years) and older men (>80 years) with LUTS. -

General blood tests

General blood tests

These are normal in early disease but, in metastatic disease, there may be leukoerythroblastic anaemia secondary to extensive marrow invasion, or anaemia may be secondary to renal failure. There may be thrombocytopenia and evidence of disseminated intravascular coagulopathy with increased fibrinogen degradation products.

General complications

General complications

Death occurs in about 0.2–0.3% of men undergoing elective prostatectomy . In very elderly men, in men with prostate cancer admitted as an emer gency with acute or chronic retention or in those with very large prostates, the 30-day death rate may be of the order of 1%. Cardiovascular - Pulmonary atelectasis, pneumonia, myocardial infarction, congestive cardiac failure and deep venous thrombosis are all potentially life-threatening conditions that can a ff ect this elderly and often frail group of men. Water intoxication Absorption of water into the circulation at the time of trans - urethral resection can give rise to congestive cardiac failure, hypona traemia and haemolysis. Accompanying this, there is frequently confusion and other cerebral ev ents often mimick - ing a str oke. The incidence of this condition has been reduced since the intr oduction of isotonic glycine for irrigating during resection, and further still with the development of bipolar TURP wher e saline is used as an irrigant. The treatment consists of fluid restriction.

Histological appearances

Histological appearances

The prostate is a glandular structure consisting of ducts and acini; thus, the histological pattern is one of an adenocarci - noma. The prostatic glands are surrounded by a layer of myoepithelial cells. The first change associated with carcinoma is the loss of the basement membrane, with glands appearing to be in confluence. As the cell type becomes less di ff erentiated, mor e solid sheets of carcinoma cells are seen. A classification of the histological pattern based on the degree of glandular dedi ff erentiation and its relation to stroma has been devised - by Gleason. Prostate cancers exhibit heterogeneity within tissue, and so two histological areas of prostate are each scored between 3 and 5. Grades 1 and 2 are now not reported as their outcome is similar to grade 3. Grade 3 cancers almost never metastasise. The scores are added to give an overall Gleason score of between 6 and 10; this (and the volume of the cancer) appears to correlate well with the likelihood of spread and the prognosis. The International Society of Urological Pathology (ISUP) and WHO have recommended a simplified grading system composed of five prognostic grade groups. Each group has prognostic significance and a higher grade group has a poorer prognosis. Grade groups are as follows: /uni25CF 1 /uni00A0 = /uni00A0 Gleason score 3 /uni00A0 + /uni00A0 3 /uni00A0 = /uni00A0 6 /uni25CF 2 /uni00A0 = /uni00A0 Gleason score 3 /uni00A0 + /uni00A0 4 /uni00A0 = /uni00A0 7 /uni25CF 3 /uni00A0 = /uni00A0 Gleason score 4 /uni00A0 + /uni00A0 3 /uni00A0 = /uni00A0 7 /uni25CF 4 /uni00A0 = /uni00A0 Gleason score 8 (4 /uni00A0 + /uni00A0 4 /uni00A0 = /uni00A0 8, 3 /uni00A0 + /uni00A0 5 /uni00A0 = /uni00A0 8, 5 /uni00A0 + /uni00A0 3 /uni00A0 = /uni00A0 8) /uni25CF 5 /uni00A0 = /uni00A0 Gleason score ≥ 9 (4 /uni00A0 + /uni00A0 5 /uni00A0 = /uni00A0 9, 5 /uni00A0 + /uni00A0 4 /uni00A0 = /uni00A0 9, 5 /uni00A0 + /uni00A0 5 /uni00A0 = /uni00A0 10)

Figure 84.19 Osseous metastases of the pelvic bones in carcinoma of the prostate (courtesy of LN Pyrah, Leeds, UK).

Introduction

Introduction

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Learning objectives

Learning objectives

To understand: The relationship of anatomical structure and biochemical â€¢ function to the development and treatment of benign and malignant disease of the prostate The terminology used to describe lower urinary tract â€¢ symptoms and to know their causes as well as the treatment options available

Liver function tests

Liver function tests

These will be abnormal if there is extensive metastatic invasion of the liver. Alkaline phosphatase may be raised from either hepatic involvement or secondaries in the bone. These can be distinguished by measurement of isoenzymes or gamma glutamyltransferase.

Lower urinary tract symptoms

Lower urinary tract symptoms

In both sexes, non-specific symptoms of bladder dysfunction become more common with age, probably owing to impairment of smooth muscle function and neurovesical coordination. Not all symptoms of disturbed voiding in ageing men should therefore be attributed to BPH causing BOO. Urologists prefer the term LUTS and discourage the use of the descriptive term ‘prostatism’. The following conditions can coexist with BOO, leading to di ffi culty in diagnosis and in predicting the outcome of treat ment: /uni25CF idiopathic detrusor overactivity (see Chapter 83); /uni25CF neuropathic bladder dysfunction as a result of diabetes, stroke, Alzheimer’s disease or Parkinson’s disease (see Chapter 83); degeneration of bladder smooth muscle giv ing rise to impaired voiding and detrusor instability; /uni25CF BOO due to BPH. LUTS can be described as: /uni25CF V oiding: /uni25CF hesitancy (worsened if the bladder is very full); /uni25CF poor flow (unimproved by straining); Alois Alzheimer , 1864–1915, neurologist, worked at Heidelberg and Munich before being appointed Professor of Psychiatry at Breslau, Germany (now Wroc ł aw , Poland). James Parkinson , 1755–1824, general practitioner of Shoreditch, London, UK, published - e - - - /uni25CF intermittent stream – stops and starts; /uni25CF dribbling (including after micturition); /uni25CF sensation of poor bladder emptying; /uni25CF episodes of near retention. /uni25CF Storage: /uni25CF frequency; /uni25CF nocturia; /uni25CF urgency; /uni25CF urge incontinence; - /uni25CF nocturnal incontinence (enuresis). LUTS are usually assessed by means of scoring systems, which give a semiobjective measure of severity and may be helpful in assessing the outcome of the therapy . Severe irritativ e symptoms are usually associated with - detrusor instability . Postmicturition dribbling is now known not to be a consequence of BOO and is not usually improved by prostatectomy . It is due to retained urine in the urethra.

Trabeculae Diverticula Figure 84.3 Pathological specimen of bladder and kidneys in a case of bladder out /f_l ow obstruction caused by

benign prostatic hyperpla

sia. Bladder trabeculation, bilateral hydroureter and hydronephrosis can be seen.

MANAGEMENT OF MEN WITH

MANAGEMENT OF MEN WITH

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Methods of performing prostatectomy

Methods of performing prostatectomy

The prostate can be approached (1) transurethrally (TURP); (2) retropubically (RPP); (3) through the bladder (transvesically; TVP); or (4) from the perineum (Figure 84.11). Transurethral prostate surgery Transurethral resection of the prostate TURP remains the most commonly performed procedure for the surgical correction of BOO. Perhaps the greatest advance in the history of transurethral surgery was marked by the development of the rigid lens system of Professor Harold Hopkins. His lenses, illuminated by a fi breoptic light source, permit unparalleled visualisation of the working fi eld. Men with indwelling catheters, those with recent urinary infection, those with chronic retention or those with prosthetic material or heart valves benefi t from prophylactic antibiotics in addition to the standard for clean surgery at induction of anaesthesia. Strips of tissue are cut from the bladder neck down to the level of the verumontanum (Figure 84.12). Cutting is performed by a high-frequency diathermy current, w applied across a loop mounted on the hand-held trigger of the resectoscope. Coagulation of bleeding points can be accu rately achieved. The ‘chips’ of prostate are then removed from the bladder using an Ellik evacuator. Resection proceeds at 1 g/minute in experienced hands. The duration of resection for monopolar TURP is limited to 1 hour due to the risk of r esorption of water if 1% glycine is used as an irrigant. The advent of bipolar TURP where normal saline is used as an irrigant permits resection of larger prostates. Following TURP , careful haemostasis is performed, and a three-way , self-retain ing catheter irrigated with isotonic saline is introduced into the bladder to prevent any further bleeding from forming blood clots. Irrigation is continued until the outfl o w is pale pink, and the catheter is usually removed on the second or third postop erative day . In men with small prostates or bladder neck dys synergia or stenosis, it is better to divide the bladder neck and prostatic urethra with a Collins knife or laser. Laser prostatectomy Laser can be used to ablate or vaporise (e.g. green light laser) or enucleate (e.g. HOLEP) the prostate. Photoselective vaporisa tion of the prostate or green light laser has the advantage that vaporisation is haemostatic and this procedure can be performed even while patients are anticoagulated; howe ver, it is unsuitable for a very large gland. In holmium laser enucleation of the prostate (HOLEP), laser is used to cut all the attachments of Harold Horace Hopkins , 1918–1994, Professor of Applied Optics, University of Reading, Reading, UK, invented the rigid rod endoscope (Hopkins’ rod, 1954) and contributed to the development of the fi bres for fl exible endoscopes. Milo Ellik , 1905–1975, American urologist, developed the Ellik evacuator in 1937. Terence John Millin , 1903–1980, surgeon, Westminster Hospital, London, UK, and honorary surgeon, All Saints’ Hospital for Genitourinary Diseases, London, UK, described the operation of retropubic prostatectomy in 1945. He was regarded as ‘the greatest of Irish urologists’ and ‘the pioneer of the retropubic space’. To facilitate his operation, he devised a self-retaining retractor that goes by his name and the ‘boomerang’ needle to close the prostatic capsule. He used to be invited all over the world to operate on VIPs. He was a former President of the Royal College of

Surgeons in Ireland. He gave up operating at the age of 57 to enjoy his farm in County Wicklow , where he died of laryngeal carcinoma. He played international rugby for Ireland. Frederic Eugene Basil Foley , 1891–1966, urologist, Ancker Hospital, St Paul, MN, USA. the adenoma to the false capsule and simultaneously coagulate any of the small vessels crossing the relatively avascular plane between the peripheral and transitional zones of the prostate while the tip of the cystoscope is used, much like the surgeon’s fi nger in Millin’s prostatectomy , to enucleate the transitional zone adenoma. The enucleated adenoma is pushed into the bladder, where it is morcellated and extracted via the cysto - scope. Damage to the external sphincter is avoided provided hich is the verumontanum is used as a guide to the most distal point of the resection/vaporisation/enucleat ion. -

Figure 84.12 For transurethral resection of the prostate the resectoscope is inserted transurethrally. Electric current is passed through a diathermy loop at the end of the instrument. The surgeon moves this back and forth to create a cavity using diathermy to cauterise as they go. The resultant chips are washed out of the bladder intermittently throughout the procedure. A visual image of the operative /f_i eld is transmitted through lenses running in the middle of the resectoscope. Around this lens, irrigating /f_l uid is instilled and /f_l ows out, washing blood away from the operative /f_i eld. The procedure is complete when an adequate channel has been created through the prostate. is removed Prostate Resectoscope

Multiparametric magnetic resonance imaging

Multiparametric magnetic resonance imaging

mpMRI is an investigation to diagnose an early prostate cancer that might reduce overdiagnosis of insignificant pros - tate cancer. Here dynamic contrast is given and should have four sequences: T1-weighted imaging, T2-weighted imaging, di ff usion-weighted imaging and dynamic contrast-enhanced imaging and spectroscopic imaging. The accuracy of mpMRI in localising and staging prostate cancer shows a high degree of variation between reporting radiologists. Interpretation and reporting of mpMRI must be carried out following stan dardised scoring systems (such as Prostate Imaging Reporting and Data System [PI-RADS] v .2). A score of 3 or above is indicative of malignancy .

Figure 84.16 Transrectal ultrasound scan showing normal seminal vesicles. Figure 84.17 Transrectal ultrasound scan showing local extension of a T3 prostate cancer.

PROSTATIC CALCULI

PROSTATIC CALCULI

Prostatic calculi are of two varieties: endogenous, which are common, and exogenous, which are comparatively rare. An exogenous prostatic calculus is a urinary (commonly ureteric) calculus that becomes arrested in the prostatic urethra. Endogenous prostatic calculi are usually composed of calcium phosphate combined with about 20% organic material.

PROSTATITIS

PROSTATITIS

In both acute and chronic prostatitis, the seminal vesicles and posterior urethra are usually also involved. Aetiology Acute prostatitis is common, but underdiagnosed. The usual organism responsible is Escherichia coli , but Staphylococcus aureus Staphylococcus albus , Streptococcus faecalis , Neisseria gonorrhoeae or Chlamydia may be responsible. The infection may be haematogenous from a distant focus or it may be secondary to acute urinary infection. Clinical features General manifestations overshadow the local: the patient feels ill, shivers, may have a rigor, has ‘aches’ all over, especially in the back, and may easily be diagnosed as having influenza. The temperature may be up to 39°C. Pain on micturition is usual, but not invariable. The urine contains threads in the initial voided sample, which should be cultured. Perineal heaviness, rectal irritation and pain on defecation can occur; a urethral discharge is rare. Frequency occurs when the infection involves the bladder. Rectal examination reveals a tender prostate; one lobe may be swollen more than the other, and the seminal vesi cles may be involved. A frankly fluctuant abscess is uncommon. Treatment Treatment must be rigorous and prolonged or the infection will not be eradicated and recurrent attacks may ensue. Spread of infection to the epididymides and testes may occur. Prolonged treatment with an antibiotic that penetrates the prostate wall is indicated (trimethoprim, ciprofloxacin or aminoglycoside).

Pathology

Pathology

BPH a ff ects both glandular epithelium and connective tissue stroma to variable degrees. BPH typically a ff ects the submucous group of glands in the transitional zone, forming a nodular enlargement. Eventually , this overgrowth compresses the peripheral zone glands into a false capsule and causes the appearance of the typical ‘lateral’ lobes. When BPH a ff ects the central zone glands, a ‘middle’ lobe develops that projects up into the bladder within the internal sphincter (Figure 84.1).

Which investigations are appropriate for benign and • malignant conditions of the prostate Clinical staging of carcinoma of the prostate and how • staging contributes to the complex decision making Right half of bladder Enlargement of lateral lobe of prostate Prostatic urethra Hypertrophy of trigone Enlargement of Posterior lobe

median lobe of of prostate prostate Figure 84.1 Diagram of late-stage bladder out /f_l ow obstruction show

ing enlargement of the prostate from benign prostatic hyperplasia, trabeculation of the bladder with smooth muscle hypertrophy and /f_i brosis.

Pathology

Serial sections of prostates obtained at routine necropsy demonstrate prostate carcinoma in 25% of men between 50 and 65 years of age. The incidence in men over 80 years is in the region of 70%. Most of these neoplasms are tiny and (if life had continued) might have remained latent for years. Most men die with the prostate cancer rather than because of cancer. The following types of prostate cancer occur: /uni25CF microscopic latent cancer found on autopsy or at cysto prostatectomy; /uni25CF tumours found incidentally during TURP (T1a and T1b) or following screening by PSA measurement (T1c); /uni25CF early , localised prostate cancer (T2); /uni25CF locally advanced and high-risk prostate cancer (T3 and T4); /uni25CF metastatic disease, which may arise from a clinically evi dent tumour (T2, T3 or T4) or from an apparently benign gland (T0, T1) (i.e. occult prostate cancer). It should be noted that only the last two groups cause symp toms, and such tumours are not curable. Only screening or the trea tment of incidentally found tumours or early prostate cancer (T1 and T2) can result in cure of the disease. The prob lem is that many suc h tumours would never progress during the patient’s lifetime and only a few will grow and metastasise; herein lies the problem with prostate cancer.

Positron emission tomography scan

Positron emission tomography scan

In prostate cancer gallium-labelled prostate-specific membrane antigen (PSMA) has been increasingly used in positron emission tomography (PET) scans. It is sensitive in detecting lymph node metastasis and may be superior to MRI; however, smaller lymph nodes can be missed on PSMA-PET . If avail able, this test o ff ers an additional and highly sensitive modality for detecting metastasis prior to o ff ering treatment. It also has an increasing role in restaging after treatment r elapse.

Figure 84.20 Bone scan showing multiple hot spots suggestive of metastatic disease in a man with prostate cancer.

Prostate-specific antigen

Prostate-specific antigen

This is discussed earlier in this chapter. It is good at follow ing the course of advanced disease; however, it is lacking in sensitivity and specificity in the diagnosis of early localised prostate cancer. Nevertheless, the finding of a PSA >10 /uni00A0 ng/mL is suggestive of cancer and >35 /uni00A0 ng/mL is almost diagnostic of advanced prostate cancer, in the absence of active urinary tract infection. A decrease in PSA to the normal range following hormonal ablation is a good prognostic sign. Following radical Sir James Paget , 1814–1899, English surgeon and pathologist, best known for his description of Paget’s disease of the bone. levels (the limit for detection for modern supersensitive assays is <0.03 /uni00A0 ng/mL).

Prostatic abscess

Prostatic abscess

In addition to the foregoing symptoms and signs, the advent of a prostatic abscess is heralded by the temperature rising steeply with rigors. Antibiotics disguise these features. Severe, unremitting perineal and rectal pain with occasional tenesmus often cause the condition to be confused with an anorectal abscess. Nevertheless, if a rectal examination is performed, the prostate will be felt to be enlarged, hot, extremely tender and perhaps fluctuant. TRUS or MRI may aid diagnosis. Reten tion of urine is likely to occur and, in such men, suprapubic catheterisation is best. Treatment The abscess should be drained without delay by transurethral resection (unroofing the whole cavity) or using a needle via the transrectal or perineal route. Injectable antibiotics such as aminoglycoside or a third-generation cephalosporin is often required for a week.

Prostatic biopsy

Prostatic biopsy

If there is suspicion of prostate cancer, because of local findings, a raised PSA or metastatic disease, then a prostate biopsy using an automated gun under TRUS guidance is recommended (Figure 84.18). This is usually performed Donald F Gleason , 1920–2008, pathologist, University of Minnesota, Minneapolis, MN, USA, published the Gleason System in 1966. He spent his last 20 years sailing, baking bread and playing bridge. transrectally , although increasingly the transperineal approach is being used. Broad-spectrum antibiotic cover is given to all patients to reduce the incidence of sepsis, which is greater with transrectal than with transperineal biopsy . Transperineal biopsy usually involves sedation or general anaesthetic while transrectal biopsy can be performed under local anaesthetic. Increasingly , areas appearing suspicious for prostate cancer on mpMRI can be targeted for biopsy to increase the diagnostic yield. Nowadays, fusion biopsy is becoming popular; this is where mpMRI and TRUS images are fused with the help of software and a biopsy is taken very accurately from the index lesion.

Transperineal Anterior needle Prostate Posterior Transrectal needle Rectum Figure 84.18 The prostate is commonly biopsied by two routes. The biopsy needle can be inserted through the skin between the scrotum and anus (perineum) or through the rectum.

In both cases the passage of the needle is usually guided to the correct place with transrectal ultrasound. Transrectal ultrasound is not good for sampling the anterior prostate, particularly when the prostate is large. Transperineal biopsy is gaining popularity as an alternative to conventional tran

srectal biopsy.

Prostatodynia

Prostatodynia

This diagnosis is made by the presence of perigenital pain in the absence of any objective evidence of prostatic inflam - mation. Whether the syndrome has any relationship with the prostate is unclear. The syndrome is part of the chronic pelvic pain syndrome spectrum and often has psychological and stress components.

Radiological examination

Radiological examination

Radiographs of the chest may reveal metastases in either the lung fields or the ribs. An abdominal radiograph may show the characteristic sclerotic metastases in lumbar vertebrae and pelvic bones (Figure 84.19). The bone appears dense and coarse, and it is sometimes di ffi cult to distinguish the change from that in Paget’s disease of bone. Nevertheless, osteolytic metastases are very common in prostate cancer and may coexist with sclerotic ones.

Rectal examination

Rectal examination

Rectal examination can detect nodules within the prostate and advanced disease. Irregular induration, characteristically stony hard in part or in the whole of the gland (with obliteration of the median sulcus), suggests carcinoma. Extension beyond the capsule up into the bladder base and vesicles (Figure 84.16) is diagnostic, as is local extension through the capsule (Figure 84.17).

Screening for prostate cancer

Screening for prostate cancer

Prostate cancer screening with PSA is controversial and the test does not fulfil the World Health Organization’s (WHO) criteria for an adequate screening programme. Screening trials are limited by contamination of patients who have already had prior PSA tests, and most include mainly white men. Most screening trials do not include high-risk groups of men (family history of prostate cancer, Africans) and screening can lead to overdiagnosis of insignificant disease. The four largest randomised trials include in total around 700 /uni00A0 000 patients; they have shown that screening did not improve overall mortality , but there is a small improvement in prostate cancer-specific mortality . However, screening increased prostate cancer cations from prostate biopsies and can lead to overdiagnosis. Summary box 84.5 Screening for prostate cancer Local spread Locally advanced tumours tend to grow upwards to involve the seminal vesicles, the bladder neck and trigone and, later, the tumours tend to spread distally to involve the distal sphincter mechanism. Further upward extension obstructs the lower end of one or both ureters, with obstruction of both resulting in anuria. The rectum may become stenosed by tumour infiltrat - ing around it, but direct involvement is rare. Spread by the bloodstream Spread by the bloodstream occurs particularly to bone; indeed, the prostate is the most common site of origin for - skeletal metastases, followed in turn by the breast, the kidney , the bronchus and the thyroid gland. The bones involved most frequently by carcinoma of the prostate are the pelvic bones and the lower lumbar vertebrae. The femoral head, ribcage and skull are other common sites. Lymphatic spread - Lymphatic spread may occur via (i) lymphatic vessels passing to the obturator fossa or along the sides of the rectum to the lymph nodes beside the internal iliac vein and in the hollow of - the sacrum and (ii) lymphatics that pass over the seminal vesicles and follow the vas deferens for a short distance to drain into the external iliac lymph nodes. From retroperitoneal lymph nodes, - the mediastinal nodes and occasionally the supraclavicular nodes may become implicated.

The results of several large-scale randomised clinical trials evaluating the role of PSA screening for prostate cancer suggest that, at present, screening the entire population with serum PSA is not cost-effective as a large number of men must be screened, biopsied and treated in order to prevent each death from prostate cancer

Serum prostate-specific antigen

Serum prostate-specific antigen

After suitable counselling, measurement of serum PSA may be helpful. Men in whom a diagnosis of early prostate cancer might influence treatment option (such as those under 70 years or those with a positive family history who might be o ff ered radical treatment) should be o ff ered a PSA measurement. If the PSA range is 4–10 /uni00A0 ng/L, a free-to-total PSA ratio of less than 15% should be suspicious of malignancy . Multiparametric magnetic resonance imaging (mpMRI) should be done, which may show a suspicious index lesion. In this situation, transrectal ultrasound (TRUS)-guided or transperineal biopsies should be considered.

Staging using the tumour–node– metastasis (TNM) sy

Staging using the tumour–node– metastasis (TNM) system

The TNM staging system for prostate cancer is shown in Figure 84.14 . /uni25CF T1a , T1b and T1c . These are incidentally found tumours in a clinically benign gland after histologi - cal examination of a prostatectomy specimen. T1a is a tumour involving less than 5% of the resected specimen; these tumours are usually well or moderately well di ff er - entiated. T1b is a tumour involving >5% of the resected specimen. T1c tumours are impalpable tumour s found fol - lowing investigation of a raised PSA. /uni25CF T2a disease presents as a suspicious nodule (Figure 84.15) on rectal examination that is confined within the prostate capsule and involves one lobe. /uni25CF T2b means that the cancer is in more than half of one side of the prostate gland, but not both sides. /uni25CF T2c means that the cancer is in both sides but is still inside the prostate gland. /uni25CF T3 tumour extends through the capsule: /uni25CF T3a, uni- or bilateral extension; /uni25CF T3b, seminal vesical extension. /uni25CF T4 is a tumour that is fixed or invading adjacent structures other than seminal vesicles – levator muscles, external sphincter, rectum or pelvic side wall. Summary box 84.6 The natural history of prostate cancer /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF

T0 T1 T2b T2a T2c T4 T3 Figure 84.14 Tumour–node–metastasis staging system for prostate cancer. This depends on the stage and grade of disease: T1 and T2 The progression rate of well-differentiated T1a prostate cancer is very low: 10–14% after 8 years. For moderately differentiated tumours, the rate is about 20%. For T1b and T2 tumours, the rate is in excess of 35% T3 and T4 (M0) About 50% progress to bony metastases after 3–5 years M1 The median survival of men with metastatic disease is about 3 years

Summary of treatment for carcinoma of the prostate

Summary of treatment for carcinoma of the prostate

/uni25CF Low-risk disease . For men in their seventies, conser - vative treatment would usually be the correct approach. Radical surgical treatment might be considered in younger (<70 years) men with this form of the disease and/or with a family history , although, even in this group, some men will elect to pursue a conservative course (active surveillance) when counselled about risks versus benefits (impotence/ incontinence). /uni25CF Intermediate-risk disease . In younger (<70 years), fitter men, this may be treated by radical prostatectomy or radical radiotherapy . Active monitoring remains an option, particularly for more elderly patients towards the - lower end of the risk spectrum. In elderly patients with outflow obstruction, transurethral resection with or with - out hormone therapy is indicated. The benefit of radi - cal treatment over a conservative approach is likely to be about 25%, given that progression to metastatic disease is of this order of magnitude after 10 years. /uni25CF High-risk disease . These patients are at significant risk of disease progression. They need multimodal therapy . Early androgen ablation is favoured if close follow-up is not possible. For the sexually active, a careful conservative approach with the adoption of androgen ablation when symptoms arise is reasonable. Androgen ablation coupled - with radiotherapy , perhaps with surgery (radical prostatec - tomy plus salvage radiotherapy) as part of a multimodal approach, is standard treatment for younger men with T3 disease. /uni25CF Metastatic disease . Once metastases have developed, - the outlook is poor. For patients with symptoms, there is no dilemma; androgen ablation will provide symptomatic relief in over two-thirds of patients. For patients with - asymptomatic metastases, the timing of treatment is less clear. Systemic chemotherapy with docetaxel should be considered in younger, fitter men.

The nervous system

The nervous system

The nervous system is examined to eliminate a neurological lesion. Diabetes mellitus, tabes dorsalis, disseminated sclerosis, cervical spondylosis, Parkinson’s disease and other neuro logical states may mimic prostatic obstruction. If these are suspected, then a pressure–flow urodynamic study should be carried out to diagnose BOO. Examination of perianal sensa tion and anal tone is useful in detection of an S2–4 cauda equina lesion.

Treatment of prostatic calculi

Treatment of prostatic calculi

Prostatic calculi usually require no treatment. Conservative measures Associated chronic prostatic infection may be treated by means of ciprofloxacin or trimethoprim. Transurethral resection Transurethral resection will often release small calculi as the strips of prostatic tissue are excised. Others are passed through the urethra at a later date. Any associated benign prostatic enlargement is treated in the same sitting with TURP .

Treatment

Treatment

The management of these patients depends on achieving an accurate diagnosis. For this, urodynamic investigation is often necessary , which should demonstrate raised voiding pressures and diminished flow rate. Drugs The presence of α -adrenergic receptors in the region of the bladder neck and prostatic urethra allows pharmacological manipulation of the outflow to the bladder. α -blocking drugs Alfuzosin (10 /uni00A0 mg once daily), tamsulosin (0.4 /uni00A0 mg once daily), doxazosin (1 /uni00A0 mg at night, up to a maximum of 8 /uni00A0 mg/day), indoramin (20 /uni00A0 mg twice daily , increased to a total maximum of 100 /uni00A0 mg/day in divided doses), prazosin (2.5 /uni00A0 mg twice daily , maintenance up to 2 /uni00A0 mg/day) terazosin (1 /uni00A0 mg at night, to a total maximum of 10 /uni00A0 mg/day) and Silodosin (4 to 8 /uni00A0 mg once a day) can be very useful, causing relaxation of the bladder neck. These drugs are not target specific, and patients must be warned of the possibility of postural hypotension, which is usually limited to the first few doses. Transurethral incision Transurethral incision of the bladder neck is the operation of choice. Sometimes symptoms recur, but this is usually due to inadequate division of the fibres of the bladder neck. Congenital valves of the prostatic urethra See Chapter 85 . Treatment

Patients are counselled on their treatment options based on an estimated risk of a localised cancer spreading and causing death. The patient’s life expectancy and comorbidities should be taken into consideration. The strongest risk factors for metastasis are PSA level, Gleason grade and clinical stage. Tables and nomograms are available using these three param eters to predict lymph node involvement and risk of metastasis. Early disease Curative treatment can only be o ff ered to patients with early disease. Low-risk prostate cancer (low PSA, small foci of Glea son 6 disease) can be managed by active surveillance. Here, with 3-to 6-monthly digital rectal examination (DRE) and PSA measurement, mpMRI yearly or 2-yearly and repeated pros tate biopsy , a proportion can safely avoid the toxicity of radical treatment. However, one-third of patients embarking on this approach will require radical treatment within a few years. The options available for T1, T2 or some T3 disease need to take into account the patient’s age, performance status and lifestyle preferences. The treatment of patients with advanced disease (T4 or any nodal or distant metastases) is only palliative. Treatment and stage /uni25CF /uni25CF /uni25CF /uni25CF

Treatment options for prostate cancer depend on stage of disease, life expectancy of the patient and patient preference PSA, DRE and biopsy Gleason grade are used to predict pathological stage Localised cancers can be treated by radical prostatectomy, radiation therapy and active monitoring (surveillance) Treatment of advanced disease is palliative, and hormone ablation remains the /f_i rst-line therapy; once it starts failing, chemotherapy is used with short-term success

Upper tract imaging

Upper tract imaging

Most urologists no longer carry out imaging of the upper tract in men with straightforward symptoms. Obviously , if infection or haematuria is present, then the upper tract should be imaged by means of intravenous urogram/CT urography or ultrasound scan.

# of chronic retention

of chronic retention

Men with chronic retention who have relatively low volumes of residual urine and who do not have symptoms suggestive - of coexisting infection and with good renal function do not necessarily require catheterisation before proceeding to pros - tatectomy on the next available list. For those who are uraemic, urgent catheterisation is mandatory to allow renal function to recover and stabilise. Haematuria often occurs following : catheterisation o wing to collapse of the distended bladder and - upper tract, but settles within a couple of days. Uraemic patients with chronic retention are often dehy - drated at the time of admission. Owing to the chronic back pressure on the distal tubules within the kidney , there is loss of the ability to reabsorb salts and water. The result, following release of this pressur e, may be an enormous outflow of salts - and water, which is known as postobstructive diuresis. It is for this reason that a careful fluid chart, daily measurements of the patient’s weight and serial estimations of creatinine and elec - trolytes are essential. Intravenous fluid replacement is required if the patient is unable to keep up with this fluid loss. These pa tients are often anaemic and may require a blood transfusion once fluid balance is stabilised (if haemoglobin is <9 /uni00A0 g/L).