11.2 Poor urine flow

Teuvo Tammela

Aetiology

- Men above 60 years of age usually have an enlarged prostate (hyperplasia (11.12) or carcinoma (11.13)).
- Anatomical or functional urethral stricture
- Detrusor sphincter dyssynergia in a neurogenic bladder associated with, for example, spinal cord disease or injury.
- Poorly contracting detrusor muscle
- In women, prolapse of the uterus or urethral mucous membrane

Investigations

- Digital rectal examination (DRE) of the prostate.
- Palpation and percussion of the bladder to detect retention (11.3).
- Measurement of residual urine volume: ultrasonography (42.4) (or single catheterization) after voiding.
- Difficulties with catheterization may suggest urethral stricture.
- Serum prostatic antigen (PSA) in men (11.12)
- Symptom questionnaire.
- In hospital, urine flow measurement is the primary investigation.

11.3 Urinary retention

Teuvo Tammela

Basic rules

- Acute symptomatic urinary retention must be treated immediately at the first encounter (at the clinic).
- Considerable retention (above 1000 ml) should be treated by cystostomy, indwelling catheter, or repeated catheterization.
- Consider the patient's medication as a potential cause of retention (anticholinergic and sympathomimetic drugs!).

Symptoms and signs

- Lower abdominal pain (often absent in slowly developing retention)
- Overflow incontinence or increased urinary frequency
- Enlarged palpable bladder
- Enlarged bladder by percussion (often a more sensitive examination than palpation)

Aetiology

- Benign prostatic hyperplasia (BPH) (age, DRE)
- Postoperative retention
- Urethral stricture
- Urethral mucosal prolapse or uterine prolapse in women
- Neurogenic causes (spinal cord injury, intervertebral disc herniation, multiple sclerosis, diabetes, neuropathy caused by alcohol or toxic substances)
- Functional causes (pain, tension, exposure to cold)
- Drugs (sympathomimetics, anticholinergic drugs, tricyclic antidepressants)

Treatment

- Before commencing treatment, ultrasonography should be performed first to assess the volume of retention if it is not definitely large and the examination can be performed without delay (42.4).
- Perform **single catheterization** if
  - the retention is not large
  - in postoperative retention more than 6 hours have elapsed since last voiding and the patient is unable to void despite encouragement and analgesics.
- **Suprapubic cystostomy** (11.32) is recommended as the first procedure if
  - the retention is large (above 1000 ml according to ultrasonography or the bladder reaches the navel)
  - the patient has a complicated urethral stricture
  - a large prostate has caused difficulties in catheterization earlier.
- The cystostomy catheter can be removed when voiding is repeatedly successful and the residual urine is less than 200 ml.
- A large retention without anatomical catheterization problems can be treated with an **indwelling silicone catheter** (11.31). Aim at removing the catheter within 3 days.

- The whole volume can be emptied at one time. In the final phase of emptying, the urine may be bloody because of small tears on the bladder mucosa caused by over-distension.
- **Medical treatment**
  - In postoperative retention a short course of alpha-blockers or the cholinergic drug like carbachol, 2 mg × 3, is useful.
  - For retention caused by BPH use alpha-blockers (tamsulosin hydrochloride or alfuzosin) (11.12). The treatment requires careful follow-up of symptoms and residual urine volume.
- For indications for surgical treatment see 11.12.

Further investigations

- In most cases of BPH-related retention the episode is the first occurrence of retention and therefore warrants follow-up.
- A cleanly voided urine specimen should be taken from all patients.
- No other investigations are necessary if the patient had his first retention and there is a predisposing factor, e.g. alcohol, exposure to cold, postoperative state, or bed rest associated with an acute illness.
- Retention without an evident cause and recurrent retention are indications for the following laboratory examinations: serum creatinine, blood glucose, and, in men, serum prostate-specific antigen (PSA). If an increase of serum creatinine concentration during retention was due to obstruction it normalizes rapidly. Note! Retention and catheterization raise PSA, and a value obtained at this point is not reliable. If the value is elevated, it should be controlled after 3–4 weeks.
- Specialist consultation is indicated in recurrent urinary retention.

11.4 Urinary incontinence in women

Juha Mäkinen

Basic rule

- Differentiate between the two main types of incontinence: stress incontinence and urge incontinence.

Types of incontinence

- Loss of urine on exertion (**stress incontinence**) is the problem in 3/4 of adult incontinent patients.
- **Urge incontinence** is due to bladder dysfunction where the need to void is so sudden that loss of urine occurs before the patient makes it to the toilet. It occurs typically in elderly women after the menopause, but also in young women.
- A combination of the two types is called **mixed incontinence**.
- Other types such as overflow, occurs after surgery, reflux incontinence rarely occur in women.
- In institutionalized patients, incontinence often is caused by cerebral ischaemia or dementia.

Epidemiology

- The prevalence in adult women (of 25 to 55 years of age) is about 20%. Every second patient conceals her problem.
  - The prevalence is 15% in women of 35, and 28% in women of 55.
- After retirement, about 50% of both men and women suffer from urinary incontinence.

Aetiology

- In **stress incontinence** the pelvic floor may be weakened because of excessive body weight (>20% overweight), pregnancy, deliveries, and heavy work. Stress incontinence may also be caused by connective tissue weakness, asthma, or muscle-relaxant drug such as prazozine.
- **Urge incontinence** is a consequence of chronic bladder irritation. It can be related to
  - sequelae of urinary tract infections
  - past surgery for incontinence
  - oestrogen deficiency after menopause
  - diabetes or multiple sclerosis
  - use of medicines, such as neuroleptics and diuretics.

Investigations

- Exclude urinary tract infection by urine culture.
- A questionnaire differentiates fairly well between stress incontinence and urge incontinence.
- Exclude tumours by examination (and endoscopy if required).

Indications for specialized investigations (ultrasonography, radiography, urodynamics)

- Annoying symptoms, especially if dominated by urge incontinence.
- Recurrence of symptoms after surgery.

Conservative treatment

- Postmenopausal women with minimal symptoms should try local oestrogen therapy (a vaginal suppository or tablet once or twice a week) B [1 2 3 4]. Local estrogen is more effective than systemic oestrogen for either type of incontinence.
- Patients with mild stress incontinence
  - Weight reduction
  - Exercises for strengthening the muscles of pelvic floor A [5 6 7]
- Patients with mild urge incontinence
  - Bladder schooling (normalizing the micturition interval) B [8 9 10]
  - Anticholinergic medication A [11] has been used
    1. The starting dose of oxybutynin is small (2.5–3 mg), the dose should be raised individually to the maximum of 5 mg × 3/day. The new slow release tablet (10 mg) taken once daily causes less side effects.
    2. Tolterodine is as effective as oxybutynin in urge incontinence, but may have fewer anticholinergic side effects (dryness of the mouth and visual disturbances). The dose is 2 mg × 2 from the start.
  - Trospium chloride is the newest drug for urge incontinence. The dose is 20 mg × 1–2/day. The effect is at least equal to the other drugs but it may have even fewer side effects.
- Electrical stimulation is worth trying in both types of incontinence (in stress incontinence the muscles of the pelvic floor are stimulated, in urge incontinence the overactivity of bladder muscles is decreased) D [12 13].
- A questionnaire assessing the seriousness of the problem helps in determining the urgency of investigations and treatment.

Surgical therapy

- Stress incontinence may be treated surgically according to the judgment of an urogynaecologist.
  - Burch colposuspension was the Golden standard up to the end of 1990s. It can also be performed endoscopically quite easily either using a mesh or stitches.
  - The most frequently used method nowadays is TVT, which is rather simple and can even be performed under local anaesthesia. The results are at least as good as with the Burch method.
- In urge incontinence, surgery usually is not effective but in resistant and difficult cases. In extreme cases an operation aimed at enlarging the bladder may be indicated by a specialist.
- The treatment for mixed incontinence is selected according to the dominant type of incontinence.

Aids

- Aids: bandages, diapers, urinals, and plastic bed sheets prevent leaking. Vaginal bullets and cones A [14] and vaginal tampons help to find the muscles in pelvic floor muscle training and prevent incontinence in short-lasting physical strain. A specialized nurse is responsible for supplying the aids and educating the patient.

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11.5 Haematuria

Erna Pettersson

Aims

- Exclude urinary tract infection and blood contamination (menstruation, sexual trauma, etc.).
- Further investigations should be carried out in all patients with confirmed haematuria that is not explained by the above causes C [1 2].

Macroscopic haematuria

- Less than 0.5 ml of blood in 500 ml of urine causes macroscopic haematuria. Depending on the urine pH the colour of urine may vary from bright red to almost black. Usually the patient is correct when he/she has noticed the urine to be "bloody".
- Red coloured urine may also be caused by
  - certain foods (beetroot)
  - medication (nitrofurantoin, rifampicin)
  - acute porphyria.

Microscopic haematuria

- More than three erythrocytes/high power field in sediment analysis.
- More than five erythrocytes/0.9 mm^3 in counting chamber.

Investigations of patients with haematuria

- It should be noted that there is not necessarily a correlation between the degree of haematuria and the severity of the underlying disease. Thus, scant haematuria should be investigated as thoroughly as more significant haematuria.
- If a dipstick test is positive for blood, the finding must be confirmed with a fresh urine sample after a couple of days. The urine must also be examined microscopically. Confirmed haematuria is always an indication for further investigations.
- Exclude urinary tract infection and contamination
- All patients
  - Thorough clinical investigation
  - Urinanalysis: proteinuria, erythrocyte morphology, casts, leucocytes
    1 If the erythrocyte morphology (acanthocytes, casts) in microscopic haematuria is suggestive of glomerular aetiology, and the patient has no proteinuria or renal impairment (creatinine normal), no further investigations are needed. However, the patient should be monitored with occasional checks (first follow-up at 6 months and annually thereafter) for the possible development of proteinuria or renal impairment.
  - Blood tests (see below)
  - Ultrasound examination of the kidneys and urinary tract
    1 All patients if glomerular haematuria has not been verified with urinalysis or blood tests.
  - Cytology (daytime sample) for patients over 40 years of age.
- Cystoscopy
  - In patients over 50 years of age; in younger patients only if haematuria has been macroscopic or the patient has risk factors for bladder cancer (smoking, occupational exposure, history of cyclophosphamide treatment).
  - Suspicious cells in cytology
  - Increased serum prostate specific antigen (PSA)
  - Ultrasound examination suggestive of bladder pathology
- Other investigations for selected patients
  - Computed tomography (investigation of choice for suspected urinary calculi or tumour of the upper urinary tract)
  - Urography
  - Angiography
  - Pyelography
  - Renal biopsy

Medical history

- In what circumstances was haematuria noted (fever, physical activity etc.)?
- Are there any other symptoms or signs (increased urinary frequency, dysuria, lower abdominal or flank pain)?
- Is haematuria seen at the initiation of, throughout or at the end of voiding? Blood at the initiation suggests a urethral pathology, continuous haematuria a renal or ureteral problem and blood at the end a bladder pathology.
- Are there any hereditary diseases or a tendency for urinary calculus formation?
- Travel abroad (exclude infectious diseases, such as schistosomiasis, malaria etc.)
- Medication: use of nonsteroidal anti-inflammatory drugs (NSAIDs) or treatment with cytotoxic agents (cyclophosphamide)? These drugs may cause interstitial nephritis (NSAIDs), interstitial cystitis or uroepithelial cancer (cytotoxic agents).

Clinical investigation

- Look for petechiae, bruising or enlarged lymph nodes.
- Check blood pressure.

- Abdominal palpation (the size and contour of the liver, spleen, kidneys).
- Palpation of the prostate via the rectum.
- Laboratory tests should include coagulation analysis, tests for prostatic disease, IgA nephropathy and tests for systemic disease and renal function (blood counts, ESR, CRP, creatinine, PSA, possibly IgA).

Urinalysis

- Dipstick tests for blood are sensitive and reliable. False-positive results may be seen in
  - haemoglobinuria
  - myoglobinuria.
- Reducing agents such as ascorbic acid or gentisic acid (a metabolite of acetyl salicylic acid) reduce and even inhibit the staining reaction.
- A positive dipstick test must be confirmed by analysing the urine sediment.
  - A semiquantitative sediment analysis or quantitative counting chamber may be used. The semiquantitative sediment analysis is reliable in validated conditions.
  - The analysis is carried out on a fresh urine sample, voided before ingesting any fluid (an early morning sample). After the urine is centrifuged the sediment is analysed under a microscope using a 400x magnification.
  - The analysis offers much more information if the sediment is stained or analysed under a phase-contrast microscope. These methods enable observation on the shape of the erythrocytes, which in turn helps to localise the source of bleeding. Symmetric, and smooth erythrocytes of equal size usually originate from the glomerulus.
- Culturing midstream urine and analysing urine sediment may not only confirm haematuria, but reveal an infection or the presence of leucocytes, casts or abnormal cells. Abnormal cells are suggestive of a urinary tract malignancy. However, urinary cytology must always be included in the investigations.
- Sterile pyuria is typical not only of genitourinary tuberculosis, but is also seen in association with calculi and tumours. Concurrent proteinuria is usually suggestive of a renal parenchymal disease.
- Cellular, granular, fatty or waxy casts in the sediment analysis are suggestive of a renal parenchymal disease.

Subsequent investigations

- Ultrasound of the kidneys and, if necessary, urography.
- Cytology of the urine
- Cystoscopy
- The importance of these investigations depends partly on the age of the patient. In children urography must be done only after careful consideration and cystoscopy is seldom necessary.
- Ultrasound investigation of the kidneys is safe and, particularly in pregnancy, the only recommended investigation. Sometimes additional investigations are needed, such as urography with tomography studies, computed tomography, angiography and antegrade or retrograde pyelography.
- Urinary cytology: a random daytime sample is better than an early morning sample, but bladder wash cytology is the best. Generally three separate samples should be analysed for the highest diagnostic yield. Up to 80–90% of transitional cell bladder carcinomas may be diagnosed with urinary cytology.
- If the patient also has pyuria the urine should be cultured for tuberculosis.
- Cystoscopy is performed at the outpatient clinic under local anaesthesia.

Additional investigations and follow-up

- Possible additional investigations depend on the primary findings. The more investigations carried out the more likely it is that the underlying cause will be found. Urological investigations will reveal a cause in up to 80% of the cases.
- A renal biopsy will reveal a renal parenchymal disease. Renal biopsy should be considered particularly if the patient has simultaneous proteinuria, pathological casts or dysmorphic erythrocytes suggestive of a glomerular haematuria. With this approach the patient may be saved from unnecessary antibiotic therapies, repeated radiographic investigations or cystoscopies.
- Some causes of haematuria are listed in Table 11.5 according to severity (serious causes indicate findings that necessitate major surgical intervention or threaten the life of the patient).
- Haematuria in a young patient is usually caused by urinary tract infection, calculi or parenchymal renal disease, particularly IgA nephropathy, whereas malignancy must be considered in patients over the age of 40 years. Therefore, haematuria must always be taken seriously.
- The cause of haematuria is not always revealed despite meticulous investigations. It may be necessary to follow up these patients, for example once a year, with a check-up of blood pressure and routine blood tests and urinalyses.

Table 11.5 Causes of haematuria according to severity

Serious	Moderate	Minor
♦ Renal carcinoma ♦ Uroepithelial cancer ♦ Ureteral stones ♦ Prostate cancer ♦ Hydronephrosis ♦ Tuberculosis ♦ Polycystic kidney disease ♦ Parenchymal renal disease	♦ Kidney stones ♦ Urinary tract infection ♦ Interstitial cystitis ♦ Bladder stones	♦ Asymptomatic prostatic hyperplasia

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11.6 Urinary bladder tamponade (blood clots in the bladder)

Teuvo Tammela

First aid

- Infuse physiological saline to ensure adequate circulating blood volume.
- Perform catheterization with an open-ended Ch 16–20 catheter; preferably a PVC catheter (which does not collapse with suction). The bladder should be flushed repeatedly with isotonic saline to remove clots. If a three-way catheter is available, start continuous lavage and refer the patient to hospital, preferably to a urological ward.
- Bleeding after transurethral resection of the prostate may stop with gentle pulling of a catheter balloon filled with 50–80 ml of saline. It is important to **hold the penis in an upward direction** to avoid urethral trauma.
- Tranexamic acid (1 g × 3) may be of benefit.
- The patient must usually be hospitalized (the bleeding may continue)
- During transportation the catheter should be in place in the bladder.

11.7 Haematospermia

Editors

Aetiology

- Usually no cause is found.
- Urethral trauma, e.g. in association with sexual activity.
- Prostatovesiculitis.
- A tumour is a rare cause of haematospermia.

Investigations

- A urine test with microscopy should always be performed to detect haematuria. For investigations into haematuria see article 11.5.
- Palpation of the prostate (touch per rectum) to detect a tumour.
- Repeated haematospermia is an indication for further investigations (serum prostate-specific antigen, cystoscopy), particularly in men above 50 years of age.

Treatment

- The symptoms usually need no other treatment than reassuring the patient.

11.10 Acute prostatitis

Teuvo Tammela

Symptoms

- Increased urinary frequency, burning sensation in lower abdomen = symptoms of urinary tract infection.
- Voiding difficulties, painful voiding.
- The patient often has fever and feels ill.

Differential diagnosis

- Sexually transmitted diseases (chlamydia, gonorrhoea)
  - Take samples for culture or PCR test.
- Chronic bacterial prostatitis (11.11).

Clinical and laboratory findings

- Tenderness in the lower abdomen.
- Very tender prostate on palpation.
- A large amount of leucocytes, mucus and bacteria in the urine specimen = findings consistent with UTI.

Treatment

- Peroral fluoro-quinolone or trimethoprim-sulpha-methoxazole in normal (UTI) doses is usually sufficient. Of the

fluoro-quinolones, ciprofloxacin and norfloxacin yield the highest concentrations. The duration of treatment is at least 4 weeks.
- If the patient has fever and severe symptoms the initial treatment should consist of intravenous cefuroxime in a hospital for one week, followed by oral medication for 3 weeks.
- Massage of the prostate is **contraindicated**.
- Suprapubic cystostomy may occasionally be necessary to secure the emptying of the bladder no catheterisation.

11.11 Chronic prostatitis

Teuvo Tammela

- See also Spastic pelvis syndrome 8.10

Basic rules

- Inform the patient thoroughly.
- Avoid unnecessary antibiotics.
- In frequently recurring prostatitis search for bacterial aetiology by fractionated urine sampling.

Aetiology

- Usually (in 70% of the cases) the patient has sterile prostatodynia. The condition tends to recur several times a year.
- The disease may be caused by bacteria residing in the prostatic ducts.

Symptoms

- The symptoms are similar to those of acute prostatitis but milder and recurring
  - Increased urinary frequency
  - Voiding difficulties and pain
  - Burning sensation in the lower abdomen, scrotum, perineum, glans, or inner thighs.
- Feeling of incomplete emptying of the bladder
- Feeling of pressure in the perineum, anus or anterior to the anus
- Sitting may cause difficulty, or the patient feels as if he were sitting on a pillow
- Bloody semen, painful ejaculation
- Decreased libido, erectile dysfunction

Clinical and laboratory findings

- Tenderness of the prostate. However, lack of tenderness does not exclude chronic prostatitis
- Normal urine test results

Fractionated urine sampling

- Should be performed only if frequently occurring acute symptoms result in repeated courses of antibiotics.
  - Sample of initial stream urine
  - Prostate massage
  - A sample of urine voided after massage of the prostate, which is examined under microscope and cultured.
- If the sample taken after massage contains bacteria and more than 10 leucocytes/field, and the first samples is clean or shows a much smaller number of bacteria, the findings suggest chronic bacterial prostatitis.
- A sample for chlamydia should be taken if there is pyuria without bacterial growth.

Treatment

- Warm clothing
- Warm sitz baths C [1]
- NSAIDs
- alpha-blockers
- 5-alpha-reductase inhibitors
- Massage of the prostate sometimes alleviates the symptoms
- Continuity of the doctor–patient relationship; reassurance of the benign nature of the condition and treatment of eventual depression
- Antibiotics are not indicated for prostatodynia
- Take a fractionated urine sample in frequently recurring cases. If bacteria are detected, treat with a 1–2-month course of fluoroquinolones (starting with e.g. norfloxacin 400 mg × 2, lowering the dose later on) or trimethoprim-sulfamethoxazole.
- If the patient has pyuria without bacterial growth try the same regimen as above; however, if this is not beneficial, do not give repeated courses of antibiotics.

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11.12 Benign prostatic hyperplasia

Teuvo Tammela

Aims

- The diagnosis of benign prostatic hyperplasia is based on symptoms and basic investigations. Other causes of voiding disturbances (prostate cancer in particular) are excluded.
- Conditions requiring surgical management are recognized.
- Follow-up alone or drug therapy are good options in patients with relatively mild symptoms and no complications of urinary tract stricture.

Symptoms

- Storage symptoms
  - Extraordinary voiding frequency
  - Nocturia
  - Urinary urgency
  - Urge incontinence
- Voiding symptoms
  - Difficulty in the initiation of voiding
  - Poor urine flow
  - Need to strain while voiding
  - Discontinued voiding
  - Feeling of inadequate bladder emptying
  - Urinary retention

Primary investigations

- Symptom questionnaire
  - A commonly used questionnaire is IPSS
  - The questionnaire is useful in the assessment of severity symptoms when decisions are made between follow-up, drug treatment and surgery.
- Writing down details associated with voiding
- DRE (digital rectal examination)
- Urinalysis
- Serum creatinine
- Serum prostate-specific antigen (PSA)
- Residual urine volume is determined by ultrasonography (42.4) (or if ultrasonography is not available by catheterization). Ultrasonography is useful in the determination of prostatic size (calculated with the same equation as residual urine volume (42.4)), shape, and eventual hydronephrosis.
- Differential diagnosis, see Table 11.12.

Table 11.12 Differential diagnosis on benign prostatic hyperplasia

Condition or disease	History or finding
Prostate cancer	Finding in DRE, elevated serum PSA concentration
Urinary bladder cancer	Haematuria, abnormal cytological finding
Bladder calculi	Haematuria, ultrasonography finding
Urethral stricture	Box-shaped flow curve
Stricture of the bladder neck	Earlier invasive treatment
Bladder neck dyssynergia	Small prostate gland, disturbing symptoms associated with voiding
Prostatitis	Tender prostate gland
Overactive bladder	Urgency with possible urge incontinence

Indications for specialist consultation

Indications for diagnostic investigations by the urologist

- The patient is below 50 years of age.
- DRE is suspicious (nodules)
- Serum PSA is above 10 mg/ml (above 3 mg/ml in patients below 65 years of age)
  - If the serum total PSA concentration is in the range of 3–10 mg/ml, measuring free/total PSA ratio is recommended. If this value is under 0.15, the probability of prostatic cancer is increased and a urologist should be consulted.
  - DRE before determination of serum PSA level does not influence the result.
- Rapidly developing symptoms
- Haematuria (cystoscopy)
- Diabetics who may have neuropathy
- History of pelvic surgery or irradiation
- Neurological disease or injury affecting the function of the urinary bladder
- Necessary medication affecting the function of the urinary bladder
- Lower abdominal pain as the main symptom
- Discrepancy between symptoms and findings
- The investigations performed by the urologist usually include:
  - urine flow measurement
  - transrectal ultrasonography,
- and if necessary also
  - cystometry and pressure-flow examination (recommended before deciding on surgery if the peak flow is >10 ml/s and also when there is a discrepancy between symptoms and findings or the patient has undergone surgery of the lower urinary tract)
  - urethrocystography

- urography
- prostatic biopsies
- cystoscopy.

Surgical treatment is indicated in the following cases:

- Urinary retention, overflow incontinence or repeatedly more than 300 ml of residual urine
- Severe symptoms
- Dilatation of the upper urinary tract
- Impairment of renal function
- Recurrent macroscopichaematuria
- Urinary tract infections
- Bladder calculi
- Severe or moderate symptoms in a patient who wants rapid relief or if satisfactory results have not been obtained with other treatments.

Conservative treatment

Follow-up

- As the symptoms of BPH vary greatly and the course of the disease in an individual cannot be fully predicted, follow-up is a suitable approach in patients with mild symptoms. Also in moderate symptoms, follow-up can be the initial approach if the symptoms do not essentially affect the quality of life and complications have not developed.
- Follow-up includes explaining to the patient the nature of the disease and carrying out basic investigations annually or when symptoms have changed. Opportunistic follow-up during other encounters in primary care is one method of screening.

Drug treatment

- Although the effectiveness of drug treatment is not as good as that of surgery it is often sufficient for reducing or alleviating the symptoms.
- When deciding on the treatment, cost-effectiveness should also be evaluated, i.e. when would invasive therapy, which usually gives complete cure, cost less and be more convenient for the patient than drug therapy continuing for years (for example, to avoid one invasive treatment, 20 men have to be treated with finasteride for 4 years). Transurethral resection is more cost-effective than drug treatment.
- Patients on drug treatment should be followed up regularly at 6–12-month intervals to detect complications resulting from urethral obstruction.
- The size of the prostate and total serum PSA determine the selection of the therapy C [1 2]. If the prostate is not markedly enlarged on palpation or in ultrasonography (<40 g) and PSA is <1.5 mg/ml the first choice is an alpha$_1$-blocker (e.g. tamsulosin or alfuzosin). If the prostate is markedly enlarged or PSA is > 1.5 mg/ml either 5-alpha-reductase inhibitor (finasteride, dutasteride) A [3 4] or an alpha$_1$-blocker can be used.
- A combination of 5-alpha-reductase inhibitor and alpha$_1$-blocker alleviates symptoms more effectively than either drug alone B [5].

Alpha-blockers

- **Tamsulosin**, **alfuzosin** , doxazosin, terazosin and prazosin.
- Alpha$_1$-blockers decrease symptoms, increase peak urinary flow and reduce the volume of residual urine significantly more than placebo.
- The effect of alpha$_1$-blockers is seen rapidly and it has been shown to continue for several years.
- The patients should be followed up initially at 1–3-month intervals.
- The side effects include dizziness, postural hypotension, and retrograde ejaculation. With selective tamsulosine and alfuzosin the risk of hypotension is lower.

5-alpha-reductase inhibitors

- The dose of finasteride is 5 mg × 1 and that of dutasteride is 0.5 mg × 1.
- The symptoms are alleviated, the urine flow is increased, and the obstruction is decreased A [3 4].
- The effect is at its best in patients with large prostates C [1 2].
- The effect starts slowly, sometimes as late as 6 months after the onset of treatment. If no effect is observed in 6 months the indications for surgery should be reconsidered.
- The drug decreases prostatic size but the prostate returns to its original size a few months after discontinuation of treatment.
- Impotence may occur as an adverse effect.

Surgical and other invasive treatments

- Transurethral resection of the prostate (TURP)
  - The only treatment for complicated prostatic hyperplasia and the best documented treatment for uncomplicated disease.
  - Results very seldom in erectile dysfunction (though in most cases already before operation), almost always retrograde ejaculation.
- Transurethral incision of the prostate (TUIP)
  - Suitable for patients with prostates <30 ml and no prominent median lobe.
- Open prostatectomy
  - Rarely used nowadays (prostate >100 ml)
- Thermotherapy (microwave treatment)
  - Alleviates irritative symptoms
  - Long-term results are not available.

- Stent or spiral
  - Can be used in selected cases in patients with a poor general condition.

Catheter

- Percutaneous cystostomy is indicated in patients with urinary retention waiting for surgery.
- In selected cases repeated catheterization can be used (preferably by the patient himself).
- A silicon catheter with the balloon filled with hypertonic (5%) saline or glyserol can be used, but percutaneous cystostomy is preferred.

Treatment after TURP

- Urine bacterial culture should be taken routinely 4–6 weeks after the operation to detect bacteriuria, and always if a urinary tract infection is suspected (pyuria and haematuria may occur as long as 3 months after the operation).
- If bacterial growth is detected, antibiotics are indicated.
- Stress incontinence may be alleviated within 1 year: exercises of pelvic floor muscles may help.
- Antimuscarinic drugs (oxybutynin, tolterodine, trospium chloride) can be used for the treatment of urge incontinence and nocturia.

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11.13 Prostate cancer

Editors

Basic rules

- Palpation and prostate-specific antigen (PSA) determination are used to exclude prostate cancer in patients suffering from prostate hyperplasia or with urinary tract infection.
- Identify metastatic prostate cancer as a possible cause of skeletal pain.

Epidemiology and risk factors

- The most common malignant neoplasm in men.
- The presence of androgens is necessary for the development of the cancer.
- Known risk factors include high intake of dietary fat, obesity and smoking.
- Only 5% of the patients are under 60 years of age at diagnosis.
- Asymptomatic prostate cancer is a common finding at post-mortem examination (in 30% of those over 50 years, in 70–80% of those over 80 years).
- The natural course of the disease is difficult to predict. In about 80% of the patients in whom the disease is confined within the prostatic capsule the disease does not progress during a follow-up of 10 years.

Symptoms

- The symptoms resemble those of bening prostatic hyperplasia. The symptoms may include
  - increased urinary frequency
  - poor urinary flow
  - urinary retention
  - urinary tract infection
  - sensation of inadequate bladder emptying
  - haematuria (rare symptom of prostate cancer)
  - symptoms caused by metastases (skeletal pain, particularly in the ribs and spine).

Diagnosis

- Screening tests are not indicated, as there is no evidence of their effect on life expectancy or morbidity C [1 2 3 4]. Patients whose disease will progress and who thus would benefit from early treatment cannot be identified with present methods.
- Rectal palpation of the prostate and serum PSA determination are indicated in men over 50 years of age who

have symptoms (see above) suggesting prostatic disease C [1 2 3 4].

- Prostate cancer is found in about 30% of the patients with a palpable nodule.

♦ PSA is a useful test in assessing the spread of the disease.
- The upper limit of the reference range is 3 µg/l.
- In benign prostatic hyperplasia, a concentration as high as 10 µg/l can be considered "normal".
- A concentration above 20 µg/l often indicates prostate cancer, and a concentration above 50 µg/l indicates metastatic cancer.

♦ Refer the patient to a urologist if
- **a nodule is felt on rectal examination or serum PSA is above 10 µg/l**
- **the patient is below the age of 65 and has serum PSA above 3 µg/l.**
- **total PSA is in the range 3–10 µg/l, and free/total PSA ratio is less than 15%**

♦ The diagnosis is verified by a histological examination of a needle biopsy obtained during transrectal sonographic examination C [1 2 3 4].

♦ Radioisotope scanning is the method of choice for detecting skeletal metastases. If serum PSA is below 10 µg/l, the probability of bone metastases is very low (below 1%). Bone radioisotope scan should be carried out if a patient with recently diagnosed prostate cancer has skeletal pain, his PSA is over 10 µg/l or serum alkaline phosphatase is elevated. During follow-up, an isotope scan should be performed if skeletal pain emerges or alkaline phosphatase becomes elevated.

♦ At diagnosis, about 20% of the cancers are localised, 40% have spread outside the prostatic capsule and 40% have sent metastases.

Treatment

♦ A **localised prostate cancer** (intracapsular cancer) can be treated withfour alternative methods C [1 2 3 4]:
- Active follow-up ("watchful wait") is suitable for elderly patients who do not want surgery or radiotherapy, or wish to avoid the associated adverse effects. Target group: T1 - 2N0M0, Gr 1, Gleason 2–4, age >70 years, little/no symptoms.
- Radical prostatectomy is suitable for patients in good health, generally <70 years, who want the tumour removed. Target group: T1b-2N0M0, Gr 1–3, Gleason 2–9. A Scandinavian study, which compared patients assigned to either radical prostatectomy or watchful waiting, showed that erectile dysfunction (80% vs. 45%) and urinary leakage (49% vs. 21%) were more common after radical prostatectomy, whereas symptoms of urinary obstruction (28% vs. 44%) were less common C [5].
- Radiotherapy (about 30 treatment sessions) is equally effective as radical prostatectomy. Target group: T1–3, Gr 1–3, Gleason 4–9. Adverse effects include irritation of the bladder and rectum. Internal radiation therapy (brachytherapy) where radioactive particles or needles (palladium, iodide^{125}) are inserted into the tissue under ultrasound guidance has increased during recent years.
- Bicalutamide. Target group: T1-T3NXM0, Gr 1–3, Gleason 2–9.

♦ Treatment of an **advanced cancer** is hormonal.
- 80% respond to therapy.
- Within 5 years the tumour becomes unresponsive to hormonal therapy in almost 80% of the patients.
- Orchiectomy is effective and can be carried out even on very old patients under local anaesthesia. The adverse effects include impotence and hot flushes.
- LHRH analogues are an alternative to orchiectomy. The medicine is administered subcutaneously, usually with an interval of three months. The efficacy and adverse effects are similar to orchiectomy.
- Oestrogen therapy (intramuscular injections of polyestradiol phosphate) is another alternative to orchiectomy. This treatment has become less popular because of cardiovascular complications (thrombosis) and other adverse effects (gynaecomastia, hot flushes, fluid retention, depression).
- Antiandrogens (cyproterone acetate, bicalutamide, flutamide, nilutamide) can be used as primary or add-on therapy for selected patients A [6 7].

♦ The **second-line** treatment of an **advanced cancer** after the tumour no longer responds to hormonal therapy may include estramustine, certain cytotoxic agents or radiotherapy. The aim is to improve the quality rather than the duration of life.

♦ Palliative treatments
- Electroresection of the prostate alleviates urinary retention.
- Radiotherapy is effective against skeletal pain.
- A small dose of radiation on the breasts prevents gynaecomastia associated with anti-androgen and oestrogen treatment.
- Clodronate is effective in hypercalcaemia (and possibly also in skeletal pain in some patients).
- The effect of cytotoxic agents is limited (only 2–19% of the patients respond).

Prognosis

♦ 5-year life expectancy is 65%.

♦ Life expectancy in metastatic cancer is on average 2–3 years.

Follow-up

♦ Follow-up visits at 3-month intervals during the first year, at 6month intervals during years 2–3, and annually from year 4 onward are recommended.

♦ In addition to regular follow-up, the patient needs to know where or who to contact if necessary.

- The follow-up of an **incidental localised cancer** (detected for example during transurethral resection of the prostate) can be carried out by PSA determinations and rectal palpation with 6–12 month intervals. Doubling of the PSA concentration is considered a sign of disease spread and an indication for referral to a urologist.
- Patients treated with **radical prostatectomy or radiotherapy** are initially followed up at the initial place of treatment, and subsequently referred to the care of a urologist or oncologist. The follow-up of an elderly patient may be carried out by his general practitioner.
- Patients receiving **hormonal therapy** have their first follow-up visit at the initial place of treatment. If the patient responds to the treatment his care may be undertaken by his general practitioner.
- If the **disease advances despite hormonal therapy**, the patient is monitored more frequently. The continuity of the doctor–patient relationship and the early recognition of symptoms and complications affecting the quality of life are important.

Investigations during the follow-up of advanced prostate cancer

- Ask about the patient's symptoms and problems (pain, voiding problems, impotence, depression).
  - Skeletal pain is an indication for urological or oncological consultation.
  - Local tumour growth may cause voiding problems. Refer the patient to a urologist.
- Measure serum PSA if the patient wishes to know whether the disease is progressing, before the symptoms become evident. A rise in serum PSA level precedes the symptoms by about one year.
  - Doubling of the PSA concentration is an indication of the advancement of the disease and requires urological consultation.
  - PSA determinations are not indicated in metastatic cancer unless the effect of a change in therapy needs to be monitored.
- In addition to the above investigations, the following tests may be carried out: haemoglobin, creatinine, alkaline phosphatase, midstream urine and residual urine.
- Chest x-rays are not indicated in routine follow-up, neither are other imaging investigations.

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11.20 Balanitis, balanoposthitis, and paraphimosis in the adult

Pekka Autio

Basic rules

- The aetiology is determined critically (avoid overdiagnosing candidiasis)
- Most often the treatment is symptomatic, and sometimes directed to the cause.
- Paraphimosis must be treated without delay to avoid the risk of necrosis of the glans.
- Consider circumcision in severe cases.

Definitions

- Balanitis can be defined widely to include all inflammatory dermatoses in the glans. In this article the following classification is used:
- Balanitis means inflammation of the epithelium of the glans.
- Balanoposthitis means inflammation of the glans and the inner surface of the foreskin.
- Paraphimosis ("Spanish collar") (picture 11.20.1) occurs when a tight foreskin is retracted and the resulting stasis causes marked swelling of the distal foreskin.

Picture 11.20.1 Balanoposthitis ("Spanish collar") is a manifestation of seborrhoeic eczema, and not caused by bacteria or fungi. If the swollen foreskin is very tight, the circulation of the glans is compromised. Reposition and class II corticosteroids improved the condition in one week.

Aetiology

- Balanitis can be caused by
  - Irritants, neglecting hygiene, tight foreskin, irritation by smegma
  - Seborrhoeic dermatitis; check scalp, the skin behind the ears, and skin folds
  - Candida; a positive culture result does not yet prove causality. Candidiasis is overdiagnosed.
  - Contact allergy
    1 Latex and additives used in rubber manufacture
    2 constituents of skin care products (used by the patient and his partner)
  - Balanitis xerotica obliterans (BXO, lichen sclerosus et atrophicus) (picture 11.20.2).
  - Balanitis circinata are there other signs of Reiter's disease?
  - Balanitis plasmacellularis Zoon (rare)

Picture 11.20.2 Balanitis xerotica obliterans, male Lichen sclerosus et atrophicus affects the glans and prepuce. Effective therapy is needed to prevent the stricture of the urethral meatus and phimosis. This disease carries a certain risk of development of malignancy if not treated and followed properly.

- In the same location as balanitis may also occur
  - Lichen (ruber) planus–it is more common in the glans than is generally believed.
  - Psoriasis–check other typical locations of psoriasis
  - Erythema fixum (particularly caused by tetracyclines)
  - Erythroplasia Queyrat (a variant of Bowen's disease in the glans), which is a carcinoma in situ.

Investigations

- Bacterial culture (bacteria, candida) should be taken only if there is a clear suspicion of infection. Interpret the result critically.
- Patch tests (in cases of suspected allergy): refer to a dermatologist.
- Biopsy (if malignancy is suspected e.g. in BXO): refer to a urologist or a dermatologist.

Treatment

- Relevant treatment against specific aetiology (bacteria, candida)
- Potassium permanganate (1:10 000) is nearly always beneficial.
- Corticosteroid creams (class I–II) for eczema
- Refer BXO to a specialist (dermatologist or urologist)
- Treat phimosis by circumcision. If the foreskin of an adult man cannot be retracted in the sulcus of the glans after the balanitis has cured a circumcision is indicated.
- Paraphimosis should be treated by immediate reposition. Use lidocaine gel and squeeze the tip of the glans long enough to reduce swelling so that the foreskin can be liberated. If reposition is not successfull, an incision of the foreskin should be made.

11.21 Peyronie's disease (Induratio penis plastica)

Editors

Symptoms and signs

- A fibrotic induration of corpus cavernosum
- The aetiology of is unknown; however, 15% of the patients have Dypyutren contracture of the palms.
- The skin is normal and freely mobile at the site of induration.
- The penis is curved in the direction of the induration during erection.

- In differential diagnosis consider the spread of prostatic carcinoma into the penis (palpate the prostate).

Treatment

- No therapy is indicated unless intercourse becomes difficult. Explain the condition to the patient.
- Refer to a urologist if the penis is painful or markedly curved.

11.22 Testis pain

Editors

- Swelling of the scrotum, see article 11.23.

Basic rules

- Diagnose and treat testis torsion immediately (always suspect torsion in children and young adults who are not yet sexually active).
- Treat epididymitis with antibiotics.
- Diagnose varicocele as a cause of prolonged or recurrent testis pain.

Testis torsion

- Pain, which is often felt initially in the lower abdomen and only later in the scrotum, and unilateral swelling of the scrotum start suddenly.
- The testicle rises in the upper part of the scrotum and lies there horizontally. The cremaster reflex is absent.
- **Torsion of appendix testis** and epididymitis may resemble testis torsion. The differential diagnosis can often be made only in an operation.
- Testis torsion should be treated with an urgent operation to avoid permanent damage to the testis.

Epididymitis

- Swelling and tenderness are located in the epididymis, but the testis itself may also be tender.
- The causative agents include bacteria causing urinary tract infections, and in sexually active patients also chlamydiae and sometimes gonococci. In older men retention problems may be a predisposing factor.
- Epididymitis occurs also before the sexually active age.
- In children epididymitis is apparently caused by the passage of sterile or infected urine to the deferent duct. In recurrences, ultrasonography of the urinary tracts is a worthwhile examination for excluding e.g., ectopic ureter. Attention should also be paid to enuresis and difficulties in voiding.
- In all age groups manipulation of the urethra, such as prolonged indwelling catheterization and urological interventions, predispose to epididymitis.
- Investigations
  - Urine test and culture
  - Chlamydial and gonococcal culture or PCR
- The treatment consists of trimethoprim-sulphamethoxazole or cephalosporin derivative (in children), doxycyclin 150 mg× 1 × 10–14 (in adolescents) or cephalosporin derivative or fluoroquinolone (in the elderly).
- A suspensor to support the scrotum, cool bandages, and NSAIDs relieve pain.

Orchitis

- The swelling is located in the testis itself.
- Orchitis is very uncommon in countries where mumps has disappeared as a result of vaccinations, but may sometimes be associated with epididymitis (epididymo-orchitis).
- The differential diagnosis of orchitis and testicular torsion is difficult (refer to hospital urgently if there is the slightest doubt).
- Investigations
  - Parotitis serology (paired serum samples) from the unvaccinated
- Treatment
  - Pain relief (see above)

Varicocele

- In a young man the symptoms are visible varicose veins, pain (rarely) and decreased fertility.
- For details see article 11.23.

11.23 Enlarged scrotum or palpable mass in scrotum

Editors

Basic rules

- An enlarged testicle should be considered a tumour unless this is ruled out. Always refer the patient to a specialist.

- If the swelling can be located **outside the testicle**
  - identify a hydrocele without special investigations
  - identify a spermatocele without special investigations, and verify that the condition is innocent by sufficient follow-up.
  - detect a hernia and refer the patient for surgery
  - detect a varicocele (which may cause infertility)

Hydrocele

- A hydrocele is a collection of fluid inside the tunica vaginalis surrounding the testicle and appendix testis.
- Easily differentiated from a solid tumour by transilluminating the scrotum in a dark room with a sharp light. The light easily traverses a hydrocele, but not a testicular tumour.
- A hydrocele can be freely deformed unlike a solid tumour.
- The diagnosis can be verified by ultrasonography.
- A small hydrocele need not be treated. A large hydrocele can be treated surgically or with sclerotherapy. Needle aspiration is not beneficial as the fluid collection recurs.

Spermatocele

- A spermatocele is a round, soft mass above the testicle clearly separated from it.
- A spermatocele transilluminates fairly well.
- Aspiration of the contents may be diagnostic. A spermatocele contains fluid that may be grey because of semen.
- An annoyingly large spermatocele can be treated surgically.

Varicocele

- Usually left-sided
- Dilatated veins can be seen as worm-like swellings in the base of the scrotum when the patient is standing. The Valsalva manouvre may be helpful in doubtful cases. In the supine position dilated veins disappear.
- Particularly in young men varicocele causes a feeling of weight in the testes, see article on testis pain11.22
- In a middle-aged or elderly patient a rapidly appearing left-sided varicocele may indicate renal vein thrombosis (which can be caused by renal carcinoma). Right-sided varicocele may indicate obstruction of the inferior vena cava.
- Treatment is indicated if the varicocele causes symptoms or infertility D [1]. The testicular vein can be ligated surgically, laparoscopically, or by a radiological procedure.

Inguinal hernia

- Visible as a swelling at the orifice of the inguinal canal. Reposition by pressing with fingers is usually easy. Read more about hernias (8.85)

Testicular cancer

- An enlarged, solid testicle or a nodule in the testis is the typical finding.
- The prognosis is rather good with the combination of surgery, irradiation and chemotherapy.

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11.30 Choosing a method for bladder emptying

Teuvo Tammela

- Repeated catheterization is the preferred method (11.31).
- If this is not feasible (the patient has an obstruction, urinary output/hour must be monitored, catheterization cannot be performed at home in long-term care, or the patient has considerable retention >1000 ml) suprapubic cystostomy (11.32) is preferred.
- If the need for catheterization is temporary, the capacity of the bladder is small, or there are operative scars in the lower abdomen (risk of bowel perforation at insertion in cystostomy) a thin silicone or PVC catheter should be used.
  - If ultrasonography is available immediately before percutaneous cystostomy the absence of bowel between the bladder and the abdominal wall can be confirmed relatively reliably.
- If the urine is bloody a Ch 16 PVC catheter can be used (11.6).
- A permanent indwelling catheter should not be inserted without a medical cause in an incontinent patient in long-term care.

11.31 Catheterization of the urinary bladder

Teuvo Tammela

Catheters

- The number of the catheter gives its circumference in millimetres. The diameter of the catheter is roughly the circumference divided by 3.
- Silicone and PVC are the most suitable materials for long-term catheterization as they cause the least tissue irritation.

Catheterization

- Wash the urethral orifice with an antiseptic solution (e.g. 0.01% chlorhexidine).
- Inject 20 ml gel into the urethra of men (and somewhat less for women). Use preferably a gel containing a local anaesthetic.
- Both gel injection and insertion of the catheter should be performed gently and slowly.
- In men the penis should be straightened to an angle of 90 degrees to the body in order to facilitate catheter insertion.
- Fill the balloon only after making sure that both the tip of the catheter and the balloon are in the bladder: the urine flows freely, or if the bladder is empty, saline solution injected into the catheter flows in easily.
- If the catheter cannot be inserted with gentle handling try a Thieman catheter. Do not attempt repeatedly but perform a cystostomy (11.32). If the patient has an enlarged prostate, changing to a bigger catheter is often helpful.

Repeated catheterization

- The most physiological means of emptying the bladder.
- Teach the patient in the hospital (and provide written instructions).
- Catheterization should be repeated frequently enough so that the bladder is not filled above 500 ml.
- If the patient is totally unable to void spontaneously, the recommended frequency is 4 times a day. If the treated residual is large, fewer catheterizations may suffice.
- The best catheter type is one that has been covered with a hydrophilic lubricant and that can be moistened and lubricated by water. Additional lubrication with gel is thus not needed.
- In self-catheterization it is sufficient for the patient to wash hands well before the procedure. In hospital aseptic techniques should be used.
- Antimicrobial medication is not recommended, even if it would prevent the development of bacteriuria in cases of single catheterization or in patients using an indwelling catheter temporarily. Only symptomatic infections are treated. Routine urine specimens are not collected as most patients undergoing repeated catheterization have bacteriuria that has no clinical significance.

Long-term catheterization

- A silicone catheter (size 12–14) is preferable. A PVC catheter (with a larger internal diameter) is most practical if the urine is bloody and flushing of the bladder is necessary.
- In long-term catheterization the balloon should be filled with 5% saline or glycerol solution.
- The catheter must not be pulled downwards by gravity (use a thigh bag).
- Prophylactic antibiotics are not indicated for a patient with an indwelling catheter. Symptomatic UTIs should be treated. Before starting medication take a sample by puncturing the catheter aseptically.

11.32 Suprapubic cystostomy

Teuvo Tammela

Inserting the catheter

- Check that the procedure is indicated.
- The bladder should be filled with at least 300 ml of urine (urinary retention or a minimum of 4 hours since last voiding). If ultrasonography is easily available, determining the location and volume of the bladder before the procedure is always recommended (42.4). Use ultrasonography also to ensure that there is no bowel between the bladder and abdominal wall.
- Clean the skin with, e.g., 0.01% chlorhexidine solution.
- Infiltrate 1% lidocaine in the skin fold just above the symphysis (approximately the width of two fingers) or just proximal to it with a long thin needle (e.g. a lumbar puncture needle). Aspiration of urine confirms the location of the bladder and its depth. Do not inject the aspirated urine into the tissues of the abdominal wall while drawing the needle back. It is important to inject the anaesthetic also to the bladder wall.
- Make a small skin incision with a lancet, insert the cystostomy needle perpendicular to the skin into the bladder, and insert the catheter.

- Withdraw the needle and ensure that the catheter is not withdrawn. Remove the needle.
- Fix the catheter either by inflating the balloon or by sutures.
- The patient can try to void with the catheter in place (after it has been closed). If voiding is repeatedly successful and the residual volume is less than 200 ml, a catheter inserted because of urinary retention can be removed.

11.40 Impotence

Outi Hovatta

Basic rules

- Impotence is often of organic origin. However, problems in self confidence and couple relationship are always associated with it. They have to be taken into account when treating these men.
- Primary impotence of a young man has to be examined by a specialist. A general practitioner can well treat older men with impotence that has developed gradually.

Aetiology

- Vascular factors (about 20%)
  - Atherosclerosis, heavy smoking, venous leakage
- Endocrine causes (about 10%)
  - Testosterone deficiency
    1. Elderly men often have testosterone deficiency that can be treated using testosterone or dihydrotestosterone. This is often related to overweight, which induces high sex hormone-binding globulin and low free testosterone levels.
    2. Small testes and infertility are associated with Klinefelter's syndrome.
  - Hyperprolactinaemia, disorders in thyroid function
- Neurological causes (about 20%)
  - Diabetic neuropathy, alcohol neuropathy, autonomic neuropathy, multiple sclerosis, spinal cord injury, pelvic traumas, operations in the pelvic area etc.
- Alcohol over-use (about 20%)
  - Erections improve in 50% after abstaining from alcohol
- Drugs (10%)
  - Among pharmaceutical agents used for arterial hypertension, calcium channel blockers and ACE inhibitors are less harmful that the others, but they may also have effects. Untreated hypertension, on the other hand, is also associated with erectile dysfunction.
  - Digoxin, thiazide diuretics, spironolactone
  - Anticholinergic substances
  - Many psychopharmaceutical agents; benzodiazepines, sulpiride
  - Opioids
  - Antiandrogenic drugs; cimetidine, ranitidine, cyproterone acetate
- Severe systemic diseases
- Psychological causes (about 20%)

Investigations in erectile dysfunction

History

- Did the symptoms begin suddenly, or little by little?
- How severe is the symptom? Does it occur continuously? Is erection sufficient for penetration in one out of five attempts, or less or more frequently?
- Are there morning erections (circulation probably sufficient)?
- Factors connected to certain situations, difficulties in couple relationship
- Drugs, alcohol consumption, smoking
- If erectile dysfunction began gradually and progressed slowly, the cause is often organic.
- If erectile dysfunction is connected with a certain partner, if there are morning erections, and masturbation is successful, the cause is probably psychological.

Clinical signs

- Blood pressure, peripheral arterial pulses
- Thyroid
- Tendon reflexes
- Prostate
- Signs of hypogonadism; size and consistency of the testes, pubic and axillary hair, growth of the beard, gynaecomastia etc.

Laboratory tests

- Specialist investigations on erection are seldom needed.
  - Devices for these investigations are expensive
  - One method is to place a band around the penis for the night; the band breaks during erection.
- Prostaglandin injection test; see later
- Blood tests are chosen according to the situation; haemoglobin, sedimentation rate, C-reactive protein, blood glucose, liver function tests, serum total cholesterol, HDL-cholesterol, triglycerides, thyroid-stimulating hormone, creatinine, testosterone, prolactin, prostate-specific antigen.

Investigation strategy in general practice

- Possible underlying diseases are diagnosed and treated. Medication is checked, and changed when suspected of influencing erectile dysfunction. Diabetes and hypertension are treated to as a good balance as possible. A recommendation is given to stop smoking and alcohol consumption for at least a test period. A new appointment is given, for 2–3 months later.
- If dysfunction has not improved (or when the patient would like to try the medication immediately, without the follow-up period) the following tests are carried out:
  - Serum testosterone (in all cases. Note that a man with diabetes can also have hypogonadism)
  - Serum prolactin, especially if sexual desire is also low
  - Other above-mentioned blood tests according to suspected aetiology.
- Young men (below 40–50 years of age) without any systemic diseases are sent to a urologist after the first investigations (the cause may be operatively treatable, as in venous leakage). A general practitioner may treat older men.

Treatment of impotence

- If a man with erectile dysfunction has low serum testosterone, a normal prostate, normal serum levels of prostate-specific antigen and serum lipids, **testosterone** treatment can be started. It has been shown to be effective in erectile dysfunction caused by hypogonadism in a placebo-controlled study .
  - Testosterone enantate (Primoteston depot®) or a combination of testosterone esters (Sustanon "250"®), 1 amp. i.m. every 3rd week
  - Testosterone undecanoate (Panteston®), 40 mg × 3–5, taken together with a meal
  - Testosterone transdermal patch (Atmos®), 2 patches per day
  - Follow-up
    1. The size of the prostate (ultrasound scan) and assay of serum prostate-specific antigen once a year
    2. If erectile dysfunction has not improved within a few weeks, therapy is stopped, and other causes and treatments are sought.
- **Sildenafil** (Viagra®) is efficient for impotence of various aetiologies.
  - The initial dose is 50 mg, and it is taken 1 hour before intercourse A [1 2 3 4 5 6 7]. In the elderly and in severe renal insufficiency or hepatic insufficiency the initial dose is 25 mg. Exceeding a dose of 100 mg brings no further benefit.
  - Maximum frequency is one dose daily.
  - Sexual stimulation is necessary.
  - The hypotensive effect of nitrates is potentiated by sildenafil. **Its use is contraindicated in patients on nitrates.**
  - Other contraindications include severe cardiovascular disease, severe hepatic insufficiency, very low blood pressure, recent cerebral infarction or myocardial infarction or hereditary degenerative retinal disease.
  - The most common adverse effects include headache, flushing, dyspepsia, nasal stuffiness and transient visual disturbances.
  - The drug is not intended for women.
- **Vardenafil** (Levitra®) has a similar effect as sildenafil.
  - The drug is taken 25–60 minutes before intercourse.
  - The average dose is 10 mg, and the maximum dose is 20 mg. In the elderly and in patients with liver or kidney insufficiency the dose is 5 mg.
- **Tadalafil** (Cialis®) has a similar effect as sildenafil, but a longer duration of action.
  - The tablet can be taken 0.5–12 hours before intercourse.
  - If 10 mg is not enough, the dose can be raised to 20 mg. With liver or kidney insufficiency the maximum dose is 10 mg.
- **Apomorphine** (Uprima®) acts centrally and is effective in impotence of various aetiologies.
  - One tablet is taken 20 minutes before planned sexual activity.
  - The recommended starting dose is 2 mg. The dose can be raised to 3 mg for obtaining the desired clinical effect.
  - The minimum interval before the next dose is 8 hours.
- **Intracavernous prostaglandin injections** are the choice if the serum testosterone concentration is normal, and sildenafil has proved not to be effective C [8 9]. Several drugs and combinations of drugs have been studied, and **alprostadil** (Caverject®) has been shown to be effective in impotence due to many causes .
  - A test is first carried out in the clinic to see if the injection is effective, and to find the appropriate dose. If the injection proves effective the technique is taught to the patient and maybe his partner. A written patient's guide including the injection technique and what to do if a prolonged erection (4–6 hours) occurs, is given.
  - Injection technique:
    1. The starting dose in young men with neurogenic impotence is 0.25 ml (5 µg), in older men 0.5–1.0 ml (10–20 µg). If necessary, the dose can be increased to 2 ml (40 µg).
    2. The solution is injected into the penile erectile tissue (the proximal third). The needle is directed from above, somewhat laterally. The urethra can hence be avoided.
    3. An injection pen can be used if the use of an ordinary needle is difficult.
  - Side effects
    1. Pain in the penis, in every second man, seldom severe
    2. Prolonged erection (4–6 hours) in 5%
    3. Prolonged erection over 6 h (requiring treatment) in 1%

- Treatment of prolonged erection
  1 Physical activity, for example, walking up and down stairs
  2 Cool showers
  3 Blood (100–200 ml) can be aspirated from the penis by using a needle and syringe
  4 An alpha-adrenergic drug (such as Effortil®, 0.5 mg, or noradrenaline, 0.02–0.04 mg) can be injected into the erectile tissue, repeatedly if necessary. Referral to a hospital urology unit if there are any difficulties in treatment.

- **Yohimbine** is a peroral drug with controversial treatment results. In a meta-analysis A [10 11 12] it was more effective than placebo in a group of patients, but in a recent placebo-controlled randomized study, no effect could be seen.
- **Intraurethral alprostadil** (Muse®) B [13 14 15]. The alprostadil gel is injected into the urethra using an applicator, and the penis is massaged gently for about 10 min. Intraurethral alprostadil is a good option in psychogenic, neurogenic or mild vascular impotence.
- A **vacuum pump** is an option for men who do not want to use drugs C [8 9]. An erection of some kind can be obtained in up to 90% of users. Being mechanical devices, they are not easily accepted by all men. Side effects are numbness and pain in the penis, sometimes bruises (contraindicated in men with problems of bleeding or anticoagulant treatment). There is little literature regarding the treatment results .
- **Vascular surgery** has been used for selected groups of patients. It has proved effective in young men with traumatic vascular lesions. In men with general atherosclerosis the benefit is only temporary . The results from venous surgery are still controversial .
- **Penile prostheses** are used by urologists as the last option, when all other treatments have been ineffective C [8 9].

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11.41 Urinary calculi

Pekka Hellström

Basic rules

- An acute attack is treated with intravenous NSAIDs at the first place of treatment.
- The diagnosis is confirmed with urography, or increasingly with spiral CT; the vitality of the kidneys is verified by follow-up.
- The stone is removed and analysed.
- Laboratory investigations to find out the aetiology of urinary calculi are always indicated to prevent recurrences.

Types of stones and their aetiology

Calcium stones

- 75–85% of all urinary calculi
- Occur mostly in men above 20 years of age

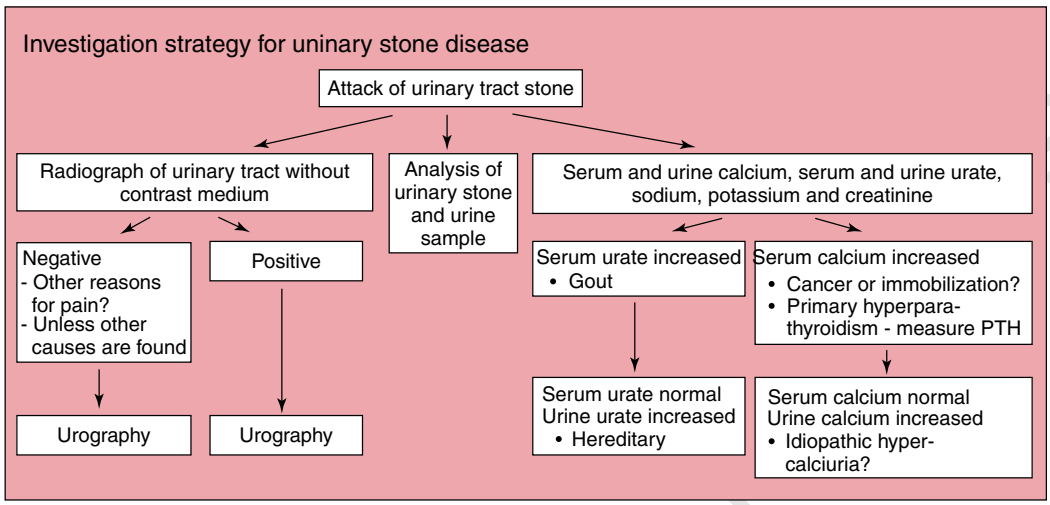

Figure 11.41

- A hereditary predisposition is often evident
- Aetiology
  - Idiopathic hypercalciuria 25–30%
  - Hypocitraturia 20–25%
  - Hyperuricosuria 10%
  - Primary hyperparathyroidism 5%
  - Hyperoxaluria (diet, after bowel resection) 15–30%

Urate stones

- 5–8% of all urinary calculi
- More common in men
- Aetiology
  - Gout in 50%
  - Hereditary in 50% (often triggered by dehydration), urine pH <5.5 may rouse suspicion.

Stones associated with urinary tract infection

- Often composed of magnesium ammonium phosphate
- 10–15% of all urinary calculi
- More common in women
  - Formed as a result of urinary tract infection (Proteus, staphylococci, E. coli).

Cystine stones

- An inherited metabolic defect
- About 1% of all urinary calculi

Symptoms and signs

- Intense, colicky pain radiates from the costal arch obliquely to the lower abdomen, groins, and testes.
- Nausea and vomiting is common.
- Microscopic, or rarely macroscopic, haematuria in 90%
- Earlier episodes are often recognized from the history, and there are cases in the family. Tendency for recurrences is 50% in 10 years.
- Tenderness of the kidneys on percussion is often observed.
- The patient has difficulty in keeping still (in contrast to, e.g. perforated peptic ulcer, where the patient prefer to lie still).
- 90% of the stones are radio-opaque (urate stones are invisible, and cystine stones may be poorly visible).

Differential diagnosis

- Colon-related pain
- Appendicitis
- Attack of biliary cholic, dyspepsia
- Aortic aneurysm
- Gynaecological conditions
- Renal infarction

First aid for an attack

- Intravenous B [1 2] prostaglandin inhibitor A [3 4] (rapid relief) or i.m. (slower onset of action), e.g.
  - diclofenac 75 mg i.m. or a slow i.v. infusion (>30 min), or
  - ketoprofen 50–100 mg i.m. or 100–200 mg as a slow i.v. infusion (>30 min)
  - indomethacin 50 mg i.v. slowly (>5 min)

Investigation strategy

- See figure 11.41
- Spiral CT is used increasingly in specialist hospitals as an on-call investigation.

- If the stone can be analysed at the beginning, the investigations can be directed according to the suspected aetiology.
- After the first attack the following tests are indicated: serum calcium, urate, creatinine, and urine bacterial culture.
- If repeated attacks occur at intervals less than 2 years the following tests should also be performed: 24-hour urine creatinine, calcium (24.21), and citrate. Routine investigation of oxalate, urate (21.50) and magnesium is not recommended.

Treatment

- The patient should be treated in a facility where urography is available (42.2).
  - If the diameter of the stone is under 5 mm, the patient does not have hydronephrosis, and serum creatinine is normal, only follow-up is needed.
  - A urologist should be consulted if the above-mentioned investigations are not locally available, the diameter of the stone exceeds 5 mm, or the patient has a urinary tract infection, has only one kidney, is pregnant, or has a recurrence.

Conservative treatment

- All patients are advised to drink 6–8 glasses of water every day.
- If the patient has hypercalcaemia (and hypercalciuria) its aetiology should be determined. For investigations see article 24.21.
- The precipitation of oxalate should be prevented by diet. The patient should:
  - Drink plenty of water
  - Avoid oxalate-containing foods such as dried fruit, gooseberry, nettle, asparagus, parsley, beans, spinach, nuts, rhubarb, chocolate, cocoa, and tea.
- Idiopathic hypercalciuria has been treated with a diet low in calcium, but a diet with restricted intake of animal protein and salt, but normal intake of calcium, may be more effective C [5]. If necessary, with a thiazide diuretic 50 mg × 1 and potassium supplementation (remember the possibility of gout). 24-hour urine calcium should be determined 3 and 6 months after onset of treatment.
- If serum urate is increased, a specific diagnosis of gout should be aimed for (clinical picture, analysis of synovial fluid in patients with joint symptoms (21.11)). The condition is treated with fluids, diet (21.51), and allopurinol.
- If the patient has only an elevated serum urate (but no symptomatic gout) the stones may be composed of either calcium or urate. The treatment of choice is
  - diet, or
  - alkalinization of urine (if diet fails), or
  - allopurinol in severe cases.
- If an infection is detected in the urine test, it should be treated according to the antibiogram. Follow-up urine tests are always indicated, as is (usually) prophylactic medication (10.10).

Control examinations

- If a stone suitable for conservative treatment has been detected the passage of the stone is ascertained with plain radiographs or renography after 1 (–3) months. If the stone persists, the follow-up is continued (plain radiographs, ultrasonography to rule out hydronephrosis, serum creatinine) until the stone has been passed and the patient is asymptomatic. If the stone has not been passed by 6 months it should be removed surgically.

Indications for shock-wave lithoripsy and endoscopic stone removal

- The diameter of the stone exceeds 4–5 mm.
- A smaller stone is not passed spontaneously and causes recurrent pain. The passing of a small asymptomatic stone can be followed up for 6 months if hydronephrosis does not develop.

Related evidence

- Single dose dipyrone appears to have similar efficacy to other analgesics used in renal colic pain B [6].
- Both NSAIDs and opioids provide effective analgesia in acute renal colic, but opioids are associated with a higher incidence of adverse events, particularly vomiting. If an opioid is to be used it should not be pethidine A [7].

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11.43 Cancers of the urinary system and testes

Olavi Lukkarinen

- For cancer of the prostate see article 11.13.

Renal carcinoma (hypernephroma)

Epidemiology

- The incidence is about 1/10 000/year.
- Smoking and overweight are the only known risk factors.
- Patients with hereditary von Hippel–Lindau disease carry a high risk of renal carcinoma (up to 30%).

Symptoms and signs

- The symptoms include haematuria (37%) C [1] [2], pain, weight loss, fever, fatigue, hypersedimentation, anaemia (but 3–5% of the patients have erythrocytosis because of erythropoietin secretion), rapidly developing varicocele, and a palpable mass.
- Ultrasonography is the most important diagnostic examination, complemented by guided biopsy if necessary. Small tumours are not visible in urography. Computed tomography is useful in assessing the extent of the disease.
- Renal carcinoma often infiltrates the surroundings. Metastases occur in lymph nodes, the skeleton, lungs, and subcutaneously.

Treatment

- Extrafascial nephrectomy is the routine treatment for localized disease. A more radical operation, adjuvant irradiation or antineoplastic drugs are of no proven benefit. Even a carcinoma that has infiltrated the inferior vena cava should be operated on. Solitary metastases (e.g. in the lungs) can be removed surgically.
- Treatments for metastases include surgery, irradiation (bone pain, symptomatic metastases), antineoplastic drugs (vinblastine), immunomodulators (IFN A [3], IL-2), and follow-up. Response to treatment is modest.

Follow-up

- Follow-up is aimed at detection of solitary, treatable metastases.
- Follow-up examinations are usually carried out at the treatment unit at 3–6 months intervals until 2 years have elapsed.
- If no relapse is detected, further follow-up can be carried out in primary care at intervals of 6 months to 1 year for up to 5 years.
- The follow-up examinations include ESR, blood count, ALT, alkaline phosphatase, serum creatinine, urine test. A chest radiograph should be taken yearly. CT scan, bone scan etc. are performed if necessary.

Bladder cancer

Epidemiology

- The incidence is about 1.5/10 000/year.
- Smoking and certain chemicals are risk factors.
- More than 90% of the cancers originate from transitional type epithelium.

Symptoms and signs

- The symptoms include haematuria in 85%, and bladder irritation in 30% of the cases.
  - More than 5 erythrocytes per microscopic field in the urine sediment indicate cytological examination of the urine, cystoscopy, and renal ultrasonography. For haematuria see 11.5.
- The spread of bladder cancer depends on the stage of differentiation and the depth of invasion. The most common sites of metastases are pelvic lymph nodes, lungs, and bones.

Treatment

- The treatment options include electroresection and coagulation, bladder resection, bladder removal, irradiation, and intravesical treatments (epirubicin, mitomycin C or BCG A [4] [5] [6] 5–6 times at one-week intervals, then once a month for one year).
- The selection of treatment is determined by the grade, TNM classification B [7] [8], and age. In the case of metastases antineoplastic drugs can be tried (about 30% of the patients respond).
- On average 70% of the tumours recur but local recurrences can usually be treated effectively. After 5 years the risk of recurrence declines to under 5%.

Follow-up

- Follow-up should be carried out in a urology unit and consists of cystoscopy, urine cytology, and if necessary, imaging.

- Cystoscopy is performed at 3-month intervals for the first year, at 6-month intervals for the next two years, and yearly after that.
- If the tumour has not recurred within 5 years, further follow-up with urine tests, including cytology, performed in primary care, may suffice.

Cancer of the testis

Epidemiology

- The incidence is about 10/million/year.
- Seminomas are the most common type in men aged 30–35 years, whereas non-seminomas are the most common type in men aged 25–29 years.
- There are many histological types of tumour. About 90% are germ cell tumours, and of these about 50% are seminomas, and 50% other tumours (e.g. embryonal carcinomas, teratomas, teratocarcinomas, placental tumours).

Symptoms and signs

- The symptoms include enlargement of the testis (which should always be investigated), a lump, a change in consistency, vague pain, and prolonged epididymitis.
- Ultrasonography usually reveals an enlarged, non-homogeneous tumour within the testis.
- Computed tomography is used to detect possible retroperitoneal lymph node metastases.

Treatment

- The treatment always begins with an operation, followed by irradiation for seminomas.
- Antineoplastic drugs are used if the tumour has metastasized widely. Over 90% of patients even with widespread tumours, are cured.
- 60–70% of metastasized non-seminomas can be cured with antineoplastic drugs.
- Fertility is preserved in about 65% of irradiated patients. Semen can be frozen before treatment.

Follow-up

- Follow-up should be carried out in a specialized unit.
- Patients with seminomas treated by surgery only are controlled for 5 years at 4-month intervals, and patients with seminomas treated with antineoplastic drugs are controlled for 3 years at 3-month intervals, and thereafter at 6-month intervals up to 5 years.
- Patients with non-seminomas are controlled once a month for the first year, at 3-month intervals for the next year, and at 6-month intervals thereafter for a total of 5 years.
- Follow-up consists of assay of biochemical markers (AFP, HCG, if the concentrations were increased before the operation), a chest radiograph at 2–3-month intervals, and computed tomography at 2–6-month intervals.
- Further follow-up with longer intervals should be continued for a long time, as the tumour may recur even more than 10 years after the primary operation. Recurrent tumours usually respond favourably to treatment.

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11.45 Hypogonadism in the aging male

Sakari Rannikko

Introduction

- Hormone replacement therapy is effective in lessening the symptoms of hypogonadism in the aging male.

- Treatment warrants a careful consideration of benefits and possible risks as well as close monitoring.
- So far, the significance and safety of hormone replacement therapy in the activation of latent prostate cancer or its precursor (PIN, prostatic intraepithelial neoplasia) is not known.
- Medicalization of the normal aging process may also be considered a concern.

Hormone activity in the aging male

- Some aging males suffer from symptoms associated with hormonal decline.
- Symptoms of ADAM (androgen decline in the ageing male):
  - deterioration of physical, emotional and sexual functions.
- As the population becomes older, the number of aging males will also increase; in 2010, 14% of men will be over 65 years of age.

Signs and symptoms of ADAM

- Symptoms resemble those seen during the female climacteric (hot flushes, sweating, depression, tiredness, sleep disturbances).
- Several symptoms are attributable to dysfunction of organs targeted by testosterone (erectile dysfunction, reduced muscular strength).
- Slowing down of physiological responses.
- Many of the symptoms are not only connected with the reduced amounts of testosterone but other factors also play a part:
  - loss of muscle tissue (growth hormone?)
  - osteopenia (oestrogens?)
  - truncal obesity (leptin?)
  - atherosclerosis (oestrogens?)
  - decreased libido (oestrogens?)
  - erectile dysfunction
  - impaired memory and learning
  - emotional fatigue
  - sleep disturbances (melatonin?)

Investigations

- When replacement therapy is considered the risk of prostate cancer must be evaluated:
  - symptoms, family history, palpation of the prostate
  - PSA, serum testosterone, LH, haematocrit (increased risk of thrombosis if above 52%), lipids
  - Other causes of hypogonadism, see (24.61).

Replacement therapy

- Before deciding to instigate treatment, the benefits and possible risks should be carefully considered.
- Before treatment is instigated, both the physician and the patient must be fully aware of the associated risks.
- The patient must commit himself to long-term monitoring, which may last for several years.
- Hormone replacement therapy may be prescribed, if
  - the patient presents with typical signs and symptoms of ADAM and
  - serum testosterone level is low (mean–2 SD)

    1 testosterone < 11 nmol/l
    2 testosterone < 11 nmol/l.

Treatment choices

- Transdermal preparations are the best treatment choice for maintaining the normal circadian pattern of testosterone concentrations, and are therefore recommended.
- Testosterone patches
- Testosterone gel
- Testosterone capsule
  - testosterone undecanoate is absorbed via the lymph pathways and therefore exerts no extra strain on the liver
- Testosterone injection–testosterone propionate - isocaproate -undecanoate

Contraindications

- Absolute:
  - suspicion of prostate cancer
  - benign prostatic hyperplasia with severe symptoms
  - suspicion of malignant breast tumour
  - high haematocrit (>52%)
- Relative:
  - severe sleep apnea
  - hepatic dysfunction
  - high blood lipid values and coronary heart disease.

Follow-up

- The first follow-up visit should be at 3 months. The intervals between subsequent visits can gradually be lengthened. The visits should, however, be at least annual.
- Monitor the development of symptoms (ADAM and micturition), palpate the prostate.
- Measure PSA. Suspect prostate cancer
  - if increased >1.5 ug / l or
  - the rate of increase >0.75 ug / l / year
- Blood count (haematocrit >52 %)
- Testosterone levels will normalize during replacement therapy and there is, therefore, no need to measure the levels during treatment.