

ovary in the pelvis, as proved by bimanual examination.

A swelling deep under the origin of the adductor muscles, and fixed to the pelvis, may be an *obturator hernia*. (See page 464.)

The lymphatic glands are arranged in two sets in superficial fascia, one along Poupart's ligament (inguinal), the other along the saphena vein (femoral), and there is a deep gland occupying the crural canal; by pressure in the iliac fossa the deep inguinal (or iliac) glands when enlarged can be felt along the external iliac artery. The position and the outline of the swelling, together with, in most cases, some local cause of infection in the urethra, penis, scrotum, perineum, buttock, groin, or lower limb, or the co-existing enlargement of other groups of glands, will enable the surgeon to diagnose a *glandular swelling*. (See page 283.) When many glands are moderately enlarged, firm, quite movable under the skin and over the deep fascia, without pain, tenderness, or other obvious sign of inflammation, they are known as *indolent buboes*; these are met with following hard chancre, and are sometimes spoken of also as *amygdaloid*.

When a gland is enlarged, painful, tender, fixed to the skin and deep fascia, and its outline, owing to surrounding œdema, is ill-defined, and a source of infection such as a sore on the toe, gonorrhœa, or a soft chancre is found, it is known as a *sympathetic bubo*; the skin over it is hot and reddened, and there is a tendency for the gland to suppurate. Exactly similar enlargements are sometimes seen as the result of strain and over-exertion. If the swelling spread from gland to gland, and they are massed together into one irregular tumour, which slowly enlarges and then softens and fluctuates at places, it is a *scrofulous bubo*; this condition may be started by infection, simple or

syphilitic. In some cases of malignant disease the glands are enlarged from simple irritation, and the swelling subsides when the primary tumour is removed.

Of the remaining tumours in this situation it is only necessary to point out that a hard swelling in the adductor muscles, close to the pubes, chronic and painless, is a "*rider's bone*," or an ossification of the tendon of the adductor longus or magnus muscle. "*Rider's sprain*" (see page 35) may occasion a considerable firm swelling in the adductor muscles, lasting some time after the injury. *Lipoma* may be met with in the superficial fat, and *enchondroma* or *sarcoma* may be found growing from the pelvis or thigh bones, and the latter also from the fascia and muscular aponeurosis. (See chapters xvi. and xix.)

## CHAPTER XLII.

### DIAGNOSIS OF DISEASES OF THE URINARY ORGANS.

IN investigating any case of disease of the urinary organs the surgeon should proceed systematically, for this will both guard him from error and economise time. Although the symptoms and signs of these affections are numerous, they may all be grouped into four classes, and the surgeon should conduct his examination in four directions. He should first investigate the patient's *pain*, then study the *act of micturition*, then examine the *urine passed*, and, lastly, proceed to investigate directly the *urinary passages, the bladder, and the kidneys*.

I. **Pain** is associated with nearly all diseases of the urinary organs. It owns the same causes and has

the same general significance here as elsewhere, but the *seat, time, and character* of the pain are of considerable diagnostic importance. Pain may be either *local, i.e.* produced at the painful part, or *referred, i.e.* produced at a distance. The *referred pains* are recognised by the absence of all other signs of disease at the painful parts, and also by the special seats of these pains. They are experienced at the end of the penis, usually just behind the glans, which is found quite normal, being "referred" there from the neck of the bladder; or they are felt in the testicle, groin, and down the thigh, being "referred" to these regions from the kidney, the pelvis of the kidney, and the ureter; this is commonly associated with marked retraction of the testicle. These "referred pains" are especially caused by the irritation of calculi and other foreign bodies. In *children* the pain "referred" to the end of the urethra is shown by the patient pulling at the penis, often drawing out the foreskin to a considerable length, or by scratching at the vulva. Of the *local pains* it is only necessary to say that pain in the *prostate* is felt in the perineum and rectum, and is excited by the passage of large and hard motions, or by the contact of the finger in the rectum; pain in the *bladder* is felt above the pubes, deep in the perineum, and also extending to the groins, and round the back to the sacrum; renal pain is felt in the loins.

*When the pain is felt.*—The pain may be *spontaneous, i.e.* quite independent of movement on the part of the patient, of micturition, erection, or defecation; such pain may be due to inflammation of the organs, to the contact of foreign bodies and calculi, to the growth of tumours and to over-distension. Many painful conditions do not give rise to "spontaneous pain." When pain is *increased during micturition* it shows that either the contraction of the

bladder or the passage of the urine along the urethra is painful, and we therefore have this symptom in acute cystitis, acute prostatitis, urethritis, and stricture of the urethra, and sometimes also in phymosis. When pain is *increased at the end of micturition* it shows that the contraction of the bladder down upon its neck is painful, and we therefore meet with this in stone in the bladder, in prostatitis, and in ulcer and fissure of the neck of the bladder. A dragging pain in the bladder, felt only at the end of micturition, may be caused by adhesion of the bladder to surrounding structures: the diagnosis will be assisted by evidence of pelvic cellulitis or peritonitis. Where pain is *diminished after micturition* it points to the contact of the urine with the bladder, or the distension of that organ as the cause of the pain, and this we see exemplified in acute cystitis and in retention of urine. Nearly all pain is *increased by movement*, but where this is a marked symptom it points to the cause of the pain being a movable body, and hence we find this especially in cases of stone in the bladder and in the pelvis of the kidney. Adults are usually able to give clear information on this point at once, as they have noticed the influence upon their sufferings of a railway journey, or a ride in a rough cart, or coming downstairs. In children the same thing is shown by the patient avoiding rough games or any unnecessary movements, or crying when made to move, and it may be tested by getting them to jump down from a table and chair; if they do this freely and without any sign of pain, stone in the bladder may be excluded with almost absolute certainty. When the pain is *increased by defecation* it shows that the painful part is at the base of the bladder or the prostate, as in prostatic inflammation. The pain is, of course, more marked when the motions are large and hard. *Erection of the penis* causes pain, either

by stretching an inflamed urethra, by adding to the congestion of an inflamed prostate, or, when part of the erectile tissue cannot expand, by the great tension to which it is subjected. It is an indication, therefore, of urethritis, of prostatitis, or of an obliteration of part of the corpus spongiosum or corpus cavernosum. When due to stretching of the urethra, a tight pain is felt all along the under surface of the penis, and the organ is more or less curved down; when due to prostatitis, the erection of the penis is perfect, and the pain is felt deep in the perineum; when due to obliteration of part of the erectile tissue, the penis is sharply bent to one or other side or directly downwards. This symptom is commonly known as *chordee*, although this term should only be used when the penis is bent, as well as painful in erection.

*The character of the pain.*—The pain of acute inflammation is described as sharp, pricking or smarting, while that of chronic inflammation is of a dull aching character; that due to foreign bodies or calculi is more often spoken of as sharp, cutting or burning; a straining pain, or “tenesmus,” which may be very severe, is particularly experienced in acute cystitis and in foreign bodies in the bladder. When pain becomes throbbing in character it is an useful indication of suppuration having occurred. Severe colicky pain in the loin and shooting down to the groin and testicle attends the impaction or passage of a calculus in the ureter.

**II. The act of micturition.**—In health, when the urine has distended the bladder to a certain extent, a stimulus is transmitted to a centre in the lumbar enlargement of the spinal cord and there reflected along motor nerves to the muscular coat of the bladder, and at the same time the contraction of the sphincter muscles is inhibited. This reflex centre is under the control of the will, and the act can be

excited or inhibited by the will, which also increases the expelling force by throwing into contraction the abdominal muscles. The resistance to be overcome that offered by the urethra, and the shape of the issuing stream is determined by the meatus urinarius. A knowledge of these facts enables us to understand how the act may be modified. Nearly all the affections of the urinary organs cause *frequency of micturition*. This may be caused by *increased stimulation* of the bladder by acid urine, or by calculi and foreign bodies; by *undue irritability* of the bladder, as in all forms of cystitis, and also prostatitis; by a *small size* of the bladder, so that a few ounces of urine distend it; by *failure to empty* the bladder, when, as in the last case, the addition of a small quantity of urine to that retained in the bladder distends it to the full; by *irritation of other parts* of the urinary apparatus, as in renal inflammation and calculus, urethritis, and phymosis; by *instability of the centre* in the spinal cord whereby it responds to stimuli of too feeble force; this is seen in the nocturnal “incontinence” of children, and in the effects of sexual excess; and, lastly, by *stimuli from the brain*, as in some cases of hysteria and some forms of “nervousness.” The frequency due to the irritation of calculi and foreign bodies is increased by movement; that due to over-distension of the bladder and atony is increased by rest, and is therefore more marked at night.

Micturition should be a conscious act; it may be *unconscious*, through an *interruption in the path of sensation* in the cord (see page 102), or through the reflex centre responding to a *stimulus not powerful enough to excite sensation*, as is seen in the nocturnal “incontinence” of children; or by the *bladder leaking*, as occurs in cases of great over-distension from atony, when the sphincter action is interfered with and urine leaks or dribbles out into the urethra; this leaking must

be distinguished from the expulsive act of micturition. *Unconscious micturition* is often spoken of as "involuntary." The surgeon must not mistake frequency of micturition or unconscious micturition for "incontinence of urine," a condition of extreme rarity only met with in extroversion of the bladder, large recto-vesical or vesico-vaginal fistula, and in paralysis.

The *force of the stream* depends upon the expelling power of the bladder and abdominal muscles, and the obstruction offered by the urethra; this force is estimated by the distance to which the stream can be propelled from the body. It may be *increased* by very powerful contraction of the bladder, as is sometimes seen in vesical calculus; it is far more often *diminished* by *atony* of the bladder, *hypertrophy of the prostate* or *tight stricture*.

The *size and shape* of the stream depend upon conditions in the urethra. Where there is stricture the stream may not fully distend the meatus, and then will not be shaped by it, but may be twisted or bifid. The stream may be reduced to a mere succession of drops.

The *duration* of micturition is increased by stricture, by atony of the bladder, and by enlargement of the prostate. Patients often complain of a difficulty in beginning to pass water, this is owing to an interference in the nervous mechanism; a difficulty in "leaving off," or a dribbling continuing after the close of the voluntary act is seen in cases of over-distension of the bladder with "residual" urine. A *sudden interruption* in the act is a very rare symptom caused by a stone in the bladder blocking up the neck.

The escape of urine from other orifices than that of the urethra is evidence of *urinary fistula*, which will be named according to its position, viz. perineal, scrotal, rectal, vaginal, etc.

**Retention of urine** is a condition characterised by inability to empty the bladder. It may be *complete* or *partial*, and as the latter is often associated with involuntary or frequent micturition, it is overlooked by the patients, and may be mistaken by the surgeon unless he remember that "dribbling arises from overflow" in the vast majority of cases. *Complete retention* has only to be distinguished from *suppression of urine*, *rupture of the bladder*, and *extravasation of urine*. It is characterised by the presence of a full bladder, as felt per rectum and above the pubes, and usually by a painful desire to pass water, while the introduction of a catheter is followed by the escape of a large quantity of urine, and relief of the pain. In the other conditions there is no bladder tumour, and on passing a catheter, either no urine, or only a few drops of bloody urine are drawn off; or it may be impossible to get the catheter into the bladder when the urethra is quite torn through. In *suppression of urine* there are characteristic general signs, such as coma and convulsions; in *rupture of the bladder* there is a history of an accident or of long previous retention, with a sense of sudden yielding (see page 167), and in *extravasation of urine* there is the characteristic swelling. (See page 502.)

*Partial retention* is characterised by frequency of micturition, by loss of force in the stream, and often by dribbling of urine or inability to prevent the escape of a few drops of urine during coughing or effort. These symptoms are worse at night; after the patient has tried to empty his bladder the catheter draws off the "residual urine."

The *causes of retention* are *nervous*, *muscular*, or *obstructive*. *Nervous retention* is caused by inhibition of the micturition centre by some strong stimulus, such as that caused by an operation on the rectum or urinary organs, or even any injury or operation, by severe

pain in the act of micturition as in acute urethritis, and also in hysteria. The retention sometimes seen in acute over-distension may be in part due to exhaustion of the lumbar centre. This form of retention is characterised by its suddenness, its completeness, its evident relation in most cases to an injury or operation, and the absence of all "obstruction." *Muscular retention* is due to over-distension of the bladder paralysing the muscle, to atony of the bladder, and perhaps to prostatic growths interfering with the action of the muscle. It is characterised by being chronic (except in cases of acute distension), generally partial, or attended with "dribbling," and by the feeble power with which the urine flows from a catheter; indeed, the bladder may be quite unable to expel its contents, and the surgeon may have to force out the urine by pressure above the pubes. *Obstructive retention* may be *traumatic* or *idiopathic*; fracture of the pelvis, subpubic dislocation of the hip, and rupture of the urethra are the injuries leading to it. The idiopathic causes are calculi and foreign bodies blocking the passage, inflammatory swelling, or stricture of the wall of the urethra, and tumours pressing upon and blocking up the passage. The obstruction from calculi, etc., is sudden; from inflammation it is acute and attended with other obvious signs, such as pain, swelling, and discharge; from stricture or tumours it is chronic, or preceded by difficulty in micturition or diminution of the force or size of the stream. The history of the case and the age of the patient usually suffice to enable the surgeon to diagnose the case; the previous occurrence of urethral discharge, or of a small or feeble stream, of pain after micturition, or renal colic, or the operation of lithotripsy, is to be enquired for. In children, retention is most often due to impaction of a calculus; in young men it is generally due to urethritis, prostatitis or abscess; in middle-aged men it is most often due to stricture:

and in elderly men to hypertrophy of the prostate, or stone.

**III. The urine.**—A full consideration of the best modes and the diagnostic value of an examination of the urine would demand far more space than can be allotted here, and for this the reader is referred to the many well-known manuals on the subject, and especially to Ralfe's "Clinical Chemistry." An examination of the urine should consist of a quantitative estimate of the normal constituents of the fluid, and then of a search for any adventitious substances added to it, or for changes occurring in it before it is voided. Of the first we shall say nothing here, except to emphasise the fact that few observations are of greater clinical importance than the estimation of the daily excretion of urea. Urine is normally an acid fluid; if passed alkaline it may be from an alteration of the secretion and dependent upon excess of fixed alkali, or from decomposition of urea into volatile alkali or carbonate of ammonia. The odour and general appearance of the urine will distinguish between these two states, and if a slip of test-paper discoloured by the alkali be gently warmed over a spirit lamp it will regain its original colour if the alkali be volatile, but will retain its new colour if the alkali be fixed.

For purposes of quantitative analysis a sample from the whole amount of urine passed in twenty-four hours should be examined. For qualitative examination, the urine should be passed in three separate glasses, the first to contain the first two ounces passed, the next the great bulk of the urine, and the last few drops or so should be passed into a third glass. In the first glass will be bladder urine *plus* adventitious matters from the urethra; in the second glass will be the average urine; and in the third glass will be the urine *plus* any sediments deposited in the bladder, or blood escaping at the end of the contraction of the bladder.

**Albuminuria** may be due to the admixture of blood or pus with the urine, or to some condition of the kidneys, their blood-vessels, or the blood, leading to a filtration of blood serum. Wherever albuminuria is unattended with the presence of blood or pus cells in the urine, it is due to some original fault in the renal excretion, and this is corroborated if "tube-casts" of any kind be found. And where the amount of albumen is out of proportion to the number of blood or pus cells seen, the same inference is to be drawn. For further information on simple albuminuria the reader must consult works on medicine.

**Hæmaturia** is most certainly shown by the detection of blood corpuscles in the urine. The surgeon must first *decide the source of the blood*, whether urethral, vesical, or renal. If the blood escape involuntarily and independently of the act of micturition, or pass with the first few drops of urine only, or if the escape of urine be preceded by the passage of a long clot the size and shape of the urethra, the blood is *urethral*. The most common cause of urethral hæmorrhage is injury, catheterism, etc. When the blood flows with the last few drops of urine, it certainly comes from the *prostate* or *neck of the bladder*, and its cause will be inflammation or congestion of the prostate or calculus. The history of the case, particularly the existence of urethritis, gleet or stricture, the examination of the prostate or the passage of a sound will decide the diagnosis. In extensive bleeding from the prostate the blood flows back into the bladder, and it is not then to be distinguished from vesical hæmorrhage except by other signs of prostatic disease. When the blood is not intimately mixed with the urine, but becomes more abundant towards the end of the act, or when the urine contains flat or irregular-shaped clots, or is reddish in colour, it may be assumed to be *vesical hæmorrhage*. The causes of

vesical hæmorrhage are stone in the bladder, tumours of the bladder, acute cystitis, tubercular and cancerous ulceration of the bladder, rupture of a vesical varix, and perhaps hæmophilia, purpura, and scurvy. The hæmorrhage from *stone* is moderate and often very small in amount, intermittent, especially excited by exercise and accompanied by the characteristic pain, etc. The hæmorrhage of *vesical tumour* is often very abundant, indeed, the source of the most abundant vesical hæmorrhage is bladder tumour, especially "fimbriated papilloma," of which it is the first and most marked symptom, and it is very characteristic for the urine to become more and more bloody as micturition proceeds, until at length pure blood is passed as the bladder contracts upon the growth. The hæmorrhage of *acute cystitis* is moderate in amount and accompanied by intense pain and frequency of micturition, and the urine contains mucus and pus. In *tubercular ulceration* there are generally signs of tubercle in the kidney, prostate, testicle, or vesiculæ seminales. The urine should be examined for bacilli. In *cancerous ulceration* there is often profuse hæmorrhage at intervals, generally the patient has previously suffered from pain and frequency of micturition, and there may be cachexia. *Vesical varix* is a very rare condition characterised by occasional profuse hæmorrhages, and only to be diagnosed when all other causes of hæmorrhage can be certainly excluded. Other signs of *purpura*, *scurvy*, and *hæmophilia* accompany bleeding from these causes.

Where the blood is intimately mixed with the urine, there being no difference in colour in that contained in the three vessels, or if the urine have a smoky tint, or if there be long narrow clots ("casts" of the ureter), it is certainly *renal* in origin. Renal and prostatic hæmorrhage may closely simulate vesical hæmorrhage, and be only