

prominent symptom is frequent (perhaps painful) desire to urinate, with no lesion; in other words, simple irritability of the bladder. Its description will be found under the title of "Neuralgia of the Vesical Neck." As will be there laid down, the sexual function is most often at fault in its causation, and not only the neck of the bladder, but the prostatic and membranous urethra, and even the whole canal at times, is involved, sensitive, irritable, congested, prone to contract, while hypochondriacal despondency and perverted intellectual function hold an important place in the picture of the disease. The connection of this affection with sexual causes has never been insisted upon, and yet this cause is, perhaps of all, the most prominent. It will be fully considered under the head of etiology of irritability of the bladder.

SYPHILIS OF THE PROSTATE.—Although it is possible for syphilis to cause its peculiar deposit in the prostate, yet it rarely, if ever, does so. There is certainly no syphilitic condition of the prostate which can be diagnosed except by analogy.

CHAPTER XII.

DISEASES OF THE BLADDER.

Anatomy.—Anomalies and Deformities, Extrophy.—Hernia of Bladder.—Hypertrophy.—Atrophy.—Wounds.—Rupture of the Bladder.—Foreign Bodies.—Retention of Urine.—Incontinence: in Children, in Adults.—Tenesmus.—Chorea.—Hæmaturia.—Neuralgia of the Vesical Neck.—Cause.—Symptoms.—Diagnosis.—Treatment.

ANATOMY.—The bladder is a muscular sac lying, in the male, between the rectum and pubes when empty, and distending, when full, into an oval bag occupying more or less of the hypogastrium. Its position is fixed below by the urethra, but mainly by the pelvic fascia, which, after having lined the cavity of the true pelvis, is reflected upward and lost on the bladder and rectum (as pubo-prostatic and inferior vesical ligaments) and the recto-vesical fascia which binds the prostate and neck of the bladder to the rectum. Above and on the sides the peritonæum covers the bladder, but is attached loosely, especially at the base, so as to offer no obstacle to any change in shape or position of the viscus. A knowledge of the reflections of the peritonæum upon the bladder is essential to a correct understanding of the methods of relieving retention by puncture. When the bladder is empty, it lies contracted behind the pubes; the peritonæum leaves the abdominal walls at the symphysis and passes at once to the bladder, over which it is spread, and then reflected upon the rectum from the base of the bladder, so that, when the latter is absolutely contracted upon itself, that portion of its base lying between

the seminal vesicles is also covered by peritonæum, and there is, properly speaking, no direct relation between the bladder and rectum. Very different, however, is the condition when the viscus is distended. Then, as its cavity fills up, the peritonæum is carried with it. The recto-vesical *cul-de-sac* of the peritonæum is deepened and all that portion of the base of the bladder situated between the seminal vesicles lies directly in contact with the rectum. When the bladder is greatly distended, its base becomes thus uncovered for a distance, roughly estimated, of two inches behind the posterior margin of the prostate. In the same way the distended bladder carries up the peritonæum in front, so that a distance of one to two inches, or even more, above the symphysis becomes bare of peritonæum in extreme retention. Hence the election of these two uncovered spots for puncture.

The medium capacity of the adult bladder is eight ounces, subject to extensive variations from habit or disease. The bladder may become so contracted as to contain only a few drachms, or again capable of holding, without rupture, the better part of a gallon.

The muscular coat of the bladder is composed of a set of external fibres which run mainly longitudinally, some of them being continued up the urachus, and an internal set whose general direction is circular. These latter, greatly reënforced in number, encircle the neck of the bladder and internal orifice of the urethra, and pass under the general name of sphincter of the bladder. Certain fibres, running across the base of the trigonum Lieutaudii, serve to pull upon and open the mouths of the ureters.

The mucous membrane of the bladder is of a pale salmon color, remarkably insensitive in health, covered by a stratified pavement epithelium, and lying in folds when the bladder is contracted. The glands are not numerous, except on the trigone and near the neck. Their office is to secrete lubricating mucus. They are exceedingly small, and composed of simple clusters of follicles. The coats of the bladder are united by connective tissue which is everywhere loose, except at the trigone.

The vesical arteries come from the hypogastric. The veins terminate in a thick plexus about the prostate and sides of the base of the bladder, emptying finally into the hypogastric veins. The lymphatics lead to the hypogastric ganglia. The nerves, partly sympathetic and partly spinal, come from the hypogastric plexus.

The neck of the bladder is that portion surrounded by the sphincter and base of the prostate, limited anteriorly by the ridge, more or less prominent in the adult, which maps out the posterior limit of the prostatic sinus.

The trigone (of Lieutaud) is a triangular space lying between the neck of the bladder and the orifices of the ureters. The muscular coat is here transverse, thick, adherent to the mucous membrane. Its poste-

rior margin is limited by a more or less prominent ridge running between the mouths of the ureters. The ridge can be followed along by the prominence made by the ureters as they penetrate obliquely the muscular coats of the bladder.

The "bas-fond" of the bladder exists only after middle life, and is that part of the base of the organ lying behind the posterior ridge of the trigone. When the bladder is distended in later life, this portion lies on a lower level than the trigone.

The urachus is the remains of the allantoid prolongation. It often remains open for a short distance above the vertex of the bladder and sometimes continues pervious throughout, so that, in adult life, the urine still passes by the navel, but this is exceedingly rare.

The bladder in the fetus, and in early life, is an abdominal organ, situated mainly above the pubes. As the pelvis enlarges it settles down behind the symphysis, and only rises into the abdomen when distended. The mucous membrane of the healthy bladder is less capable of absorption than any other. When deprived of its epithelium, absorption goes on as from other nude surfaces.

ANOMALIES AND DEFORMITIES OF THE BLADDER.

The bladder is almost invariably unique. Large sacculi have sometimes been described as supernumerary bladders, and they may indeed reach a size double or triple that of the bladder itself. They may always be recognized by being destitute of muscular covering. They are herniæ of the mucous coat through the meshes of the muscular tunic. Molinetti¹ describes a woman who had five kidneys, five bladders, and six ureters. Partial partitions extending into the bladder have been observed. Blasius¹ relates a case of perfect segmentation of the bladder by a partition, one ureter opening on each side. Podrazki² refers to several cases by different authors. The bladder is sometimes abnormally small, occasionally wanting, in which case the ureters may open directly into the urethra or into the rectum, or into a general cloaca, there being at the same time arrest in the development of other portions of the genital apparatus. Besides the above, there is one deformity, extrophy, the occurrence of which is sufficiently common to demand a special description.

EXSTROPHY OF THE BLADDER.—This deformity is found in both sexes, but much more frequently in the male.³ In the female it is of less importance, as it may be more easily concealed, and does not prevent the performance of the sexual act. Cases of pregnancy and successful de-

¹ Quoted by Pitha.

² "Die Krankheiten des Penis und der Harnblase," p. 51, Erlangen, 1871.

³ Mr. Earle (volume i., *London Medical and Surgical Journal*) alludes to sixty-eight reported cases, of which sixty were male. Isidore Geoffroy St.-Hilaire ("Histoire générale et particulière des Anomalies de l'Organisation chez l'Homme et les Animaux," Paris, 1825) estimates that one-fourth of the cases are female.

livery at term are recorded. The subject will be considered here, however, only in relation to the male.

The deformity is an arrest of development in the median line, analogous to hare-lip, and is found in different degrees. In a type case the lower part of the front wall of the abdomen and the front wall of the bladder are absent. The pubic bones are more or less widely separated from each other, their ends being united by a strong band of fibrous tissue. The posterior wall of the bladder, pressed out by the intestines, forms a mottled, red, tomato-like tumor, occupying the position of the symphysis pubis. Inguinal hernia of one or both sides is not uncommonly present, either partial or extending down into the scrotum, which is usually normal, containing the testicles. The penis is more or less rudimentary, and affected by complete epispadias. The ureters are sometimes greatly dilated, forming, as it were, rudimentary bladders. A good illustrative case is figured by Sir Astley Cooper.¹

The above description applies to a type case. There may be variations in the absence of herniæ, a normal union of the pubic bones, the amount of the protrusion, etc. Ordinarily in the adult the mass reaches the size of the palm. With complete extrophy there is also always complete epispadias. A condition analogous to extrophy may exist where the bony union of the pelvis is lacking, but the anterior walls of the abdomen and bladder are perfect. Here there is a sort of hernia of the bladder forward. In such cases there is always some anomalous condition of the external organs of generation.

In extrophy of the bladder, the patient's condition is miserable indeed. The thickened inflamed mucous membrane covering the protruded posterior wall of the everted bladder is constantly covered by decomposing "stringy mucus" of alkaline reaction, similar to what is found in vesical catarrh. From the orifices of the ureters, which can be readily seen by pressing back the protruded mass, there constantly distills a limpid, acid, healthy urine. This at once becomes alkalized by contact with the inflamed mucous surface of the bladder, and goes into rapid decomposition, wetting the patient's linen and keeping him constantly surrounded by an atmosphere of ammoniacal, fetid gases, making him disgusting to himself and intolerable to his friends. The integument of the abdomen and thighs becomes excoriated and inflamed. The friction of garments in walking only serves to aggravate the existing difficulties, and the sufferer is in a condition truly pitiable.

By pressing back the inflamed bladder a small prostate is exposed, lying at the angle of the penis and the vesical tumor, and upon it the veru montanum and ejaculatory ducts may be plainly seen. These patients have erotic fancies and seminal emissions; but they are incapable of full erection or of perfect sexual intercourse.

Patients with extrophy of the bladder have been useful to science

¹ Volume i., *Edinburgh Medical and Surgical Journal*.

in facilitating experiments upon the rapidity of the appearance in the urine of substances taken into the stomach. Thus it has been found that asparagus affects the urine in eight and a half, turpentine in four and a half minutes, etc. (salts much more quickly). Furthermore, they give positive evidence of the fact that the secretions forming on the surface of an inflamed bladder are alkaline, and that the urine coming down healthily acid from the kidneys is at once alkalized on reaching the bladder and promptly decomposed. Hence the rule to give alkalies to correct alkaline urine where such alkalinity is due to bladder inflammation, since by this means the urine is rendered less acid and less irritating as it comes from the kidney.

Treatment.—Attempts made to destroy the vesical mucous membrane by cauterization and leave cicatricial tissue in its place have proved unsuccessful. Plastic operations have been performed with sufficient success to justify like attempts where the patient is willing to assume the risk of a fatal termination to an operation undertaken to relieve a deformity which does not threaten life. Usually several operations are necessary to reduce the aperture to a small size; but, even when the flaps slough, the subsequent contraction of the cicatrix is said to improve the local condition. If an operation is to be performed, each case forms a study by itself. Usually a large abdominal flap is dissected up from above the tumor and turned down over it, epithelium inward. The raw external surface of this flap is covered by one or more side-flaps or by integument taken from the thigh; such flap or flaps are secured in place over the abdominal flap by bringing the raw surfaces into contact, and fixing the whole by sutures. Some sloughing is to be anticipated, and subsequent operations have to be devised to meet the requirements of special cases. The most that can be done is to inclose the bladder, leaving an opening below, through which the urine flows unrestrained, as it is impossible to reproduce a sphincter. Finally, a suitable urinal is adjusted and worn constantly.

John Wood¹ reports a case which seems to be an exceedingly good example of what may be effected. A boy seven years old was operated upon four times; and the bladder was closed in—all but a small hole large enough to admit the little finger. The patient was able to retain two ounces of urine, but any cough or other contractile effort would expel it in a jet. The patient died six weeks after the last operation, from erysipelas. Ayres, of Brooklyn, Pancoast, of Philadelphia, and many foreign surgeons, report cases where alleviation of some of the symptoms was effected by operation.

The most that can be promised by operative interference is to leave behind a fistula, more or less large, over which a urinal must be constantly worn. The patient's virility is not returned to him, nor is his condition very materially bettered.

¹ *Medical Times and Gazette*, 1865, vol. i., p. 115.

A less dangerous and equally efficacious mode of treatment seems to be to adapt a suitable urinal to the parts as they are left by Nature, such a one as shall shield them from injury, and keep the patient dry and clean. A urinal of this sort exists, and about a dozen patients in the United States, male and female, have attested its sufficiency for all practical purposes. It was originated by Mr. Earle, of St. Bartholomew's Hospital. It is figured by Vrolick,¹ and again by McWhinnie.² It consists (Fig. 75) of a metallic shield, preferably of silver, sufficiently bulged to contain the protruding vesical wall without coming into contact with it. The edge is rounded off so as to make for itself, by pressure, a deep groove around the vesical tumor. From its lower part, which is slightly bellied downward, extends a tube upon which is fitted a long, flat rubber bag, to be worn strapped to the thigh, and to serve as a reservoir for the urine. The bottom of the bag terminates in a metallic screw, which can be removed to allow the urine to drain off. The metallic shield above is held in place by a truss, which serves at the same time to retain any hernial projections in the groin. The instrument may be kept clean by the use of a weak solution of permanganate of potash. While wearing it the patient is preserved from any friction. All the urine is collected as it flows, and a considerable degree of comfort is obtained, while, with a little care, all offensive odor may be avoided, and the patient put in a position to attend to all the ordinary duties of life, without being objectionable to those around him.

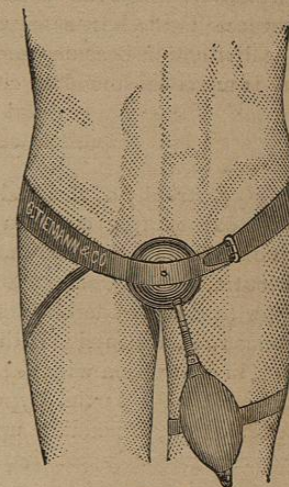


FIG. 75.

HERNIA OF THE BLADDER.

Dislocation of the bladder in the form of hernia may be congenital (rarely), or come on later in life, especially in old age, from exertion, retention, or violence. Abdominal, inguinal (scrotal, sometimes on both sides), crural, perineal, ischiatic herniæ, and cystocele through the foramen ovale (Lentin), have been noted. In women, vaginal and femoral cystocele are most common; in men, scrotal—that portion of the bladder uncovered by the peritonæum being found in the hernia. The bladder may alone constitute the hernia, or coexist with a portion of intestine, perhaps being adherent to it. Cystocele has been opened by mistake in operations for strangulated hernia. Pott records two cases. Stagna-

¹ Plate 604, "Cyclopædia of Anatomy and Physiology."

² *London Medical Gazette*, 1850, vol. xlv., p. 360.

tion of urine, with inflammation of the bladder and formation of stone, may result from cystocele; finally the hernia may become (rarely) strangulated.

The diagnosis is usually easy, especially with a catheter, since the tumor increases when the bladder is full, and may be emptied by pressure, such pressure causing a flow of urine through the catheter.

Treatment.—Replace the tumor, if possible, and retain it by a truss. If it be irreducible, a suspensory bandage should be worn, and the tumor emptied, by pressure, during urination. If it become strangulated, herniotomy must be performed. A knowledge of the possibility of cystocele is the best safeguard against mistaking it for ordinary hernia. The distinction becomes more difficult if the retained portion of the bladder is much thickened by chronic inflammation, or contains stone.

HYPERTROPHY OF THE BLADDER.

Hypertrophy of the bladder as a spontaneous affection does not exist. It is exceedingly common in connection with any morbid condition which prevents the free outflow of urine (hypertrophy of the prostate, stricture, tumors), with stone, or in connection with cystitis from any cause (hernia of the bladder, etc.). The different forms of hypertrophy (concentric, eccentric, with sacculi) are described as part of the disease, in connection with the morbid conditions occasioning them. Civiale speaks of a partial hypertrophy of the bladder, affecting chiefly its anterior wall, depending upon chronic inflammation or tubercular infiltration—evidently not simple hypertrophy.

ATROPHY OF THE BLADDER.

In rare cases in reduced, soft-fibred, debilitated individuals the bladder is sometimes found weak and thin, apparently atrophied in all its coats, and liable to rupture. Civiale gives the caution of avoiding pressure on the bladder-walls during catheterization in weak subjects, for fear of perforation. Bonnet, Hauf, and Hunter,¹ give examples of sudden rupture of the bladder in young persons from this cause. Atro- nized bladders, and those whose nervous supply is cut off by spinal or brain disease, undergo more or less fatty atrophy.

WOUNDS OF THE BLADDER.

Wounds of the bladder are not common, since the position of the organ protects it from ordinary accidents, inclosed as it is, when in a state of relaxation, by the bony pelvis. Excepting the violence done by instruments in lithotomy, possibly in lithotrity, or during other operations, the bladder is but little liable to injury except during distention.

¹ Quoted by Pitha.

It may be perforated by a fragment of bone in fracture of the pelvis. Rising above the symphysis pubis it becomes exposed to incised, punctured, and gunshot-wounds. Wounds of the bladder are exceedingly dangerous to life, without being necessarily fatal. Bullets and fragments of shell have entered the bladder without producing fatal consequences,¹ and there formed nuclei for calculus—as have also portions of bone.

Treatment of injuries of the bladder is that of symptoms and indications—arresting hæmorrhage, and making a free outlet for urine, as well as providing an escape for any extravasated fluid. No matter where the perforation may be, if infiltration is going on, it is always better to set the bladder at rest by a free perineal incision, as in lateral lithotomy, so as to prevent the viscus from filling up. Rest, supportive treatment, and the combating of peritonitis, if it arise, by the early and free use of opium, constitute the outline of treatment. This course is preferable to the practice of tying a catheter in the bladder, which could not fail to prove an additional source of danger.

RUPTURE OF THE BLADDER.

A bladder, when over-distended by urine, may become ruptured by external violence, and this especially if it be atrophied or thinned by disease, ulceration or otherwise; or the accident may occasionally happen if the bladder were previously weakened in any part by the accumulation of urine alone, as in case of stricture. Usually, under such circumstances, the immediate cause has been muscular contraction. The most frequent cause of rupture of the bladder, as commonly met with in practice, is a fall, the bladder being distended. Imperforate urethra is an efficient cause in the foetus. Among traumatism, where the viscus is not weakened by previous ulceration, falls, blows, and crushing injuries, with or without fracture of the pelvis, or even appreciable injury to the soft parts, may be mentioned. The most common position of the rupture is in the posterior wall of the organ, the fissure usually including the peritoneal coat. Other portions of the bladder-walls occasionally suffer.

The symptoms are sudden occurrence of intense pain in the abdomen, with urgent desire to pass water, while attempts to urinate are usually, but not always, ineffective.² Ordinarily the patient is unable to walk from the first. Collapse soon follows. Death may occur in this stage, or the patient reacts and passes into a state of acute peritonitis, or suffers from symptoms of peritonitis with those of infiltration. If he survive the acuteness of this attack, the symptoms merge into those of

¹ I have recorded in the *New York Journal of Medicine*, May, 1865, the case of an adult whose bladder was perforated when distended, by a bullet, during the New York riots, in July, 1863 (the gentleman being a looker-on), terminating in complete recovery.
—VAN BUREN.

² Erskine Mason, "Rupture of Urinary Bladder," *N. Y. Med. Journal*, August, 1872.

local peritonitis, constant and often ineffectual desire to urinate being still a prominent symptom.

The catheter passes generally without difficulty, and clear urine may be drawn, or urine tinged with blood. Whenever a diagnosis of ruptured bladder can be made, a very guarded prognosis must be given, as a vast majority of the cases terminate fatally. Of seventy-eight cases collated by Stephen Smith,¹ there were but five recoveries. The prognosis is naturally more grave where the extravasated urine has entered the peritoneal cavity, than where it has only escaped into the cellular tissue of the pelvis.

Treatment.—It is unwise to temporize by the introduction of catheters. Sound surgery calls for an opening at once in a dependent part of the organ, so that no accumulation of urine whatever can take place. The lateral operation for stone must be performed, the neck of the bladder being incised and stretched so that the urine will drain off without accumulating. If fluctuation can be felt in Douglas's *cul-de-sac*, the latter should be punctured with a trocar and the fluid evacuated. The advantages of this method of treatment, introduced by Dr. Walker, of Boston, are ably discussed by Mason, in the case referred to. In only two reported cases has this operation been tried thus far—both were successful: in one, Walker's, the rent was in the anterior bladder-wall, complicated by fracture of the pelvis; the other, Mason's, was complicated by general peritonitis.

The unsparing use of opiates to keep down peritonitis, and meeting any symptomatic indications which may arise, constitute the remaining treatment.

FOREIGN BODIES IN THE BLADDER.

Besides the foreign bodies which find their way into the bladder through wounds, or come down the ureters (renal calculi), a host of substances have been encountered in the bladder, introduced through the urethra. All unimaginable articles, such as pins, beads, stones, pieces of straw, heads of rye, heads of wheat, portions of glass, tubing, pipe-stems, lead and slate pencils, portions of chalk, wax, etc., have been found in the male bladder, introduced there through the urethra under the influence of morbid erotic fancies. The budding sexual instinct of a boy yearns for satisfaction, but finds none; is thoughtlessly stimulated by the youth himself, by impure thoughts or books, often kindled by those who are older. An uneasy feeling of a desire to do something leads a timid boy to masturbation, and tempts him to play all sorts of pranks with his sexual apparatus. In this way, substances, of every conceivable description which the orifice of the urethra will admit, are introduced into the canal and again extracted,

¹ *New York Journal of Medicine*, 1851.

until, on some unlucky occasion, the object slips beyond the grasp and remains fixed in the deep urethra, or the bladder. The patient's shame will often prevent him from seeking relief; a small smooth foreign body in a healthy bladder may create no disturbance at first, and so the patient goes on, supposing that every thing has arranged itself, until, in after-years, perhaps long after he has forgotten his boyish folly, he gets bladder-symptoms, is cut for stone, and the latter is found to have formed upon a nucleus introduced from without.

Not infrequently, however, a foreign body comes legitimately, as it were, into the bladder; dermoid cysts containing bones, teeth, and hair, may discharge into its cavity. The broken end of a metallic, or, more commonly, a gum-elastic catheter, may constitute the foreign body, usually in cases where the individual is obliged to have frequent recourse to a catheter for the purpose of emptying his bladder. A catheter is most apt to break at the eye. The old-fashioned gutta-percha bougie is particularly dangerous, on account of its liability to become brittle when old. Such bougies should not be used. Again, substances of all sorts, bone, seeds, etc., may enter the bladder through ulceration into the rectum, while splinters, bullets, and bone, may be lodged there during injuries of the bladder.

Treatment.—If the foreign body be a portion of catheter or bougie, the patient will usually hasten to tell his troubles and demand relief. If, however, it is some other foreign body, he will probably seek aid for the cystitis it may have occasioned, but will steadfastly deny the knowledge of any cause, often indeed after the foreign body has been detected, or even extracted. When the nature of the substance in the bladder has been learned, an attempt should be made to extract it, to prevent it from becoming a nucleus for stone. If there be much cystitis present, rest in bed, with demulcents and some anodyne, for several days before the operation, would be advisable. Any thing which will go into the urethra would come out of it, if it could be correctly seized, with its points turned backward, and be drawn upon in a correct line; consequently, an attempt should be made to reach all long bodies (pencils), and all small bodies, by using a small lithotrite, or other forceps designed for this special purpose, of which there are several varieties kept by instrument-makers. If the object be seized in a faulty diameter, it may be released and caught again. This rule applies to portions of metallic catheters as well. It is exceedingly difficult to catch them correctly; soft catheters, however, are very easy to extract; they become doubled up, and may be withdrawn, however caught. The difficulty in seizing a portion of soft catheter is, that it cannot be felt on account of giving no click or grating against a metallic forceps; consequently, in the search for such a foreign body, the blades of the lithotrite have to be shut occasionally over different parts of the bladder-surface, and the offending body is pretty sure to be found, finally,