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BY

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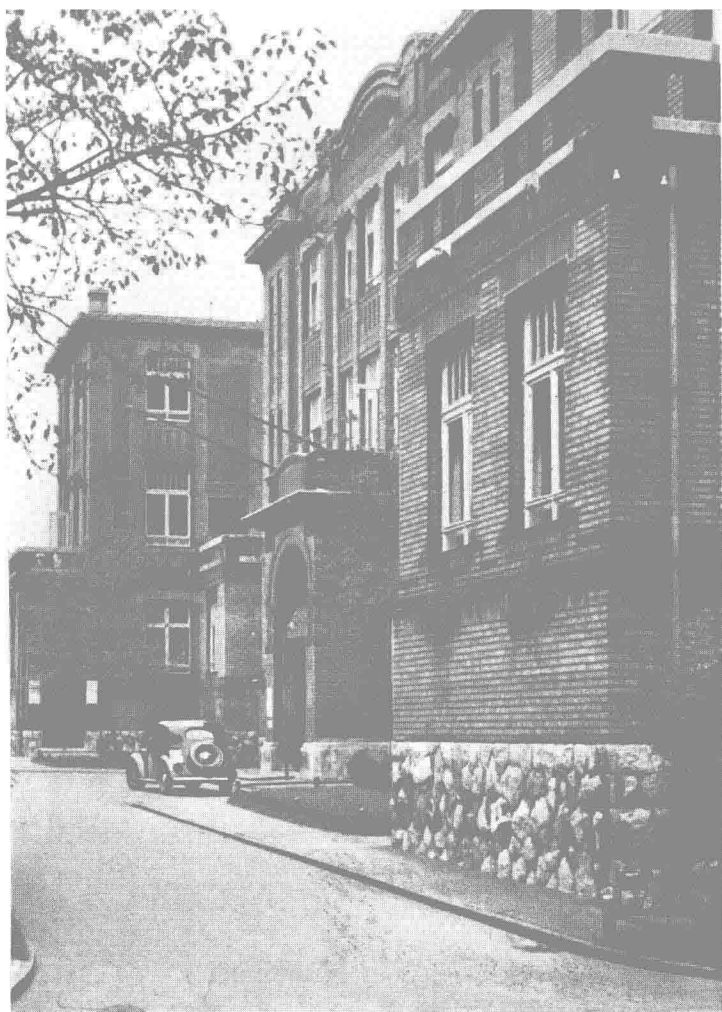
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SURGICAL-UROLOGY



THE CLINIC OF UROLOGY OF
THE HUNGARIAN ROYAL PÉTER
PÁZMÁNY UNIVERSITY, BUDAPEST

CONTENTS.

<i>B) The bladder.</i>		Page
Diseases of the bladder		372
The developmental anomalies		372
<i>A) Extrophia of the bladder</i>		372
<i>B) Diverticulum of the bladder</i>		375
<i>C) Patent urachus</i>		394
Injuries to the bladder		394
Infectious diseases of the bladder		397
<i>A) Cystitis</i>		397
<i>B) Tuberculosis of the bladder</i>		410
<i>C) Syphilis of the bladder</i>		417
Inflammation of the bladder region (pericystitis)		418
Parasitic diseases		422
Actinomycosis		422
Bilharziosis		423
Stones and foreign bodies		424
Bladder stones		424
Foreign bodies		439
Tumours of the bladder		443
Carcinoma of the bladder		453
Nervous disturbances of the bladder		465
 <i>C) Diseases of the prostate.</i>		
Injuries		468
Inflammation of the prostate		469
<i>a) Acute prostatitis</i>		469
<i>b) Chronic prostatitis</i>		476
Tuberculosis of the prostate		480
Prostatic stones		483
Hypertrophy of the prostate		485
Atrophy of the prostate		535
Tumours of the prostate		537
<i>a) Cancer of the prostate</i>		537
<i>b) Sarcoma of the prostate</i>		543
 <i>D) Diseases of the penis.</i>		
Short anatomy of the urethra and the penis		544
Developmental anomalies		546
Phimosis		547
Paraphimosis		548
Injuries of the penis		549
The inflammatory diseases of the penis		551
Tuberculosis and syphilis		553
Tumours of the penis		554

<i>E) Diseases of the urethra.</i>		Page
Anomalies of the lumen of the urethra		559
Congenital stricture		559
Congenital outpouchings of the urethra		560
Anomalies of the external urethral orifice		561
<i>a)</i> Epispadias		561
<i>b)</i> Hypospadias		562
Reduplication of the urethra		564
Injuries of the urethra		565
Gonorrhoeal urethritis and its complications		568
1. Acute gonorrhoeal urethritis		570
2. Chronic gonorrhoeal urethritis		572
3. The complications of gonorrhoeal urethritis		577
Non-gonorrhoeal urethritis		586
Stricture of the urethra (of inflammatory origin)		588
Traumatic stricture of the urethra		603
Peri-urethral suppuration and fistula formation		608
<i>a)</i> Peri-urethral inflammation		608
<i>b)</i> Urethral fistula		610
Tuberculosis of the urethra		613
Syphilis of the urethra		615
Neoplasms of the urethra		618
 <i>F) The diseases of the scrotum the testicle and the epididymis.</i>		
The scrotum		622
The testis and the epididymis		624
Injuries		627
Inflammation of the testicle and of the epididymis		628
<i>a)</i> Acute epididymitis		628
<i>b)</i> Chronic inflammation of the epididymis		630
<i>c)</i> Acute orchitis		631
<i>d)</i> Chronic orchitis		632
Tuberculosis of the testicle and of the epididymis		632
Syphilis of the testicle and of the epididymis		638
Hydrocele of the testis and of the spermatic cord		639
Hydrocele funiculi		645
Haematocele		646
Spermatocele		647
Varicocele		648
Tumours of the testicle		652
 <i>G) Diseases of the seminal vesicle.</i>		
Inflammation of the seminal vesicles		655
Tuberculosis of the seminal vesicles		658
Tumours of the seminal vesicles		659
 Disturbances of the sexual function.		
Irritative symptoms of the sexual organs		664
Pathologic emissions of the semen		664
Satyriasis		665
Priapism		665
The clinical picture resulting from a retention of the genital secretions		666

B) THE BLADDER.

The bladder together with the prostate, seminal vesicle, the ampullar part of the ductus deferens are situated in the small pelvis and posterior to the symphysis. According to the degree of dilatation the shape of the bladder varies. When

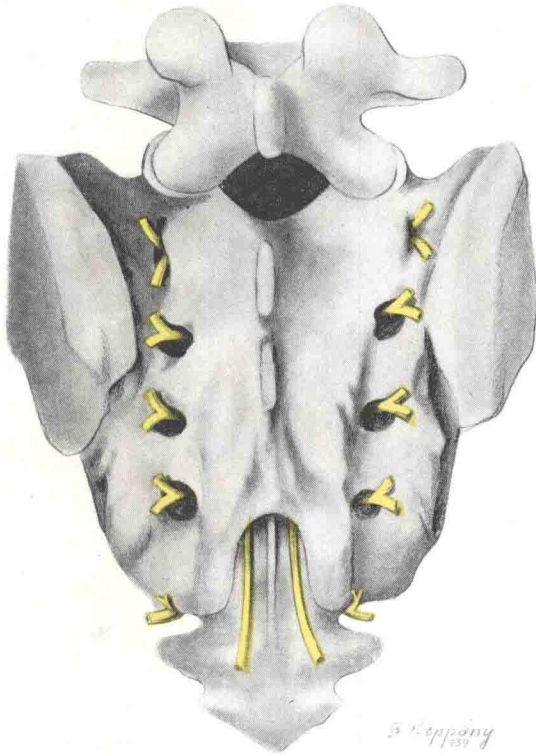


Fig. 244. Os sacrum and the sacral nerves.

it is full, the bladder raises above the pelvis minor, reaches the upper part of the symphysis, in fact, it can extend to the navel. Topographically, there is an anterior, two lateral and a posterior wall as well as the fundus. Mention must be made of the trigonum, which is bounded in the back by the interureteric ligament and in the front by the neck of the bladder and the urethra.

The border between the latter two is formed by the internal vesical sphincter. The wall of the bladder is comprised of multiple layers of smooth muscle, the inner layer is loosely connected and covered by the thick mucous membrane; however, at the site of the trigonum the mucous membrane is very closely bound to the muscle fibers. The outer anterior and posterior walls of the bladder are covered with loose fat tissue (*spatium praevesicale Retzii*).

The blood supply of the bladder is served from the hypogastric artery through the superior and inferior vesical arteries, also the medial haemorrhoidal arteries supply branches, which are greatly anastomosed especially at the fundus. The veins collect and empty their blood supply partly in the hypogastric vein and

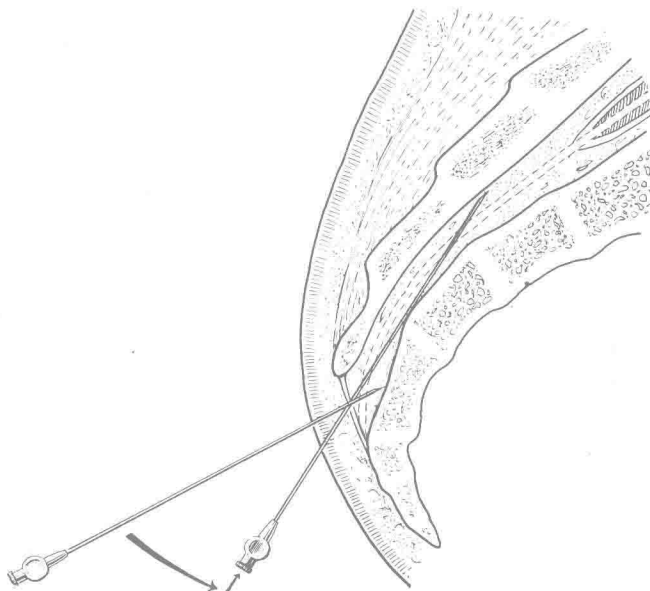


Fig. 245. Epidural anaesthesia. (Introduction of the needle.)

partly into the pudendal plexus. The innervation is from the spinal column and from the sympathetic.

Anteriorly the bladder lies upon the symphysis, posteriorly the rectum and the uterus. The factor of importance in the case of operations is the peritoneum. This extends from the upper symphysis upon the vertex of the bladder, proceeds upon the posterior wall and down into the deep forming the vesico-rectal excavation, in the case of females the vesico-uterine excavation. In males the peritoneum reaches under the fundus and covers the seminal vesicle as well as the ampullar portion of the deferent duct. In females the peritoneum bends back upon the lower and middle third of the uterus. When the bladder is full, the peritoneum covering the bladder is lifted, thereby creating a portion of the anterior wall free of peritoneum; this is the *spatium prevesicale*, which is of importance surgically.

Bladder operations are performed under *local anaesthesia*. The bladder and adjacent parts in the minor pelvis derive their innervation from the sacral plexus, more strictly the pudendal plexus interposed in front of the sacral plexus. (Fig. 244.)

The pudendal plexus is formed by the 1., 2., 3. and 4. sacral segments, from which nerves are given to the muscles (*rami musculares*), to the organs of the small pelvis (*nervi haemorrhoidales*, *n. vesicalis*, *n. pudendus*, *n. cutaneus femoris pos-*

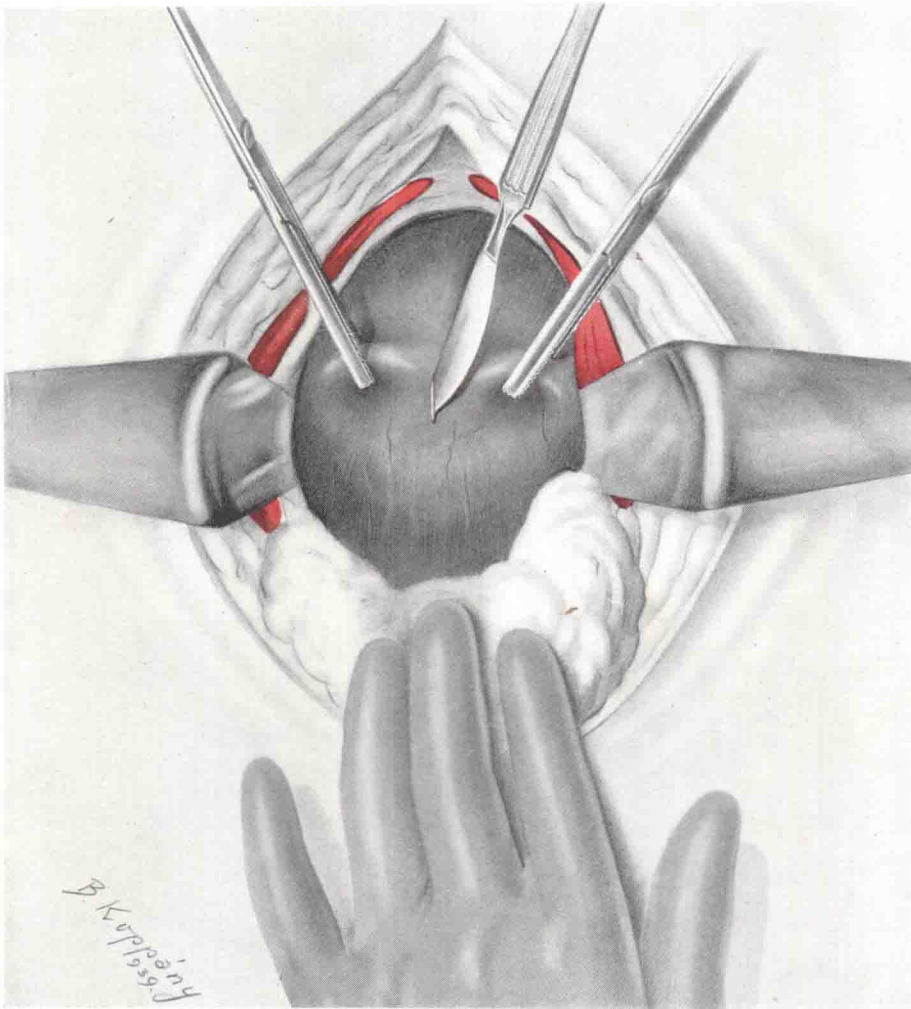


Fig. 246. High incision of the bladder. (Epicystotomy.)

terior, *n. perinei*, *n. dorsalis penis-clitoridis*, *n. scrotalis labialis*). Moreover the sympathetic reach down on the excavation of the sacrum and at each opening form a new ganglion, which is connected with the proper spinal nerve, such as may be found in the thoracic and lumbar regions. The sacral canal, through which the nerves lead to the bladder and adjacent tissue, is in reality the continuation of the vertebral canal. At the bottom of the sacrum can be found the hiatus

sacralis and laterally to this on both sides the vestiges of the vertebral processes, called the cornua sacralia. In the sacral canal is the end of the dural sac (conus duralis) approximately at the level of the second sacral vertebra, which is about 6—9 cm. from the lower outer opening. The sacral nerves spread out laterally and at an angle from the dural sac and reach out in a fan shape to the foramina of the sacrum. The dura covers these nerves to the point of where these step out of the canal. This oblique and fan shaped anatomical feature facilitates the admittance of a needle into the canal without injury occurring to the nerve roots.

Epidural anaesthesia is carried out by having the patient laying on his side in such a position that the knees and the hip are flexed, causing the elastic membranes



Fig. 247. Bladder forceps.

covering the sacrum to be taut and thereby permitting the easy approach of the needle. (Fig. 245.) The point of puncture is determined by palpation of the cornua sacralia and using the middle of these two extremities as the point of entry. The needle is pushed 5—6 cm. ahead in the direction of the long axis of the sacrum and then carefully observed. If neither spinal fluid nor blood flows out, it is a sign that the needle has not entered the dural sac nor the lumen of a vein. Therefore, the needle is retracted some and 30 cc. of 1% novocain-adrenalin solution is slowly injected. The great advantage of this method is that with a single piercing of the needle the anaesthesia is produced. The results are good and therefore it eliminates the lumbar anaesthesia that has more dangers.

The bladder operations are all performed with this method with the exception of the high incision of the bladder, where the tissue surrounding the bladder is anaesthetized by infiltrative procedure.

The incision is made in the median line between the symphysis and the umbilicus being about 8—10 cm. in length. After the incision through the fatty tissue under the skin we find before us the fascia of the rectus abdominis. These are cut sharply the whole length of the incision by scissors. (Fig. 246.) By blunt dissection we push aside the fibers and go through until we find the fat tissue of the prevesical space, which covers the overlapping peritoneum. Before we look for the peritoneum, the bladder is filled with water thereby resulting in the bulging of the bladder. The peritoneum is usually easily pushed off from the bladder by blunt dissection. After this procedure the bladder wall is quite discernible. The wall is grasped by forceps (Fig. 247.) and opened ; however, before opening the bladder is emptied of its contents in order to avoid liquid coming in contact with the incision.

Other operations performed on the bladder are not typical and these will be discussed in the proper chapters.

At the end of the operation, the bladder is closed by one layer of cat-gut sutures in such fashion that only the muscle wall is ligatured, namely : the sutures are paramucous in nature.

Then the fibers of the rectus abdominis are pulled together by a few sutures, then the fascia, and lastly the skin is clipped together.

DISEASES OF THE BLADDER.

The developmental anomalies

include extrophia of the bladder, congenital diverticulum, and patent urachus.

A) Extrophia of the bladder.

In this condition the anterior wall of the bladder and of the abdomen over it are absent. The posterior wall of the bladder bulges forward and protrudes over the symphysis as a red mass, which is covered with mucosa. The ureter orifices lie on a small elevation in a fold of mucosa above the symphysis and they can be seen clearly, if the protruding posterior wall of the bladder is pushed backward with the finger. The urine will at the same time be seen to be ejected from them in a normal rhythm. This constant dribbling of urine macerates the surrounding skin. The patient has a disagreeable ammoniacal, urinary odour. Even males in such a condition prefer to wear a skirtlike garment, which they can better protect from a constant saturation with urine. The protruding mass enlarges on coughing and straining and it does not entirely disappear even on lying down. At its edges the mass is sharply demarcated from the skin of the abdominal wall, which lies in folds and sometimes gives the impression of being scarred.

The umbilicus is also lower and frequently disappears in the folds of the surrounding skin.

The external genitalia are altered. The penis is deformed and flat; and the upper wall of the urethra is completely absent — in other words there is a *total epispadias*. (Fig. 248.) The distorted penis bends upward in a slight curve toward the protruding bladder wall. The foreskin is visible as a well developed fold of skin on the lower half of the penis, as a result of which the organ can readily be curved inward. The bladder sphincter is completely absent.

The testicles are undeveloped and they lie under a fold of skin in the inguinal region (*inguinal retention of the testis*) or in the abdominal cavity (*abdominal retention of the testis*).

In the female the upper wall of the urethra is likewise absent, for a cleft extends through the upper wall of the urethra and through the clitoris. The labia majora and minora appear as folds of skin on both sides; and they do not unite. The vagina frequently forms a small, shallow depression and there is often a double uterus. (Fig. 249.) The anal orifice lies close to the bladder — because the perineum is shortened — and sometimes it even opens into the posterior wall of the bladder.

The ureters curve anteriorly, because the posterior wall of the bladder is pushed forward. Sometimes they are slightly kinked. This may lead to a stagnation of urine in the renal pelvis, which increases the danger of an ascending infection.

The symphysis is absent, for the pelvic bones do not unite in front. A shorter or a longer gap takes its place so that the rectus muscles are separated and often undeveloped.

Symptoms. Under these conditions it may readily be understood that the constant dribbling of urine causes a maceration of the skin of the thighs below the

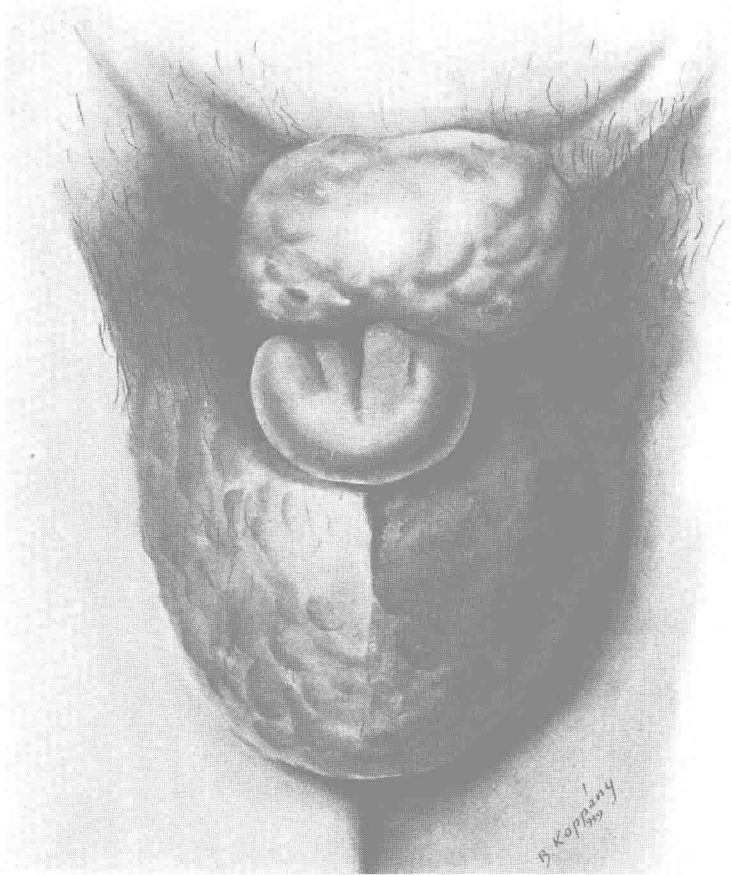


Fig. 248. Extrophia of the bladder (male). Total epispadias.

bladder. An itching eczema arises and the patient has a foul odour. The protruding bladder mucosa becomes irritated and inflamed by the friction of the clothes and hence bleeds easily. In males there is impotence. In the female, even though pregnancy occurs, the uterus prolapses after delivery or even more serious complications may arise. At an advanced age it frequently happens that the prolapsed bladder wall undergoes carcinomatous degeneration.

One third of the children born in such a condition die of a renal infection before the third year of life. Those who live longer, are constantly in danger of ascending infection, recurring pyelitis or infections of the adjacent skin.

Treatment. A receptacle cannot be used successfully in these cases. The patient can, therefore, be relieved only by operation, for if left in that condition, he is unable to support himself and is otherwise a social outcast.

Numerous operations for the relief of this anomaly have been described. In several of these an attempt is made to replace the bladder defect with flaps from the neighbouring skin. In another procedure the bladder is reconstructed from the bowel. This is accomplished by using bowel to form anterior bladder wall or by isolating a loop of bowel completely and transplanting the ureters into it. These

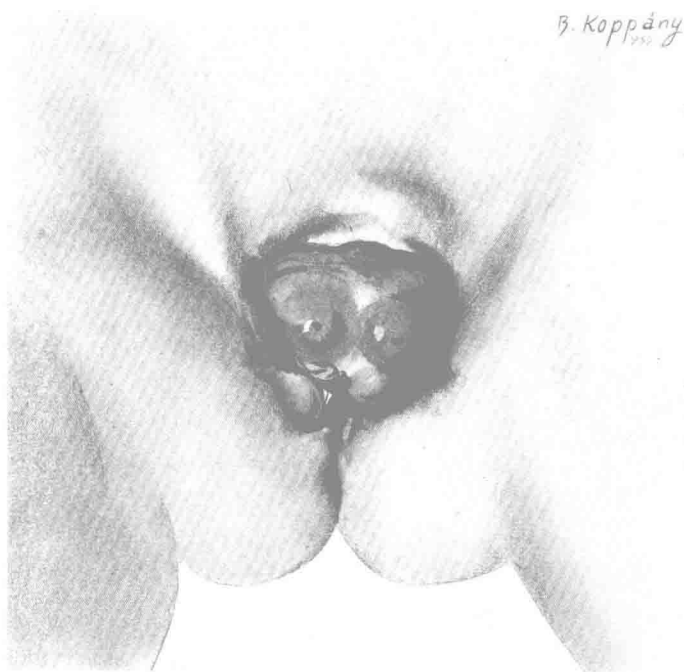


Fig. 249. Extrophia of the bladder (female). The vagina is absent.

operations are not satisfactory, for even when they do succeed, it is not possible to replace the missing sphincter.

The best procedure is that, in which the ureters are transplanted into the colon or the rectum. The urine is discharged through the rectum and the dribbling is eliminated. But there is a constant danger of an ascending infection, which will kill the patient sooner or later — even though he may have survived the operation — which carries a high mortality with it.

In my experience the method of *Coffey* has been the most satisfactory. The ureters are implanted into the sigmoid in such a way that they take an oblique course through the bowel wall between the mucosal and the muscular layers. This tends to prevent an ascending infection without interfering with the discharge of the urine into the bowel.

B) Diverticulum of the bladder.

A diverticulum is a sac-like outpouching of the bladder wall, which communicates with the bladder lumen through a narrow orifice, which is surrounded by a sphincter-like bundle of muscles. Congenital diverticula are not infrequent and they may vary in size from that of a pea to an apple. They occur in those parts of the bladder, in which the musculature is weaker — most frequently around the ureter orifices — and then in the upper portion of the bladder. They are found less often on the lateral and anterior walls.

Some examiners say that there is no renal secretion in the fetus and that renal function begins only after birth. There are some, however, who claim that there is also renal function in the fetus. *Englisch* reported the case of a five month

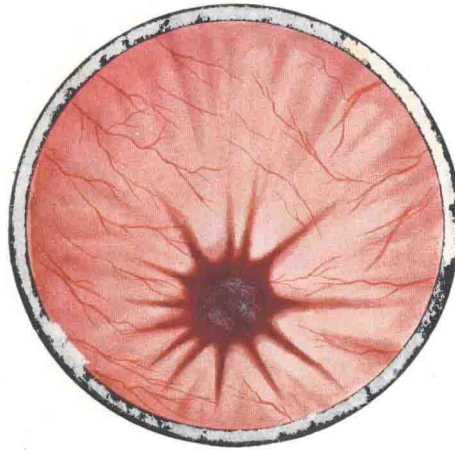


Fig. 250. Sphincter-like orifice of the pouch.
(Cystoscopy.)

fetus with hydronephrosis, where the bladder was filled with urine. *Gusserow* believes that urinary secretion begins in the second month and this empties into the amniotic fluid. This is upheld also by *Jakobson* and *Wiener*. They believe that there may be an obstruction preventing urine passage in the fetal life; this causes a great tension on the wall of the bladder resulting in the initial formation of the diverticulum.

The wall of a *congenital diverticulum* has a layer of muscle similar to that of the bladder. This musculature is even better developed at the orifice of the diverticulum. The wall of an *acquired diverticulum* either has no muscular layer, or the latter is thinner than that of the bladder.

In *trabeculation* of the bladder in cases of obstruction to the outflow of the urine, smaller or larger sac-like outpouchings of the bladder wall are frequently seen. This occurs, because the increased intravesical pressure forces the thinner portions of the bladder wall out between the thickened muscle bundles. These outpouchings are called *cellulae* and their walls consist only of mucosa and connective tissue, and possibly of serosa. They are often seen, sometimes in large numbers, in trabeculation of the bladder due to prostatic hypertrophy or stricture.



Fig. 251. Diverticulum of the bladder. (Cystogram.)

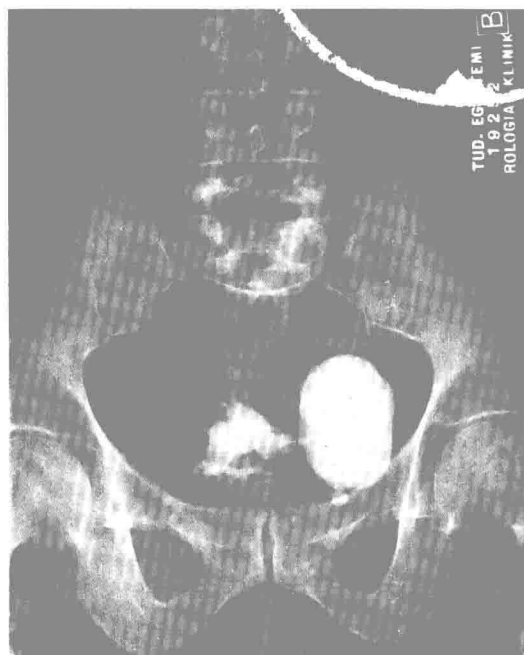


Fig. 252. The same case as Fig. 251. After micturition the bladder empties whereas the diverticulum remains full.

In the beginning the diverticulum is intact and contracts and empties just as the bladder. Later, as it increases in size, its contractions become incomplete and a stagnation of urine occurs in it, because it does not empty properly. For this reason it becomes infected sooner or later and the urine becomes cloudy. Ammoniacal fermentation occurs in the stagnant urine; salts are precipitated and stone, papilloma, or carcinoma may develop in it.

Symptoms. In younger individuals there will be no symptoms as long as the bladder empties properly.

We rarely meet with signs so characteristic of diverticula (without cystitis) as the following case demonstrates. A 21 years old patient complained of micturition in two acts since childhood. After completion of the first micturition pressure upon the region of the bladder resulted in another micturition.

Even a congenital diverticulum only becomes noticeable in later life, especially when a prostatic hypertrophy or a stricture produces an obstruction to the passage of the urine. We found hypertrophied prostate or distal obstruction because of urethral stricture in 80 cases (68%) out of 117 patients with vesical diverticula. When an attempt is made to void in such a case, the hypertrophied bladder musculature will express the urine with great force. The urine will, however, meet with an obstruction and it will, therefore, not drain properly through the urethra. Instead it will flow into the diverticulum and fill it to the point of distension. As a