

The three essentials commonly insisted upon for the proper performance of a cystoscopy are:

1. A urethra large enough to admit the cystoscope.
2. A bladder not too contracted to contain the necessary 150 c. c. of fluid.

3. A clear medium. This is the condition most difficult to fulfil. Unless there is profuse intravesical bleeding the contents of the organ can readily enough be made clear, but they will not remain so. Whether the case is one of tubercle, tumour, or stone, bleeding is a prominent feature, and the cystoscopic manipulations promptly evoke the bleeding. There are two ways of avoiding this difficulty. The first is to know in a general way what you expect to see, and to go straight for it and get a good view of it before it is obscured by the hemorrhage. The other way is to use an irrigating cystoscope, to wash the prism clean, and dilute the muddied contents of the bladder. This latter expedient is deemed the more scientific. I must confess to having found the former more practical.¹

Indications.—Many surgeons constantly employ the cystoscope for the diagnosis of hypertrophy of the prostate, stone in the bladder, and cystitis. I do not consider it a proper routine method of diagnosis for any of these conditions. They may be better determined by other means. In tuberculosis the cystoscope should never be introduced except to decide a question of operation. The only indications for cystoscopy that I recognise beyond this are ureteral catheterization (p. 472), tumour (p. 419), and, in obscure cases, for a diagnosis.

Contra-indications.—In the presence of any acute inflammation cystoscopy is certainly contra-indicated. Chronic cystitis and inflammation, hypertrophy and tumour of the prostate, while they do not absolutely contra-indicate cystoscopy, make it a difficult and rather harmful operation. Cystoscopy irritates tubercular cases even more than do other local measures.

CONGENITAL ANOMALIES OF THE BLADDER

Double bladder, a condition in which the bladder is either divided into lateral halves by a central partition, or gives off one or two large lateral cavities, or is divided by a transverse partition, is very rare. The anomaly is a curious one and has a certain clinical significance in that it may give rise to troubles similar to those

¹ The injection of a solution of adrenalin (1:2,000) serves to prevent hemorrhage in urine segregation (p. 476), and the same solution may be employed in simple cystoscopy.

caused by acquired diverticula (p. 342), with which, indeed, it is often confused. *Absence of the bladder* is also very rare.

EXSTROPHY OF THE BLADDER

Exstrophy or extroversion of the bladder (*ectopia vesicæ*) is far more common in the male than in the female. Thus of the 49 cases collected by Pousson,¹ 37 were men and 12 women. In the female it is of less importance, as it may be more easily concealed, and does not prevent performance of the sexual act. Cases of pregnancy and successful delivery 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 one another, 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 tumour, 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 rudimentary, and affected by complete epispadias. The ureters are sometimes greatly dilated, forming, as it were, rudimentary bladders. The pathology and etiology are given in detail by Connell.²

The above description applies to a type case. There may be variations in the absence of herniæ, in a normal union of the pubic bones, in the amount of the protrusion, etc. Ordinarily in the adult the mass reaches the size of the palm of the hand. With complete exstrophy there is also always complete epispadias. A condition analogous to exstrophy 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 analogous condition of the external organs of generation.

In exstrophy of the bladder the patient's condition is miserable indeed. The mucous membrane covering the protruded posterior wall of the everted bladder is inflamed, thickened, ulcerated, and covered by decomposing stringy mucus of alkaline reaction, similar to that found in vesical catarrh. From the orifices of the ureters,

¹ Guyon's Annales, 1888, vi, 94, 155, 244, 337, 409, 471, 536, 615.

² J. Am. Med. Ass'n, 1901, xxxvi, 637.

which can be readily seen by pressing back the protruded mass, there constantly distils a limpid, acid urine. This at once becomes alkalized by contact with the inflamed mucous membrane 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 truly pitiable condition.

By pressing back the inflamed bladder a small prostate is exposed, lying at the angle of the penis and the vesical tumour, and upon it the verumontanum and the 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 exstrophy of the bladder have been useful to science 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, we have here 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, on reaching the bladder is at once alkalized 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 irritating as it comes from the kidney. Moreover, the possibility of years of severe vesical catarrh without any ascending infection of the kidney enforces the lesson that the ureteral sphincters are the true guardians of the kidneys, and that ascending infection does not occur unless these portals are forced by the back pressure of urinary retention. Yet in the long run the inflammation of the exstrophied bladder does extend up the ureters to the kidneys and the patient thus usually meets his death.

Treatment.—*Palliative* treatment consists in wearing an appropriate urinal. No urinal can be well arranged for an infant or a young child, and at this time vaselin, hot water, and dusting powder are our only arms against the disease. In later life Earle's urinal may be worn. It consists 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 tumour. 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 (Fig. 89) to retain any hernial projections in the groin. The instrument may be kept clean by 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 thus obtained.

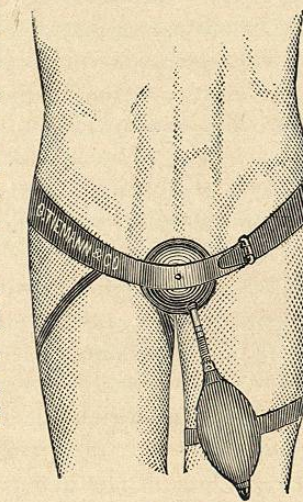


FIG. 89.

Radical treatment is obtained by operation. Unfortunately the most radical operations never result in a perfect *restitutio ad integrum*. Yet they are all, in a sense, radical. Three varieties of operation may be recognised—

1. Obliteration of the bladder.
2. The formation of a new bladder.
3. Diversion of the stream of urine.

With each of these the radical cure of hernia may be combined.

1. *Obliteration of the Bladder* (Sonnenberg¹).—This operation attempts but little. The mucous membrane of the bladder, or the whole bladder wall, is removed, and some attempt is made by skin-grafting or flap-raising to bring the abdominal wall together and so to remove the large raw surface of the bladder and to substitute scar or skin in its place. The ureters, with the mucous membrane around their orifices, are displaced downward and sutured to the end of the penile groove, which may be closed previously or simultaneously by one of the operations for epispadias (p. 22). Thus the object of the operation is to improve the patient's condition to the extent of leaving him with a manageable incontinence by removing the sore and stinking bladder. The operation, though by no means simple or always successful, has no immediate mortality.

2. *The Formation of a New Bladder* (Autoplastic Method).—Operations of this class should not be performed on children younger than five. This operation is the ideal one, but it is an ideal that has not been realized in practice; for the few patients who can be classed as satisfactory retain their urine only for some twenty minutes to an

¹ Berlin. klin. Wochenschr., 1882, xix, 471.

hour, and even these are but a small proportion of the unfortunates who, after their three, four, five, or more operations, have proved total failures. Several improvements in the technic have been recently suggested, but until some one shall produce a sphincter for the bladder the patient's capacity to hold his urine after operation will be entirely a matter of chance.

The operations may be described as—

- a. Suture of the bladder itself.
- b. The flap operation.
- c. Closing the symphysis.

As a preliminary to operation urotropin should be administered to keep the urine sweet, and ureteral catheters should be introduced to keep the wound dry.

The ideal method theoretically is to dissect up the bladder wall, to turn it over, and to suture it so as practically to form a new bladder. There are two causes of failure. In the first place the bladder is so contracted that there is scarcely any tissue to work on. Pousson¹ has in some measure overcome this by boldly entering the peritoneal cavity, inverting the bladder, peritoneal coat and all, and then closing off the general peritoneal cavity (but he reports only one case, and that a failure). In the second place, in spite of ureteral catheters and constant changes of dressings, urine gets into the wound, which granulates instead of healing, with the result that the sutures tear out in the great majority of cases.

The flap operation has been developed by the ingenuity of Roux, Thiersch, Pancoast, Ayres, Holmes, and many others. (Cf. Pousson.) One or two flaps taken from the surrounding skin are turned in to form the anterior wall of the bladder, and the raw surface thus left is covered in as far as possible by other flaps. This operation often succeeds after many partial failures, but the hairs that ultimately grow from the inverted skin become encrusted with phosphates, and the patient finds his partial relief not worth the having. Recent experimenters have suggested filling in the gap with a segment of the gut (Tizzoni and Poggi, Enderlen²), and this operation has been performed once successfully on a man by Rutkowski,³ whose patient eight weeks after operation could retain 25 c. c. of urine. The defect in the bladder wall in this case was not a large one. The gut used was the ileum, which was left attached to its mesentery. Manifestly such an operation is not without its dangers both immediate and remote. A simpler procedure, suggested by Mundel,⁴ con-

¹ Guyon's Annales, 1898, xvi, 1223.

³ Centralbl. f. Chir., 1899, xxvi, 473.

² Deutsche Zeitschr. f. Chir., 1900, lv, 50.

⁴ Annals of Surgery, 1899, xxx, 715.

sists of elevating a flap from the abdominal wall and grafting to its raw surface the bladder wall of a sheep. After this graft has adhered it is swung over the bladder. This operation commends itself by its simplicity.

Attempts at closing the symphysis in order to diminish the gap to be covered over, and at the same time to attempt the formation of a sphincter, have not been very successful. Trendelenburg applies a belt, hoping by its pressure to approximate the bones, and if this fails he opens the sacro-iliac synchondrosis on each side. This operation is not applicable to children over eight years of age, and its results have been quite universally unsatisfactory, though Delagénière¹ reports a case in which after seven supplementary operations he obtained a radical cure and a satisfactory sphincter. Berg² has employed osteotomy of both iliac bones with rather better success. Not enough work has been done along any of these osteoplastic lines for broad conclusions to be laid down as to their results.

3. *Diversion of the stream of urine*, by means of ureteral implantation into the loin or the bowel, has long been a favourite but dangerous operation. Implantation into the loin may be condemned unreservedly (p. 496).

Numerous successful implantations of the ureters into the bowel have shown that the lower intestinal tract is in no way irritated by the urine and that the bowel readily retains the fluid from four to six hours. Yet the danger of ascending infection is here greatest of all. Much has been done to diminish this danger by transplanting the two ureters with the surrounding structures of the trigone in one piece (Maydl). But all of these operations are difficult and dangerous (the description of them belongs to the surgery of the ureter, p. 498). Frank's suggestion of a vesico-rectal anastomosis has given happy results when tried upon dogs.

Choice of Treatment.—Palliative treatment is always unsatisfactory, yet it may be employed by those who object to operation, for operative treatment is almost equally unsatisfactory. We still await the genius who shall give us a reasonably safe and certain cure for this condition. Most of the autoplasmic methods are safe, but their results are scarcely worth the having. Maydl's operation does not give much better results. If the patient is cured by this operation he holds his urine from four to six hours, a result boasted by no other procedure. Yet the operation is a serious one. Its 13% reported mortality is probably an underestimate. It is impossible yet to judge how long the kidneys will withstand infection. But, such as it is, Maydl's operation is the best we have.

¹ Revue de Chir., 1900, xxii, 413.

² Brit. Med. J., 1900, ii, 1168.