

cations for *palliative cystostomy* (p. 395). I have been forced to this expedient a number of times, and have always found it most serviceable. Simultaneous scraping or cauterization of the growth may be of material aid in ameliorating the symptoms and checking the cause of the disease for a time.

**Operative Treatment.**—Palliative suprapubic cystostomy is the operation suited to all desperate and incurable cases. Even though no pretence is made of eradicating the disease the patient's life is prolonged by the very fact that he is relieved of his worst symptoms. I have at present under my care a striking example of the value of this operation. Before operation the patient weighed 120 pounds, and was tortured day and night by incessant straining. Within six months after operation he gained 25 pounds, although the tumour, which was only curetted, was a typical villous carcinoma.

The radical operations employed for tumour of the bladder may be reduced to 4 types:

1. Intravesical excision.
2. Excision after cystotomy.
3. Resection of the bladder.
4. Extirpation of the bladder.

1. **Intravesical Excision.**—This may be performed upon the female bladder through the dilated urethra. But upon the male it must be performed by means of an operating cystoscope, such as Nitze<sup>1</sup> employs. The operation is performed as follows: A cystoscope is introduced into the bladder and the location and other characteristics of the tumour are observed. Then a specially devised electro-cautery snare is thrown about the base of the tumour. The current is turned on, the peduncle burned through, and the stump recauterized. The hemorrhage is slight. In the course of time the tumour is voided through the urethra.

According to Nitze, the instruments required for this operation number 15 at the very least; snares, cauteries, cystoscopes, etc., and no little skill is required as well. Moreover, the operation is manifestly suited only to small tumours, and, while it is true that the tumours most likely to elude the surgeon's eye when the suprapubic operation is undertaken are the very ones that are most conveniently dealt with by this process, it is small wonder that even the 31 operations without a death reported by Nitze have brought him few imitators.

2. **Excision after Cystotomy.**—This and the other operations about to be described are all performed through an epicystotomy

<sup>1</sup> Centralbl. f. d. Krankh. d. Harn. u. Sex. Org., 1896, vii, 377, 469, 601.

wound (p. 459). The bladder is opened in the usual manner by a vertical incision, and the wound in the abdominal wall enlarged, if necessary, by a transverse cut at its lower extremity. A previous cystoscopy has shown the surgeon the exact position of the tumour, which he now searches for with his finger, and draws into the wound by a volsella forceps or a Guyon clamp. A clearer field of operation may be obtained by putting the patient into the Trendelenburg position before proceeding to excise the tumour. This may be done in one of several ways. If the tumour is distinctly pedunculated, it is convenient to burn it away close to the bladder wall with the Paquelin or the galvano-cautery, or Watson's cautery clamp may be employed. For that form of papilloma which grows as a bunch of tufts from a circumscribed area of the mucous membrane, the best operation is a thorough curetting, with subsequent cauterization of the bleeding points. The advantage of using the cautery to check bleeding is obvious. But this treatment is not entirely appropriate to the excision of sessile or frankly malignant infiltrating tumours. These require resection of the bladder wall.

After the tumours have been burned away, a final minute search is made over the bladder wall with the aid of a headlight or mirror (Fenwick employs a tubular speculum to keep the field dry, both in the search and in operating), and any other growths that are thus found are treated similarly. The suprapubic wound is then closed by Gibson's suture (p. 463) about a drainage-tube. There are no special features in the after-treatment.

3. **Resection of the Bladder.**—Resection of that part of the bladder wall surrounding a tumour is essential in the removal of every sessile or infiltrating growth of the bladder (except the myomata), whether it is frankly malignant or not. Papillomata that are apparently benign in character and have stout peduncles require excision or thorough cauterization of the surrounding mucous membrane. But if the tumour is truly sessile, or if there is any evidence whatever of infiltration of the bladder wall, a section of the whole thickness of this muscle must be excised, including an area of apparently normal tissue 1 cm. beyond the limit of induration.

If the tumour lies on the upper or the lateral wall of the bladder the operation is comparatively simple. Peritoneum is stripped away if possible, the requisite section removed, and the gap sutured with two layers of catgut, the one buried for the muscle, the other for the mucous membrane. If the tumour is conveniently situated, the suture may be re-enforced by a layer of subperitoneal Lembert stitches. A wick of gauze may be inserted between the peritoneum



and the incision in the bladder wall to avert infiltration. Free drainage of the suprapubic wound is essential.

If the peritoneum is adherent to the bladder it may be more convenient, after irrigating the viscus thoroughly and packing it with iodoform gauze, to open the peritoneum boldly and excise the section of the bladder from without.

Unfortunately, the great majority of vesical tumours spring from the base of the bladder, from that portion of the organ, namely, which is least accessible, and where free removal of the growth is impeded by the presence of the ureters, the prostate, and the urethra. The rectal colpeurynter is useful in these cases both to force the field of operation up into the wound, and, by pressing upon the pelvic plexus of veins, to control the hemorrhage, which is always considerable. If the growth encroaches upon the mouth of a ureter that duct may be transplanted to the fundus of the bladder (p. 493), although this protracts the operation and increases its peril.

If it is expected that the edges of the wound can be approximated, the incision is best performed with the knife. The burst of bleeding from the cut bladder may be disregarded for the moment, since it is best controlled by the sutures themselves. But if it is foreseen that the section removed from the walls of the bladder will leave too wide a gap to be closed by suture, the incision is more conveniently made with a thermo-cautery heated only to a cherry red. The incision then bleeds relatively little, and such bleeding as does occur may be controlled by forceps, suture, or further cauterizations. The wound is then approximated as far as possible and the raw surfaces left to granulate.

At the close of the operation the bladder may be left empty or it may be packed with iodoform gauze. With our present knowledge of the innocuousness of the ureteral catheter it would seem proper to catheterize both ureters, and thus to divert the stream of urine from the bladder for the first forty-eight hours after operation. Unless this is done the bladder must be gently washed twice a day after operation with hot salt or boric-acid solution. The only special features of the after-treatment are the prevention of hemorrhage and rupture of the bladder. Both of these dangers must be foreseen at the time of operation and prevented by adequate suturing. A general oozing, which often occurs and may assume alarming proportions, is best prevented or controlled by irrigation with a hot 25% alum solution.

4. **Extirpation of the Bladder.**—Total extirpation of the bladder is a most formidable operation, the results of which have been ex-

tremely unsatisfactory. Tuffier and Dujardin<sup>1</sup> review the first 9 operations, including 1 of their own. Of these, only 4 survived. The operation was performed 3 times on the male with only 1 recovery, which case died seven months later. Of the 6 females operated upon, 3 survived, and 1 was known to have been alive three years later. The authors conclude: "We believe that total cystectomy is rarely indicated. It should never be attempted except on a patient strong enough to undergo a shock which is always considerable. Moreover, the tumour must have invaded the vesical tissues so extensively as to make partial extirpation impracticable. Finally, there must be no malignant secondary deposits, as they would render the eradication of the disease incomplete, and therefore illusory." Unfortunately such a combination of widespread local lesion and absence of secondary deposits is not met with clinically. The operation itself is one before which any surgeon may quail. The uretero-rectal implantation which it involves is almost certain to bring about the patient's death within a few months or years. It is quite incredible that there should be no secondary glandular involvements, and quite impossible that these deposits should all be removed. The severity of the operation is attested by its recorded mortality, while its futility is manifest. On the other hand, palliative cystostomy does not subject the patient to any inordinate risk, leaves him fully as comfortable, and assures him quite as long a life as does the more radical procedure. Mann<sup>2</sup> and Bovée<sup>3</sup> take a less pessimistic view of the results of extirpation.

**Results of Operation.**—Motz<sup>4</sup> has collected the records of 55 cases operated upon at Necker. Of these, 35 had been operated upon three years or more before. Ten only survived; and of the 18 cases of epithelioma only 1 was alive at the end of three years. Nine papillomata gave 4 relapses and 2 operative deaths. Albarran counted 36 cures in 48 operations for benign tumour and 23 cures in 97 operations for malignant growth. Clado collected 49 cures in 62 operations for benign tumours and only 28 cures in 111 operations for malignant disease. Even these statistics are optimistic. Papilloma, myoma, and pure fibroma are undoubtedly curable, but malignant disease is almost sure to prove fatal, however small the growth, however radical the operation. I believe that in these cases cystostomy gives more satisfaction to the patient than any resection of the bladder, unless the tumour is entirely circumscribed and its indurated base no more than 2 cm. across.

<sup>1</sup> *Revue de chir.*, 1898, xviii, 277.

<sup>2</sup> *American Medicine*, 1901, ii, 55.

<sup>3</sup> *Ibid.*, 1901, ii, 59.

<sup>4</sup> *Guyon's Annales*, 1899, xvii, 1212.



### CONDITIONS RESEMBLING TUMOURS OF THE BLADDER

Under this title it is convenient to classify three dissimilar conditions which have nothing in common except their extreme rarity and no connection with tumours of the bladder except a clinical resemblance.

#### VARICOSE VEINS OF THE BLADDER

A few cases have been reported which showed only one symptom—i. e., a spontaneous, profuse, uncontrollable hemorrhage of the bladder, which hemorrhage was found to arise from a ruptured varicose vein lying immediately under the mucous membrane. The diagnosis was made either by cystoscopy as the hemorrhage was ceasing, or by suprapubic cystotomy undertaken for the relief of the hemorrhage, as in Dr. Ellsworth Elliot's case. If the hemorrhage does not stop spontaneously the only treatment is cystotomy with ligature or cauterization of the bleeding point.

#### URACHUS CYST, OR FISTULA

Towards the middle months of intra-uterine life the urachus (the canal connecting the bladder with the umbilicus) becomes obliterated. Exceptionally, it remains patent throughout or at one extremity. This patency gives rise to a urachus cyst,<sup>1</sup> or fistula,<sup>2</sup> as the case may be. Urachus cyst is exceedingly rare. I have seen one in an adult which formed a large, irregular, fluctuating, hypogastric tumour. Occasionally a sacculated bladder simulates urachus cyst.

Urachus fistula is commonly a congenital condition and is usually caused by urethral obstruction. Certain cases of persistent permeability of the urachus without any obstruction of the natural urinary passages are quite inexplicable. The urachus may open in adult life as a result of urethral obstruction, but doubtless this does not occur unless there has been some congenital defect in the closure of the canal. Urachus fistula may be distinguished from fistulae resulting from the bursting of an abscess or from malignant infiltration.

The treatment of urachus cyst, or fistula, consists in the excision of the canal or cyst after the urethral obstruction has been removed. Indeed, some fistulae have been closed by merely removing the obstruction and cauterizing the canal by injections of alcohol or other irritants.

<sup>1</sup> Phila. Med. J., 1899, iii, 830.

<sup>2</sup> Delore, Guyon's Annales, 1899, xvii, 962. Jahn, Beitrag z. klin. Chir., 1900, xxvi, 323.

### INTESTINAL FISTULA

Vesico-intestinal fistula may be traumatic, ulcerative, cancerous, tubercular, or congenital. Congenital fistula is very rare. Ninety-five reported cases of acquired vesico-intestinal fistula in man have been collected by Chavannaz.<sup>1</sup> Of these, 13 were traumatic, 29 ulcerative (from stone, abscess, etc.), 19 cancerous, 7 tubercular, and 27 unclassified. The fistula usually opens into the rectum (43 cases) or into the sigmoid flexure (14 cases), but it may open into almost any part of the intestine, even the appendix vermiformis. The fistula may be short and direct, but in fully 25% of the cases there is an intermediate suppurating cavity between the vesical and the intestinal orifice.

**Symptoms.**—The most notable symptom of vesico-intestinal fistula is the passage of gas from the urethra (*pneumaturia*). This symptom is always present and is always noted by the patient. The urine may also be passed partly or wholly by the bowel, and when the opening is large feces may enter the bladder and issue with the urine. Cystitis is inevitable.

**Diagnosis.**—As a rule the diagnosis may be made from the presence of pneumaturia, although gas may be evolved by fermentation within the bladder itself. Thus the intravesical action of the yeast fungus upon saccharine urine has been known to cause pneumaturia, and I have seen two obscure cases in which the presence of gas could not be accounted for. If the evidences of bladder disease do not sufficiently confirm the diagnosis of fistula, an injection of methylene-blue solution into the bladder will decide the question by transuding through the fistula and appearing in the dejecta. The position of the fistula may be estimated by cystoscopy, by rectal touch, and, if necessary, by the rectal speculum.

**Prognosis.**—The prognosis depends on the nature of the fistula. Traumatic fistulae often heal spontaneously if the bladder is kept clean and the urethra clear. Tubercular and malignant fistulae will not heal.

**Treatment.**—Palliative treatment consists of daily irrigation of the bladder and bowel. Traumatic and ulcerative strictures that do not heal kindly may be stimulated by rectal injections of alcohol or of the ethereal solution of hydrogen peroxid (p. 129). Palliative operation consists in colostomy. This is the only appropriate treatment for incurable fistula. Temporary colostomy is also employed as a preliminary to the attempt at radical cure. Palliative colostomy

<sup>1</sup> Guyon's Annales, 1897, xv, 1176, 1287, and 1898, xvi, 85, 203.



has been performed 11 times. Seven patients survived the operation one month; but of these, only 4 lived out the year and only 2 survived three years.

A radical cure may be attempted in several ways. Chavannaz reports 3 cures by dilating the fistula and scraping its rectal extremity. Suprapubic section and suture of the vesical end of the fistula improved 1 case. Inasmuch as fistulæ between the bladder and intestine above the rectum are almost all either tubercular or malignant, they are only susceptible of palliation by colostomy. Vesico-rectal fistulæ may be operated upon by the methods employed in the treatment of urethro-rectal fistulæ (p. 247).

## CHAPTER XXVIII

## URINARY CALCULUS—VARIETIES—ETIOLOGY—VESICAL CALCULUS—MORBID ANATOMY—SYMPTOMS—DIAGNOSIS—TREATMENT OTHER THAN RADICAL

## URINARY CALCULUS

A URINARY stone, or calculus, is a body resembling a stone in its general characteristics, and formed of crystalline urinary salts (exceptionally of other substances) held together by viscid organic matter, and showing, microscopically or to the naked eye, a laminated structure.

All true calculi are composed of a nucleus, single or multiple, and layers more or less concentric of the same or of another material arranged around it (Figs. 98, 99, 100). This is the case for large as well as for microscopic calculi, even for those requiring a magnifying power of 250 diameters (Beale) to make out their lamination. This fact of lamination alone differentiates calculus from gravel, the latter being crystalline dust or concretions of crystals more or less large, but not possessed of definite structural arrangement.

The *nucleus* of a stone may consist of whatever, among the organized, crystalline, or earthy constituents of normal or pathological urine, is capable of concreting into a more or less solid mass; or it may be a foreign substance either coming from within the body or introduced from without. The nucleus is usually in the centre of the stone (Figs. 99, 101). An unusual excentric development is shown in Fig. 98.

The calculus takes its distinguishing title from the salt or salts



FIG. 98.—SECTION OF A PHOSPHATIC STONE, SHOWING EXCENTRIC DEVELOPMENT.