

early. It has been our experience that complications and the consequent mortality may be reduced by efficient and intelligent nursing. Formerly patients on whom prostatectomies had been done were always attended by women nurses both for special and general care. As a rule these nurses had had little previous training, they despised this class of cases, they took no interest in the results, and only an embolus or a hemorrhage startled them into an appreciation of the presence of a complication when it was still early enough for effective treatment. The condition of the patients' wounds was evident from the fact that as far as possible cases of this kind were isolated, and justifiably, to one ward or hall. At present with a corps of male nurses who spend practically all of their time on prostatectomy and allied bladder cases, it is rare that a wound has an odor, and the patients occupy any room in the hospital. The male nurses are alive to the necessity of anticipating complications and starting the necessary treatment sufficiently early to do good.

#### CONCLUSIONS

I would emphasize:

1. The value of nurses who are trained in prostatic work.
2. The direct ratio between the local infection and the number and severity of complications.
3. The necessity of early recognition and early treatment of complications.

#### POSTOPERATIVE TREATMENT OF PATIENTS FOLLOWING PROSTATECTOMY \*

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The postoperative care in surgical cases is concededly one of the important factors of an operation. The policy of "watchful waiting" can have no place here, but rather one of preparedness. This preparation is doubly important in prostatic cases because of the advanced age of the patients and usually their lowered vitality, resulting from back pressure on the kidneys. To make use of an Irish bull, the preoperative preparation of the patient is the most important part of the postoperative care.

Generally prostatic patients present a history of frequent urination for some years, to which little attention has been given because such frequency was considered a natural condition in an old man's life. Only when they began to suffer from broken rest or experienced complete retention was their physician's attention called to these urinary symptoms. They are treated for dyspepsia, colitis, some cardiac condition, high blood pressure, Bright's disease—because of a trace of albumin in the urine—when the underlying cause is the enlarged prostate, with the coincident back pressure on the kidneys.

To relieve this condition and to put the patient in the best condition possible previous to operation should be the aim of the surgeon. Various methods have been used, such as frequent catheterization at regular intervals, the indwelling catheter in the urethra, and suprapubic puncture. The last is really akin to the two-step operation.

The two-step operation, brought into prominence by Lilienthal, has been popularized by Pilcher, through the use of the large mushroom or Pezzer catheter. The primary operation is performed under local anesthesia, the suprapubic opening being made high enough in the bladder, as suggested by Squier, to be just below the border of the peritoneum, and the Pezzer catheter slipped into the bladder through an opening around which a purse string suture has already been placed. A tight joint is thus made, the wound heals quickly, and, if necessary, we may wait for a week, a month, or three months, until the patient is in good condition. In my opinion this method is far superior to frequent catheterization or the indwelling catheter, with its accompanying traumatism of the urethra and ensuing urethritis.

If there has been a dirty bladder and infection of the wound occurs, the patient can withstand it much better than if it were an added risk to a prostatectomy. Nature, in self-protection, lines this opening with granulation tissue. As it is only necessary to stretch this opening in the second operation, there is little risk of infection in this tissue during removal of the prostate.

The patient may now receive cabinet baths, bowel washes, and whatever attention is necessary to care for his vascular system or other complications. It is highly important that patients should sleep at night, and by this method they seem to thrive through their ability to make up for previous loss of sleep.

The cystitis, which is usually present, may now be treated by silver nitrate lavage two or three times daily. The rapidity with which severe cystitis will improve under this treatment is surprising, and a patient who has been septic from absorption of toxic material will yield most gratifying response in increased appetite and general well-being.

In patients who have never been catheterized and have a sterile urine, we have found that with the greatest care infection soon follows. A number of cases have been reported in which fatal results followed the first catheterization. It is this class of cases with the chronically distended bladder, and urine of low specific gravity, and where no great discomfort is complained of, that is most dangerous. Cabot claims that if an immunizing dose of colon vaccine be administered no infection follows. If this proves to be true, it will mark a great advance in the care of these cases.

Now that the patient has been given the preoperative care suggested, how are we to know when he is fit for the second operation? The best answer is had by looking at the general picture. Functional tests, which have been low at first, have been increased. The appetite is better, the urine output has improved and become nearly normal, and either a polyuria has been reduced, or a scanty urine increased. As the function increases, the patient usually looks better. I myself rely a great deal on the phenolsulphonephthalein test; but reliance should not be placed on these tests alone, because I have operated successfully on a number of patients when the test remained low. It is most assuring, however, if the test improves and appears within normal limits.

During the period of preparation the patient usually is occupied during the morning with cabinet baths, etc., and is up and around during the afternoon, and sleeps well at night. These patients show a marked change after a week's care. They are being trained for a fight, and the more thorough the training, the greater the

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resistance in the final combat. When they are prepared for the second operation, the most important part of the operation is over.

The second operation is performed under general anesthesia, and the time consumed is very short. The opening is usually stretched to admit two fingers, and the prostate shelled out in four or five minutes. The shock from the anesthetic is almost nil. Probably as many patients have died from hemorrhage, which has been called shock, as from any other cause. Hemorrhage can be obviated in various ways. First, and most important, keep to the line of cleavage. Second, after flushing out with hot water, by the use of the Hagner bag, the hemorrhage may be controlled by pressure. Third, the cavity may be packed with a long strip of gauze, the end being brought out through the drainage tube, or an indwelling catheter may be left in the urethra for drainage and packing around the catheter. Fourth, sewing up the edges of the torn bladder wall. The latter procedure, which has been attempted by various operators and has been more time consuming than the operation itself, has been much simplified by the adoption of an ingenious retractor by Dr. Danforth of the Mayo Clinic. The retractor is easily inserted in a small suprapubic opening and a running suture readily taken where the bladder wall has been torn in removing the prostate. This usually controls the greater share of the bleeding.

The drainage tube should be of sufficient size so that it cannot be plugged by a clot. I prefer the Marion because of its stiff wall, and also the small tube attached, which can be used for irrigation. In closing the wound, figure of 8 sutures of silkworm gut should be used, leaving the ends of the sutures long next to the drainage tube. The less irrigation and the least disturbance of the bladder following the operation the better. If left alone a clot will soon form. When continual irrigation was used, we did not realize just how much bleeding there was, and by our irrigation we inhibited just what we wanted to take place.

If Hagner's bag has been used, it is better to wait forty-eight hours before removal. If packing has been used and the end brought out through the Marion tube, we may begin to remove the packing at the end of twenty-four hours, pulling out that part which is loose, and repeating about every four hours until all comes away. On the third day, as a rule, the urine is clear, or but slightly tinged. The large Marion tube may then be removed and a large size Pezzer catheter inserted. The ends of the figure 8 sutures which were left long may now be tightened up, and the wound strapped with adhesive plaster to give it support. In another twenty-four hours the bladder will have closed sufficiently tight around the tube so that the patient is dry, can get out of bed and can move around quite comfortably.

Patients should sit up in bed on the third day and be out in a chair for an hour or so on the fourth. Men of advanced age do not do well if confined to bed, and should be stimulated to help themselves by getting out of bed early.

At this time a cork may be inserted in the Pezzer catheter and the patient told to void naturally, but he must not try to distend his bladder. The Pezzer is left in the bladder until the wound is solid, usually at the end of two weeks. The tube is then removed and the fistula heals in a few days. The healing can be aided at this time by inserting an indwelling catheter, so that the bladder will not be distended.

The comfort of a patient who is kept dry following operation is incomparable with the former method of letting the suprapubic wound fill up voluntarily. Even if the dressing were changed every two hours, the patient lay in a wet bed most of the time, and the odor surrounding the patient was most offensive.

From a financial point of view, the saving of a dollar a day for dressings is important to many patients, to say nothing of the comfort.

The urine should be watched for marked alkalinity. Acid sodium phosphate or lactic acid bacilli will clear up an alkaline urine, and this would tend to improve a cystitis and prevent formation of phosphates about the wound. It will also lessen the tendency of a complicated epididymitis, which is a frequent occurrence.

To protect the skin from an irritating urine and also to stimulate wound healing, some oily preparation should be used. Equal parts of balsam of copaiba and oleum ricini are very satisfactory. As the suprapubic wound closes, the patient frequently has a rise of temperature, often reaching 104, for twenty-four or forty-eight hours. This condition usually cares for itself without any specific treatment.

The Murphy drip should not be used, because following the trauma of removing the prostate the lower bowel is very sensitive, and the patient has more or less desire to strain and will expel any fluid.

Whiteside<sup>1</sup> reports two cases of rectal fistula following passage of the rectal tube and urethral catheter; also two cases of fatal hemorrhage caused by passing the rectal tube a day or two after suprapubic prostatectomy. These reports emphasize the fact that instrumentation of the lower bowel following prostatectomy is contraindicated.

Diverticula are frequently overlooked before operation because of the difficulty of cystoscopy. Following the operation they may be the cause of hemorrhage because of reducing the pressure in the sac. This may not be recognized until the wound heals, and the patient continues to have residual urine or cystitis that does not clear up. If silver iodid or thorium is injected into the bladder, the patient lying on his back and a roentgenogram taken, it will save much explanation afterward. If a diverticulum is recognized before operation, it is not wise to attempt removal of both diverticulum and prostate at the same time. If the diverticulum is small it may not give any trouble afterward, but if large it should be taken care of after the patient has recovered from the prostatic operation.

Hiccups are a most serious complication. If occurring before operation, they should be a warning of low renal function. They usually appear in from twenty-four hours to a week following operation. They do not occur so frequently following the two step operation as after the one step operation. Being of renal origin, all nourishment should be stopped and every effort made to increase diuresis.

Femoral thrombosis, although a rather unusual complication, is caused by keeping the limbs quiet, permitting the deposit of fibrin at this point. Aschoff suggests, as a prophylactic measure, massage of the legs daily, or having the patient flex and extend the legs for a period each day while in bed.

In the postoperative care of prostatic cases, as in all surgery, it is important and profitable that the surgeon give his personal attention to all details unless, of

1. Whiteside, G. S.: Prostatectomy Mistakes and Failures, *The Journal A. M. A.*, Oct. 2, 1915, p. 1163.

course, competent nurses can be directed or are experienced in such cases. The surgeon will gain by his personal attention to after-care, because he may early discover any alarming conditions and avoid serious consequences, and he will also derive from his experience in one case points which may prove valuable in subsequent cases.

#### CONCLUSIONS

It has been my endeavor to emphasize:

The importance of preoperative care and diagnosis.

The advantage of the two step operation because it causes less shock to the patient.

The use of the Hagner bag or packing to control hemorrhage.

The use of drainings which keep the patient dry and also permit them to be out of bed while convalescing.

The fact that instrumentation of the lower bowel following operation is contraindicated.

The importance of personal attention to details of postoperative care.

Electric Building.

### THE POSTOPERATIVE AND CONVALESCENT PERIOD OF PROSTATECTOMY \*

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For some years past, the importance of preoperative preparation of a patient to be subjected to prostatectomy has been well recognized. Few surgeons at present will operate until the functional capacity of the kidneys has been tested, and if found markedly deficient, attempt has been made to stimulate renal excretion to at least an approximation of the normal.

About a year ago, I became interested in the research work of Myers and Fine on the chemistry of the blood in diabetes and nephritis; and having the opportunity to have blood examinations of my patients carried out by these men, I believe that I have been able to avail myself of certain laboratory determinations which have been of material aid in preventing postoperative complications.

Many of the patients requiring prostatectomy are individuals who present a well defined degree of nephritis. A few have diabetes. The diabetes may vary from a simple glycosuria without acetone or diacetic acid to the more marked cases with a variable degree of acidosis.

Diabetes and nephritis are accompanied by characteristic alteration in the concentration of one or more blood constituents.

In diabetes the sugar concentration of the blood is usually about 0.2 per cent. and may reach as high as 0.8 per cent., and the chemical change in the blood is confined principally to the sugar concentration. Normally the sugar concentration varies between 0.09 and 0.12 per cent. It follows, then, that a knowledge of the concentration of blood sugar is very often a great aid in interpreting the fluctuations in the glycosuria which may be attributed to renal complications. Primarily we are concerned with the hyperglycemia and not with the glycosuria.

We have operated on a number of patients who showed simply a glycosuria but without a hyperglycemia, and have had no trouble in the postoperative convalescence. Again we have been able, by means of blood chemistry, to anticipate certain of the serious complications of diabetes. In a patient presenting a diminishing glycosuria with an increasing hyperglycemia, we have suspected that the threshold of renal retention for sugar has been raised. This not infrequently occurs when chronic kidney disease is associated with a diabetes. The determination of a diminishing glycosuria with a high blood sugar has enabled us to treat the case accurately and adequately before operation, and we feel sure has obviated complications that would have arisen had we not availed ourselves of these scientific determinations.

Previous to taking up the study of blood chemistry in its relation to operative risk, we made it a rule to test out the functional capacity of the kidneys, and have been impressed with the prognostic value that such determination gave us. There are, however, a class of cases in which the ordinarily functional test of renal capacity is fallacious, and we have found that the estimation of the urea, uric acid and creatinin retention has been a much safer guide as to operability. Occasionally a patient who has responded in an adequate degree to the phenolsulphonephthalein test, and would seem to indicate a condition that would be operatively safe, has been operated on and ended up in an acute suppression of urine and death. This has been particularly true of the type of uremic nephritis. Neubauer, Folin, Denis, Myers and Fine have shown that in uremic nephritis concentration of uric acid and creatinin are far in excess of those observed in any other condition. In fact, the uric acid exceeds the concentration observed in gout and lead poisoning, and may rise above 15 mg., while the creatinin is commonly from 5 to 15 mg., and may give as high as 34 mg. per hundred c.c. of blood. This degree of creatinin retention is confined to the uremic type of nephritis.

If one considers that the ratio of creatinin which is formed in the body in health and in disease is practically a constant quantity, and since creatinin is most readily eliminated by the kidney, it is found under normal conditions only in small amounts in the normal blood, from 1 to 2 mg. per hundred c.c. It follows, then, that the estimation of creatinin is of immense value in the prognostic value in this type of case.

It would appear that the permeability of the kidney in nephritic states is lowered and becomes evident in the blood: first, by an increase in the uric acid, second, by an increase in the urea, and lastly by creatinin; and therefore a case that has presented a creatinin retention of from 4 to 15 mg. per hundred c.c. has been a case that has almost invariably developed marked uremic symptoms.

The determination of urea, uric acid and creatinin retention indexes has been a matter of great usefulness in the way of indicating adequate preoperative treatment and thereby preventing the development of some of the major urinary complications after prostatectomy.

I would refer those interested in this phase of the subject to the recent papers of Myers and Fine.<sup>1</sup>

Among a number of factors making for success in prostatectomy, I doubt if I put it too strongly when I

\* Read before the Section on Genito-Urinary Diseases at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.

1. Myers and Fine: Chemical Conditions of the Blood in Health and Disease.