ONE-STAGE SUPRAPUBIC PROSTATECTOMY

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THE value of suprapubic prostatectomy has been established by many years of experience with the operation. Not infrequently, however, accepted procedures are improved and such advances may go unheralded or taken for granted. With the introduction of other surgical procedures for the correction of benign prostatic hypertrophy it seems timely to review suprapubic prostatectomy to see if it has maintained its place in the surgical treatment of this condition.

One-stage suprapubic prostatectomy in itself represents an advance. Many can recall the days of the two-stage operation, and one leader in urology even advocated a three-stage operation at one time. The multiple stage operations doubtless served a useful purpose but they are no longer necessary. With the one-stage operation one avoids long periods of hospitalization and there is less morbidity and fewer complications.

Several factors may be mentioned as having accelerated the adoption of a one-stage prostatectomy. In the past decade or two the increased safety of prostatic surgery has encouraged patients to seek relief earlier. Thus, patients in a younger age group come to us in better general health and before extensive renal damage is present. The introduction and intelligent use of the sulfonamides and antibiotics is another important factor. Before their introduction, urinary sepsis was a major cause of catastrophe in prostatic surgery and there was no satisfactory treatment.

Although it appears paradoxical on first consideration, I believe that transurethral resection increased the safety of one-stage prostatectomy. This was accomplished by providing us with an operation to relieve the small fibrotic prostates and vesical neck contractures, and permitted at least symptomatic relief to the bad risk patient with the larger glands. Furthermore, I believe transurethral resection stimulated a return to open surgery for benign prostatic hypertrophy because of the unsatisfactory results which so often followed resection of the larger glands. Transurethral resection is a useful and valuable operation, but has its definite indications and limitations which should be recognized.

One of the most important factors in advancing one-stage prostatectomy, is an appreciation of the importance of certain details in the preoperative study and management of these patients. We all recognize the value of careful general examinations of the patient, particularly the cardiovascular system, and for many years the importance of blood chemistry and renal function studies has been appreciated. An examination of extreme importance which we routinely employ is the intravenous urogram.[1] We have adopted the following

technic. After a preliminary plain roentgenogram of the abdomen, the intravenous contrast medium is injected, and a 14 by 17 inch film made at intervals of 5, 15, 30 minutes, and one hour. At the time of the 30 minute film an additional 8 by 12 film is made of the bladder, prostate and urethra. Although not a routine procedure, when the urogram is completed one may make an additional bladder film after the patient has voided; this makes visible the amount of residual urine.

By careful study of these films one may determine the renal function, the exact status of the upper urinary tract, the condition of the bladder, and the presence of possibly associated disease such as diverticulum, stone, or tumor. One may also estimate the size and type of the prostate which may even show calculi. Furthermore, one may readily determine the need for preoperative drainage and, in most instances, the appropriate operation may be selected without the need for cystoscopy.

Any patient who presents prompt and normal diodrast excretion with an anatomically normal upper urinary tract does not require preoperative drainage of any type. This conviction applies even in the presence of residual urine. I have repeatedly performed a one-stage prostatectomy in patients with 500 cc. or more of clear, uninfected residual urine, insisting only that the urogram demonstrate a normal upper urinary tract.

In contrast, however, preoperative drainage is essential in those patients whose urograms present delayed diodrast excretion with the hour film showing bilateral hydroureter and hydronephrosis. It should be emphasized that we do not attempt to do an intravenous pyelogram in any patient whose blood urea exceeds 60 mg. per cent as there will be no visualization. However, the blood urea may be within normal limits in a patient whose urogram presents a pronounced bilateral dilation of the upper urinary tract. Such a patient requires preoperative drainage, and affirms the fact that the blood urea alone is not a reliable indication of the status of the obstructed kidneys.

The matter of preoperative drainage deserves special comment. Years ago, and in some instances even today, it was routine practice to place an indwelling catheter in every patient admitted for prostatic surgery. This is unnecessary in most cases, and may actually be detrimental. This procedure is all too often followed by infection, chills, fever, and acute prostatitis. There may also be thrombophlebitis of the periprostatic plexus of veins, the danger of which is immediately apparent. In fact, the apparently simple indwelling catheter may initiate a train of events leading eventually to the death of the patient. Its use should therefore be avoided.

We have condemned the indwelling catheter, but acknowledged the necessity for drainage in certain cases of chronic prostatic obstruction. Trocar cystostomy is recommended for those patients requiring a period of prolonged drainage. This procedure was described by Dr. Lower in 1914; since then we have employed it many times, and a careful study of 400 cases has recently been reported.[2] For the patient with the chronically distended bladder which has resulted in upper urinary tract dilation and renal damage, we feel it is vastly superior to the indwelling catheter. Furthermore, it permits a subsequent

one-stage prostatectomy. This implies that we do not consider trocar cystostomy as a first stage operation, even though the results accomplished are essentially the same.

The technic for trocar cystostomy has been previously described.[2] It is especially applicable to those cases of long standing chronic obstruction, and should be employed only if the bladder is clearly palpable above the symphysis. When indicated, it should be employed as the initial drainage procedure, rather than a subsequent measure after an indwelling catheter has provoked a urinary infection.

According to these principles, we see that the patients fall into two broad categories: the one in which no preliminary drainage is required, and the other which requires prolonged drainage best accomplished by trocar cystostomy. Between these two classifications are the patients with complete urinary retention who require intermittent catheterization until they can be adequately examined in anticipation of operation. In a group of 100 recent consecutive prostatectomies, trocar cystostomy was employed in 11 per cent.

Having discussed the preoperative factors which have contributed to the advancement of suprapubic prostatectomy, let us consider the indications for this operation. I am of the opinion that any patient with severe obstructive symptoms produced by benign enlargement of the prostate which has attained an estimated size of 60 Gm. or more is a candidate for suprapubic prostatectomy. This procedure should be advised provided the patient's general condition is satisfactory, and the presence of adequate renal function has been established. For several years when transurethral resection was advocated, I resected all such patients. While it is possible to do a prostatectomy with the resectoscope, one-stage suprapubic prostatectomy is preferable for the large glands. The mortality is no higher, the morbidity questionably greater, and the late results are more gratifying to the patient and surgeon. I have never regretted advising prostatectomy, but have done resections on a number of patients on whom I wish I had performed prostatectomies. I have also performed prostatectomies on a number of patients who had had previous transurethral resections.

The other important indication for suprapubic operation is the presence of associated disease in the bladder. In a review of 100 recent cases we find that 8 had diverticulectomies, 2 had excision of bladder tumors, and 11 had stones removed from the bladder at the same operation during which the prostate was removed. This, of course, is one of the main advantages of the suprapubic operation over the retropubic; it affords an opportunity for careful inspection of the bladder which occasionally reveals previously unsuspected disease.

There are certain points in the technic of the operation which appear important, although not necessarily new. We have preferred carefully controlled spinal anesthesia. Intravenous fluids are given throughout, and blood is available, although not given routinely.

A midline suprapubic incision is usually employed, although in obese per-

sons a transverse incision is generally chosen in order to facilitate better wound healing. The incision in the bladder is made as high as the peritoneal reflection will allow and I believe it is important to bring the bladder up to the incision to avoid extensive exposure of the perivesical spaces (fig. 1).

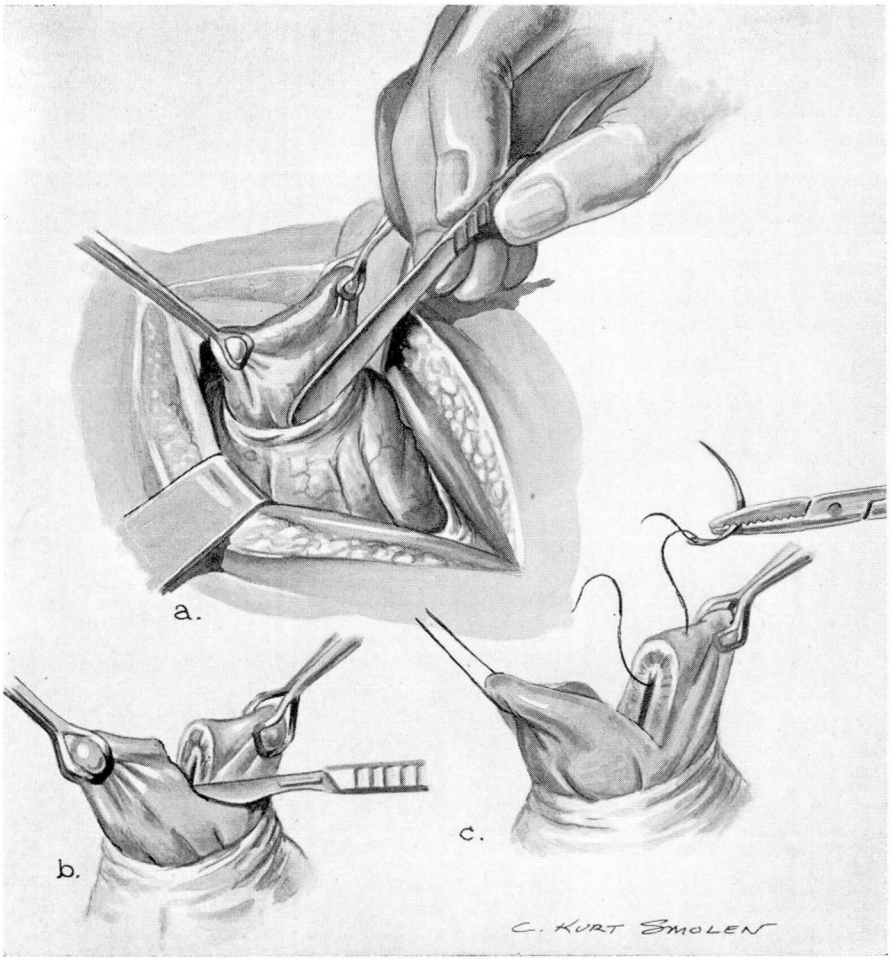

FIG. 1. (a) Bladder drawn up into incision and peritoneal reflection being pressed back. (b) Bladder opened between Allis forceps. (c) Retraction suture being placed deeply through bladder wall. When these are placed on each side, Allis forceps are removed.

Having carefully inspected the bladder to exclude associated lesions, one proceeds to enucleate the hypertrophied portion of the prostate. It is important to recall that only the pars anterior of the prostate is involved in benign pros-

tatic hypertrophy, and the compressed pars posterior forms the so-called capsule of the enlarged gland. Furthermore, the enlargement may be chiefly intravesical or subvesical and, in the latter case, the ureteral orifices may be drawn up out of their normal position, a fact which must be recognized to avoid injury.

The right index finger is introduced into the urethral orifice and the mucosal covering manually ruptured just at the vesical neck at about 11 o'clock and 1 o'clock, the anterior angle between the lateral lobes representing 12 o'clock (fig. 2). One then feels the smooth surface of the enlargement on each side. The mucosa and muscle fibers, when present, are then cleanly cut under vision with scissors in a circular direction completely around the vesical neck. This clean incision I believe to be a major factor in avoiding excessive bleeding.

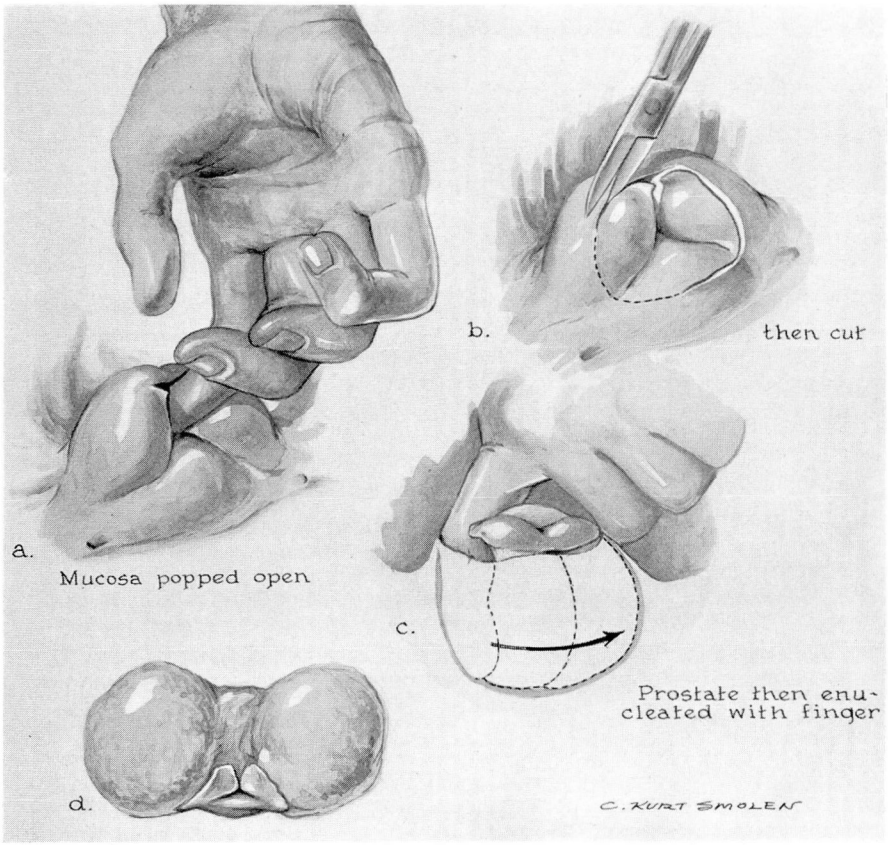

FIG. 2. (a) Drawing designed to show location of breaking through mucosal covering of left lobe of prostate at 11 o'clock position. A similar maneuver exposes the right lobe at 1 o'clock position. (b) Mucosal and muscular covering cleanly incised with scissors around vesical neck. (c) After urethral attachments have been divided as described in text, the prostate is carefully enucleated with right index finger. (d.) As illustrated.

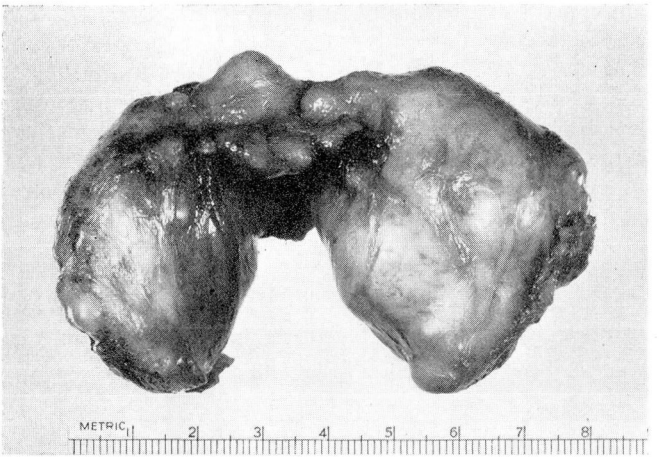

FIG. 3. Photograph of typical prostate removed at operation. Note that lateral lobes are connected by posterior commissure or middle lobe. They fall apart since there is no connection above.

The well lubricated index and middle finger of the left hand is now introduced into the rectum, the patient having been appropriately draped. The rectal fingers serve as a guide and prevent the prostate from being pushed down.

The index finger of the right hand is now introduced into the urethra, the verumontanum is palpated, and the urethral mucosa manually ruptured proximal and lateral to the veru. The cleavage plane is again felt and the urethral mucosa carefully separated down to the apex and then back along the upper margin of the left lateral lobe until the separation joins the original rent made at the vesical neck. By an exactly similar maneuver the mucosal covering of the right lobe is then separated until it joins the original rent made at 1 o'clock. In this manner all mucosal covering and attachments to the hypertrophied gland have been divided. Then, by careful digital enucleation, the smooth hypertrophied prostate is separated from its so-called capsule.

The separation described should not be hurried. I am convinced that painstaking care in this phase of the operation avoids breaking into false cleavage planes which may precipitate excessive bleeding and later complications.

When completely separated, the prostate is carefully lifted from its bed and, in the typical case providing the enucleation has been properly done, it will be in one piece with the two lateral lobes attached to a median lobe or commissure but open above so that it falls apart in butterfly shape (fig. 3). The prostatic fossa is temporarily packed with a hot gauze tape held firmly in place with a ribbon retractor while the operator changes gloves. If this is done in a leisurely manner all significant bleeding usually will have ceased by the time he returns to the operation. The gauze is gently removed from the fossa and any stray mucosal tags which might retard normal healing are trimmed away.

It is rarely necessary to suture any vessels. Occasionally a small spurter will require electrocoagulation, but the majority of cases require no special maneuvers to control bleeding. I never pack the prostatic fossa. Oxycel and gelfoam have been employed in the past, but discarded as unnecessary and because slow absorption produced a "mud" which blocked the urethra and delayed wound healing.

At the operation a No. 24 bag catheter with a 30 cc. balloon is introduced through the urethra. The bag is distended to 25 or 30 cc., depending upon the diameter of the vesical neck. It is then drawn down in such a manner as to lightly compress and invert the vesical neck but *should never be drawn into the prostatic cavity*. To do so prevents the cavity from contracting normally, invites continued and excessive bleeding, and may produce postoperative incontinence if traction has been applied (fig. 4).

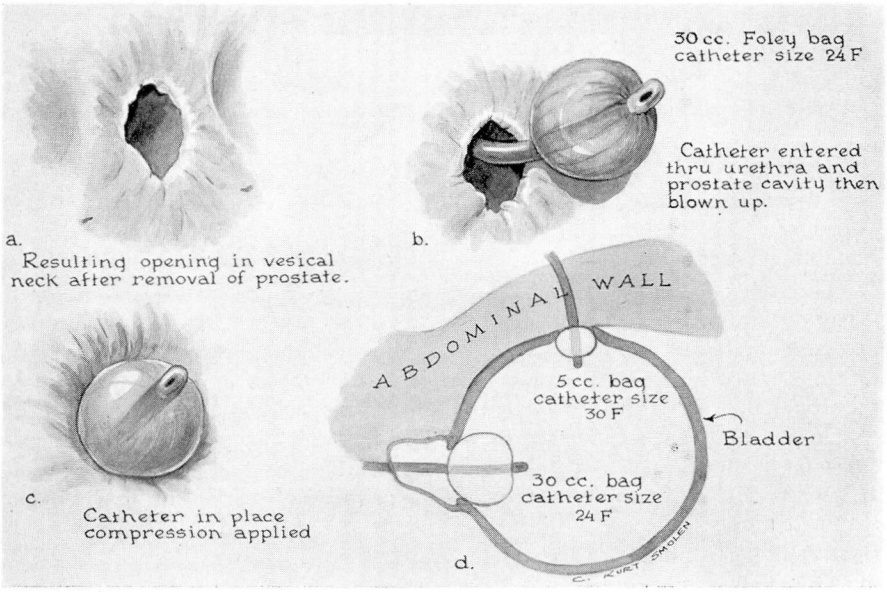

FIG. 4. (a) Appearance of vesical neck looking into prostate cavity after removal of prostate. (b) A No. 24 urethral catheter is introduced and the 30 cc. bag inflated. It is then drawn down *against* the vesical neck as shown (c). (d) Diagrammatic representation of the relative positions of urethral and suprapubic bag catheters when operation is completed. Note that bag of urethral catheter is not in prostate cavity.

After proper bladder toilet, a 30 F. catheter with a 5 cc. bag is placed in the bladder above, and the bladder closed tightly around it. It is usually wise to bring the perivesical fibrofatty tissue together above this as a second layer of suture. A small cigarette drain is placed in the prevesical space and the abdomen closed in layers with interrupted catgut, all layers being closed tightly around the suprapubic tube. Vasectomy is optional. In the study of 100 pa-

tients, vasectomy was performed in 45. There were but two cases of epididymitis in the remaining 55.

The patient is returned to bed and a continuous through and through drip of saline solution is introduced into the urethral catheter and out of the suprapubic tube. This is discontinued as soon as evidence of active bleeding has disappeared. The suprapubic tube is regarded as merely a safety valve against possible excessive bleeding and should be removed as soon as the danger of bleeding has passed. In the majority of cases the suprapubic catheter is removed 36 to 48 hours following operation. Early removal is encouraged before a sinus tract forms and while the tissues are sufficiently flexible to fall together and heal by primary union. By following this principle, persistent suprapubic fistulae have become a rarity and the scar which remains resembles that subsequent to a clean laparotomy.

The prevesical drain is removed 24 hours following the removal of the suprapubic tube and the urethral catheter as a rule is removed 7 days later. Thus the patient is usually voiding normally 9 to 10 days after operation and if the situation continues normal for a day, he is permitted to go home.

Although in these cases we do not encourage immediate ambulation, bed exercises are instituted from the time the operation is completed. Especially important are deep breathing and regular exercise of the leg and calf muscles. The patient is permitted to sit upright in bed and his position frequently changed. If he is an habitual smoker, this habit may be resumed promptly and a strong pipe assures a speedy recovery. For such patients the operation is an incidental experience.

As soon as the suprapubic tube has been removed, the patient is allowed to get out of bed any time he desires and is encouraged to do so. The majority seize this opportunity because of the toilet privileges and I have no doubt that this is a factor in preventing troublesome postoperative constipation.

In order to visualize and illustrate the change occurring in the suprapubic operation for prostatic hypertrophy I have studied 100 consecutive patients whom I have recently operated upon with the enumerated principles in mind and compared or contrasted their cases with similar ones having been operated upon at the Clinic 25 years ago. This seems like a convenient period and is of special interest to me, since it encompasses my own career in medicine. I was particularly concerned with the method of preoperative preparation, the number of two-stage operations done in the past, the postoperative days allocated for convalescence, and the incidence of significant complications. Mortality statistics were also tabulated in this review. This study reveals the following interesting facts.

Twenty-five years ago the average hospital stay before the operation was 10.6 days, with a minimum of 3, and a maximum of 58. Of the recent cases, the average was 2.8 days, with a minimum of 1, and a maximum of 12. Following operation, the average stay 25 years ago was 30 days, with a minimum of 11 and a maximum of 106. The recent patients were hospitalized for an average of 17.7 days, with a minimum of 10, and a maximum of 74.

All patients of the older series wore indwelling catheters before operation and it is significant that 64 per cent of these had fever recorded as 100 F. or higher. Four of the recent patients were admitted to the hospital wearing indwelling catheters, and they represent the only cases so handled.

The operative mortality in the older series was 12 per cent, while among recent patients it was 1 per cent.

In recording these statistical figures which are summarized in table 1, it is not intended that one should draw absolute conclusions. However, I believe they indicate that significant improvements have been made in doing suprapubic prostatectomy, and that it has retained and improved its position as a method for the surgical treatment of benign prostatic hypertrophy.

Table

COMPARABLE SERIES **Suprapubic Prostatectomy**		
	Present Series	25 years ago
Average preoperative hospital days	2.8	10.6 (64% with fever)
Average postoperative hospital days	17.7	31
Indwelling catheter	4%	100%
2 stage prostatectomy	0	12%
Trocar cystostomy	11%	4%
Operative mortality	1%	12%

References

1. Engel, W. J.: Intravenous urography in the study of vesical neck obstructions. Am. J. Roentgenol. **62**:661 (Nov.) 1949.

2. Engel, W. J.: Suprapubic trocar cystostomy. J. Urol. **65**:998 (June) 1951.