Surgery of the Prostate

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By

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THIS VOLUME IS
DEDICATED TO

THE RESIDENTS WHO HAVE SERVED WITH ME
IN THE DIVISION OF UROLOGY OF THE
STANFORD UNIVERSITY HOSPITALS

Preface and Acknowledgments

When I was a medical student Dr. J. Whitridge Williams gave this advice to our class: "Don't any of you ever write a textbook—for if you do, they will 'swat' you." Having given birth to a book on obstetrics "Bull" Williams, as he was known to his students, was going through a puerperium characterized by adverse criticism of his fledgling. Yet his indomitable spirit was not crushed, for he went on to say, "However, if any of you do ignore my advice, there is one thing you must not forget—be sure to leave the back door open." Although this volume is evidence that I did not heed Dr. Williams' initial admonition, I have made every attempt to heed his second. I have done my best to leave the back door open. In presenting these surgical approaches to the prostate I have tried not only to cover the present standardized operations, but also to describe a representative selection of valuable alternative techniques.

The past fifty years have been marked by revolutionary advances in the surgery of the prostate. It is time to assess these advances, to recognize and adopt changes of proven value, to reject those without merit. It is important to know why some procedures are safe, why others are dangerous, to know why some techniques are unsatisfactory under some circumstances, yet valuable under other circumstances. Expansion of knowledge in the medical sciences and phenomenal progress in surgical technique make the necessary task of evaluation ever more complex.

In writing this volume the primary objectives have been to state the general principles of prostatic surgery, and to describe techniques based on these principles. An effort has been made to evaluate each type of operation without bias.

A broad historical review of prostatic surgery is included in an intro-

ductory chapter in which obsolete methods are also mentioned. A detailed history of the four modern approaches will be found in the introductory remarks of the individual chapters devoted to these techniques.

Considerable attention has been paid to pre- and postoperative care. In prostatic surgery these share importance with the operation itself. Preceding the operative techniques is the chapter on operative preparation and criteria of when this is complete; following the operative techniques is the chapter on postoperative care and the treatment of complications.

No pretense is made to adequate coverage of anesthesiology, intercurrent diseases and "medical" complications. These are the responsibility of specialists in other fields. It seemed advisable, however, to include many of these subjects as background. For example, it is valuable for the surgeon to understand the problems encountered by the anesthesiologist. He is then better able to perform the operation and to evaluate the influence of the anesthesia on the postoperative course. The same is true of the care and treatment of any blood dyscrasia, diabetes mellitus, pulmonary and cardiovascular disease.

There is detailed discussion of fluid and electrolyte balance. It is essential that the prostatic surgeon be well informed of developments in this field. Not only is it necessary to treat electrolyte disturbances which result from prostatic obstructions, but also the profound alterations brought about by fluids absorbed through the operative site at transurethral prostatectomy require increased attention.

Inspiration for this volume was given by Dr. Hugh Hampton Young. His predominating interest in the prostate was sown on fertile soil in the early years of my surgical training. The seed was nourished and grew in the suprapubic school of Drs. Joseph C. Birdsall and William H. Mackinney. My interest in transurethral prostatectomy was aroused by Dr. Edwin P. Alyea, one of the pioneers of the method, who gave me initial instruction in this technique. My knowledge of perineal prostatectomy stems from Dr. Frank Hinman. The lessons of retropubic prostatectomy were learned without benefit of tutors other than my able residents.

Dr. Milton L. Rosenberg read the entire manuscript and made countless helpful suggestions. Many colleagues gave advice on related subjects, particularly Dr. Harold Lindner, Surgical Anatomy; Dr. Houghton Gifford, Surgical Pathology; Dr. Philip J. Bailey, Anesthesiology; Dr. J. Max Rukes, Fluid and Electrolyte Balance. During their residencies, Drs. James J. Niebel, Samuel I. Roland, John D. Nesbet, Victor I. Caglieri, Glen Shols, and Arjan D. Amar assisted with the writing of many of the chapters.

Because so much of this volume is an atlas of surgery its value rests heavily on the quality of the illustrations. This work was begun by Ralph Sweet and was completed by Halcyon Harris Cowles. For the illustrations I am also indebted to Dr. Robert Prentiss, Figures 69 through 72; Dr. Juan F. Aycinena, the preliminary drafts of Figures 74 through 78; Frederick

Wallace, President of the American Cystoscope Makers of America, Figures 208 through 215.

Gratitude must be expressed to the Editors of Surgery, Gynecology and Obstetrics, of the Journal of Urology, and of the Stanford Medical Bulletin for having graciously allowed me to reproduce here, without specific credit, illustrations which had appeared in previous articles of mine in these publications.

Invaluable editorial assistance was given by Elizabeth Skafte Ferrari and the manuscript was prepared by Virginia McBirney Frazier. Finally, the people at the W. B. Saunders Company never failed to give encouragement and to use their abundant skill in bringing this volume to press.

HENRY M. WEYRAUCH

Contents

Chapter 1

Introduction

PROSTATIC SURGERY provides the romance of urology. Despite remarkable advances made by a distinguished line of surgeons, technical problems continue to supply a fertile field for research. It is the position of the prostate which lends most to the intricacy of operative technique. Lying deep within the bony pelvis, the gland surrounds the posterior urethra and is bounded at either extremity by the urinary sphincters. It is close to the lower ends of the ureters, to the rectum, and to structures concerned with erection of the penis. It is supplied by blood vessels which are not readily accessible over much of their course. The difficulty of removing the regional lymphatics at the time of prostatectomy presents a further challenge.

Almost all operations on the prostate are performed for the removal of obstructive or neoplastic tissue; these operations are loosely termed "prostatectomy." Only occasionally is operation performed for some other purpose—as prostatotomy for drainage of abscess, or plastic repair in case of injury. Of the various types of prostatectomy, the term *conservative prostatectomy* is used to designate enucleation of benign adenoma from within the gland. *Subtotal prostatectomy* is applied to partial excision of the gland, and *total prostatectomy* to its complete extirpation.

Regardless of the type of prostatic operation, the factor which most influences operative technique is the approach. In the quest for the perfect operation, nine surgical approaches to the prostate have been explored (Fig. 1). These have been subjected to countless modifications and combinations. Some have been better received than others; some have been abandoned in one period to be revived in another. Four have withstood the test of adequate trial and are in use today—the suprapubic, retropubic, transurethral, and perineal. Each of the four is peculiarly suitable in certain circumstances, undesirable in others.

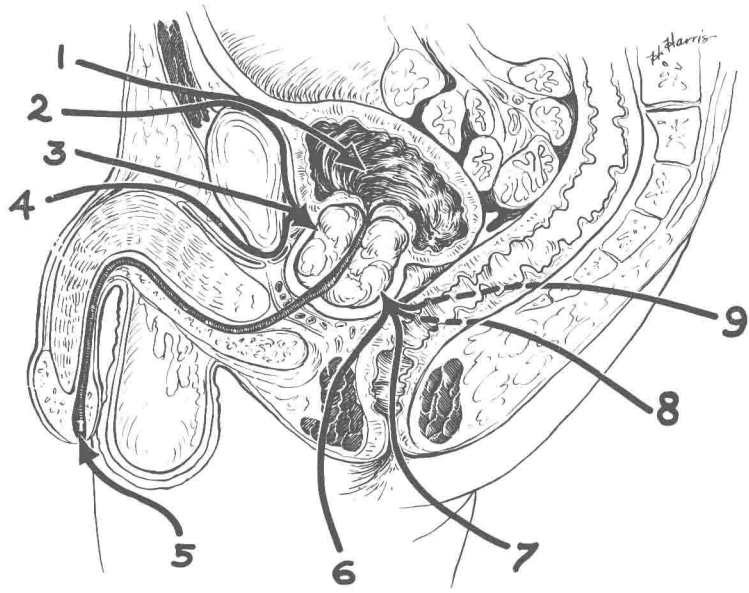

Figure 1. SURGICAL APPROACHES TO THE PROSTATE.

APPROACH	ORIGINATED BY	YEAR	DEVELOPED BY	YEAR
1. Suprapubic	Amusset	1834	Freyer	1896
2. Retropubic	Von Stockum	1909	Millen	1947
3. Transpubic	Billroth	1867		
4. Infrapubic	Langenbuch	?	Uteau and Leroy	1936
5. Transurethral	Guthrie	1834	McCarthy	1931
6. Perineal	Covillard	1639	Young	1903
7. Transrectal	Demarquay	1873	Soposhkoff	1922
8. Ischiorectal	Dittel	1890	Voelcker	1919
9. Sacral	Boeckel	1908		

HISTORICAL LANDMARKS

According to Bugbee (1920), any surgical procedure passes through three stages of development. First there is recognition of a pathologic condition and crude attempts at relieving it. Since these first attempts are based on incomplete knowledge the results are far from uniform. Usually ridicule of pioneer methods retards their development.

A second stage is marked by increased knowledge of pathologic conditions, by experimentation, and by evaluation of different methods of relief. Results vary and opinion fluctuates. The conservative go back to palliative methods while the more adventurous forge ahead to integrate and apply new knowledge.

This leads to the third stage, one of crystallization, in which acceptable operative procedures are placed on a sound surgical foundation. These procedures may be modified from time to time, but the surgical principles are established and remain essentially the same.

There is no more perfect example of these three stages than in the surgical treatment of prostatic obstructions.

The primitive era extends back several hundred years. Although the existence of the prostate was not recognized until the sixteenth century, Home (1805) called attention to a quotation in the Bible which apparently refers to symptoms of prostatic obstruction.

Ecclesiastes, twelfth chapter, first to eighth verses reads:

"Remember also your Creator in the days of your youth, before the evil days are come, and the years draw nigh when you will say, 'I have no pleasure in them' . . . before . . . the pitcher is broken at the fountain, or the wheel broken at the cistern . . . "

A free interpretation of this passage is: A man should remember his Creator before he grows old and finds no pleasure in life, being afflicted with urinary incontinence or retention of urine.

Ignorance of the existence of the prostate could be expected of the ancients because they did not practice dissection of the human body. Herophilus was the first to mention the "prostate," but his description suggests that in humans he applied the term to the seminal vesicles. The prostate of lower domestic animals and the monkey is a bifid organ, in some cases resembling the human seminal vesicles. Except for this brief reference, no mention of the gland is to be found until the sixteenth century. The first authentic description is attributed to Niccolo Massa, a Venetian physician who died in 1563. Riolanus (1649) was the first to suggest that the neck of the bladder could be obstructed by the prostate.

The perineum was the route of primitive attempts to relieve obstructions to the vesical neck. This may be attributed to the fact that perineal lithotomy was a widely practiced operation in the early days of surgery. It was not until the nineteenth century, however, that the pathology of prostatic hyperplasia and its clinical implications became known. The condition is described in some detail in the texts of Guthrie (1834) and of John Hunter (1835).

The publication of these texts constituted an important landmark in the history of prostatic surgery. By summarizing knowledge gained in the first, way was made for the second historical period, that of experimentation. During the second period, which extended from 1834 into the early part of the twentieth century, attempts were made to evaluate all nine surgical approaches to the prostate. In 1834 investigation of both the suprapubic and transurethral routes was initiated, the former by Amusset, the latter by Guthrie. The transurethral approach was a natural outgrowth of urethral catheterization: urethral catheterization ——→ forced catheterization ——→ division of tissue ——→ excision of tissue.

Of the obsolete methods, *transpubic prostatectomy* was executed by Billroth in 1867. The fixation of the sacro-iliac joints would seem to prevent any appreciable improvement in exposure which might be gained by division of the symphysis pubis.

Lagenbuch divided the suspensory ligament of the penis to perform *infrapubic prostatectomy*. Compromised by the arch of the pubis, the limited space permitted by this approach is one of its chief disadvantages. This drawback, coupled with the close proximity of the plexus of Santorini and the corpora cavernosa of the penis to the operative field, caused Lagenbuch to advise abandonment of the approach. The method was revived by Uteau and Leroy in 1936, who recognized the difficulties mentioned, but found as advantages improved healing and a shorter convalescence. Apparently the method has not been subjected to further trial.

Demarquay in 1873 practiced *transrectal prostatectomy* for both benign hyperplasia and carcinoma of the prostate. The operation was again performed by Soposhkoff in 1922, and by others in more recent years. The disadvantages of this approach are limited exposure, dangers inherent in working through an infected field, and the likelihood of urethrorectal fistula as a postoperative complication.

Another obsolete method, *ischiorectal prostatectomy*, enjoyed the most extensive use. It was first practiced by Dittel in 1890. With the patient in the prone position, an incision was made from the coccyx to the right of the anus, the rectum retracted to the left, and the prostate exposed by way of the right ischiorectal fossa. In Dittel's procedure he excised portions of the lateral prostatic lobes, leaving a cuff of tissue surrounding the prostatic urethra, through which a catheter was placed.

Voelker in 1919 reported using the ischiorectal approach in 56 cases. In his technique, also with the patient in the prone position, the prostate was exposed through either the right or the left ischiorectal fossa. The adenoma was enucleated through a capsular incision and hemostasis secured by ligature and packing. Although Voelker's method was perpetuated by Meherin (1930) and other of Voelker's students, its advantages are similar to those of perineal prostatectomy, which has supplanted the ischiorectal route.

An isolated reference to sacral prostatectomy was made by Boeckel in 1908. He described an approach through an incision made from alongside the sacrum down to and encircling the anus. By this method the rectum was freely mobilized and retracted away from the prostate and seminal vesicles.

The third stage of historical development, that of crystallization, is confined to the twentieth century. During the early nineteen hundreds the suprapubic approach became the most popular. However, it was supplanted in a few clinics by the perineal route, since the latter was attended by a dramatically lower mortality. In the suprapubic method a high toll was

exacted by excessive blood loss and by urinary sepsis. Subsequently, improved methods of hemostasis, adequate blood transfusion, and effective antimicrobial therapy have assured the safety of this approach and led to its renewed popularity. With the development of instruments satisfactory for electroresection, transurethral prostatectomy burst into phenomenal favor. As its limitations became evident, there was a retreat from the initial overzealous acceptance, but the route remains as one of the standard approaches to the prostate. With improved methods of achieving hemostasis and asepsis, retropubic prostatectomy also became an accepted procedure.

Combined techniques of prostatectomy were originated early. Some are still in limited use, for example, the establishment of dependent perineal drainage following suprapubic or retropubic prostatectomy (Chute and Ireland, 1956). Fuller (1892) first reported suprapubic prostectomy with the use of a perineal drain. Nicoll (1895) performed perineal prostatectomy with a hand in the opened bladder to depress the prostate toward the perineum. Bryson (1899), in a somewhat similar operation, opened the abdominal wall to introduce a finger into the space of Retzius to depress the prostate. Thomas (1900) opened the bladder suprapubically, forced a clamp through the perineum and enucleated the prostate between the two index fingers—one introduced through the bladder, the other through the perineum. Lowen freed the prostate through a perineal incision and removed it suprapubically along with the seminal vesicles.

Watson (1888) combined desiccation of the prostate by the galvanocautery with suprapubic cystotomy. During recent years attempts have been made to secure hemostasis by transurethral fulguration at the time of suprapubic prostatectomy. Since advocated by McCarthy (1941) the method has been used sporadically. It has not gained acceptance because of inherent technical difficulties. After suprapubic enucleation innumerable bleeding vessels obscure the prostatic fossa, rendering it difficult to control them all at the same time. Powell devised a large caliber instrument for suprapubic fulguration, which demonstrated little advantage over conventional resectoscopes. As a matter of fact, transurethral instrumentation affords more direct access to all parts of the prostatic fossa, a factor which more than compensates for the smaller size of the instrument.

Of historical interest are the surgical methods of attempting to relieve prostatic obstruction without direct attack on the gland. Bier (1893) ligated the internal iliac arteries to diminish the blood supply to the enlarged prostate and cause it to shrink. Loze (1898) advocated removal of the venous plexuses around the base of the bladder to accomplish the same result. The poor results attained by both of these methods discouraged further trial.

Wyman (1885) and Andrews (1902) advocated tenotomy of the puboprostatic ligaments to relieve prostatic obstruction. This procedure did not prove successful.

On the basis of observations of John Hunter, that removal of the tes-

ticles arrested the growth of the prostate in young animals, castration was practiced during the late eighteen hundreds in an attempt to shrink the obstructing prostate. In 1893 White, Ramm, and others strongly advocated the procedure. However, a lack of effect in benign hyperplasia and the high mortality rate of the operation at this time led to its abandonment. But for this high mortality rate its beneficial effect on prostatic carcinoma might have been discovered fifty years earlier.

Lenander, in 1894, proposed vasectomy to shrink the enlarged prostate. This method was later endorsed by Mears, who advocated it as an alternative to castration because of the high mortality of the latter operation. Without effect, vasectomy, too, promptly fell into oblivion.

MODERN TRENDS AND ADVANCES

During the past fifty years prostatectomy has been established as one of the most satisfactory operations of the present surgical era. If one takes into account that many patients who undergo prostatic operations are elderly, the mortality statistics for these compare favorably with those for other operations of equal magnitude. The mortality rate from prostatectomy ranged from 25 per cent to 50 per cent fifty years ago; today it is 2 per cent to 5 per cent.

Supplanting a previous tendency of surgeons to hold with religious zeal to one operation for all types of prostatic obstruction, a new trend is emerging. It is toward appreciation of the merits of each established type of operation, and a recognition of the indications for its proper use. The more carefully one selects the proper procedure for the particular conditions in the individual patient, the better will be the result. No one operation is suited to use in all patients.

Developments in surgical technique have contributed a great deal to the excellence of prostatectomy. The serious problem of hemorrhage has been met by more adequate exposure of the operative field, better methods of securing blood vessels, and adequate blood transfusion. Modern methods represent a notable advance over the primitive practice of relying on natural forces and on packs and tampons to arrest bleeding. A long unrecognized cause of early fatalities was the loss of blood.

There has been improvement in methods of enucleation and more adequate excision of obstructive tissue, especially by the transurethral route. Newer methods of plastic treatment of the vesical neck, of closing the prostatic fossa, and of anastomosing the bladder to the urethra in total prostatectomy have yielded a higher incidence of per primam healing with superior results.

Many improvements in surgical technique have been made possible by the development of instruments of precision. Young's prostatic tractors and perineal retractors have facilitated the technique of perineal pro-