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Surgical approach of the hypertrophied prostate

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THE SURGICAL APPROACH OF THE HYPERTROPHIED PROSTATE

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I. INTRODUCTION

In choosing a subject for a thesis, the author wanted one which he thought would be in the same field that he may be in someday, and on investigation, perineal prostatectomy versus transurethral resection appealed to me, but that was widened a little to include suprapubic prostatectomy. It appeared on reading the first ten or fifteen articles that there was a very ferocious battle going on between two distinct groups, but this overlaps and is not as fierce as it seemed at first. It has shown me that there can be much faster progress where there is good fast moving discussion on a subject. There are more statistics gathered and more enthusiasm shown if a man is attempting to produce proof to substantiate his opinions, or if a man is honestly attempting to find what the best treatment is for his patients. It is in this theme that this paper is written.

The history of the surgical treatment of the prostate is not a very long history and being it forms a foundation for the argument which is now prevalent, I spent some time on that portion of the paper. There has, it seems, been a fast moving argument going on at all times about the various phases of prostatic surgery, either preoperative or postoperative care or the early

surgeons debating as to whether total or partial enucleation was the best, then later the argument turned to suprapubic versus perineal prostatectomy, and the relative merits of cystotomy in the various types of present day operations. The present day discussion is transurethral resection versus perineal prostatectomy, and suprapubic prostatectomy to a lesser extent.

The material was gathered under the heads of perineal and suprapubic prostatectomy and transurethral resection. The articles are all articles (except the history and anatomy of course) written since 1933. They are arranged under their headings as to date of publication. There is a discussion about these and a summary and conclusion.

The bibliography is not a true bibliography but is a "selective bibliography" including only the articles referred to in the body of the thesis. There were two hundred and twenty one articles read and the articles chosen which covered the most material in a certain section were chosen to prevent repetition.

The author is very grateful to the Doctors Edwin Davis and Payson Adams for very useful advice and information given to him concerning this paper. Likewise to Miss Madalene Hillis and the library staff for helpful advice concerning form, attack and organization of the paper.

II. THE HISTORY OF THE DEVELOPMENT OF SURGICAL TREATMENT OF THE HYPERTROPHIED PROSTATE GLAND

In a discussion and study of any disease, it is necessary to have a full understanding of the historical development of that disease, and a well understood knowledge of the development of its treatment, therefore to review and summarize older methods we shall consider this in the following section on history.

It is an amazing fact to learn that the prostate, in all its pathological importance, should pass unknown in history until the beginning of the sixteenth century. Its discovery is attributed to Nicolo Massa, a Venetian physician, who died in 1563. Riolanus, about the middle of the sixteenth century, was the first one to suggest that urinary retention or obstruction could be due to a constriction at the neck of the bladder by the prostate. However we must remember that the ancients did not practice dissection of the human body.

According to Galen, Herophilus was the first to employ the term "prostate," but it appears that, due to the fact that in lower domestic animals as well as monkeys, the prostate is a bifid organ, resembling in some cases the human seminal vesicles, he appeared somewhat confused with the seminal vesicles, the vas deferentia and the prostate (1).

The symptoms of the enlarged prostate, malignant or benign, however, have been recognized from time immemorial. The enlargement of the prostate is "alluded to in the beautiful description of the natural decay of the body, in the Bible, in the Book of Ecclesiastes, the 12th chapter, 6th verse, where it is written, 'or the pitcher be broken at the fountain, or the wheel broken at the cistern,' expressive of the two principal effects of this disease, the involuntary passive of the urine, and the total stoppage"(1).

It was believed by the classic authors, as it appears to workers translating their various writings, that the patients with prostatic hypertrophy suffered from "excrescences" or "carcinomas" at the neck of the bladder. In treating these growths, when causing obstruction to the evacuation of the bladder, their destruction was attempted with various metallic instruments, which we may well believe were very crude but a beginning in the right direction in treatment(1).

We must remember that the writings, in reference to our modern view of surgery of the prostate, have been of importance only over a period of approximately forty-five years. However, in the late sixteenth century we see that Rirolanus suggested the use of incising the neck of the bladder through the perineum.

In these cases we do not know the exact cause of the retention of urine, however.

Later when the nature of the disease was better known the obstacle was perforated by metallic catheters and sounds. This was recommended and practiced by John Hunter and Sir Everard Home, and still later by others, but it was finally abandoned because of its resultant infection, uncertainty, and dangerousness.

Chopart records that when Astruc was attacked by retention of urine in 1756, his attendant, LaFaye, attempted to introduce a catheter, but met with an obstruction from a tumor in the neck of the bladder. He then perforated this with a lance shaped stylet, introduced through the opening in the catheter, and in this way forced the catheter into the bladder and thus drawing off the urine. The catheter was retained for fifteen days. Through this false opening a catheter was introduced occasionally until the patient's death, ten years later, and this was proven to be a false opening by post-mortem examination.

Chopart and Billrath's experiences, however, were not as pleasant and were disastrous, when used by both men (2).

Ducamp and his followers, among others, seem to

use caustics on the obstruction with obvious embarrassment. We see still later the use of electricity in various forms in the treatment of prostatic hypertrophy.

Dr. Philip Syng Physick of Philadelphia employed hydraulic compression and retrograde dilatation of the urethral vesical orifice by introducing an elastic hollow tube through the compressed prostatic urethra, and with its distention by fluid after putting it in place (3). This procedure was a very remarkable procedure considering the time, which was approximately 1800 (4,5).

Leroy d' Etiolles and Mercier also made use of the above procedure of compression, in an effort to reduce the size of the prostate, or to mould it in its growth (6). However, the best known advocate of systematic compression was Mr. Reginald Harrison of London. He introduced the use of gum bougies, of gum elastic, from two to four inches longer in the stem than ordinary instruments and an expanded portion near the end, that was caused to enter the bladder, and dilated the urethra and compressed the prostate both on introduction and on removal, it being allowed to stay in place for several minutes (7).

There were numerous types of metallic sounds used, flexible, and with various curves. It was in 1825

that Leroy d' Etiolles introduced his rectilinear metallic sound, and later a flexible sound. Meyrieux and Tauchon, about the same time used an articulating catheter. Mercer used a rectangular sound for depression of the prostate. He also used a flexible catheter which was usually left in place from five to ten minutes (1).

Necessity does cause the resourceful to develop many useful practices, and so it was in the development of operative treatment for urine retention due to the enlarge prostate. At first it was undertaken only in emergency cases or in conjunction with another operation such as lithotomy. It is seen that Covillard, in 1639, successfully operated by perineal cystotomy and removed a hard mass, not a stone, crushing and destroying it upon removal with a forceps. Gauley (5) thought this to be a prostatic in origin. Some tumors were accidentally removed or portions of them removed, when removing, or after removing calculi.

Sir Wm. Blizzard (8) performed perineal prosta-totomy several times before 1806, and on patients without any calculous formation. Some writers think that Sir Wm. Blizzard's operations were only opening of prastatic abscesses; but he distinctly says that he performed the operations with the object of reducing

the size of the gland by incision, irrespective of the presence of pus (8).

It is seen that Sir Wm. Fergusson employed the use of perineal prostatotomy combined with lithotomy in the 1840's, and that these procedures were not uncommon before Sir Wm. Fergusson's sanction was given.

George James Guthrie did much of the early work on the structures of the prostate. He attempts to rationalize for the users of caustics in his book on "The Anatomy and Diseases of the Urinary and Sexual Organs" (9). He states that there really is a practical use for "Argentum nitratum and the potassa fusa." It is interesting to note that Guthrie mentions the use of caustics, its popularity, its great increase in popularity, the demand of the public to have caustics used and then its overuse, and consequent decline and fall. We must now consider Guthrie as the true beginner in establishing the first surgical procedure for relief of stricture, which could not be cured in any other way, in which he "divided the bar at the neck of the bladder." This bar sometimes being produced by a fold of mucous membrane being stretched taut across the vesical orifice of the urethra by enlargement of the two lateral lobes of the prostate. He first cut this bar by a catheter which had a

concealed blade (1). Later he developed some remarkable procedures. He next devised an operation in which the prostate was incised through an incision in the perineum much as the perineal procedure of today.

About this time, 1837, we see a new argument arising in this developmental stage of the surgical treatment of hypertrophied prostate and that argument was one of the instruments with Mercier, Leroy & Eliolles, and Civiale claiming priority over Guthrie who was the actual originator of these instruments and methods.

Mercier, in 1837, devised the two instruments, the Prostatotome and the Prostatectome which were used to punch an opening in the tissue which obstructed the flow of urine (10).

Enrico Bottini, then of Pavia, improved on Mercier's instruments, in about 1873, by avoiding the bleeding following Mercier's technic by the use of a galvano-caustic incisor (11), and again in 1885 (12).

Further modification of the galvano-caustic apparatus was more recently introduced by Dr. H.H. Young (13) in 1902 in which the prostate was unable to slip away from the nose of the instrument and thus minimizing the possibility of burning through

the bladder wall instead of through the hypertrophied gland.

In America we find Dr. Orville Horwitz of Philadelphia and Dr. W. Meyer of New York, among others, as later men continuing in the Bottini type of treatment. Belfield, in 1886, advocated the use of the Bottini method through a perineal wound, while Watson (1888), Bangs (1898) and Barffleur (1902) recommend this type of treatment through a suprapubic opening. (14).

We must consider the perineal, the rectal, and the suprapubic types of puncture for urine retention. Although these do not pertain to the transurethral or perineal development, they are important because they were used as today in cases in which the condition of the patient is such that perineal prostaticectomy would be deemed dangerous, or transurethral resection would not be advisable. Simple catheterization had long been employed. Home (14) had used catheterization for periods of one to three months for chronic cystitis. When it was found impossible to pass catheters, puncture of the bladder by one of the three routes was practiced. Perhaps the earliest suprapubic cystotomy was performed by Rossetus in 1590. It is interesting to note that the rectal route

was the favorite in the early nineteenth century, with the perineal and suprapubic again sharing honors at the end of that century (1). An interesting development occurred in 1888 by Hunter McGuire. He formed a fistulous tract in the upper portion of the bladder and the patient could carry some urine and then by bending forward could expel this urine and in some cases could expel a stream, with voluntary control of the bladder (28).

Reginald Harrison (7), on November 4, 1881, and John W.S. Gauley (10), on April 27, 1880, both claim to have re-introduced perineal prostatotomy, with the former using a retaining metallic perineal tube from six to twelve weeks and the latter not leaving a perineal tube. However, Gauley sometime later left a rubber tube in the wound which perhaps may be compared to packing the wound open today. Other early advocates of this type of procedure were Whitehead and Brown (1).

Going back again to 1875 and the Bottini type of operation we see Gauley who practiced this with his new instrument, the prostoctectome. This was an improvement over the linear incisions made in the earlier methods which caused local sloughing. We see many improvements attempted in the instruments and find Freudenberg perfecting an instrument with which he obtained a mortality rate of approximately five per cent

and with this we see the acceptance of this type of operation. Among others who practiced the Bottini operation with success were Fergusson (15), Dr. Willy Meyer of New York did only Bottini operations, Dr. H.H. Young developed a new instrument with good results (13).

In 1893, J. William White of Philadelphia advocated treatment of the hypertrophied prostate by castration and resultant atrophy of the organ. Due to false results from animal experiments and over-enthusiasm this was practiced with great enthusiasm for several years. John Hunter appears to have experimented on animals in reference to this point, and more recently Griffiths added importantly to those researches. Decimus Hodgson of Glasgow wrote in 1856 "in persons who have been castrated the prostate dwindles down almost to a rudimentary condition." The inference, however, that this was thought to be true, relative to the normal state of these parts, also applies in varying degrees to the hypertrophied prostate does not appear to have been utilized until Dr. William White mentioned above (29).

Reginald Harrison, in his booklet, "The Bradshaw Lecture", of 1896, states "I was struck not so much with the high death rate, eight to eighteen per cent, but with the uncertainty as to the kind of result, physical as well as mental, the surgeon is likely to expect. In the ex-

pression of opinion by Dr. Cabot that castration seems especially efficacious in cases of large tense prostates when the obstruction is by the lateral lobes, and is of but little use in myomatous and fibrous glands, is warranted, I consider, by the records to which I have referred (16). These men thought they were perfectly right and had records that apparently substantiated their beliefs, however, later this was abandoned due to damaging evidence brought out by H.H.Young and others (13).

We now see a development, about this time, of various types of treatment by drugs. Heine used the injection of iodine into the prostate, Iversen and Tangenbek used ergotive subcutaneously, with the hope of reducing the size of the gland. Some drugs were given by mouth, some by rectum, some injected into the gland by the rectum. The results were greatly disappointing to the profession and due to suppuration and following infection, death resulted in many cases. This practice, it may be easily understood, never gained much prominence (11).

Cheron and Moreau-Wolf carefully studied the method of treatment by electricity, which was reported to have had good success, although the cases so reported are open to the criticism of having possible been merely those of chronic prostatitis and not true hypertrophy.

According to George W. Overall the surgical operations for relief of urinary troubles resulting from

enlargement of the prostate fall into two classes. The first are the procedures already discussed in this paper in which the gland is attacked directly; the second method is the procedures that "aim at reduction of the blood supply of the swollen organ and consequently atrophy thereof" (11).

The operations undertaken for the purpose of reducing the blood supply of the gland and thus causing an atrophy of the gland are two in character: direct or indirect. The direct meant ligating both internal iliac arteries and the second is the aforementioned orchidectomy. The theory on which this last procedure was based was that the vascularity of the gland had a direct relation to the genital system and nervousness caused by the presence of the testicles, and sexual excitability, and by secretions from the testicles (11). In operating to reduce the blood supply Deaver (1) states that Bier in 1893 introduced the operation and that in most reported cases the mortality rate was perhaps as high as any type of operation ever used for enlarged prostate and that gangrene, peritonitis, and renal disease resulted often. The results of this type of operation, as reported by Derjuschinsky and substantiated by experimental work on dogs, are some decrease in size possible in a short time but with the original size

again reached in approximately eight months after collateral circulation has again established the original volume of blood flow (1).

There must again be mentioned here the use of cataphoresis used by Overall, in which he used prolonged periods of treatment in which he "hammered" at the enlarged gland by urethra and rectum. After sometimes a year of treatment the gland would "soften and atrophy" (11).

Peter J. Freyer in 1906 reported in his text that he had performed total enucleation by suprapubic incision, on three hundred twelve Adenomatous prostates, with the average age being sixty-eight years and the average weight of the gland being two and three-fourths ounces. Many of these patients had complications such as cystitis, stone in the bladder, pyelitis, kidney disease, diabetes, heart disease, thoracic aneurism, chronic bronchitis, paralysis, hernia, haemorrhoids, etc.

In connect with these three hundred twelve operations he had twenty-two deaths, a mortality rate of slightly over seven per cent. He claims that all the rest (290 cases) were successful and "when I speak of success I mean complete success" (17).

Again in 1920 Sir Peter J. Freyer reports that he had performed the operation of total enucleation on

one thousand six hundred twenty-five patients with an average age of sixty-eight years and an average weight of two and one half ounces of removed gland. He had all races and nationalities in this group and cut his mortality rate from seven plus per cent to five and one third per cent. His operation is a suprapubic type and in the above results we can see the improvement in results a man gets who uses one procedure a lot. This was entered in to help show how the results were improved by this one man over a period of fourteen years. The first group of three hundred twelve cases are included in the last group of one thousand six hundred twenty-five cases. This above mortality rate may be compared to mortality rates given later (18).

C.S Wallace, in 1902, state that the whole gland could not be taken out with the capsule intact, (19) but C Roberts, in 1902, after working on the dissecting table said the entire gland, even if it were normal, could be taken out in capsule (20).

Perineal prostatectomy was a close follower of perineal prostatotomy and precursor, by some number of years, of McGills introduction of the suprapubic method. This operation was used mainly for malignant enlargements of the prostate early, but later it was more widely accepted and was soon used for benign cases.

This was used for partial removal at first and later for the total removal and was used in a larger number of cases than the suprapubic.

George Goodfellow of San Francisco in a report given in 1904 (21) gave von Dittel in 1889 credit for removing wedge shaped bits of the prostate from the lower, under surface of both lateral lobes, and Nicol in 1894 made a combined suprapubic and perineal type of operation removing the prostate (21). Alexander and Chetwood about the same time, made a similar operation but differing in slight detail (22). Goodfellow also mentions that Reginald Harrison recommended in 1885 the perineal route for exploration of the bladder and incidental removal of tumors thereof (21).

In this same paper George Goodfellow claims to have been the first one to have performed a "pure perineal prostatectomy--deliberately devised and carried out." (21) There has been confusion and debate as to the actual originator in each type of operation but we shall consider a few more men in this field who have done work in the twentieth century.

The late Dr. John E. Summers of Omaha (23) gave a paper before the Nebraska State Medical Association in July of 1919. In this paper he started out by talking of the history of the evolution of the suprapubic type of prostatectomy, and he states that we owe the initial

logical efforts towards removal of the obstructing prostate, through a suprapubic incision into the bladder, to McGill of Leeds, England, and Belfield of Chicago. He also talked of the importance of the proper preparation of the patient for operation and how a lack of this preparation increased the mortality rate very much and caused high mortality rates in many reported series that could have been lower if proper care had been taken preoperatively. In 1900 to 1902, Dr. Summers continued, Murphy and Ferguson of Chicago, and Parker Syms of New York invented instruments to draw the hypertrophied gland near the surface through a perineal incision so that it could be enucleated under direct vision.

Dr. Summers stated that in 1903 High H. Young of Baltimore, became an advocate of the open or dissecting operation, the technique which the French surgeon Proust had modified. In Young's hands this operation has been very successful to the present day.

Although we must give credit to Dr. Eugene Fuller of New York as the originator of the suprapubic enucleation of the enlarged prostate, yet Freyer of London deserved the greatest credit of developing the operation from an "embryonic" stage to its present status (23).

The growing tendency of two decades ago was to

expose the prostate by a wide retraction of the bladder incision, using a special retractor for this purpose. A five per cent novacain solution is injected into the prostatic capsule. This, it was said, helped in the following ways: a) It almost entirely controls bleeding during enucleation, making a relatively dry field. b) It helps to free the enlargement. c) It produces an anoci-association and thus helps to avoid shock. Allen of New Orleans and Lower of Cleveland emphasize this last advantage. Dr. Summers continued to say that the operation of enucleation took a short time, and did not entail too much knowledge of the anatomy of the region as the perineal type of operation, and was therefore of value to the general surgeon who did approximately ninety-nine per cent of the operations in the United States.

This paper given by Dr. Summers then was discussed by the Doctors C.A.Roeder, B.B.Davis, A.F.Jonas, C.R.Kennedy, W.L.Ross, H.B.Boydén, A.I.MacKinnon, Max Emmet and Edwin Davis, all of Nebraska. It was of great interest to me to note that many of these men stressed the importance of this operation to the general surgeon and that their opinion was that the operation in the hands of the general man could get better results than a more complicated operation in the hands of this same man (23).

Now we go on in the discussion to Dr. Edwin Davis of Omaha and I quote from his discussion. "I do not suppose there will be a dissenting voice to the statement that if every surgeon had the ability to make the clean perineal dissection Young does, there would not be so much criticism of this method. There are certain advantages which cannot be overlooked. The factor of not having to operate in the dark; of being able to make a clean dissection and see what you are doing; of being able to pack the cavity and control the bleeding, are points worthy of mention." Continuing, Dr. Davis said, "The packing after the perineal route is solidly held. After the perineal route--the shock is less, and less postoperative toxemia and intestinal paralysis. Young's statistics speak for themselves--by combined blunt and sharp dissection the small, hard fibrous prostate may be readily handled; whereas this type cannot be readily shelled out with the finger--the anatomy of the perineum is relatively intricate compared to that of the suprapubic approach, and the average surgeon is not familiar with it. In a consideration of the decision of the type of operation to be made, I should say certainly neither route can be decided on for all cases, and in the decision, a consideration of the individual patient should be made, and also of the

training and preference of the surgeon." This was an unrehearsed response and is as we can see today a very brilliant and true response (24).

Dr. Hugh H. Young of Baltimore reported one hundred cases of median lobe hypertrophy which had been treated, without a single mortality by the "punch" operation. He used this in cases of small bars, which were caused by contractures or lobules at the prostatic orifice and not associated with lateral lobe hypertrophy. This report was in 1913, and the results were good, without having to repeat the operation, although not thoroughly radical, does not require subsequent urethral dilatation and gave "lasting cures" (25).

Charles M. Harpster in the same year (1913) reported the use of the Goldschmidt Cautery doing prostaticotomy by the method of Goldschmidt (26).

John R. Caulk reported also the use of a "cautery punch" in 1920, and he states that this operation, owing to its simplicity, its freedom from hemorrhage, absorption and similar complications would offer itself as the method of choice for the group of prostatic obstructions due to median bar formations or contractures of the vesicle neck. He gives this as the solution to the "gross death rate" problem of prostatic surgery (27).

This now gives a view of the different types of

operations used in the twentieth century and continues with the old eighteenth century question of what is the "ideal operation" and leaves that question with us unanswered in the twentieth century.

III. THE ANATOMY OF THE PROSTATE

The prostate is a partly glandular, partly muscular organ of a dark brown-red color which surrounds the beginning of the urethra in the male. It lies within the pelvis behind the symphysis pubis, and is enclosed by a dense sheath derived from pelvic fascia. This sheath and the pelvic fascia hold the gland firmly in a fixed position. The ejaculatory ducts traverse the prostate in their course downwards and forwards to join the urethra as it descends through the gland. The gland may vary in size but normally is three and four tenths centimeters transversely. Its anter-posterior diameter is about three quarters of an inch and its vertical diameter about one and a quarter inches. Superficially the prostate is separated from the bladder by deep wide lateral grooves directed downwards and forwards, and by a narrow posterior groove which is horizontal.

The urethra enters the prostate at a point near the middle of its upper surface or base, and leaves it at a point situated on its anterior border, just above and in front of the apex, describing a curve which is concave forwards.

A somewhat wedge-shaped portion which lies between the ejaculatory ducts and the posterior aspect of the urethra is termed the middle lobe. When hypertrophied,

the middle lobe may cause a considerable elevation in the cavity of the bladder.

The remaining part of the prostate is described as being composed of two large lateral lobes, which are, however, not marked off from one another superficially.

The sheath of the prostate is formed by the pelvic fascia, and closely invests the gland on its lateral and posterior aspects. Inferiorly at the apex of the prostate the sheath becomes continuous with the superior fascia of the uro-genital diaphragm, and is attached to the pubic arch. The pubo-prostatic ligaments pass forwards from the anterior aspect of the sheath to the back of the lower part of the pubis, where they are attached to the periosteum. This ligament in its upper portion, which passes upward and backward to the bladder wall, are spoken of as the pubo-vesical muscles. On each side the sheath of the prostate is continuous with the strong fascia which cover the pelvic surface of the levator ani muscle.

The structure of the prostate is, superficially, made up of matted interlacing bundles of smooth muscle and fibrous tissue fibres, which form a capsule like area for the deeper portion of the organ. This capsule is not sharply defined, but from its deep aspect fibrous and muscular strands pass inwards, converging

towards the posterior wall of the urethra, to become continuous with the mass of plain muscular tissue which surrounds this canal as it traverses the prostate. The somewhat radially arranged strands divide this prostate into a number of incompletely defined lobules, of which there appear to be about fifty. The yellow colored glandular tissue which forms the lobules is composed of minute, slightly branched tubules, the walls of which in places show saccular dilatations. There are about thirty prostatic ducts and these empty into the prostatic sinus.

The nerves of the prostate are derived from the pelvic plexus, and there is a prostatic plexus formed which is of considerable size. It is placed on both sides of the gland, and it supplies the substance of the gland, the prostatic urethra, and a branch to the neck of the bladder and seminal vesicles.

The arteries of the prostate are branches of the intestinal pudendal, inferior vesical, and middle hemorrhoidal. Its veins form a plexus around the sides and base of the gland and receive in front the dorsal vein of the penis, and end in the hypogastric veins (30).

IV. RECENT LITERATURE FAVORING SPECIFIC TYPES OF OPERATIONS

In reviewing approximately two hundred articles on, or relating to, prostatic surgery, much repetition was encountered in the articles, some as to figures, statistics, ideas, results, type of patients, and so forth, but most of the authors had many good ideas which they all try to put across to the reader in all sincerity. A few articles have been chosen on each sub-head and the more prevalent ideas were attempted to be gleaned out by the author and placed in its group. Some of these ideas are again brought up in the discussion, and contradicted or commented on. Some of the more radical ideas are also brought up in an attempt to give a cross section of the articles read. They are all articles less than eight years old and are grouped in order of appearance in the various journals.

A. TRANSURETHRAL PROSTATIC RESECTION

The introduction of a new type of surgical treatment for removal of "bits" of the prostate is a relatively recent procedure (Sterns and his resectoscope, 1926), which did seem to overwhelm some of the more stable urologists, with enthusiasm. Where we are, in the arc through which the pendulum of enthusiasm places us, may be approximated, but, where we will end, and where we should end, are locations which we all are very interested in learning about as soon as possible.

Dr. John R. Caulk of Saint Louis, Missouri, who states the treatment of the large prostatic obstruction is his "progeny", thinks the operation has a definite field in prostatic surgery and he wants to see it develop into a substantial character. He tells in his article (31), that in an analysis of almost eight hundred cases it was determined that approximately eighty per cent of the patients received complete relief of obstruction with a sacrifice of a small portion of the gland. Chronic inflammation tends to recede causing a diminution in the size of the gland after removal of a "certain amount" of tissue from the bladder orifice. In an analysis of eighty cases in which the "punch" operation had been used for large obstructing glands, it was found that seventy per

cent were entirely relieved without recurrence for a period of from three to ten years, twenty-two per cent were "sufficiently" relieved to be satisfied.

In speaking of instruments which are used now for transurethral prostatic removal, each instrument may possess certain advantages over the other, but let the operator employ the instrument he can use most satisfactorily and get the best results with. The competitive struggle for supremacy on the part of different instrument houses has placed many instruments in the hands of the incompetent, untrained operator, who is advised that the instrument is almost foolproof and that most men can use it without danger. This above fact, Caulk thinks, will retard the progress of urological surgery unless promptly corrected. These operations although "advertised" as simple, require skill and delicacy of technique, also the patient needs the same preparation as required for major surgery. No unnecessary chances should be taken either in operating upon unprepared parts or in working "under the sublime delusion" that these electrical instruments will do the job. He likewise impresses the fact on the reader that in the post-operative case if our goal of the best possible results is to be attained, the "most stringent detail" must be made use of (31).

John L. Emmett of the Mayo Clinic states that in three thousand five hundred cases in which transurethral resection had been used, about one to one and one-half per cent had postoperative urethral stricture. These are easily treated (or at least the large majority) by one or more dilations. The minority which cannot be dilated are usually in the anterior urethra and these are treated by the "Riba high frequency urethrotome". Nesbit advised recently the use of a "large resectoscope through a perineal incision" and thus being able to remove larger pieces of the gland. This, of course, is to find its use in removal of large glands and small urethras, and in helping to prevent stricture as a result of trauma in the anterior urethra. By this method larger pieces of gland may be removed. An incision is made in the bulbous perineal urethra over a grooved sound and the resectoscope is introduced through this wound and the operation performed. Postoperatively a urethral catheter is used through the penile urethra, and the perineal incision closes without being sutured. Emmett states, "Because any type of prostate gland may now be successfully removed transurethrally, there will be little indication in the future for any type of open operation in prostatic obstruction."

In the summary Emmett writes, "Transurethral prostatic resection has changed the surgical relief of prostatic obstruction from an operation of necessity to one of election", and this he says is due to the "dramatic lowering of the mortality and morbidity rates and, length of postoperative hospital confinement." He thinks the trend is to remove more completely the prostatic tissue, removing larger amounts of the gland. This makes for a smoother and more rapid convalescence. The results are permanent and better than those obtained by the older operations of total enucleation. He writes that "transurethral prostatic resection is to become transurethral prostatectomy" (32).

Dr. G. J. Thompson of the Mayo Clinic states that prior to the development of transurethral resection there was no safe method by which a direct attack on the enlarged prostate could be made in cases of chronic renal insufficiency of serious degree. He states that before this operation was made popular a catheter had to be inserted to prepare the patient for cystotomy and then suprapubic drainage by catheter for weeks or months, and the patient would perhaps have to return for observation several times before he could be enucleated. In some patients the renal function never returned to a safe level so the patient wore the catheter for years (33).

Dr. George R. Livermore of Memphis, Tennessee (34), relates in his article that prostatic resection is not applicable in all cases, because it is, first, impossible to introduce the resectoscope in some cases; second, many patients are in such poor condition that the operation is not deemed advisable; third, some prostates are too large and an insufficient amount of tissue can be removed to afford relief. He performs prostatectomy in the first and third group and interesting to note he gives relief to the second group by injecting water into the projecting lobes, the water being about one hundred and sixty-seven degrees Fahrenheit, thus being hot enough to cause atrophy but not hot enough to cause sloughing.

Interesting in the line of results is a point brought out by Livermore in which he says, "The success of resection cannot be judged entirely by the patients freedom from symptoms and his ability to void freely and easily, because we see a similar condition in many patients on whom we make a cystoscopic examination and find marked bladder neck obstruction." Some of those patients think the doctor wrong because they have practically no symptoms referable to the urinary tract. He gives some examples of this.

Dr. Livermore brings out an important point in this same article (34) and that is the reason for recurrences of obstruction in many of the patients treated with transurethral resection. He thinks that all the obstructive prostate tissue is removed when the part is first operated, but later there is an "infolding" of the portion of the gland that remains and this is due to removing the center portion which has acted as a support. There is we may well suppose a contraction of the capsule forcing the remaining tissue into the internal meatus and into the prostatic urethra.

Fractional resection of the prostate is applicable to those patients who fringe on the border of "inoperable" cases in which the risk of total resection is too great. Dr. Livermore began using this after getting the idea from a statement of Dr. Alcock at the 1936 meeting of the American Medical Association at which he said that second resections were less dangerous than the first, and that he had never had a death from a second resection.

Some of the complications of resection, namely primary and secondary hemorrhage, shock, sepsis, uremia, and embolism are found in perhaps greater number than appear in the statistics of most authors. Carcinoma percentage was reported in a series of cases by Livermore to be

twenty-two per cent. That increase is due, he thinks, to the fact that more thorough sectioning is done by the pathologists following resection (34).

Drs. Bumpus and Massey (35) of Pasadena, in an article on the preoperative treatment of the patient to undergo resection, stress the point that in preparation of the patient for prostatectomy in a group of one hundred and forty patients who were absolutely free of fever, from the preliminary cystoscopic examination, from acute epididymitis, and free from any pulmonary complication. These one hundred and forty patients, left from an original group of seven hundred, submitted to inlying catheter drainage, and developed a fever within five days, lasting seven and one-half days. Sixty-three, as shown by phenolsulphonephthalein tests, demonstrated a decline in renal function. This they think lowers his hemoglobin, lowers his weight, decreases renal function, and causes loss of appetite. When complete enucleation of the prostate was to follow this method of preparation, the infection didn't appear to be of any great seriousness because, with removal of the gland in toto, the original source of infection is eliminated and the remaining inflammation was given adequate drainage.

They go on to explain that this is different in transurethral resection because the entire gland is not

removed, only the obstructing portion is resected. The remainder is left "in situ" and, since there is no catheter that adequately draws this portion, it is a potential source of immediate ascending infection, or a source for systemic infection. Especially is this so when the resection has been done by the cautery loop, sealing in all the bacteria and their toxins, not giving them a chance to drain. "The wonder is not that these patients have a relatively short hospitalization, but that so many of them escape a general urinary sepsis."

Bumpus and Massey go on to state that the newer concept of the limitations of preliminary preparation "leaves a much smaller group requiring any treatment before operation, and logically increases considerably the number of patients having cystotomies." "There are many urologists who like to go on and do a two stage suprapubic prostatectomy after doing the suprapubic drainage, but these men state there is a great difference in mortality figures, "a mortality rate of from six to ten per cent is the best that may be expected from suprapubic enucleation, while there are over five thousand cases reported of transurethral resections with a mortality of less than two per cent." This indicates, they continue, that transurethral resection, being a procedure of lessened risk, must be applicable to a larger

group. Alcock reported a group of two thousand, eighty nine cases with prostatic symptoms, five per cent died because of being refused prostatectomy due to the risk of the operation. They state (Bumpus and Massey) that where formerly Alcock's prostatectomies averaged sixty-six years of age, the patients upon whom transurethral resections were performed averaged seventy-three years. "The fact that transurethral resection is a less dangerous procedure made this possible, and, being a less dangerous procedure, it can be undertaken in cases where prostatectomy would not be justified." They feel that a preliminary treatment such as used for prostatectomy is not needed, for the patient need not be in as fine a physical condition to survive the safer procedure. They state that the resection replaces the preoperative treatment in a majority of cases. The treatment needed by prostatectomy before operation require a skilled personnel with special training whereas if operated on immediately this personnel is not needed and this is very adaptable to the man who works in smaller and varied hospitals.

The above paper is concluded with the statement, "The advent of the transurethral resection has not only diminished the necessity of preliminary preparation in the majority of cases of the hypertrophied prostate, but

has increased the number of patients for whom the surgical relief is feasible" (35).

Roelnick and Riskind (36) in a report on the review of eight hundred and ninety-seven patients, at the Cook County Hospital, Chicago, who had performed cystotomy, cystotomy and suprapubic prostatectomy, perineal prostatectomy, cystotomy and resection, or transurethral resection. In their figures, which we must consider are all from a large charity hospital covering a five year period and with various men doing the work, the author was struck by the mortality rate reported on five hundred and ninety-one cases who had had cystotomies performed, there were one hundred and seventy-one deaths (twenty-eight and six tenths per cent mortality). This we must all agree is a very high mortality rate for a procedure which everyone considers as a "minor" procedure, and is done to produce a better drainage before the prostate is attacked. Is it then justified to allow these patients to have a "safety-valve", to prevent him from "blowing-up" within himself, if approximately thirty per cent of the patients are going to die in producing this valve. According to these figures one wonders if cystotomy is justified. These same two men report a series of one hundred and twenty-six patients on whom they had performed

cystotomies in private hospitals with a mortality of six out of one hundred and twenty-six, and only one of those six could be considered a surgical death. Rolnick and Riskind continue to explain the high mortality rate in a "city general hospital" saying that the patients in these hospitals are the poorest surgical risks. "It is important to note that the majority of the patients who died following cystotomy would not have been operated in most clinics." Many of these cystotomies were done for bladder stone, (fifteen) of whom six died, and tumor (fifty-six) of whom twenty-five died. Fulgeration, in addition to cystotomy and the malignancy were the chief causes for mortality. Thirteen out of forty-five patients died on whom cystotomy, for relief of obstruction due to carcinoma, was performed. "Transurethral resection is now done routinely for these patients."

In the County hospital in 1933, 1934, and 1935, two hundred and eighty-three patients were operated on by the transurethral route with a mortality of eighteen and three tenths per cent. These cases were selected cases, selected by cysto-urethroscopic findings. Sixty-three of the two hundred eighty-three had had preliminary cystotomy. In 1936, the mortality rate was fourteen and five tenths per cent at the Cook County hospital.

In sixty private patients Kolnick and Riskind had a mortality of twelve per cent in resection with a closed bladder and in twenty-nine patients resected who had previously had cystotomies there was no mortality. They conclude that resection is the safest procedure in those who are poor risks and where the prostate is not large, and if there is "intolerance to the catheter or marked infection" a preliminary cystotomy should be carried out carefully under local anesthesia, and if done so there is practically no mortality (36).

Dr. N. G. Alcock of Iowa City (37) in a discussion of a paper given by Dr. Hugh H. Young of Baltimore brings out some very interesting points. Dr. Alcock is a resectionist and Dr. H. H. Young favors perineal prostatectomy and both men agreed according to Dr. Alcock that for Dr. Young perineal prostatectomy was the operation of choice and the operation he should do and for Dr. Alcock transurethral resection was the operation. He makes it a point that if the good men could do all operations as well as Dr. Young could do perineals, then surely he should do more by that route. The type of surgery should fit the problem the patient presents and not the patient fit the type of surgery used. This last statement is generally accepted yet, asks Dr. Alcock, what does one find in actual practice? He states that he relieves all,

or practically all, of his patients by the transurethral method. Dr. Young uses the perineal method almost without exception and Dr. Verne C. Hunt did all of his at Rochester by the suprapubic method. Alcock does not think that that is fitting the surgery to the patient and yet must all admit that the patient is getting good results. He states that the answer to this is that the surgeon should do the operation which in his hands will give the patient the best result.

He brings out a good point also as to the statistics of the various types of operations and the results. These statistics can be easily colored in one way or another, for instance, in one series of cases of one thousand five hundred prostatectomies reported, only sixteen per cent were over seventy years of age; five hundred and seventy were under the age of sixty. Compared to that group is a group of one thousand five hundred reported by Alcock in which sixty-four per cent of the patients were over seventy years of age and one hundred and forty-eight of these were over eighty years of age compared to only eight patients over eighty years in the first group. The statistics of these two groups can be changed a lot by this age factor. Dr. Young reported a group of one hundred and ninety-eight in which nineteen per cent were used under sixty years of age and twenty-nine per cent

over seventy years of age; this group Alcock thinks is a fair cross section of the average. He thinks that urologists generally, whatever method they use, get good results considering the type of patient with which they deal (37).

Dr. I. R. Sisk at the Wisconsin General Hospital compares one hundred cases of the "pre-resection era" to one hundred cases of the present resection era. Before the resection era suprapubic prostatectomy was the procedure of choice with the two stage being performed about twice to a single one stage operation. In considering these figures we must remember that there are three residents in urology at the Wisconsin General Hospital and that it is a teaching institution, and effects to some degree the morbidity and mortality of prostatic resection.

In the first series, one hundred patients were chosen as they came, fourteen patients were not operated, eighter because, the disease was not far enough advanced and they refused the operation; they had other serious pathological conditions or they did not improve enough after suprapubic cystotomy to allow for the operation. Seventy-two of the remaining eighty-six patients had one or two stage prostatectomies. Of these six died (seven and nine tenths per cent), five had "punch" operations performed with no

deaths, and two patients were sent home for intermittent catheterization.

Of the second one hundred consecutive admissions, eight were not operated because of various accompanying conditions and eight more died before operation, from grave general diseases unrelated to their prostatic conditions. Of the remaining eighty-four patients, eighty were operated on by the transurethral route and four had prostatectomies. There was a mortality rate of five per cent in the resection group and no deaths in the prostatectomy group.

In a comparison of hospital days of these two groups we must remember again that this is in a teaching institution and procedures of examination are slower, than in private hospitals, the patients generally are in a poorer condition than private patients, and some patients cannot be released when able due to home conditions. The average total days by those who had prostatectomy (excluding those that died) was very large--one hundred and seventy-nine days, compared to twenty and one-half days (excluding those that died) for resection.

Sisk believes that if "sufficient tissue is removed to permit complete emptying of the bladder--the cloudy urine due to infection, slough and hemorrhage" would be no more marked following resection than it is in

prostatectomy. The latest "annoying complication" says Sisk is stricture of the anterior urethra, and this is due to the overdistention of the anterior urethra. This may be avoided by operating through an external urethrotomy, and he thinks this procedure should be used more.

In summarizing Sisk again emphasizes that resection is a "practical" procedure for all patients with benign hypertrophy of the prostate who can be placed in the "proper position" for operation and of course on whom the instruments can be passed. The results are good if adequate tissue is removed, and recurrences are "no more or only slightly more" frequent than in prostatectomy. The mortality rate is "somewhat lower" in resection, and if the patient is in good condition the mortality rate is "almost negligible". The economic advantage of the shorter hospital stay of the resectional patient. Patients do not fear resection to the extent they do prostatectomy.(38).

Dr. Harry C. Kolnick of Chicago in his article on the "Status of Transurethral Resection" (39) thinks that the personal experience and training of the urologist is to a large degree responsible for his favoring a type of treatment for prostatic obstruction and, that this should be remembered in discussing an operation, that there is

a personal as well as an objective point of view.

In attempting to evaluate the various procedures Rolnick emphasizes transurethral resection, and thinks that many of the technical difficulties have now been ironed out, and many of the dangers eliminated. "The hemostatic bats of Foley and Alcock aid in controlling hemorrhage--". Making a channel is not sufficient in transurethral attack on larger prostates, because the same difficulties are found that the partial prostatectomies give rise to, namely persistency of obstruction and infection. In large prostates Rolnick thinks that total removal should be done and of the three routes transurethral prostatectomy is technically the most difficult.

An important point brought out by Flocks experimental work on the arterial supply of the hypertrophied prostate is very interesting and explains why we may expect persistent infection, and sloughing when transurethral resection is done and leaves portions of the lateral lobes. The main blood supply to the hypertrophied prostate is by the internal urethral group and when a median cut is made these vessels are obliterated, and the lateral lobes have no circulation.

Rolnick in talking of the advantages of resection states that the cold punch does not require preliminary

catheter drainage, and very little coagulation is needed thus infection is decreased. With the resectoscope preliminary catheterization is not needed if the residual is less than three ounces. Coagulation should be restricted due to the sloughing that follows. "Hospitalization is markedly reduced, and the procedure usually is less formidable than the open operation" therefore the advantages of resection in suitable cases cannot be over-emphasized. "Wherever feasible," Rolnick performs transurethral resection and he states that it is technically possible to remove all forms of prostatic obstructions transurethrally." The safest of all operations on the prostate is cystotomy followed by resection, and in addition, once the bladder is opened, early enucleation can be carried out in most cases as a second stage procedure. In the hands of the experienced urologist the mortality should be virtually nil (39).

Dr. Thomas J. Kirwin of New York City (40) states that prostatic surgery has one purpose and that is to give free drainage from the bladder. The question is not: "What is the best method to adopt for cases of prostatic surgery?" but rather: "How can the urinary obstruction of this patient best be relieved?" In discussing prostatic resection Kirwin thinks that the skill of the operator is restricted by the instruments

he is forced to use; but the urologist may attain "excellent technical results after sufficient practice." He thinks that the indications for "intraurethral resection" are wider than indications for the perineal or suprapubic approach. He also mentions the economical advantage of transurethral resection, both that advantage to the hospitals and patients.

Another point is stressed by Kirwin and, that is, due to "newspaper propaganda", and the laity's belief that it is a "minor procedure", with the younger men thinking this to be a "simpler" operation, we find an ever increasing number of cases "clamoring for relief" and these cases have previously been operated on by the transurethral route. He also thinks that patients who have some organic derangement such as cardio-vascular-renal disease may be relieved by resection whereas the enucleation type of operation could not be endured, or due to its attendant hazards. Due to these various causes we have found a large increase in transurethral resection.

The distinction between various types of prostatic hypertrophy must be remembered and those set forth by Alexander Randall may be mentioned. "If there be large intravesical intrusion of hypertrophied lobes, the suprapubic approach should be employed and the tissues within

the bladder enucleated. If there be marked extravescical intrusion, with large masses of tissue in the posterior urethra, enucleation by way of the perineum is in order. But for relatively small lobes, causing urinary obstruction by position rather than size, introurethral resection is by far the most efficient method" (40).

B. PERINEAL PROSTATECTOMY

In taking up the discussion of this type of prostatic surgery the author picks an article that some men have termed "radical" or "conservative", but I found the article very interesting if a bit over-enthusiastic. The paper referred to is the "Moonlight and Roses" paper by the Drs. Bransford Lewis and Grayson Carrol of Saint Louis. These gentlemen take the results of some of the reported cases of transurethral resection and attempt to destroy the evidence that most of them attempt to build into a concrete conclusion. This article is very much against transurethral resection but it does not give much evidence that could be called positive for prostatectomy but gives much that is negative for transurethral. These men have done resections with good results and also with bad results. They bring out that bleeding occurs if too much fulgeration is done or if not enough is done (41).

In an article by the Drs. Edwin Davis and C.A.Owens of Omaha we see an opening poem by Pope which reads,

"Be not the first by whom the new is tried,
Nor yet the last to lay the old aside."

This is a very good thought and does fit what we should do in cases such as this problem in prostatic surgery. In this article we see a relatively early paper comparing the merits of transurethral resection to the merits of

transurethral resection to the merits of prostatectomy of the perineal type. They speak of the exactness of urological surgery and the new "impetus" received by the introduction of a new procedure, namely transurethral resection. We are warned of the swing of the pendulum beyond safety and reason in a burst of over-enthusiasm, and after reading the history on this subject and preparing this paper, the author must also agree with this idea. They stress the manner in which to evaluate a new surgical procedure and this being an accurate comparison of complications, mortality rates and immediate and ultimate functional results between the "New and The Old." (42)

In giving results of their personal experience Davis and Owens state "Results in general have been satisfactory --in a limited number of selected cases--and in a few cases, highly gratifying." They confined themselves to fibrous contractures of the vesical orifice, median prostatic bars, moderately hypertrophied median prostatic lobes and to prostatic carcinoma. Of this last group (Oprostatic carcinoma) transurethral resection offers to this patient "relief hitherto unknown." The advantage as seen by these men in this type of case is in the, perhaps only palliative and temporary, relief which is

given without a fistulous tract which these are prone to cause if operated on by the perineal route.

Davis and Owens give credit to the economic advantage of prostatic resection and the advantage that resection does appeal to the patient more because he (the patient) does not think it a major operation. However they say that it is definitely a major surgical procedure, although requiring no external incision, it leaves an "open sloughing surface with consequent possibilities of grave complications due to sepsis, and to both immediate and secondary hemorrhage" (42).

Davis and Owens state that the prostatic resection procedure is a much harder operation being both more trying and tedious than an ordinary perineal prostatectomy both the operator and the patient. They noted that Alcock had seen a decrease in his mortality rates after his "skill and a familiarity with the method have increased," he decreased his mortality from twenty-eight per cent to four per cent in approximately one hundred cases.

In considering functional results they quote from some men who today are more or less grouped as resectionists or as prostatectomy artists, as an interesting point the author chose several of these to see how their various opinions were in 1933 compared to their present standing. Dr. W.G. Alcock of Iowa City, now a rather

strict resectionist, said at that time "So far as immediate results are concerned I am perfectly satisfied with the method, whether I continue to use it will depend upon the ultimate outcome--a year or two after they are resected." He found that the "ultimate outcome" was satisfactory to him evidently.

Dr. Hugh H. Young of Baltimore, states that the modified punch method had become popular because of the mortality of prostatectomy which these men had had, but those men who did prostatectomies more frequently did not quit prostatectomy and he asks why we should do an operation which is "manifestly incomplete, partial, liable to recur, and which", then he said, "shown much higher mortality," than the other route. He is still of that opinion at this writing.

Dr. J.R.Caulk of Saint Louis stated that trans-urethral surgery is sure to have a more prominent place as time goes on, but "it is a delicate task and entails training, confidence, careful preliminary preparation, accurate surgical manipulations, and scrupulous after-care.

These are several divergent views yet as put by Davis and Owens; these men are men who are all able, honest and of established character. They conclude that prostatic resection in selected cases and properly employed is

undoubtedly a useful and valuable procedure, and that it will "partially replace, but not supplant" prostatectomy. The actual percentage of prostates to be operated on by prostatectomy or resection was a question at that time as it is now, late functional results were not obtainable at that time (nor are they today). The "personal equation" will determine to a great extent the number of resections or prostatectomies each man will do.

In this same article a series of four hundred and seventy-nine consecutive cases were reported in which a mortality rate of only two and five tenths per cent was found and only one and two tenths per cent were unimproved as to late functional result, sixteen and five tenths per cent were improved, and eighty-two and three tenths per cent were well. These we must all admit are very good results (42).

Dr. Charles H. Chetwood of New York City collected results on twenty-seven thousand, three hundred and ninety-seven cases of transurethral prostatic resection, and the mortality rate ranges from one and three tenths per cent in a selected group to a nine per cent mortality in a non-selected. In the best group of eight thousand three hundred and ninety-one cases there were sixty-seven per cent satisfactory and thirty-three per cent unsatisfactory, and in the non-selected group of three thousand

eight hundred and sixty-seven cases there were twenty-five per cent satisfactory and seventy-five per cent unsatisfactory. In the selected cases (mortality one and three tenths per cent) the operations were for minor lesions, bars, contractures, small lobes and so forth with limited tissue removal. In the non-selected cases (mortality nine per cent), the operations were performed without regard to size of growth on both median or lateral lobes. This article was placed in this group under prostatectomy because of the conclusions one must draw after reading the above figures and Chetwood summarizes his view which he had had "since the beginning of my study of this subject: that lobular enucleation of the prostate has its appropriate indication as an operation of expediency as well as of necessity", and in concluding he stated that the percentage of cases to which it is adaptable is claimed to be seventy-five per cent which would be a "notable achievement", ninety-eight per cent, doubtful, on one hundred per cent, which would be a "panacea, which it is not" (43).

Dr. Benjamin S. Barringer in discussing Chetwood's paper and carcinoma of the prostate makes a very interesting statement in which he says, "I think we are all terribly troubled by the cases of resection that have perfectly good results for six months or a year and

then relapse." He goes on to mention, referring to large malignant prostates, that resection followed by a moderate form of external irradiation is the best treatment (44).

In discussing the paper of Drs. Bumpus and Massey (35), Dr. J. C. Negley of Los Angeles mentions a fact worthy of note, and that is that, in obtaining statistics on any surgical procedure one should take a "cross section of the average practitioner" and not a selected group which favor your side of the question. He then submits two charts in which one hundred prostatectomies and one hundred resections are compared first, in a charity hospital with the work done by some thirty urologists, and second, in a private hospital, the work having been done by general surgeons and urologists. The mortality rates were six per cent for prostatectomy and eleven per cent for resection in the charity and two per cent for prostatectomy and twelve per cent for resection in the private cases. He talks of preliminary drainage and this is done in a very large percentage of cases yet. The preoperative care averages five days difference (in favor of resection* in the charity group and eight days in the private group. Complete retention was present in forty-eight of the two hundred who received prostatectomies and only in thirteen of the two hundred

who received resection. The per cent who had residual urine, urine infection on admission, and kidney damage, all favored resection for better results (45).

In concluding Dr. Negley states that in any group of patients of the prostatic age with their associated diseases of heart, vascular, kidney, prostate and so forth are all individual problems, and one who reaches this age should not be given an operation that has more dangers and higher mortality to save a few days. They deserve a rest in bed for a week or more before surgery "for a reward if for nothing else" (45).

Dr. H. A. R. Kreutzmann of San Francisco in discussing Drs. Bumpus and Massey's article brings out the difference between the patient who is now operated on by resection with little or no preoperative care is the patient that the prostatectomist used to send on telling him to wait, that he had a "beginning hypertrophy" and he should wait until it was larger before he submitted himself to operation. He does think however that this patient should be operated upon because it is safer before complications arise and it lessens the preoperative care as Bumpus and Massey contend. Kreutzmann does not agree with Bumpus and Massey on the percentage of "immediate operations" being greater than the percentage of those first being repaired before operation. Kreutzmann

also thinks that a suprapubic trocar is the preferred method of bladder drainage in preference to the indwelling catheter, because the indwelling catheter causes irritation so that hemorrhage is increased during operation (46).

Dr. George A. Livermore states that resection is not applicable in the very large hypertrophies and cannot be used when the resector will not enter the bladder. His article is that of a resectionist but he notes some limit to its use (34).

The Drs. Rolnick and Riskind mention that the patients who are good risks for a one stage operation or in whom malignancy is suspected should have perineal prostatectomy. The high incidence of carcinoma, which has been reported from fifteen to twenty-two percent, of the prostate should influence a great deal the type of operation (36).

Dr. Hugh H. Young of Baltimore in his article concerning the problems in surgical treatment of the prostate mentions Alcock in a "splendid and frank study" of eight hundred patients it was demonstrated that the mortality in resection increased rapidly with the weight of the tissue removed with an average mortality of eight and two tenths per cent with those in which the tissue removed weighed thirty grams or more (47).

Later in his article Young states that he believes transurethral operations have been satisfactory in treating bars, contractures and obstructions and enlargements of the vesical neck. However, he feels that if the disease has progressed much beyond this stage that preferably perineal or, if they choose, suprapubic prostatectomy should be used. This method enables the operator to view the gland directly, pulling it down with instruments and taking a biopsy, if they so decide, of the gland while it is exposed. In this way early malignancy may be found and radical operation performed, and this is "about one in every five." If one does an enucleation he has the satisfaction of "avoiding sloughs and infection" which are not uncommon with the resection type of operation. This infection and sloughing may lead on to more serious complication such prostatitis in whatever gland tissue is left, or an infection of the bladder proper with accompanying severe irritation (47).

Dr. Edwmn Davis (48) brings out a very interesting idea in his article "Prostatectomy Or Transurethral Prostatic Resection?" and that is his "trial and appraisal" curve in which he explains how a new drug or surgical method brings a rush of "over-enthusiasm" and after going through the stages of "publicity, commercial exploitation, unrestrained use, incompetence, abuse, and

poor results," the curve begins a decline and "damage, recognition of defects and dangers, caution, decreased use, fear, and over-correction" follow. Finally after hours, months, or years we find "recognition of true merit, same appraisal, and stability" following in order. This is as the author sees this question. We may all not the "over-enthusiasm" of many men who, previous to the beginning of the popularity of the newer resection method, were more conservative in their methods and manners, but who were overcome by the "upswing" portion of Dr. Davis' curve. In reading over the literature of the twentieth century, one can well see this curve unfold. Where we are in this curve however is hard to determine, because, as Dr. Davis found on receiving answers to inquiries sent to one hundred urologists of this country, there is still "such wide discrepancy" in the various opinions, some "extol" the transurethral method "to the skies," and others "condemn it utterly." However, he explains that both are right "at least in part", if the operation is done by the right man. That is the ninety per cent resectionist may get as good a group of results from a group of patients as would a ninety per cent prostatectomist on a similar group.

A classification of urologists is set forth by Davis in which he has three groups: first, the

"pauresectionist," who does at least ninety per cent of his cases by the transurethral route; second, the "nihilists," and those are the men who think there is no place at all for the resectionist; the third group is the "selectionist" and these are the men that are not extreme in their judgment but attempt to choose an operation that will be best for each individual patient rather than fitting the patient to a definite operation (48).

Dr. Davis finds that the trend of the urologists is now showing a decrease in the number of transurethral resections, and that many of the men who were doing many transurethral operations are now going back more to the prostatectomy. Culver for example was doing ninety per cent resections in 1934 and had "tapered off to sixty per cent 1938".

Public demand has also played a very important role, due to the publicity which circulated making the public think that resection was a "minor procedure" has had its injurious effect. Hepler in a personal communication to Davis stated that he believed "the public in undergoing a change in opinion."

In considering "time and cost" Randall wrote Davis "the question of hospital cost (in resection) must be

weighed against the possibility of recurrent hospitalization," and Green in a letter to Davis stated "the actual convalescence even though it is not in the hospital, is longer."

Commercializing by instrument houses has been harmful in placing various types of resectoscopes in the hands of men who are not qualified to do this type of surgery. "untrained operators are doing too many financial operations." The result of course of all this is abuse with "unnecessary expenses--suffering--and death, and undeserved discredit to a very useful procedure."

As to mortality rate; it is an unsettled question but the mortality rate of each type of operation is about the same in the hands of the experts and in those not so expert some claim resection to have the lowest and some claim prostatectomy to have the lowest mortality rate.

In comparative mortality rates Davis found that in seven hundred and forty-one perineal prostatectomies there was a series of one hundred and twenty-one without a death and an average mortality rate of two and seven tenths per cent whereas in the resection group there was a series of one hundred and seven cases without a death and an average mortality of five and eight tenths per cent.

In late functional results he also had good results by the perineal route, in which eighty-two and five tenths per cent reported themselves as well and sixteen and three tenths per cent considered themselves improved. That leaves only one and two tenths per cent to put in the unimproved group. This article was found very interesting by the author and brought up the question in my mind of why we do not see more "ultimate results" reports from the resectionists (48).

In his article of "Resection Versus Prostatectomy" Thomas J. Kirwin of New York City writes that prostatic resection requires a "Surgical team" to perform, and refers to it as an "expert's operation" however, he thinks those that are "capable of performing it" will have good results, with low mortality and permanent functional improvement. Kirwin also believes with H.H.Young, E.Davis and others that the enlarged prostate that is of any large size should be treated by open operation. Kirwin mentions that knowledge of all types of operative attack on the prostate should be known because all should not be treated by one method. There are many cases that are "borderline" cases and may be treated by the operators choice method, and the author agrees with this, thus making some men perform eighty per cent prostatectomies and others eighty per cent resections. He gives praise

to Randall's classification of types of hypertrophy (40).

Dr. Harry C. Rolnick of Chicago opens his article (39) by saying, "Personal experience and training are to a large degree responsible for the type of operation that is favored by the urologist in the treatment of prostatic obstruction", therefore, he thinks that any discussion of this question should look at it from a personal as well as an objective point of view. He thinks that perineal prostatectomy has gained or regained some increase in popularity. Prostatectomy is the only answer to relief of an obstructing prostate, and of the three types of attack the transurethral route is technically the most difficult and "requires the greatest experience". The author does not know how to interpret this last statement but there are many who would not agree with that statement I am sure. Again it is mentioned what happens to the remaining soft tissues of the prostate when the middle portion of the gland is removed by resection and the main blood supply obliterated, namely sloughing and infection.

An occasional early case of malignancy may be cured by perineal prostatectomy, and this operation is indicated if there is any suspicion of malignancy. The only chance of cure lies in radical removal or encucleation. An

indurated prostate and prostatic calculi are likewise best treated by the perineal route (39).

In discussing Dr. John L. Emmett's article (32) Dr. W. L. Sherman of Eloise, Michigan mentions that he is very grateful for the resectoscope but that he does not think any man should limit himself to one type of operation. He considers the resectoscope of value in offering the patient with little residual urine relief with a minimum of troublesome sequalar but he is glad for other methods he has to offer his patients. He also mentions that the resections are done in cases in which the symptoms are not as severe but he does not think as Emmett that he offers three times as many patients surgical relief since the advent of the resectoscope the author feels that if this be true surely the indications for operation have also changed. Dr. Sherman also refers to the prostatics of Detroit as having among them some sufferers who still have symptoms of chronically distended bladder, foul urine, marked pyonephrosis, renal insufficiency and anemia, and he feels that this type of man presents an emergency. He brings up again a subject that should be considered in statistics and that is the type of patient and he refers to the patients that go to the Mayo Clinic as perhaps not being as advanced, generally speaking, in their

hypertrophy as are some of the patients at the various charity institutions, for example, around the country. Sherman thinks that this type of patient, the far advanced prostatic, should have suprapubic drainage first and later some type of surgical attack on the hypertrophied gland. He also contradicts Emmett's statement that the morbidity and mortality rates of prostatectomy are higher than those of resection. Sherman does not think the mortality rate of the two stage suprapubic or the perineal type of operation have any higher rate than that of resection. He closes his discussion by asking for better qualifying statistics as to comparative symptoms, age groups, etc. (49).

C. SUPRAPUBIC PROSTATECTOMY

In discussing this type of operation procedure we must remember that it does not have the basic difference in comparison to perineal prostatectomy that transurethral resection has. The author feels that this operation still has a definite place in treatment of the hypertrophied prostate and therefore several pages will be devoted to discussing it.

This type of operation is used by many men who consider it safe and less technical than perineal or transurethral approach. It is often used after cystotomy has been performed and as Rolnick and Riskind state in their conclusions "two-stage suprapubic prostatectomy is a very satisfactory procedure and carries with a low mortality in those patients who can be considered only fair risks" (36).

Dr. A. M. Meads of Oakland states that in six different individuals, with severe hemorrhage from the prostate, demanded immediate operation, because of the distention of the bladder due to clots, without preparation. In five of these cases he did suprapubic cystotomy and they recovered with no abnormal reactions, but the sixth died because he waited too long to be operated upon and died due to this "self-imposed delay." Meads thinks

that one reason suprapubic operation has such a high mortality rate is because the use of indwelling catheters and other preoperative procedures have caused pyuria, increased temperature, epididymitis and pyonephrosis, thus increasing the hazard (80).

T. J. Kirwin (40) speaks of the high mortality rate which suprapubic prostatectomy is usually connected with, and thinks this is due largely to general surgeons use of the operation because it appears to be an easier operation. These men who have not had definite urological training would get a higher mortality rate than the man who has had urological training, despite the type of operation used. The patient and the surgeon are both pleased with the one incision which serves for cystotomy and the prostatectomy. Kirwin thinks along with a great many other men that knowledge and evaluation of all three methods of surgical approach to the prostate is desirable, and that without this the operator will not "be able to satisfy either himself or the majority of his patients." In concluding Kirwin states that Randall's classification should be kept in mind and under this classification I quote: "If there be large intravesical intrusion of hypertrophied lobes, the suprapubic approach should be employed and the tissues within the bladder enucleated."

In his discussion of the status of transurethral resection, Dr. Harry C. Rolnick of Chicago (39) thinks that the two stage suprapubic prostatectomy, which was the choice of "most" urologists before the advent of transurethral resection, is a procedure which many men are still using and a procedure which is "still safe and satisfactory". He writes, in giving his opinion of the comparison of the three methods, "if the ureteral orifices cannot be visualized by cystoscopy because of intravesical protrusions, suprapubic enucleation is indicated. Sub-trigonal, and sub-cervical prostates are also best removed by open operation. If marked bladder infection is present, or the prostate is soft and spongy and bleeds readily, and there is a history of hematuria, two stage suprapubic prostatectomy is preferable." Rolnick goes further to mention that if the weight of the tissue to be removed is in excess of "twenty to twenty-five grams", then enucleation is the method of choice in the majority of these cases.

V. DISCUSSION

In this portion of the paper the author wants to stress several points which may have been previously mentioned, or which may be brought out in discussions of papers, or as conclusions to articles, pertaining to outstanding points of interest met with in preparing this paper.

Dr. Maximilian Stern of DeLand, Florida (51), although the inventor of an early resectoscope and a confirmed believer in the many good points of resection, sees the fault of having the instrument in the hands of the untrained man and realizes and writes of the contraindications of the procedure. He believes in the large number of prostatitis who seek aid when they have acute urinary retention, that they should have an immediate cystotomy and then among these there are cases that can have resection "under the more ideal conditions", however if large "intravesical protrusions" are present then "enucleation is imperative".

Stern contends that the two "desiderata" of importance in determining which operation to use is "the degree of inflammation and edema present", and "the position and size of the intrusions".

In a comment at the close of his article Stern states that "it is unfortunate that in an operation containing

so much potential good, the surgeon must hold himself in suspense for several days after performing it, fearing lest its evil potentialities dominate." The responsibility he thinks is increased some in prostatic resection when the patient thinks he is having only a minor operation, which it is not (51).

Dr. Reed M. Nesbit of Ann Arbor, brings out the point that the usual resectoscope has a sheath of at least a twenty-eight french or thirty french caliber in size, and that some male urethras are not this large. Many of these are dilated in attempting to prepare them for resection, and in so doing the mucosa of the urethra is damaged and this results in stricture. However, urethrotomy as mentioned earlier in the paper, may be used in some of these cases. The operative time for resecting a moderately sized hypertrophied gland is more than the time required to do a perineal operation.

In this same paper Nesbit states that transurethral prostatectomy is an operation which demands a high degree of "technical skill" if it is, to be done properly. He thinks that a surgeon should realize how much skill he possesses and limit his cases to those in which he can perform a "more or less complete prostatectomy." He also says that the election of transurethral resection in any given case must be made by a competent urologist and not

the patient or his referring doctor or some friend. This man calls the resectoscope a "two-edged sword."

"No case should be subjected to resection or prostatectomy, unless the general condition permits," so writes Meltzer (53) in an article in which he discusses prostatectomy and resection. The care of the prostatic in the best way we now know consists of urologist working with the internist and the laboratory. Meltzer mentions the harm done by the early claims and publicity which the procedure obtained and the early records show poor judgment in selecting their cases for the minor operation which was supposedly a choice operation for the cardiacs, asthmatics and diabetics because it was "free of all shock and reaction." These case which have some type of preliminary treatment and the author fails to understand why in many of these cases which have a serious medical complication, some men consider it good when the patient can be operated on (without first having been "straightened out") and yet have a fairly low mortality rate (53).

Considering a patient of the above type, why does time make such a big difference? As some men believe, the patient may be operated on by resection, and then released a few days later, sent home there to continue with his original medical complication, plus the possibility of a prostatitis, cystitis, pyelonephritis,

epididimitis or late hemorrhage and as any man in medicine must agree if a patient has some complication before he is operated his chances of having these secondary complications have increased considerably over the man who is relieved of this medical complication previous to operation.

The author wonders if men who consider transurethral resection as saving an average of four to six preoperative days and an average of seven to ten postoperative days in the hospital, ever consider the average convalescent days after release from the hospital due to the above mentioned complications, to say nothing of the number who linger in a semi-invalid stage for a long period of time and then are finally forced to have another operation. There are perhaps more of these men than some urologist usually considers. More preoperative and postoperative treatment should be emphasized at least in equal proportion to the surgical technique.

In considering preoperative treatment some men do vasectomies on a majority of their patients and this of course lessens the possibility of epididimitis occurring portoperatively. Meltzer states that he does vasectomy just prior to instrumentation in the patient to be resected and in the two stage perineal prostatectomy, it is done just before cystotomy (53).

The postoperative stay in the hospital of course is one of the big advantages of transurethral resection. However Hinmain (54) has an average postoperative stay of seventeen days and E.Davis twenty-one days. The difference in the average figures is about nine days, and as E.Davis puts it, "The one results of prostatectomy is a temporary perineal drainage tract, three or four centimeters in length and a result-of resection is the presence of a more or less "residual" glandular tissue (depending on the ability of the resectionist", which is not temporary. Each surgeon must therefore ask himself whether a clean permanent job is worth nine days."

A subject that should be brought up in the discussion is that of Randall's classification (52). This is referred to in many articles and I believe well worth repeating here. He classifies the type of enlargement and the type of treatment.

"1. Simple bilateral lobe hypertrophy: intracapsular producing symptoms without signs. Prostatectomy should be done.

2. True middle lobe hypertrophy: Submucous or sub-cervical Albarran gland hypertrophy. Its strategic position presents true mechanical obstruction. Superficial in origin an growth; rarely of great size. Resection should give brilliant and complete cure of obstruction.

3. Combination of middle and lateral lobe hypertrophy: Sphincter dilatation and intrusion of lateral lobes, through sphincter. Growth is often gigantic. Often exhibits large, unsuspected residuals. Have atonic, weak bladder walls. Have cardiovascular-renal complications. Prostatectomy should be done.

4. Median bar formation, secondary to long standing prostatic infections, with inevitable senosis of the bladder orifice. Produces residual urine and all the symptoms of prostatitis. Resection gives excellent clinical results."

Meltzer states that the type of obstruction encountered may be determined by palpation, the amount of residual urine, and by "cystourethroscopic visualization of the bladder, its orifice and the interior of the prostatic urethra" (53).

The mortality rate of the various operations is the biggest factor in determining most surgical procedures, however, in this case we find that there is no appreciable difference in the perineal operation and the resection operation when done by the best men in each group. Suprapubic carries a little higher mortality rate but this perhaps is due to the fact that the operation is done in many cases by general surgeons, and also on a type of patient that is generally in worse condition

than the one that is resected. Again speaking of the mortality rates of transurethral, we find many operators doing the type of case by the transurethral route that would have a lower mortality rate under any surgical maneuver than in the group on which he uses enucleation. Therefore the mortality rates should be lower in the average patient who is resected. We must also remember that there are many patients who are resected who would not be classified as deserving surgery as yet, by many of the more conservative "selectionists."

Next to be considered is the Carcinomas of the prostate. Hinman states that fourteen per cent of men over forty-five years of age have carcinoma of the prostate. In a group reported to Dr. Hugh H. Young of one thousand autopsies done routinely on men over forty years of age there were found to be nineteen per cent of the glands malignant in character (55). Hinman says that one in every five men with prostatism have cancer, and also that more than half the patients with cancer also have hyperplasia, and he states in the summary of his article, that through the two be different, "any method which treats the hyperplasia and neglects the cancer is not a good method." The perineal route he feels is the only one by which both "hyperplasia and cancer can be treated successfully at the same time." If cancer is found the treatment may be carried out by this route (54).

Recently there was a patient that returned to the University of Nebraska dispensary. This man had been resected approximately three years ago and upon his return it was found that he had large, fixed, indurated, nodular mass in the region of the prostate which was diagnosed as a malignancy. This man had had symptoms of obstruction and retention all but about six months of the interval between his resection and his return to dispensary. This, the author believes, deserved perineal prostatectomy and then had the carcinoma been found by the pathologist it could have been attacked surgically through the perineum.

The ratio of the number of operations done by the general surgeon and those done by the specialist has changed in favor of the specialist. This of course is the desired "swing to the specialists" because, as brought out by many men, the mortality and morbidity rate is much higher when the operation, no matter which one, is done by the men with less experience. Although many men believed that there had been an operation devised in which general surgeons could expect very low mortality and morbidity rates, it was found that trans-urethral resection was an operation which took a great amount of skill and dexterity and also as Alcock and others have shown, the mortality rate decreases inversely

as the amount of operations performed by a man. This is not a direct ratio, of course.

Many men both those favoring transurethral resection, and those favoring prostatectomy have warned of the abuse of the transurethral resection by men who are not competent, and "untrained operators who are doing too many financial operations" (48). Also the instruments sold out number by far the number of men who should have these instruments in their hands. E. Davis (38) states "one dealer has sold more instruments alone--than there are urologists in the United States."

Among the resectionists we find men who feel that "transurethral prostatectomy" is a possible procedure and the coming procedure. This is possible in some cases by a skill man but Denning in a communication to Edwin Davis states, "The removal of all the prostatic adenoma (transurethrally) in one hundred per cent of the Cases is beyond imagination" (48). Randall does not feel that in the majority of cases all the gland is removed. He bases his opinion on the average weights of the tissue removed in the various procedures (48).

The functional results of the various operations are hard to compute accurately because of the lack of statistics on the ultimate results of transurethral resection.

The literature is lacking in this respect. Few, however, would find fault with the fact that the ultimate results of perineal prostatectomy are not outdone by any other method. Suprapubic results compare favorably with the results of perineal prostatectomy and transurethral resection falls short of that somewhat. How close it will approximate the perineal results is yet to be determined.

VI. SUMMARY

In summarizing the author wishes to mention the outstanding points in the controversy as to the type of operation to be used in attacking the hypertrophied prostate. Before going into the points proper, there are two ideas that have presented themselves to me which are worthy of note. First: the fact that T. J. Kirwin brings forth, and that is the overlooking of the non-operative treatment of the hypertrophied prostate. He thinks it has been neglected due to the widening of indication for operation since the advent of transurethral resection. This may be done either by dilatation, tissue shrinkage, or in malignant--radon implantation (40). Second: the idea that appeared to me in reference to statistics which are presented by some men. These statistics and opinions should not be biased and should be presented, as near as possible, from a common viewpoint with, for example, approximately the same age patient in transurethral results as in perineal results.

Transurethral resection is not minor surgery and it is dishonest, to the good qualities and usefulness of the operation to teach that it is minor surgery, and it is also dangerous.

The best figures of resectionists compare favorably with those of the perineal prostatectomy men, with suprapubic not quite being up to these two.

The time required for the actual operation is less in perineal prostatectomy.

The results of untrained and unexperienced men using the resectoscope have been degrading to a very useful procedure.

Transurethral resection will not replace prostatectomy nor will the average urologist be able to do transurethral "prostatectomy".

Randall's classification should be remembered by all, for resection has a place which is definite in the respect that most men can use it in a definite type, usually the middle lobe enlargements and the median bars etc., and get good results, and it has a place which is flexible in the respect that to a degree the patient may choose his operation. That, of course, means that the urologist considers him in the margin of both the resection and prostatectomy groups, and that he may get comparable results in either approach.

We still do not have an operation which the general surgeon can do with results that compare to the specialists results.

The swing is to the specialists, and well should be as can be concluded from studying the results of the "specialized" specialist to those obtained from a near-specialist.

We would like to see more late results reported from the resectionists.

The momentary economical advantage of the trans-urethral resection should not sway the urologist too much in choosing the type of operation for his patient.

Urologists get very good results in all cases considering the type of patient that he has to deal with.

The preoperative care should be approximately the same in similar patients whether operated on by the trans-urethral, perineal or suprapubic route.

The mortality rates of prostatic surgery bear a definite relationship to the skill and experience of the operator.

The "swing of the pendulum" is now on a descent from its peak in transurethral prostatic resection, both as far as the public is concerned and also in its popularity with the urological surgeons. We may now begin to look forward to the point where this pendulum may stop.

The percentage of carcinoma in the man past forty or forty-five years and the percentage of carcinoma in

the hypertrophied glands, should make all operators doubly cautious as to the type of operative procedure followed.

VII. CONCLUSION

The opinion which is outstanding in the author's mind which has been derived from the writing of this paper is that transurethral resection has many good qualities and has found a definite spot in prostatic surgery that it deserved to hold. Perineal prostatectomy is the operation which is the procedure of choice in large hypertrophies, especially of the lateral lobes, and in view of the large percentage of malignancies found in prostatics. The wise urologist is a selectionist.

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