

A SURVEY OF HOSPITAL RECORDS ON ONE THOUSAND
TRANSURETHRAL PROSTATIC RESECTIONS

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CHAPTER I

THE PROBLEM AND SOURCES OF DATA

THE PROBLEM

Statement of the problem. Transurethral resection for the relief of bladder neck obstruction due to benign prostatic hypertrophy or prostatic carcinoma, is a popular method of treatment in this centre. The purpose of this study is to enquire into the preoperative state of the patient, the operative findings, and the post-operative hospital period. Data on post-discharge follow up is not included.

Importance of the study. Presentation of data on a series of this size can confirm previous impressions, bring to light new problems, and serve as a yardstick in comparing transurethral prostatic surgery done here to that done elsewhere. Bladder neck obstruction is a common cause of disability in the middle-aged and older male. The patient is still either the family breadwinner, or the retired head of the family. In either case, these patients are, or have been, responsible members of the community. The morbidity and mortality associated with this operation have been decreasing through the years. This is due in part, to the better understanding of the problem that reviews of this nature can stimulate. All surgical procedures can benefit from periodic review.

SOURCES OF DATA

The Winnipeg General Hospital records on one thousand consecutive cases of prostatism resected transurethrally during the years from 1944 to 1948, constitute the basis of this study. The cases were both public and private patients of the members of the Urological Department of the Winnipeg Clinic.

Age incidence, duration of symptoms, associated disease, urological appraisal, x-ray findings, operative blood loss, amount of tissue resected, repeat surgery, post-operative complications, mortality, and duration of hospital stay are reviewed and presented.

The records consulted, include the history, progress notes, laboratory and x-ray reports and operative summaries. Available in the staff cases were the Out-Patient Department records.

The Stern-McCarthy, Nesbit Modification of the Stern-McCarthy, and the Thompson resectoscopes were used for the operations in this series. The Davis-Bovie, or Wappler high-frequency units were used as the sources of current.

ORGANIZATION OF REMAINDER OF THESIS

The remainder of the thesis contains chapters on The History of Transurethral Resection, Review of The Literature, Report of The Study, Summary Conclusions and Recommendations, and an alphabetically arranged Bibliography.

The Report of The Study is presented under divisions corresponding to the three phases of the hospitalization period.

Chapters III to VII inclusive, are organized in such a manner as to enable the reader to quickly refer to the literature review, report of the study, and conclusions made on any one point of investigation, e.g., prostatic calculi.

CHAPTER II

THE HISTORY OF TRANSURETHRAL RESECTION

EARLY HISTORY

Catheterization has been practiced since before the period of recorded history began. In the sixteenth century Ambroise Pare developed and used a stricture dividing device for the relief of urinary obstruction.³⁶ In 1603, Turguet de Mayenne was censured by the Faculte' de Paris for practicing transurethral manipulation to overcome prostatism.⁴³ However it was not until the beginning of the nineteenth century that prostatism was generally recognized as a disease entity. From this point to the Listerian era all surgical approaches to the prostate were made via the urethral route.

In 1806, Sir William Blizard treated prostatism transurethrally via perineal urethrotomy. The first case report of a patient treated by trans-urethral surgery for prostatic hypertrophy was published by Stafford in 1831.⁵⁶ One year previously, Guthrie had described an instrument used only to incise median bars.²⁰

The contemporary French surgeons, Civiale, D'Etoilles, and Mercier, used modified lithotrites as cutting tools.⁶³ Their operations, like those of Blizard and Stafford, were essentially transurethral incisions of bladder neck obstructions and were not widely accepted.

In 1874, Bottini developed a galvano cautery incisor on the lithotrite frame. This instrument produced thermal destruction of tissue and later alough. In spite of the usual disadvantages of a blind procedure, this instrument was widely used in America and Europe.

In 1900, Freudenberg improved on Bottini's model by attaching a lens system and this modification was recommended by Meyer in America.

Bottini's model was further modified by Goldschmidt, Wishard, and Chetwood. Wishard operated through a perineal urethrotomy, using a large speculum and reflected light. Chetwood, using galvano cautery, was apparently the first to use a palpating rectal finger as a guide.

Hugh Young developed and discarded his modification of Freudenberg's instrument about 1899.

Starting about the turn of the century, the transurethral approach was abandoned because of poor visualization and lack of adequate hemostasis. The open surgical approach to the prostate came into vogue and flourished without serious challenge for twenty-five years. As will be seen later, the open surgery of the Listerian era was supplanted to a large degree in America by the perfection of the resectoscope.

HISTORY OF THE CYSTOSCOPE

As early as 1805, unsatisfactory urethroscopes and cystoscopes had been made. Following the invention of the incandescent lamp in 1879, Nitze and Leiter in collaboration produced and marketed a satisfactory cystoscope in Europe. The lamp was first incorporated into an indirect cystoscope with a magnifying lens system by Du Rocher in 1885.

The first American cystoscope was made by Dr. Otis and Mr. Wappler in 1900. The modern American cystoscope is chiefly the result of the work of Young, Buerger, Brown, Braasch, McCarthy and Lewis with the cooperation of skilled technicians and instrument makers.

Although the history of the cystoscope is made interesting by many brilliant later modifications, the purpose here will be served by mentioning in what direct ways the cystoscope contributed to the modern resectoscope.

The so called cold punch as used today, developed from the direct-vision, non-magnifying cystoscope of Braasch; the present day, high-frequency

resectoscopes all incorporate the foroblique lens system of the McCarthy cystoscope.

DEVELOPMENT OF THE COLD PUNCH

During the quarter century that witnessed the rise of open prostatic surgery it became apparent to several surgeons that this form of attack left something to be desired. Patients were subjected to shocking open surgery for the treatment of median bars or contracted bladder necks. Both of these conditions, it has been shown since, are better treated transurethrally.

The three important developments that made resectoscopes possible were, the incandescent lamp, the fenestrated sheath, and the high-frequency current.

Probably more is owed to Hugh Young for his development of the fenestrated sheath than to any other pioneer in this field. Young, in 1909 created the first successful instrument purposefully designed for prostatic resection. With this instrument, tissue was engaged in a fenestra near the distal end of a tubular sheath. The tissue was cut with a sliding tubular knife contained within the sheath. The actual cutting manoeuver was blind, and there was no method of controlling bleeding.

This instrument he modified in 1911 by the substitution of a cutting loop made of platinum heated by an electric current. In 1917, Young reported 156 punches performed under local anaesthetic with no deaths.

Workers on both continents developed high-frequency current of two fundamental types. Undamped cutting current was used to excise tissue. Highly damped coagulating current was used for hemostasis. In 1914, Luys of Paris and Stevens and Bugbee in America had developed a technique of using high-frequency coagulating current to destroy tissue through a urethroscope.

In 1920, Caulk further modified the Young resectoscope by the addition of an electrocautery tip to control bleeding. He used this instrument a great

deal, and by 1933 had incorporated the McCarthy foroblique lens system.

Braasch modified Young's instrument to include a window. This enabled the procedure to be done entirely under vision and under water.

In 1925, Rose combined Braasch's and Caulk's model to present a visual cautery punch.

Walker introduced the bakelite sheath to protect the tissues from thermal trauma.

In 1926, Bumpus added a flexible wire electrode to the Braasch instrument and is given credit by Nesbit for designing the first completely unified instrument for use in transurethral prostatectomy.

The Braasch-Bumpus model was refined and used enthusiastically by Thompson. Refinements and changes such as Foley's pneumatic principle have been made since but the Thompson model (1935) of the Braasch-Bumpus cold punch is today the most widely used by those who favor this type of resectoscope.

DEVELOPMENT OF THE HIGH-FREQUENCY RESECTOSCOPE

The first application to Urology of the high-frequency current was made by Beer in 1910. He described its use in the coagulation of bladder tumors and thereby paved the way for electroresection under water.

The first use of the cutting current for the treatment of prostatism was reported by Keyes and Collings in 1924. This was apparently limited to incision of median bar.

In 1926, Stern presented a lens system resectoscope, using the fenestra, but replacing the tubular knife with a cutting wire loop, activated not by heat but by high-frequency current. To him has been given the credit for the introduction of the term "resectoscope".

In 1931, Davis and Kerwin, working independently, brought out loop resectoscopes both of which used the fenestrated sheath. Davis reported

enthusiastically that he was able to resect large glands with his instrument.

In 1932, McCarthy brought out his model which immediately rendered all other electro-resection models obsolete. It incorporated the bakelite sheath, the magnifying foroblique lens system, and a semicircular cutting loop. The fenestra was situated at the end of the sheath. This provided a large operating area and allowed resected tissue and irrigating fluid to escape easily.

Recent modifications have been introduced by Nesbit, Foley and others. The most widely used modification is that of Nesbit. The newest model is the roller-bearing, Nesbit Modification of the Stern-McCarthy Resectoscope. This allows the operator to resect tissue and fulgurate bleeding points under continual vision in running water with one hand. The index finger of the other hand applies rectal pressure which aids greatly in the complete excision of tissue widely practiced today.

CHAPTER III

REVIEW OF THE LITERATURE

SOURCES OF DATA

All relevant available literature appearing during the years from 1945 to date has been utilized. Comments of a general nature have not usually been included. An attempt has been made to refer only to those reports which were accompanied by facts and figures. Several good, earlier reports by well known authorities were consulted. Most reports appearing prior to 1945 are of lesser significance when compared to those of more recent origin. Much of this is due to the fact that it took about ten years to develop the able resectionists operating today. These men were largely self-taught and it is felt that most of their early surveys are not comparable to recent reports.

PREVALENCE OF RESECTION

In the United States and Canada, most large centers, especially teaching hospitals, practice transurethral resection on a large proportion of prostatic cases.^{39, 37, 38, 5, 54} A recent authoritative survey of prostatic surgery states that more resections are done than all other methods of prostatic surgery combined.³⁶

INCIDENCE OF BENIGN PROSTATISM

The incidence of benign prostatic hypertrophy in men over fifty is very high. This has been estimated at 50 per cent of men at the age of fifty, and 75 to 80 per cent of men over eighty.^{47, 36}

INCIDENCE OF PROSTATIC CARCINOMA

The incidence of carcinoma of the prostate in patients seeking relief from prostatism has been found in various series to be:

PER CENT		REFERENCE
7.6	...	14
<u>10.2</u>	...	54
10.3	...	37
10.6	...	45
11.0	...	6
<u>12.0</u>	...	29
12.1	...	25
12.4	...	5
13.0	...	3
13.4	...	46
<u>14.0</u>	...	7
14.0	...	55
14.0	...	12
14.4	...	33
<u>14.6</u>	...	39
<u>15.0</u>	...	35
15.2	...	24
16.0	...	59
16.6	...	31
16.8	...	40
<u>17.0</u>	...	62
17.0	...	9
17.0	...	60
18.0	...	36
18.7	...	41
23.0	...	52
24.5	...	21

The underlined figures represent series of over one thousand cases. Of the twenty-seven estimates of incidence, fifteen, or over half, fall within 13.0 to 17.0 per cent. This group of fifteen contains four of the six series of over one thousand cases. However, the largest group studied was made up of 12,500 cases with a 12 per cent incidence of cancer.²⁹ Therefore, on the basis of this review, it is reasonable to say that the incidence of prostatic carcinoma in cases coming to surgery is from 12.0 to 17.0 per cent. Young, in a frequently quoted statement, said that 17 per cent of all

prostatism was due to cancer.²⁶ It appears that this is the upper limit.

AGE INCIDENCE OF PROSTATISM

The average age in cases of prostatism seeking relief has been estimated at:

AGE IN YEARS		REFERENCE
<u>65.3</u>	....	16
<u>66.0</u>	....	55
<u>66.0</u>	....	29
<u>66.5</u>	....	54
<u>66.6</u>	....	31
68.0	....	40
68.0	....	5
68.3	....	9
<u>68.9</u>	....	35
<u>70.1</u>	....	21
71.0	....	52
74.0	....	12

The underlined ages represent series of over one thousand cases. Of the group of twelve ages, nine fall within a five year group from 65 to 69 years. This group of nine contains all of the five series of over one thousand cases. The largest group was 12,500 cases with an average age of 66 years.²⁹ The high value of 74 represents staff cases only. These patients do not, as a rule, seek treatment until quite ill.

The average age in cases of benign hypertrophy alone has not often been reported. Two references set this figure at 68.8 and 69.8 years.^{53, 38}

More figures for carcinoma are available. The average age was found to be 62.6, 66.1, 68.4, 69.4, 71.0, and 77.6 years.^{36, 57, 5, 50, 18, 38} It is evident that this is a somewhat older age group with half the values being over 69 years. One study reports over half the cases in the seventh decade and one quarter over 70 years.⁶² Although it has been said that the age incidence is the same for both forms of prostatism,¹ there is general agreement

that those with carcinoma do fall into an older age group.

ASSOCIATED DISEASE

The reviewed literature contains very few references to duration of symptoms and associated disease, especially to associated disease of a type likely to influence risk. General statements are made to the effect that prostatics suffer from diseases affecting the male age group into which they fall. Most of these are degenerative cardiovascular diseases due to hypertension, arteriosclerosis, or diabetes. A series of 314 prostatics showed evidence of heart disease on clinical examination or electrocardiogram in 35 per cent of the cases.²⁷ These were unselected cases with a subsequent mortality rate within the present accepted range. Hypertension was found in 15.5 per cent of a series of 400 cases.⁵⁷ This statement was not qualified.

An admission diagnosis of uremia was made on 20 per cent in a series of 560 cases.³⁸ Whether uremia was diagnosed clinically or on the blood urea nitrogen levels is not stated. One author states that very few of his patients were admitted with advanced uremia.³²

URINARY RETENTION

The incidence of acute retention in cases admitted to hospital has been said to be, "greater than 50 per cent", 28 per cent and 23 per cent.^{35, 52, 21} The estimate of over 50 per cent comes from a series 1458 cases. Patients admitted with acute or chronic retention were found to be 34 per cent of another series.⁴⁰ No statement was found which compared carcinoma and benign hypertrophy in this regard.

RENAL FUNCTION

The blood urea nitrogen levels reported in the literature are sometimes hard to interpret. Usually the value accepted as the upper limit of normal is

not given. At other times it is not clear whether the values given are admission levels or operative levels. One series of 86 malignant cases had admission values of under 20 mgm. per cent in over half the cases.⁴⁴ Elevated non-protein-nitrogen was reported in 16 per cent of 200 cases of prostatism.²¹

X-RAY INVESTIGATION

Hydronephrosis. Preoperative routine x-ray investigation revealed hydronephrosis either unilateral or bilateral, in 2 per cent of a series of 100 patients with benign prostatism.⁵³ In a series of 408 excretory urograms, a 37.9 per cent incidence of hydronephrosis was found. This was broken down to 53 per cent for the malignant cases and 36 per cent for the benign.²⁵

Urinary calculi. Urinary tract calculi were found in 7 per cent of patients in a series of 100 cases.⁵³ Ureteral calculi were found in 1 per cent, and bladder calculi in 5 per cent of a series of 200 cases.²¹ Two other series present an incidence of bladder calculi of 3.6 per cent and 5.1 per cent respectively.^{52, 25}

Diverticula. Bladder diverticula have been found in 2.6, 4.0, 6.0 and 12.7 per cent in various series.^{52, 53, 21, 25} It is clear that the diagnosis of diverticula was made on urographic findings alone in 13.7 per cent. No data was found on the incidence of diverticula at operation, nor were comparisons made between carcinoma and benign prostatism.

Prostatic calculi. Prostatic calculi were found in 13.5 per cent of 1458 cases. Of this group, the malignant cases showed an incidence of 7 per cent.³⁵ In two series presenting a total of 140 cases of prostatic calculi, the co-existing diagnosis was carcinoma in only four patients.^{62, 19} We are not told whether the diagnosis was made on x-ray findings alone,

operative findings alone, or on a combination of the two. One series of 408 urograms reports an incidence of 7.8 per cent.²⁵ Two independent investigators came to the conclusion that there was no difference between the incidence of prostatic calculi in benign and malignant cases.^{23, 13}

Metastases. Regarding the incidence of metastases in patients with malignant prostatism, an unqualified statement sets this figure at 10.2 per cent for a series of 560 cases.³⁸ For two series of similar size, spinal and pelvic metastases were found on x-ray in 60 per cent and 42.6 per cent.^{57, 48} It is presumed that these figures represent the incidence of metastases found in patients when the diagnosis of carcinoma was first made.

PYURIA

Only one reference to preoperative pyuria was found. This was an unqualified statement to the effect that pyuria was demonstrated in more than half of 560 patients.³⁸

HEMOGLOBIN

No reference to anemia nor to preoperative hemoglobin levels was found.

AMOUNT TISSUE RESECTED

The average amount of tissue resected is stated in most reports. Whether large prostates are commonly resected and whether resection to the capsule is usually carried out is generally not stated in the literature. Average values for weights of tissue resected in mixed series are, 26.8, 30.0, 30.27, 30.95, 33.4, and 44.3 grams.^{40, 35, 52, 21, 12, 9} The last weight is reported in a recent series by an author who is known to resect