

## TWELVE YEARS' EXPERIENCE WITH THE BRAASCH-BUMPUS RESECTOSCOPE<sup>1</sup>

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During the past 16 years much has been written about the endoscopic approach to the problem of urinary obstruction. The formative years have passed and the transurethral method should share equal importance with the suprapubic and perineal approach. Transurethral resection today re-emphasizes what perineal prostatectomy emphasized years ago. Genito-urinary surgery is a definite specialty requiring selective training of the highest order.

Nothing has been written for several years regarding the Braasch-Bumpus resectoscope. The instrument, now regarded by many as having been a capable instrument for removing small amounts of tissue, has been outmoded and superseded by the somewhat more complicated knife resectoscope of Dr. Gershom Thompson.

It occurred to me that it might be of interest to present very briefly the present form of the instrument, the type of patients cared for, the general procedure of handling the average patient with urinary obstruction, and the summation of our work with private patients in the 2 Pasadena hospitals in the past 12 years with an analysis of the complications and deaths.

When Doctor Bumpus and I established practice in 1934, I shared his firm conviction that the cold knife resectoscope was the safest instrument, gave the patient the best result with the lowest morbidity. The experiences of the past 12 years have strengthened these convictions.

The greatest single improvement in the Braasch-Bumpus resectoscope was the addition of the irrigating knife; this increased the visibility and permitted very rapid removal of tissue. This improved instrument, like its predecessor, incorporates no built-in carrier for the Bugbee electrode. This was considered a slight disadvantage for several years in that it caused an extra maneuver to control bleeding. However, when we began doing prostatectomies, we found that the shrinking capsule takes care of many of the vessels. The electrode carrier is frequently used for a few minutes (at the end) following removal of each half of the prostate. The ratio of calibre to visibility is greater in this instrument than in the Thompson instrument and the increased visibility, plus less possibility of stricture, far outweighs the value of an electrode carrier incorporated into the instrument.

The one distinct disadvantage of the Braasch-Bumpus resectoscope is that we have been unable to get the instrument standardized and manufactured to the precision necessary for most efficient use.

### TYPE OF PATIENT

Pathologists, who have done extensive work throughout the country and in Southern California, are agreed that the Pasadena area is the center of a popu-

<sup>1</sup> Read at meeting, American Association of Genito-Urinary Surgeons, Stockbridge, Mass., June 21, 1946.

lation of elderly people who have the most extensive degenerative lesions observed as compared with their findings in any other section of the United States. These people have retired from an active life, seem to be enjoying themselves and are wholeheartedly engaged in trying to prolong their years. I bring out this point as it is important in understanding the type of risk we encounter.

Very few of these patients come with advanced uremia. We have observed some with the mildest forms of prostatism over a period of several years before symptoms justify surgical intervention. Many are seen in their first attack of complete retention or with 200 to 300 cc infected residual urine and little or no evidence of renal damage. The advantage of only slight renal damage in these patients is over-balanced by their advanced age, extensive cardiovascular disease, hypertension, with history of previous cerebral vascular accidents and actual or threatened occurrences of coronary thrombosis.

Considering that such patients comprise the largest group of surgical risks, all procedures are directed and carried out in a manner calculated to least upset the patient. Preliminary cystoscopic examination is never done on the obviously obstructed patient. Those in acute retention or with chronically infected residual urine are made comfortable by catheterization and the use of sulfonamides. The patient is admitted to the hospital the afternoon prior to the day of operation, he is given sulfonamides and barbiturates the night before and the morning of surgery. Morphine is never given because of its depressing effect and danger of inducing nausea and vomiting. Spinal block anesthesia is given with every effort being made to hold the anesthesia at the lowest level that will relax the bladder. Any fluctuation of blood pressure during surgery is combated with saline and glucose and plasma. If routine blood count proves the patient to be anemic, a transfusion of citrated blood is given during the operation. The cutting time of the operation is limited to 1 hour and at the end of the procedure a 30 cc bag catheter is left inlying without tension. A bilateral partial vasectomy is performed following the resection. Complete removal of all adenoma is desirable; however, if this is not feasible, complete removal of one-half the prostate will give a functional result superior to incomplete removal of all lobes.

Upon the patient's return to his room, the catheter is attached to a closed automatic irrigator and he is permitted to sit up in bed. He is allowed a regular diet beginning with the first meal served following his surgery.

The irrigator is removed the first postoperative day, the catheter is connected to a sterile tubing and gallon bottle, and the patient is gotten up in a chair. The catheter is removed in 48 hours following a resection of the average amount of tissue; it is removed in 72 hours in cases where the obstruction is small and the muscular and fibrous elements predominate. As soon as the patient voids satisfactorily for 24 hours after removal of the catheter and he is afebrile, he is permitted to leave the hospital.

This study represents the composite experiences of three men: Doctor H. C. Bumpus, Jr., who was an experienced resectionist at the outset and but for whose experience in the control of hemorrhage enables us (and I say "us" advisedly)

to control bleeding which would have increased the complications and mortality statistics; myself, who had done some resections before 1934 and, like many resectionists, believed my ability was above my experience but who realized, as the years passed, each year of endeavor had improved my skill; and the subsequent association of Dr. Earl F. Nation in 1941, an extremely capable resectionist.

For clarity of presentation, the years 1934 through 1945 have been arbitrarily divided into 2 groups of 6 years each. This division accidently rather roughly

TABLE 1.—*Transurethral resections 1934-1939*

YEAR	NUMBER OF PATIENTS RESECTED	NUMBER OF RESECTIONS	PRIMARY	SECONDARY	
				Delayed	Immediate
				<i>per cent</i>	<i>per cent</i>
1934	11	11	11	0.0	0.0
1935	44	46	42	0.0	9.0
1936	54	60	52	1.8	12.9
1937	61	78	55	9.8	27.8
1938	52	58	45	11.5	13.4
1939	47	57	42	8.0	23.4
Total . . . . .	269	310	247	6.3	13.4

TABLE 2.—*Transurethral resections 1940-1945*

YEAR	NUMBER OF PATIENTS RESECTED	NUMBER OF RESECTIONS	PRIMARY	SECONDARY	
				Delayed	Immediate
				<i>per cent</i>	<i>per cent</i>
1940	48	53	41	16.6	8.3
1941	66	75	61	7.5	13.6
1942	81	87	75	8.6	6.1
1943	102	107	95	7.8	3.9
1944	129	134	114	12.4	3.1
1945	121	124	111	9.9	0.8
Total . . . . .	547	580	497	10.2	4.9

divides the groups on the basis of the manner of resection. By 1939 we had adopted the principle that partial removal should be substituted for as complete a removal as we were able to do as time and the condition of the patient would allow. We believed that transurethral resection for the average patient must give a permanency of results equal to that of any other surgical procedure or its application to the average patient in the youngest age group would not be justified. From the very beginning we adopted the principle that the operation should be applicable to every patient regardless of the size of the gland. When we fell short of the ideal, we felt it was due to personal shortcomings and not the method; proceeding on this basis, the largest glands were attacked. This was accomplished by the use of preliminary suprapubic cystostomy.

The headings of the first two tables are, in general, self-explanatory. Briefly, primary means a new patient undergoing his first resection. You will note after the first year that the number of patients resected is less than the actual number

TABLE 3.—*Transurethral resections 1934-1945*

YEAR	NUMBER OF PATIENTS RESECTED	NUMBER OF RESECTIONS	PRIMARY	SECONDARY	
				Delayed	Immediate
				<i>per cent</i>	<i>per cent</i>
1934 thru 1939	269	310	247	6.3	13.4
1940 thru 1945	547	580	497	10.2	4.9
Total.....	816	890	744	8.25	9.25

TABLE 4.—*Analysis of subsequent resections 1934-1939*

YEAR	NUMBER OF PATIENTS RESECTED	NUMBER OF PATIENTS NEEDING SUBSEQUENT RESECTIONS, BENIGN				NUMBER OF PATIENTS NEEDING SUBSEQUENT RESECTIONS, CARCINOMA				AVERAGE INTERVAL IN YEARS BETWEEN DELAYED RESECTIONS
		1	2	3	4	1	2	3	4	
		1934	11	2			1			
1935	44	4	1							
1936	54	9	3	2		2				2
1937	61	23	5	1		5	1			$\frac{3}{4}$
1938	52	10	3			1				$1\frac{1}{2}$
1939	47	11	3				2			2
Total.....	269	59	15	3	1	6	5	0	0	
Per cent...		21.9	5.5	1.1	0.3	2.2	1.8			

TABLE 5.—*Analysis of subsequent resections 1940-1945*

YEAR	NUMBER OF PATIENTS RESECTED	NUMBER OF PATIENTS NEEDING SUBSEQUENT RESECTIONS, BENIGN				NUMBER OF PATIENTS NEEDING SUBSEQUENT RESECTIONS, CARCINOMA				AVERAGE INTERVAL IN YEARS BETWEEN DELAYED RESECTIONS
		1	2	3	4	1	2	3	4	
		1940	48	10	3	1				
1941	66	11	1							$3\frac{1}{4}$
1942	81	14					2			$3\frac{1}{2}$
1943	102	7				2				$2\frac{1}{2}$
1944	129	3	1			3				3
1945	121	1				2				4
Total.....	547	46	5	1	0	7	2	0	0	
Per cent...		8.4	.9	.1		1.2	.3			

of resections performed. This difference is explained best by realizing that the difference in numbers represents patients having more than 1 resection during the same year or patients of previous years returning for further resection. The term "secondary" is a poor choice of words and denotes any subsequent resection

regardless of time interval between or number of resections after the patient's primary resection. The terms "delayed" and "immediate" under the heading of "secondary" denotes the time interval between resections: "immediate" secondary applies to patients having a subsequent resection within 3 months of their primary one; the term "delayed" covers the period after 3 months and in most cases, years.

Table 3 summarizes the 2 periods. It shows graphically the increased skill acquired in that immediate secondary resections dropped abruptly after 1940. The increase in the delayed resections is ascribed to 3 conditions: 1) The large accumulation of patients resected during the first half of this period who returned with mild recurring prostatism; 2) those upon whom, on their return, we were unable to pass a catheter, and cystoscopic examination revealed adhesions between the remaining lobes; 3) our changing conception of a satisfactory resection. After 1939 we believed that total removal should be sought for.

TABLE 6.—*Analysis of subsequent resections 1934-1945*

YEAR	NUMBER OF PATIENTS RESECTED	NUMBER OF PATIENTS NEEDING SUBSEQUENT RESECTIONS, BENIGN				NUMBER OF PATIENTS NEEDING SUBSEQUENT RESECTIONS, CARCINOMA			
		1	2	3	4	1	2	3	4
		<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>
1934 thru 1939	269	21.9	5.5	1.1	0.3	2.2	1.8		
1940 thru 1945	547	8.4	0.9	0.1		1.2	0.3		
Total . . . . .	816	15.1	3.2	0.6	0.1	1.7	1.0		

Tables 4 and 5 are likewise broken into the two 6 year periods. They show by years, the number of resections our patients needed in order to obtain what we considered a satisfactory result.

Perhaps a few would like some explanation as to what we call a satisfactory result. The absence of residual urine has never determined a satisfactory result; we demand complete healing, free, painless urination and microscopically negative urine in every patient who had microscopically negative urine before resection was commenced, or who had a urological tract not severely damaged by the obstruction.

Tables 4 and 5 also designate whether the subsequent resections were needed by patients having benign or malignant glands and the average interval between these delayed resections in years.

Table 6, a summary of the two previous tabulations, brings out, as did table 3, the decrease in necessity of subsequent resections after 1940.

Table 7 shows a relatively high number of patients who were subjected to cystotomy prior to the primary resection. Cystotomy in general was done for 3 reasons; 1) The general condition and age of the patient were such that we believed operation might have to be discontinued at any time during the procedure.

The suprapubic, being a safety valve, allowed prolonged convalescence with the bladder neck at rest. 2) The gland was of such size that we wished preliminary shrinkage to occur and a satisfactory result could be obtained by one or two resections. 3) The bladder contained large stones.

Table 7 graphically shows our increasing self confidence in our ability to completely remove larger amounts of tissue without increasing the calculated risk.

TABLE 7.—*Number of patients cystotomized prior to primary resection*

YEAR	NUMBER OF PATIENTS RECEIVING PRIMARY RESECTION	PATIENTS CYSTOTOMIZED PRIOR TO PRIMARY RESECTION	
		Number	per cent
1935	42	8	19.0
1936	52	6	11.5
1937	55	15	27.2
1938	55	9	16.3
1939	42	3	7.1
1940	41	6	14.6
1941	61	8	13.1
1942	75	3	4.0
1943	95	3	3.1
1944	114	2	1.7
1945	111	2	1.8
Total.....	743	65	6.7

TABLE 8.—*Post-operative complications, bladder perforation and extravasation*

YEAR	NUMBER	EXTRA PERITONEAL	INTRA PERITONEAL	OPERATED	RECOVERY	DEATH
1937	1	1		1	1	
1940	1		1	1		1
1941	1	1		1		1
1942	1	1		1	1	
1943	1	1		1	1	
1944	2	2		1	1	1
Total.....	7	6	1	6	4	3

No patients presented above post-operative complications during 1934, 1935, 1936, 1938, 1939 and 1945.

Table 8 is, in itself, self-explanatory and represents a serious complication of transurethral procedure. This complication, in our hands, was most frequent in contractures of the bladder neck and occurred several times in passing the instrument, the beak of the resectoscope leaving the posterior urethra just outside the internal sphincter. One of the perforations which occurred in 1944 represents the increased risk assumed by the operator when the patient has an excessively large intravesical prostate and a relatively small bladder capacity. The beak of the instrument was caught on a trabeculation while trying to get over the intravesical portion of the prostate and a small tear was made in the posterior bladder wall.

Table 9 is remarkable for the relatively small amount of incontinence in the early years with a marked increase in the past 2 years. The infrequency is accounted for by our extreme conservatism in the early years. We always left a small amount of visible adenoma in the region of the external sphincter and verumontanum. This occasionally caused adhesions with the formation of a double-barrelled urethra which, though healed, sometimes decreased the calibre of the urinary stream, occasionally caused a secondary contracture at this point, and frequently embarrassed the operator by preventing catheterization.

One likes to offer explanations for incontinence. I have always been cynical about anyone classifying incontinence on a complete and partial basis. I have analyzed these patients and here are the facts.

The 1 patient in 1935, as you see, was a carcinomatous patient. He had complete control night and morning; he used a clamp during the afternoon and evening.

TABLE 9.—*Post-operative incontinence 1935-1945*

YEAR	NUMBER	TYPE OF OBSTRUCTION OPERATED			RECOVERY		
		Carcinoma	Bladder neck contracture	Benign adenoma	Complete	Partial	None
1935	1	1				1 (CA)	
1944	6	1	1	4	5		1 (CA)
1945	3		1	2	1	2	

The 1 patient in 1944, who did not recover, was also carcinomatous. He is compelled to wear a bag urinal and has stress incontinence at all times when he is on his feet. He is continent when reclining in bed.

Two patients in 1945 had only partial recovery. The first was a 77 year old individual who had 800 cc overflow with a chronically infected bladder. A 72 gm. prostate was removed. He now has complete control night and day when sitting. He begins dribbling late in the afternoon when standing and wears a clamp at that time only. In April 1946, he stated that he was continuing to improve. The second patient in 1945 was a man of 67 who had infected urine, bladder neck contracture and prostatic stones. Initially, there was constant dribbling when standing. In April 1946 he wrote that he was greatly improved but did not state the exact degree of improvement. However, he was more concerned over insomnia at this time and I judge his incontinence is not marked.

Since we have been completely removing the enlargement, many of these patients have incomplete control for about 12 hours and following this they regain complete control.

Table 10 is a record of all deaths associated with the operative procedure. I personally know that many of these patients are not operative deaths, but I feel that every patient who dies following one of these procedures should be listed. As you will notice in most cases many days have elapsed between operation and death. Many of these deaths occurred suddenly after the patient had made a complete recovery and was home following his usual routine of living.

TABLE 10.—Deaths associated with transurethral surgery of the prostate

YEAR	NUMBER OF PATIENTS	AGE	CAUSE	TIME P.O.
1935	1	71	Ac. Epididymitis, Sepsis	<i>days</i> 35
1937	1	66	Uremia	20
	2	78	Cardiac	8
	3	70	Agranulocytosis	21
1938	1	85	Cardiac or embolic	6
	2	75	Cardiac	10
	3	77	Cardiac	2
1939	1	74	Cardiac, secondary to hemr.	2
	2	76	Cardiac	6
1940	1	77	Cerebral thrombosis	2
	2	89	Intra-perit. perf., pneumonia	3
1941	1	76	Periurethral abscess, sepsis	8
	2	70	Perf. bldr., pulmon. oedema	5
	3	71	Cardiac or embolic	10
	4	71	Sepsis, cardiac & embolic	25
1942	1	79	Cardiac or embolic	25
	2	72	Aortic sten, ac. bact. endocar.	33
1944	1	70	Uremia	37
	2	81	Perf. bldr. wall abscess	8
1945	1	75	Broncho-pneumonia	23
	2	65	Pulmonary embolus	21
	3	67	Subac. bact. endocar., rupt. ht.	127
	4	75	Pulmonary Embolus	3

TABLE 11.—Summary

1934-1945	890 RESECTIONS
	<i>per cent</i>
Late Hemorrhage.....	2.1
Extravasation.....	0.7
Stricture (non-meatal).....	0.5
Incontinence:	
Partial.....	0.3
Complete.....	0.1
Associated Death.....	2.4

Table 11 is self-explanatory. The mortality percentage of 2.4 is somewhat higher in this series than in other reports with which you are familiar. This



increase, I believe, is partially due to the completeness and method of computation as many of these patients died some time after being discharged from the hospital. The apparent cause of death simply reflects, I think, the high incidence and degree of degenerative cardio-vascular lesions encountered among the patients in this age group in Southern California.

Continued observation during these twelve years of the work of equally experienced resectionists using the electric loop instrument, has strengthened our original convictions that the Braasch-Bumpus resectoscope, in the hands of a competent resectionist, remains on a par with any other resectoscope in its ability to remove large amounts of prostatic tissue rapidly and efficiently.

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