LATE RESULTS OF PERURETHRAL PROSTATIC RESECTION

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Advances in the open surgery of prostatic obstruction have distracted attention from the merits of the perurethral approach. Harris (1929) and Wilson Hey (1946) have shown the advantages of closing the bladder, and Millin (1945) has demonstrated the advantages of not opening the bladder at all. Surely it is better still to leave the abdominal wall intact.

The immediate results of perurethral prostatic resection are recognized to be good. This operation has a very low mortality, and its value in this respect is greater than can be shown by figures, for many general surgeons enucleate the straightforward case themselves but refer the "bad risk" to the urologist for perurethral treatment. The use of thrombin has eliminated the frequent wash-outs of the bladder which were considered necessary and has reduced enormously the incidence of clot retention. Suction evacuation has shortened the duration of the operation and facilitated the treatment of larger glands. Isotonic irrigating fluids have eliminated post-operative anuria—never a common complication, but a grave one. Many patients experience merely the minimal discomfort associated with a modern anaesthetic and a few days of catheter drainage. The present investigation is an attempt to assess the late results, on which the reputation of this operation clearly depends.

Indications

The patients were treated by the "punch" type of operation, using the Gershom Thompson resectoscope. This is the operation which has achieved superlative results at the Mayo Clinic. The indications varied a little at different times, but a high proportion of the patients were treated perurethrally throughout. In the last 400 cases referred to the urological units at the Victoria Infirmary and Hairmyres Hospital the mortality was 3.25% (13 cases). Table I shows all cases of prostatic

TABLE I.—Treatment of All Cases of Prostatic Enlargement

Expectant treatment	138 cases
Endocrine treatment only	27 "
Catheter drainage only	9 "
Perurethral resection	400 "
One-stage suprapubic prostatectomy	18 "
Two-stage "	11 "
Retropubic prostatectomy	5 "
Permanent suprapubic cystostomy	26 "
Catheter drainage (admitted in extremis)	23 "

enlargement referred to these units during the same period and gives an impression of our present practice. "Expectant treatment" includes those cases referred on account of prostatic enlargement without signs of obstruction and with only mild symptoms. This group has been discussed more fully elsewhere (Chapman, 1949). "Endocrine treatment only" includes cases of carcinoma of the prostate in which obstructive symptoms were not marked. "Catheter drainage only" includes

cases in which bladder function was resumed after a short period of catheter drainage, and in which the patient refused operation or was advised against it. Several of these were cases of acute retention in the post-operative phase of some other condition.

Suprapubic prostatectomy was performed when the gland was exceptionally large, or when complicated by large diverticula, or when the urethra would not accommodate the instrument with ease. When stones accompanied prostatic obstruction, litholapaxy and prostatic resection were performed if both the stone and the prostate were of moderate size. Four of the five retro-pubic prostatectomies were performed by a deputy doing holiday duty. Permanent suprapubic cystostomy was advised for the "very bad risk" patient. The final item of the Table includes patients whose prostatic obstruction proved to be only an incident in the final stage of some other disease. Of all patients whose prostatic disease was severe enough to require operation and whose general condition justified the removal of the obstruction, 92% were treated by perurethral prostatic resection.

Description of Present Investigation

In this investigation we are concerned with late results, and patients treated since 1949 are not included. Efforts have been made to maintain contact with all patients. Postal questionnaires were sent out on five occasions—December, 1941, April, 1945, June, 1946, August, 1948, and August, 1950. Patients who had changed their address or who failed to respond were usually traced by the almoner's department of the Victoria Infirmary. If the reply to a questionnaire suggested unsatisfactory progress the patient was asked to attend for examination. In 1948 an attempt was made to see all surviving patients. Of the 497 patients traced, 28 died within a year of operation and are not considered except in the discussion of cause of death. In six cases in which the operation was performed in the hope of removing a suprapubic tube an unsatisfactory result was obtained and the tube was retained. In two cases frequent micturition persisted after the operation, and the patient sought advice elsewhere. In both cases an enucleation operation was performed and the frequency persisted. The convenient explanation was given that damage had been caused by the perurethral resection. Both were cases in which frequent micturition was the chief symptom and the evidence of obstruction was not great. It is sometimes justifiable to operate for frequent micturition alone, but it is common experience that disappointing results occur in this group.

The remaining 461 cases are tabulated in Table II. In the cases of nodular hyperplasia an attempt was made to remove all glandular tissue. No doubt this has been

TABLE II.—Duration of Follow-up

Duration in Years	Cases of Nodular Hyperplasia	Cases of Median Bar	Cases of Carcinoma	Total No. of Cases
13+	1	—	—	1
12-13	9	—	—	9
11-12	10	—	—	10
10-11	13	—	—	13
9-10	12	5	—	17
8-9	22	2	2	26
7-8	22	2	—	24
6-7	26	2	—	28
5-6	34	3	3	40
4-5	39	3	4	46
3-4	39	3	2	44
2-3	68	5	13	86
1-2	100	6	11	117

more successful in the later than in the earlier cases. In the median bar cases only a small quantity of tissue was removed. In the carcinoma cases variable quantities were removed, sufficient to produce a wide channel. Since 1942 these patients have also received stilboestrol treatment. Table II shows the duration of follow-up—that is, the period between operation and the time of writing in the case of survivors, or the period between operation and the date of the patient's death.

Deaths During Follow-up

Table III shows the cause of death in those patients who died within a year of operation and who have not been considered in the general discussion. It is probable

TABLE III.—Cause of Death Within One Year of Operation

	Nodular Hyperplasia	Carcinoma
Urinary infection	2	—
Uraemia	2	—
Secondary prostatic carcinoma	1	2
Cardiovascular disease	9	—
Carcinoma (extraurinary)	3	1
Cerebral thrombosis or haemorrhage	3	—
Pneumonia	1	—
Obstructive jaundice	1	—
Infective hepatitis	1	—
Unknown	2	—

that the original condition or the operation for its treatment was responsible for death in the four cases in which death was due to urinary infection and to uraemia. In one case in which the prostate was apparently benign at the time of operation and in two cases in which malignancy was known to be present the patient died of secondary malignant disease. In the remaining cases there appeared to be no association with prostatic obstruction or its treatment.

Table IV shows the cause of death in those patients who have survived more than a year. In nine cases death was due to urinary infection or to uraemia, and these again must be associated with prostatic disease. One patient who had an apparently benign prostate and five who had definitely malignant prostates died of secondary carcinoma. In the remaining cases there was no obvious connexion.

TABLE IV.—Cause of Death in Those Surviving More Than a Year

	Nodular Hyperplasia	Carcinoma	Median Bar
Urinary infection	7	1	—
Uraemia	1	—	—
Secondary prostatic carcinoma	1	5	—
Cardiovascular disease	33	3	2
Carcinoma (extraurinary)	13	—	—
Cerebral thrombosis or haemorrhage	11	—	—
Pneumonia	3	—	—
Nephritis	2	—	1
Anaemia	2	—	—
Carcinoma of bladder	1	—	—
Ascites	1	—	—
Diabetes	—	—	1
Disseminated sclerosis	—	—	1
Septicaemia	—	—	1
Duodenal ulcer (haematemesis)	1	—	1
Accident at work	1	—	—
Strangulated femoral hernia	1	—	—
Ulcer of back	1	—	—
Unknown	8	2	3

Results in General

In most cases the patient was very well pleased with the function of the bladder. The results as judged by day and night frequency, force of the flow, control of the flow, and the effect on general health were excellent throughout the period of observation. If doubt arose bacteriological examination of the urine, intravenous

pyelography, and endoscopic examinations were performed. Complications have occurred, and these are considered individually.

Recurrent Prostatic Obstruction

Many believe that the effects of perurethral prostatic resection are temporary or even brief. For example, Grant and Lich (1948) write about the "enormous percentage" of recurrent cases, and we have been asked quite seriously how many times it is necessary to repeat this operation in the course of a year in order to keep a patient free from obstruction. This impression is often due to confusion between benign prostatic enlargement and an active malignant process where a few cells left behind will grow in an uncontrolled manner. It has been shown by Moore (1936, 1943) that the process of involution in the prostate goes on with the greatest rapidity before the age of 60, and that the aetiological agent which produces benign hyperplasia is most active before that age. One of us has demonstrated this fact in a follow-up, extending over ten years, of patients who had received no treatment at all (Chapman, 1949).

In the group of patients discussed here 18 have had a second operation for recurrent prostatic obstruction, and to these must be added five patients who had been operated on elsewhere, probably for obstruction, and two patients treated in other units in whom obstruction is known to have occurred, although no operation was advised. Two patients who had previously had resection for median bar returned after intervals of seven and ten years, showing signs of obstruction which proved to be due to lateral lobe enlargement; there was no evidence of recurrence of the bar formation, and the lateral lobes had enlarged during the interval. These two cases need not be considered in a discussion of recurrence of benign prostatic enlargement.

The incidence of recurrence was much higher in patients followed up for more than ten years. This is not due merely to the longer follow-up. In the earlier stages of his experience an operator removes less tissue. In the units discussed here 14 g. was an average resection in 1938; 50 g. resections are now fairly common. Of 116 cases of benign hyperplasia followed up for a period of five to ten years, seven have recurred, a rate of 6%. This is much lower than is usually suggested by the detractors of this operation. Of 246 cases of benign hyperplasia followed up for one to five years, five (2%) recurred. This is a clear demonstration of the great value of the operation in patients whose expectation of life is short. Local recurrence of obstruction in malignant cases has not been common. Possibly stilboestrol treatment is responsible to some extent for this. It must be noted, however, that only two malignant cases survived for more than six years.

Most urological surgeons treat many of their papilloma cases by multiple perurethral diathermy treatments, yet suprapubic, perineal, and retropubic prostatectomists join in their cries of horror at the thought of a second resection of prostatic tissue, however small. This would be less surprising if the open operations were free from the risk of recurrence themselves. Millin (1942) found in his records 53 cases of post-prostatectomy obstruction after suprapubic operations by various surgeons. Emmett (1944) found records of 102 patients who had suffered from recurrent obstruction after suprapubic and perineal operations. The retropubic operation, so recently devised, has already had recurrences.

By far the most important point about recurrence after perurethral prostatic resection has yet to be mentioned. In most cases the correction of the recurrence is a trivial matter both for the surgeon and for the patient. The amount of tissue to be removed is quite small and the operation quite short. With one exception these operations for recurrent obstruction have been free from trouble, and most of the patients have not regarded the experience as a surgical operation.

Second Operation for Symptoms other than Obstruction.—Six patients have had a second operation for reasons other than obstruction. One patient had attacks of haematuria at intervals, and it was thought that the removal of a few remnants of prostate might reduce this tendency. He continues to have occasional haematuria, though his general health is good. Four had persistent frequent micturition, and a second resection was performed in the hope of relieving this. Some benefit resulted in these cases, though there was no evidence of recurrent obstruction. One patient who had heavily infected urine before his operation did not improve much after his resection, so a second small resection was tried, also without much effect.

Post-operative Stricture

Millin (1947) comments on the "high incidence" of post-operative stricture after perurethral prostatic resection, and Grant and Lich (1948) describe it as a "frequent sequela." In the present series of 461 cases nine post-operative strictures have occurred. Two of these required to have the stricture excised and one had an external urethrotomy. All attend at intervals for bougie dilatation; in three cases the interval has been extended to one year. The most recent answers to questionnaires in these nine cases show that six have no difficulty in micturition, one has some difficulty in the morning, and two notice a weakening of the flow before they attend for bougie treatment. One of them passes urine at intervals of two hours; the others have intervals of three or more hours. This complication is not a major catastrophe, but it is a very unpleasant experience, and all steps should be taken to avoid it.

Urethral bougies passed without force do not influence the calibre of the normal urethra, but they seem to facilitate the passage of the resectoscope. This may be the result of thorough spreading of the lubricant. They also show when the instrument ought not to be passed. For many years American surgeons have used resectoscopes through a perineal stab when the lumen of the urethra was not adequate. An unfounded fear of fistula formation deterred us from the use of this method for many years. Recently, on the strong recommendation of T. J. D. Lane, we have used it with success.

Incontinence of Urine

Urinary incontinence has occurred after all types of prostatic operation and is said to be commoner after perurethral procedures. The present investigation appears, at first glance, to support this view, as seven patients require to wear incontinence bags. This impression is modified by further consideration. Three of these patients had carcinoma of the prostate and were incontinent before their operation. The disease rather than the operation appears to be responsible in these cases. The same may be said of another patient who had an infected prostate and was referred by a general surgeon who would have enucleated an uninfected gland. In

another there was gross fibrosis of the prostate and of the region around the bladder neck as a result of old infection. A minute resection from a prostatic bar increased the incontinence of another patient: the cause is probably neurogenic, though no definite evidence has been found. The remaining patient, a case of simple nodular hyperplasia, is probably the only one in the series in whom an enucleation was a reasonable alternative.

One patient who had persistent incontinence after resection was treated with complete success by the operation described by Millin (1939). Two other patients have had this treatment without success.

In addition to these patients a few have a slight dribbling after the act and find it convenient to wear a pad. One man gives the unusual story that his control is excellent except when he goes to sleep in a chair—a practice which could be avoided without serious results.

It is true, however, that many patients are incontinent for a few hours or days after the removal of the catheter, and in some cases this symptom has persisted for a few weeks. The detrusor has hypertrophied to overcome the obstruction, and the sudden removal of the obstruction has left the sphincter at a disadvantage. The movements of the instrument produce some stretching of the sphincter, which is sufficient in some cases to retard the recovery of its tone.

Conclusions

The complications of perurethral prostatic resection have been exaggerated, and this operation is worthy of a greater place in the treatment of prostatic obstruction in this country. Many British surgeons use perurethral resection only in fibrous prostates, malignant prostates, and "bad risk" cases, and believe that the functional result after perurethral resection is, in general, inferior to that of an enucleation operation. Perurethral resection is selected for these groups only because enucleation is impossible. The best results by the perurethral methods are obtained in the small or moderate glandular types. The distinction between gland, bladder neck, and capsule is clear, and removal of the glandular tissue is an exact procedure. It is true that the removal of the very large gland is an extremely difficult operation, but a gland of 20–40 g. can be removed in a reasonable time, with negligible upset to the patient, by a surgeon who has been trained in this operation. We believe that the indications should include such cases, and that these constitute the majority of patients suffering from prostatic obstruction.

The open operations for prostatic obstruction have become much safer in recent years. This is one reason for the decrease in interest in perurethral operations. It is not, however, an adequate reason. It is instructive to compare the treatment of vesical calculus. The crushing of a bladder stone is a very old operation, and when it became reasonably safe to open the abdomen interest in litholapaxy decreased. The urological specialist continued to practise it, however, and there is no doubt that it is still the operation of choice for the usual bladder stone of moderate size. The only reason for another course is the absence of any surgeon experienced in the operation.

In prostatic surgery in this country it is usual to reserve perurethral resection for the case in which enucleation would be difficult or impossible. We believe that the opposite policy might be employed with

advantage—that is, to use enucleation operations only when there is a serious contraindication to the perurethral route.

Summary

Perurethral prostatic resection has been used in the treatment of over 90% of patients fit for the removal of prostatic obstruction.

We followed up 461 cases for periods of one to thirteen years, and in the great majority an excellent functional result has been maintained throughout.

Recurrent prostatic obstruction occurred in 6% of cases of benign hypertrophy followed for five to ten years and in 2% followed for one to five years.

Post-operative stricture occurred in 2% of cases and was not difficult to treat.

The operation failed to relieve incontinence in five cases and produced incontinence in two—one a nodular hyperplasia and the other a fibrosis of the prostate and periprostatic tissues of inflammatory origin.

The results suggest that the complications of perurethral prostatic resection have been exaggerated, and that this operation is worthy of a much larger place in British surgery.

Our debt to the surgeons of the Mayo Clinic is obvious. In addition we wish to thank Dr. A. B. M. Currie, Dr. W. Kraszewski, and the staff at the Victoria Infirmary, Glasgow, and Hairmyres Hospital, Lanarkshire.

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INCONTINENTIA PIGMENTI

REPORT OF CASE, WITH SUMMARY OF 29 CASES FROM THE LITERATURE

BY

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Twenty-six years ago Bloch (1926) demonstrated to the Swiss Dermatological Society at Basle an 18-months-old girl with irregularly distributed bizarre-shaped pigmentation of slate colour involving the trunk and lower extremities. After histological study of the skin he gave the condition the name of incontinentia pigmenti. In 1925 Bardach had reported "systematized naevus-formation" in a pair of 17-months-old twins, undoubtedly with the same condition. Since 1926 at least 29 other cases have been reported, the details of which are summarized below. Although reports have come from Germany, Sweden, the United States (both white and black subjects), Canada, Holland, Denmark, and Japan, no case has yet been recorded in England. It is true that Kalz and Mackenzie (1947) published a case in the *British Journal of Dermatology and Syphilis*, but the child was Polish and in Montreal.

The case reported here is that of a baby who was born and lives in Hertfordshire.

Case Report

A female infant, born on February 24, 1950, was the survivor of first-born twins, eight weeks premature, the other twin being stillborn. The mother and father are unrelated, are both healthy, and there is no family history of skin disorder. The mother's father and her younger brother were each blind in one eye from babyhood. Neither survives, and the nature of the blindness is unknown.

The patient weighed 3 lb. (1.4 kg.) at birth, but was rather feeble. I saw her in her first week for this reason, and she remained in hospital for five weeks. During this time her skin was normal. Except for the skin condition described below she has been a normal girl and free from symptoms. When aged 2 months the left lower limb became swollen and red, and when two or three days later the swelling subsided a "scorch-mark" was seen by the mother. At 7 months there was another attack, the child becoming ill-at-ease and feverish, and seeming to be in pain. The left lower limb became swollen, red, and shiny; after three hours blisters appeared in the pigmented areas and a measles-like rash on the clear skin. A few days later the swelling subsided and further pigmented areas were found. When I saw her at 13 months (March 28, 1951) there had been three attacks and the lower limbs only were affected. Three

FIG. 1.—Showing the pigmentation on the chest and the narrow stripes round the trunk.

FIG. 2.—Section of skin showing a large number of melanophores containing closely packed melanin granules. ($\times 240$.)