Transurethral Resection

J Blandy

Second Edition

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Preface

The first edition of this book appeared seven years ago, since then the subject has changed, and so has its readership. No longer is it necessary to explain and defend transurethral resection against a prevailing view that it was necessarily an incomplete operation, fraught with incontinence, perforation, and stricture, which always had to be done again. Today it is the method of choice for all but the very rare giant benign gland, for all the obstructing carcinomas, and for dealing with superficial bladder tumours as well as for obtaining an adequate biopsy of the solid infiltrating ones. Within these seven years the equipment has been improved out of recognition—the Hopkins rod-lens telescope, fibre lighting equipment, solid state diathermy machines and the continuous flow irrigating system have made the operation much safer and easier to do, as well as to teach. When it came to preparing a second edition it was clear that the first one had to be entirely revised. Every page has been rewritten, all the illustrations redrawn, and many more, particularly in the section on bladder tumours, have been added. Although its format has changed, the book is still designed for the young surgeon setting out to learn how to use the resectoscope. Today he will have had a thorough grounding in general surgery, but no longer should he be expected to have seen or done many open operations on the prostate, and no longer can he expect to do urology on the side as a dilletante. Transurethral resection is for the professional committed specialist in urological surgery.

John P. Blandy
London
1978

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CHAPTER ONE

History

The ancients, who thought that the bladder was divided by a horizontal septum, knew little about obstruction at its outflow, even though Galen must regularly have divided the prostate and bladder neck when performing lateral lithotomy (1). Oribasius of Pergamum, writing his synopsis at the command of the Emperor Julian in the fourth century A.D., proposed to cut through the prostate by a perineal incision in those cases of retention of urine where it was impossible to pass a catheter. The risk of fistula after this operation, he thought, was preferable to death from unrelieved retention. Ambroise Paré had a more clear understanding of bladder neck obstruction, and had a catheter made with a sharp cutting cup at its tip with which pieces of the bladder neck could be torn away (Fig. 1.1) (1). Morgagni, Valsalva and

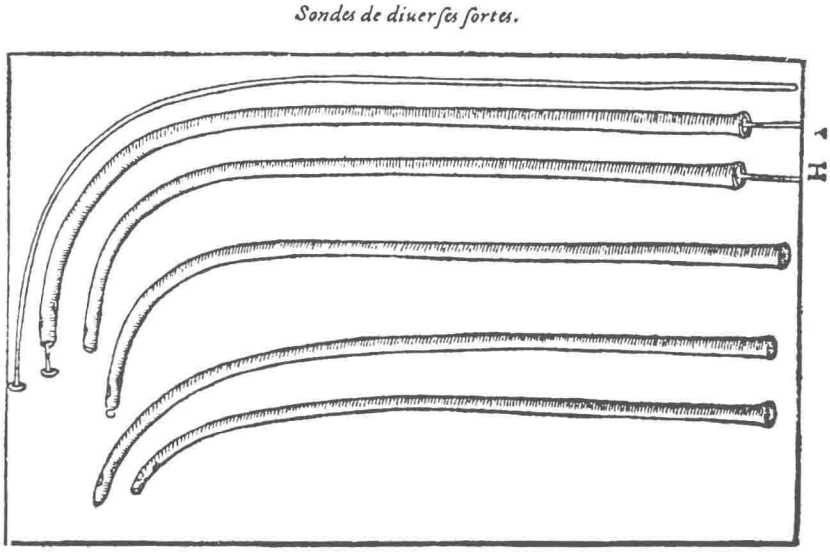


Fig. 1.1 Catheters armed with sharp cups for removing 'carnosities' from the urethra, and possibly also pieces from the neck of the bladder—by Ambroise Paré (1510-1590).

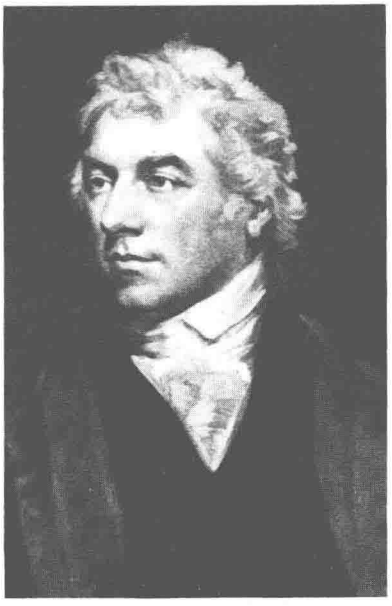


Fig. 1.2 Sir William Blizard (1743-1835) Surgeon to The London Hospital.

Fig. 1.3 Sir George James Guthrie (1785-1856) Surgeon to The Westminster Hospital. (From original Daguerrotype, by permission of the Librarian, The Royal College of Surgeons of England.)

Bartholin all wrote on the subject (1-3) and John Hunter prepared and drew a specimen of bladder neck obstruction with middle lobe enlargement (4). His son-in-law Everard Home attempted to pass off Hunter's observation as his own—plagiary soon denounced by his contemporaries (4, 5). All that any surgeon could advise for these patients was intermittent self-catheterisation, a proceeding fraught with the risks of bleeding, infection, and false passages. It was not surprising that surgeons sought other alternatives.

Probably the first to attempt an open division of the bladder neck was Sir William Blizard, 1806 (Fig. 1.2) who described a patient in The London Hospital who lay with an indwelling catheter, and subsequently died with an abscess in each lateral lobe of the prostate (4). Blizard reflected that:

> "this person might have been successfully treated by dividing the prostate with a double gorget cutting on both sides introduced in the usual way on a staff into the bladder. It would have relieved the immediate distress, and might have laid the foundation for a cure. This is not a speculative remark. I have several times performed such an operation in cases of disease of the prostate gland which I have thought within its scope of relief, with complete success."

Of Blizard's contemporaries, Guthrie at The Westminster Hospital, had won an international reputation for his advocacy of the conservative treatment of the limb wounds both before and after Waterloo (6) and had made contributions to the surgery of ophthalmic and urological conditions. Even today Guthrie's account of the anatomy of the neck of the bladder is still worth reading (Fig. 1.3). After castigating Everard Home, Guthrie went on to emphasise the role played by the hypertrophied bladder neck in cases of outflow obstruction:

> "no greater error has been committed in surgery, than that which supposes the third lobe, as it is called, of the prostate to be the common cause of those difficulties in making water which occur so frequently in elderly people, and sometimes in young ones. I do not deny that a portion of the prostate does enlarge and project into the bladder, preventing the flow of urine from it; but I mean to affirm that this evil takes place more frequently, and is more effectually caused by, disease of the neck of the bladder, totally unconnected with the prostate, than by disease of that part" (4).

Understanding the nature of the 'bar at the neck of the bladder' Guthrie devised a means of dividing it which would

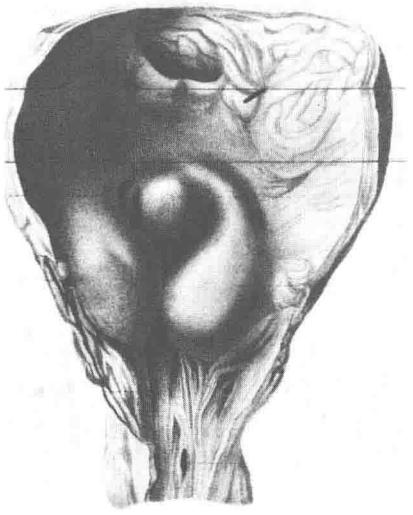


Fig. 1.4 Guthrie's illustration showing the circular ring of hypertrophied bladder neck enclosing the prostatic adenomas.

be less traumatic than Blizard's open incision. A sound was made for him with a concealed knife which could be projected to cut the bar, dam, or stricture without injuring the adjacent parts (Fig. 1.4).

It is often said that Guthrie had in mind the unusual tight stenosis of the neck of the bladder which may occur without any prostatic adenomatous hypertrophy, but in the illustration of the type of gland for which he recommended using his concealed knife it is clear that he thought it would relieve cases with typical 'middle lobe' enlargement by cutting the ring of bladder neck tissue which imprisons and traps the adenoma.

Guthrie's concealed knife was in use for several years prior to 1830, a time when similar ideas were being tried out in France where Civiale had devised a very similar gadget and Mercier another (Fig. 1.5). At this distance in time it is sad to read of the quarrels between Civiale and Mercier who joined only in condemnation of Guthrie in their doubtful claims for priority (3,7). Today it is difficult to see how any of these instruments could have been successful in more than a very small group of patients with pure annular stenosis at the neck of the bladder. Nevertheless Mercier boasted of 300 successful operations, a figure which Guyon later doubted (8). Even if the principle had been sound, all these instruments had two major defects—they were blind and they were bloody.

To meet these defects surgery had to wait for the application of electrical engineering to urology. The first step

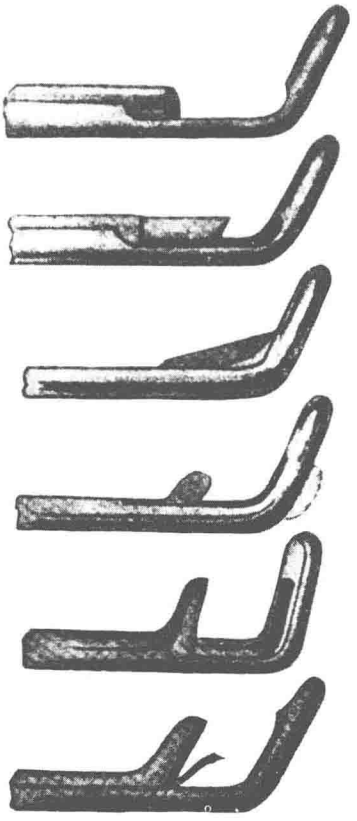


Fig. 1.5 Mercier's instrument.

was taken by Bottini who had an instrument like a lithotrite whose male blade could be heated by direct current, and used to cause a thermal burn at the neck of the bladder (Fig.1.6).

Fig. 1.6 Bottini's galvanocautery (Institute of Urology Collection).

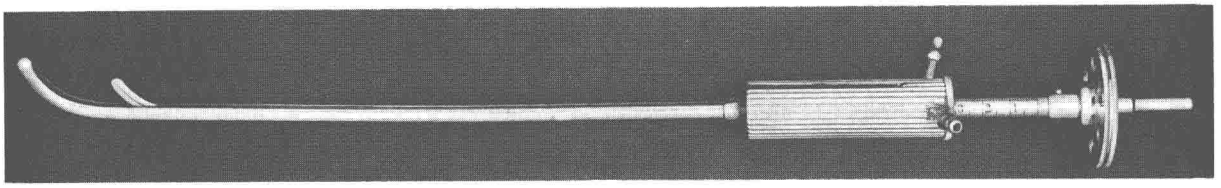


Fig. 1.7 Edwin Hurry Fenwick (1856-1921) Surgeon to St Peter's and The London Hospital. (Courtesy of Mr B. A. Fenwick.)

Fig. 1.8 Sir Peter Freyer (1851-1921) Surgeon to St Peter's Hospital.

There was no bleeding until the slough came away, but it was difficult to know just how deeply the burn would reach, and incontinence and secondary haemorrhage were a common sequel. Bottini reported 57 cases with only two deaths and twelve failures (9–12).

Bottini's work was taken up by his contemporaries. Fenwick, Chetwood and Wishard were among many who improved Bottini's instrument or devised one of their own, but the results were unimpressive (14–18) (Fig. 1.7). "No permanent good ever came of it" wrote Reginald Harrison of St. Peter's Hospital in 1893. Harrison preferred to open the bladder and stretch the internal meatus with the finger, or do the same dilatation through a perineal urethrostomy. If the patient were unfit for either of these operations, he was given a permanent suprapubic tube of the type developed by Buckston Browne and Henry Thompson (19, 20). At the turn of the century the records of St. Peter's Hospital show very clearly that the standard treatment for prostatic outflow obstruction was intermittent catheterisation–patients were admitted for a week or two in order to teach them how to pass a catheter on themselves, and were discharged 'relieved' but not, one must note, 'cured'. Even then, it was known that infection and recurrent obstruction leading to uraemia would lead to death within a month in as many as 8 per cent of cases (20). It was this grim record which drove surgeons of the time to attempt suprapubic prostatectomy, first by snipping off the projecting or salient portions of the prostate by McGill in 1887 (21) and later by the more rapid and thorough enucleation of the adenomas devised by Freyer in 1900 (Fig. 1.8) (22). Enucleation was relatively easy and successful for the large adenoma which had compressed the residual normal prostate into a 'surgical capsule' but it was untidy and unsatisfactory when there was a bladder neck

stenosis or a small fibrous gland. As Fuller remarked in 1897– "the amount of tissue removed at suprapubic operations is often so small that it seems ridiculous to have to perform suprapubic operation for its removal" (23).

The same thought led Hugh Young, even while he was perfecting the perineal prostatectomy, to devise a better way of dealing with the small gland. In 1908 Young began to use a sharp tubular endourethral knife (24, 25) in essence like a cork-borer (Fig. 1.9). "I called my instrument a prostatic excisor and the instrument excision. The internes promptly dubbed the instrument 'the punch' " (26). The first punch was very simple and had no means of haemostasis, but this was soon added thanks to the development of diathermy (27).

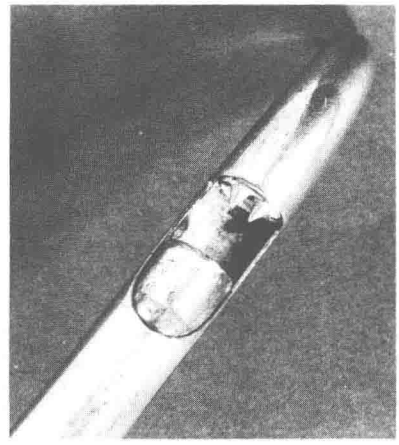


Fig. 1.9 The tubular blade of Young's punch (Institute of Urology Collection).

Shortly after it was found that very high frequency alternating current failed to excite nerve or muscle, it was used to destroy warts on the skin with great success. Beer immediately tried to use the same current, via a cystoscope, to destroy papillomas in the bladder (28). At that time the cystoscope had reached an astonishing level of perfection, in a short time it had come from the early struggles of Nitze to see inside the bladder with a heated platinum wire (29), to Edison's early filament light, and then to the combination of irrigating and operating cystoscope developed by Tilden Brown and Leo Buerger which was in all respects unchanged 50 years later (Fig. 1.10). Let us never forget how much urology owes to those dogged pioneers of electric cystoscopy, it is after all within living memory that Hurry Fenwick of St. Peter's Hospital was laughed off the rostrum at the

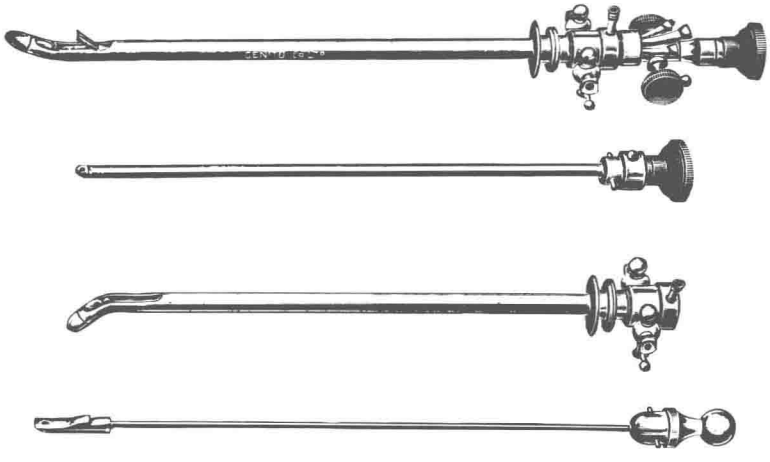


Fig. 1.10 Brown-Buerger operating cystoscope (Genitourinary Manufacturing Company).

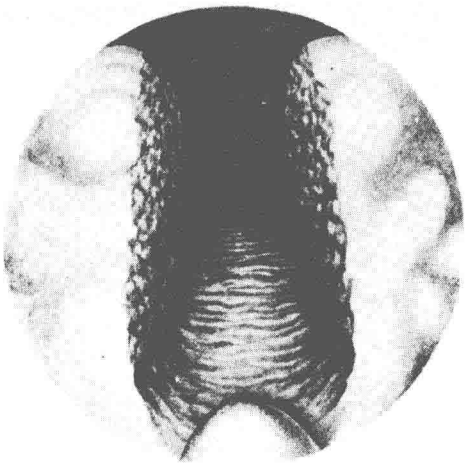
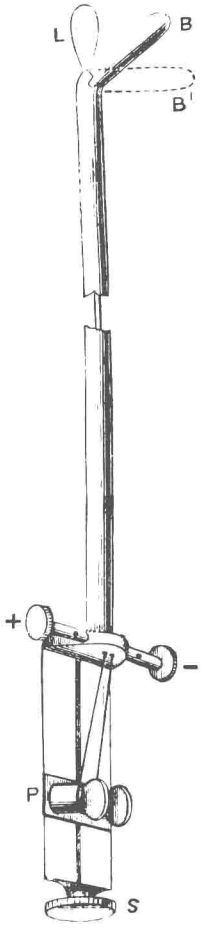


Fig. 1.11 Forage of the prostate, from Luys (1935).

Fig. 1.12 Galvanic écraseur of Hurry Fenwick (1895).



Medical Society of London for daring to suggest that electric cystoscopy was anything more than a passing gimmick. Every sensible well trained surgeon knew that the right way to explore the bladder was with a finger introduced via the perineum (30).

Using the early operating cystoscopes and the early spark-gap diathermy machines, one could produce at the neck of the bladder exactly the same kind of burn which had been made with Bottini's instrument, with the advantage that now the surgeon could see how much damage he had done. In New York, Stevens and Bugbee and in France, Luys, developed this system into a series of treatments often carried out under local anaesthesia, until in the end a channel had been burnt through the obstructing bladder neck (31–34). Luys called his technique 'forage' and claimed excellent results (Fig. 1.11) (35).

Hugh Young's concept was from the start a different one, namely to cut away the tissue, and stop the bleeding afterwards. Using the tubular 'punch' any amount of adenoma could be removed, and thanks to the modifications whereby diathermy haemostasis was incorporated by Braasch, Bumpus and Caulk (36) the punch enabled these surgeons to remove all the adenoma that was necessary. As early as 1930 Caulk reported that he could deal with 85 per cent of his prostatic cases with the diathermy punch, and had only had one death in 510 cases (37). The 'cold punch' had arrived. It did however have one drawback—at the moment the tissue was being cut off, the surgeon's view was obscured. To the majority of urological surgeons, the cold punch was difficult to use, and in inexperienced hands, dangerous. They would have preferred to see what they were doing.

A different principle was being developed at the same time, the use of a hot wire to cut through the tissue. In 1895 Hurry Fenwick had designed a 'galvanic écraseur' with a wire snare, heated white hot, which was to cut through the projecting parts of the middle lobe (Fig. 1.12) (13). In practice it is very difficult to cut through the prostate with a hot wire—it drags, sticks, and carbonises. Loop resection was not a practical possibility until a current was available which did not merely cook the tissue, but would sever it cleanly. In 1926 Maximilian Stern tried out a powerful new radio-frequency valve diathermy machine which Wappler called the 'endotherm'. The current was more powerful and Stern described the "luminous ring or halo which causes eruption of cells in its path as the loop is advanced, leaving no carbonised tissue either on the loop or the cut surface of

the gutter it leaves in the tissues" (38). By modifying the output of the diathermy machine the surgeon could choose a current which would coagulate tissues and stop the bleeding, or cut them cleanly with the arc. Improvements in Stern's early optical system, especially the foroblique lens devised by McCarthy, led to the design of a sturdy and reliable resectoscope, the 'Stern-McCarthy', which remains with us, in all essentials, today (Fig. 1.13) (39).

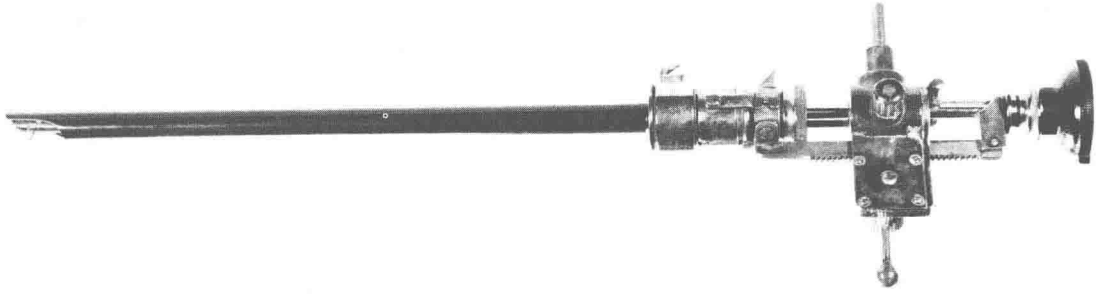


Fig. 1.13 Stern-McCarthy resectoscope (courtesy of Mr I. Preiskel FRCS).

By 1930 loop or punch instruments were available for the surgeon who would take the trouble to learn to use them. At first the aim was limited to cutting a groove through the middle lobe, and in the early days resection was limited to small glands and tight bladder neck stenoses, where removal of only 5 or 10 g of tissue was all that was necessary. But before long more and more tissue was removed until in 1936 Thompson and Buchtel (40) reported 200 cases from whom more than 20 g of tissue had been removed (Fig. 1.14), and Creevy in 1941 was writing of the large prostate as one from which he had taken more than 30 g (41). To these experts the concept of transurethral resection had entirely changed and their intention was no longer merely to perform a kind of forage, but to remove all the adenoma down to the surgical capsule, thus removing piecemeal through the urethra just as much tissue as one would be enucleating on the finger at an open operation. Detailed instructions to perform this complete transurethral resection were published independently, by Barnes and by Nesbit in 1943 (42, 43). By the end of the Second World War the transurethral technique had become the standard procedure for the benign prostate in the leading urological clinics in North America.

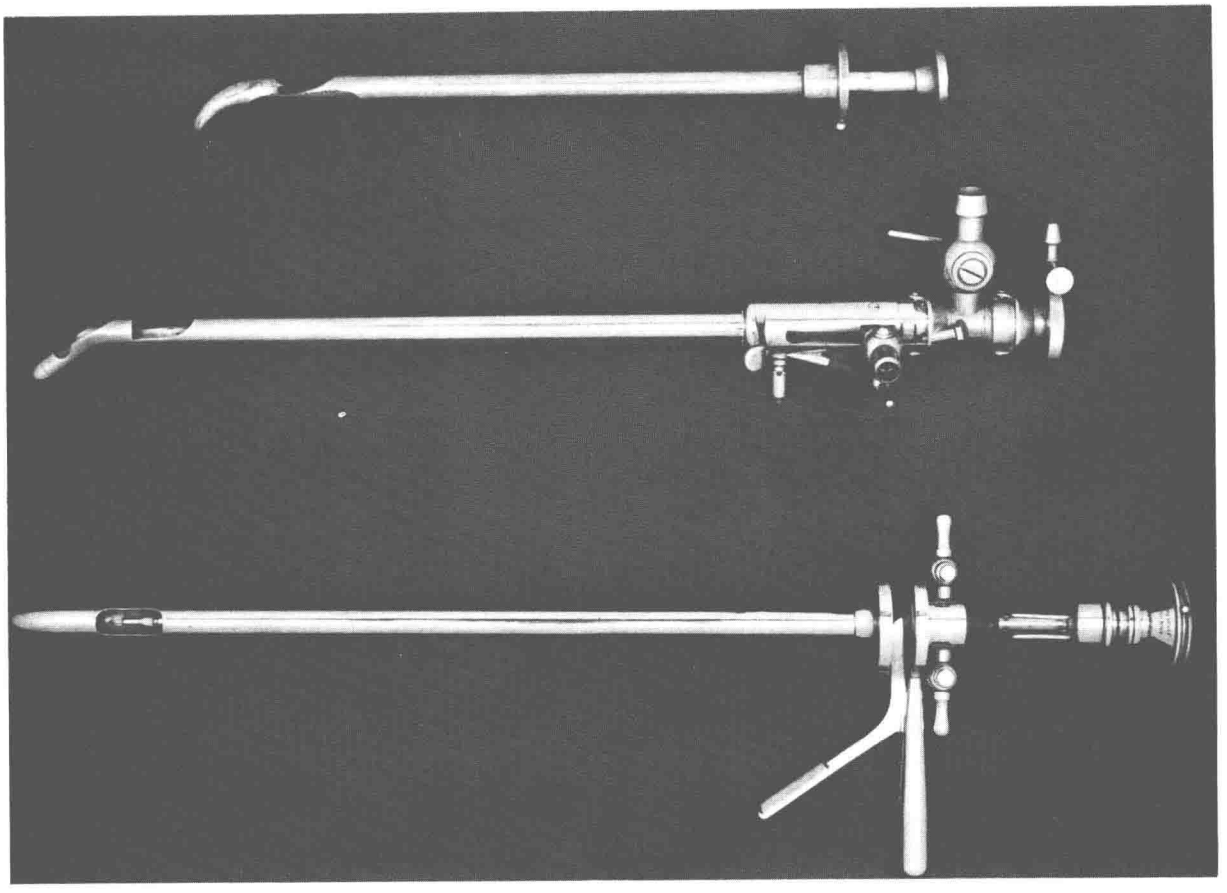


Fig. 1.14 Above, Young's cold punch; centre Thompson's; below, an unidentified German punch with retrograde action (Institute of Urology Collection).

Unfortunately in Britain things were different. Despite the pioneer work of Blizard and Guthrie, few British urologists had a comparable enthusiasm for the transurethral method. Canny Ryall (Fig. 1.15) and Millin at All Saints' (44, 45), Kenneth Walker (Fig. 1.16) at St Paul's (46), and Ward at St Peter's (47), all tried the new instruments, but were constantly hampered by technical failures particularly in the quality and reliability of their diathermy equipment (48). With the outbreak of the Second World War, the most powerful diathermy machines were appropriated, and used to block the enemy Knickebein radar system. Many British hospitals were without a urological diathermy machine which would cut cleanly under water. Even in 1969 at St Peter's Hospital this was the situation. Here and there a few outstanding exceptions could be found: in Newcastle, Dublin and Bradford, Wardill, Lane and Hamilton Stewart (49–51)

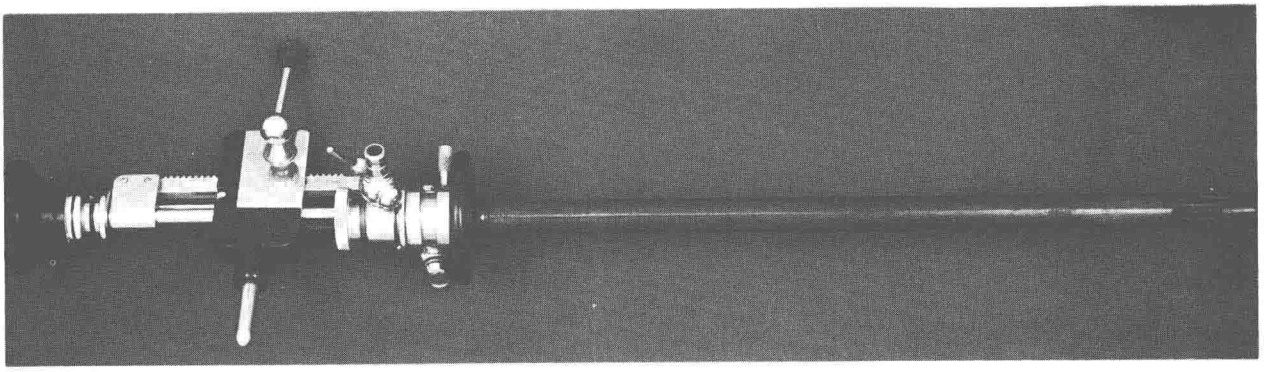
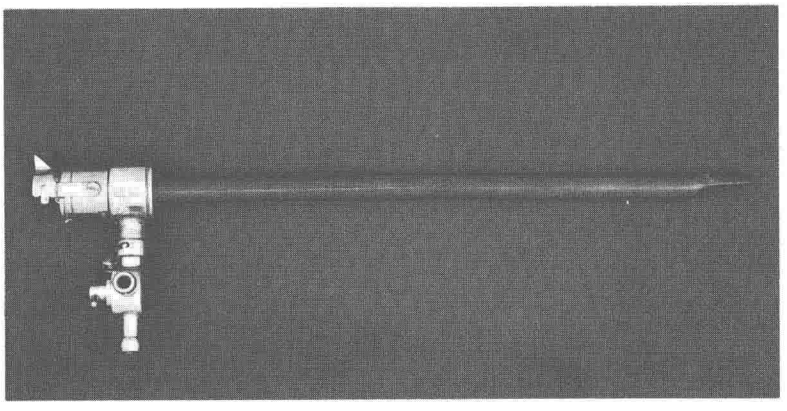


Fig. 1.15 Canny Ryall's modification of the resectoscope (Institute of Urology Collection).

Fig. 1.16 Ogier Ward's version of Stern-McCarthy instrument (Institute of Urology Collection).



became expert with the cold punch, but unfortunately failed to convert or convince more than a handful of their colleagues. In London, perhaps the foremost exponent of transurethral resection was Terence Millin.

When the war was over, the returning surgeons were greeted with the news that Millin had devised a new, simple, and easy technique for prostatectomy, and had virtually given up the transurethral method (52). To the generation of surgeons brought up in the stink and filth of the old suprapubic operation, with its huge suprapubic tube, the haemostatic bag, Irvine's box, and the rest of the grisly apparatus, Millin's operation was a revelation of exposure, cleanliness, haemostasis and simplicity. Coming at a time when Wilson Hey was preaching the advantages of strict aseptic care in urological surgery (53), and when sulphon-

amides had diminished the hazards of gram-negative sepsis, Millin's operation was adopted far and wide. It was soon believed that the problems of prostatectomy were solved, and alas, in Britain this procedure was firmly incorporated into the repertoire of the regular general surgeon (Figs.1.17 and 1.18). Statistics which repeatedly demonstrated the advant-

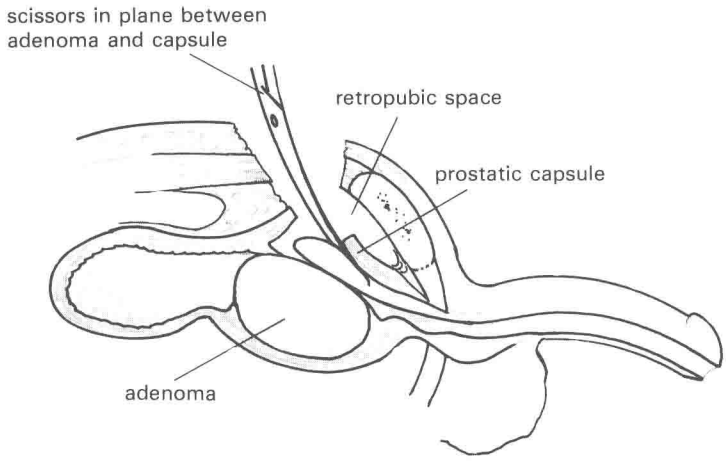


Fig. 1.17 Millin's retropubic approach to the prostate allowed the adenoma to be removed through an incision in its capsule.

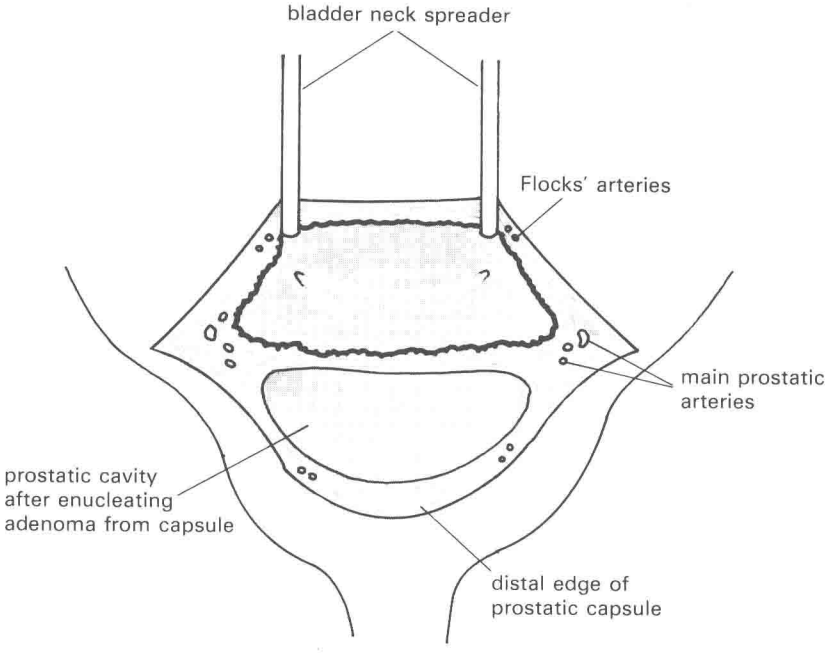


Fig. 1.18 The chief advantage of Millin's operation was the excellent access it gave to the bleeding vessels which could be suture-ligated under vision.