Operations in Urology

Philip Clark

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Foreword

The subject of urology provides an interesting exercise for surgeons with a literary bent either to write monographs on limited aspects of the subject or alternatively to write larger books which seek to cover the subject completely. The attraction of urology as a literary subject lies partly in the available historical accounts of the early efforts to relieve acute retention of urine, the painful vesical calculus and other disorders, and partly perhaps because of its relatively compact and limited scope as a well-defined group of human disorders in which the diagnosis and treatment during the last 50 years have been distinguished by the remarkable progress made in the precision of its diagnostic procedures and in the gradual improvement of its surgical techniques and particularly of perurethral operations. A further attraction to intending authors may also be the growing alliance between surgical and medical urology (now called nephrology), and the ever-increasing scientific and biochemical contributions to the subject have led to a greater understanding of such aspects of the discipline as the modern treatment of renal failure, renal calculus and malignant tumours of the urinary tract than had been thought possible 40 years ago. Most such books dealing, for example, with one urological disease or disorder and most complete textbooks of urology written by experienced surgeons nowadays deal chiefly with the aetiology, symptoms, diagnosis and treatment of the various disorders which are described. The author usually assumes that the reader is familiar with the routine aids to diagnosis including familiarity with radiographs, the use of the cystoscope, urethral dilatation and so on, and does not present detailed descriptions of such procedures. It is probably assumed that the use of these diagnostic procedures will have been taught in the department in which the trainee has worked, and that knowledge of them will have been acquired by practice and from the explanations given by his chief. But few written accounts exist of the varied details of cystoscopic diagnosis, ureteral catheterization, etc., describing not only the techniques but the pitfalls, risks and possible complications which occasionally arise during the performance of these routine diagnostic procedures. The present work commendably fills this occasional gap.

Mr Clark has had a long experience of the surgery of urological disorders in a busy department of urology which has been closely linked during the last 25 years with independent and expanding departments of renal medicine, haemodialysis and renal transplantation, and basic biochemical research into metabolic urological problems. He is therefore favourably placed to deploy his knowledge for the benefit of others, and this he has done. While taking care of these ever-developing aspects of urology the book provides detailed descriptions of the routine diagnostic procedures and especially of the urological operative procedures which he has used in his own extensive practice, expertly dealt with in a manner readily intelligible to the reader. The text is written in a literary staccato style (and partly in 'note' form) which allows of great economy of words appropriate in a period when a book may need to be expanded by subsequent editions in order to incorporate descriptions of newly available knowledge and changing techniques. At the end of each chapter is appended a list of carefully selected and mostly modern references to the literature of the subject discussed, helpful to those who wish to enlarge their knowledge. In addition to the written descriptions he has provided a large number of skilfully executed and easily understood line-drawings (rather than photographs) to illustrate the techniques which have been described verbally. This novel feature, which carries the reader through the successive steps of the operative procedure being described, has been prepared with great imagination and skill and makes a valuable addition to the verbal descriptions.

During the last 15 or more years, with the growing acceptance by British surgeons of the necessity that urology should now become a surgical specialty, and with the arrangements recently approved by the Joint Royal Colleges of Surgeons of a programme of training for the young graduate who aspires to become a consultant urologist, the trainee now has the opportunity, not available to most of his older teachers (who were usually trained in 'general surgery' which then included urology) to start his consultant career with a good background of theoretical and practical knowledge of urology (not so systematically available in former

years) assisted by excellent books such as the present one. Since 1970 fulfillment of the programme of training for the intending urologist follows the acceptance of his appointment as a senior urological registrar when he becomes committed to carry through the training programme to the stage of his being accredited as a potential consultant, if he satisfies his chief. A book such as that now provided by Mr Clark dovetails superbly with the necessary reading which should accompany the formal training programme. Perhaps many trainees rely too much upon the *practical* training which they receive in their formative years without taking advantage of the available background literature summarizing the totality of urological knowledge. This book presents a composite picture of many diagnostic and operative urological procedures, stamped with the imprint of the author's vast personal experience, and should find a place in the personal library of all young urologists.

Leeds, 1985

L.N. Pyrah

Preface

'How did he do that part?', 'Why did he do it that way?' and 'Whatever do I do next?' These and other questions the would-be urologist may ask when he first struggles to do an operation himself, an operation which seemed so simple when he watched it being done. The first objective of this book is to describe how to perform the common urological operations, to explain why they are done in a particular way and to teach the trainee to perform them in a methodical manner, stage by stage. 'Help! What do I do now?' or any cry of distress, should rarely be heard! The second objective of this book is to teach the trainee how to keep himself out of trouble and, should disaster strike, how to extricate himself from it.

Who is this book written for? It is written first and foremost for the young registrar — the person in training. The Department of Urology at Leeds is above all a training centre. New trainees start every few months. Many are relatively inexperienced. In this book they may read about the essential features of an operation, one method of performing it and the difficulties and complications which may arise. Fully trained urologists will also, I hope, find it of value as a book of reference should any case present unusual difficulty.

What does this book contain? It contains descriptions of all the common urological operations. There are, of course, many different methods of performing one operation. The method given is the one I have used, tested and taught in Leeds. With few exceptions, which are clearly stated, I have used it continuously for at least 10 years and can, therefore, recommend it from long personal experience. References for other methods of performing the same operation are given at the end of each chapter. The inquisitive urologist will read them, try as many different methods as possible and decide for himself which method suits his own personal style of surgery best. A large repertoire of different operative techniques is desirable because, occasionally, the particular problem presented by an individual case will be best solved by one particular method of performing the operation.

The book is divided into four parts:

— Diagnostic procedures.
— Minor procedures.
— Open operations.
— Transurethral operations.

Each part contains several chapters and each chapter is broken up into sections. These sections follow the same, general pattern throughout the book:

The *introduction* outlines the operation or procedure, and is immediately followed by a *history* and a list of *essential features*. The history of any operation is always worth studying and, whenever possible, the urologist should read the original description himself. Rarely does anyone ever think more deeply about an operation than its originator, and what others write about it afterwards may not necessarily recapture that first flash of genius.

After this introduction, sections on *diagnosis* and *assessment* sometimes follow. Then come the *indications* for each operation. Only broad guidelines are given, not hard and fast rules; in surgery, as in medicine, each case should be judged on its own merits. Sections on *preoperative investigation* and *preparation* come before the main section, which describes in detail the actual operative *procedure* for the uncomplicated case, stage by stage. The order in which the stages are described is the order in which they should be performed.

However, not every case is uncomplicated. Some are difficult by their very nature and some are made difficult by the surgeon himself. The next two sections describe the *difficulties* which may be encountered and the surgical *disasters* which may arise. In surgery, as in life, everyone at times gets into trouble; however, it is not getting into trouble, it is how you get out of trouble that matters, and these sections also describe how difficulties should be overcome and the action to take if a disaster occurs. No one should ever be ashamed of his mistakes, but all of us should try to learn from them. The revered and skilled Manchester surgeon, R.L. (Tiny) Holt, comforted one registrar who came to him, 'cap in hand', to confess a terrible mistake by saying, 'My dear fellow! There is nothing you could possibly do in surgery that I have not done many times myself!' In some

urological departments they hold a 'Death Club' periodically, when every patient's death, especially postoperative deaths, are scrutinized to make sure nothing could have been done to prevent them. This is often helpful, provided the verdict reached is not as specific as that of one house surgeon who wrote on a death certificate, 'Cause of death — Mr. ....., F.R.C.S.' In other departments they hold similar meetings, though in lighter vein, to award prizes to the surgeon who has made the most stupid mistake without actually harming the patient. Some of these appear in this book under the heading of *classical mistakes*.

At the end of each chapter there are sections on routine *postoperative management* and the treatment of *postoperative complications*, followed by sections on routine *follow-up* and the treatment of *late complications*.

The aim of this book is to tell the registrar clearly what to do and how to do it, no matter whether the case is straightforward or complicated.

Operations in Urology is meant to help people learn the secrets of urological surgery, from the newly qualified doctor to the senior registrar serving his years of apprenticeship in a training programme. I hope that anyone destined to become a urologist and trying to learn the craft of urology will find this book useful. I hope, also, that all urologists will find at least something in it which is new to them and which they will be glad to learn. I certainly have learnt much from writing it. We learn from teaching and by teaching we learn. This book is for all who are still learning, for all who enjoy the fascination of urology.

Leeds, 1985 P.B.C.

Contents

PART 1

DIAGNOSTIC PROCEDURES

1

Cystoscopy and urethroscopy

Introduction

The key to successful surgery is accurate diagnosis. In reaching it, the most important factor in urology is the clinical history. Physical examination should be thorough, but is less helpful because abnormal signs may be few or absent. Investigation, therefore, is the next most important factor and, although radionuclide studies and the newer imaging techniques of ultrasound and computerized tomography have made rapid advances, intravenous urography and cystoscopy remain the two routine investigations which are needed in the majority of urological cases. The intravenous urogram outlines a silhouette of the upper urinary tract in black and white; cystourethroscopy shows the true appearances of the lower urinary tract in its natural colours.

History

Throughout the history of cystoscopy illumination has been a more difficult problem than vision. The source of illumination started outside the bladder, was moved into the bladder and is now back outside the bladder once more.

The feeble flicker of a candle was reflected down the original Bozzini cystoscope (1806) by a mirror (Fig. 1.1); a mixture of paraffin and camphor provided a more intense flame for the Cruise cystoscope (1865); Kelly (1883) also used an external lamp and focussed its rays with a head-mirror down a speculum to illuminate an air-filled bladder (Fig. 1.2) (Murphy, 1972).

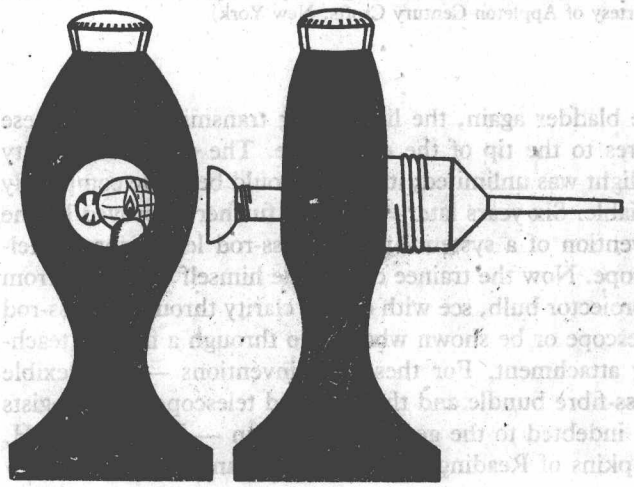

Fig. 1.1 Bozzini cystoscope, 1806.

Cystoscopy, however, only became a practical reality in 1887, when Nitze adapted Edison's carbon-filament lamp and fitted it to the tip of his cystoscope, thereby moving the source of illumination into the bladder. During the era that followed, every cystoscope, panendoscope and resectoscope had a bulb at its tip to provide illumination. This had its problems. The size of the bulb and the illumination it could give were limited; there were several electrical contacts between battery and bulb, any of which might fail; if the current was turned up too much the bulb burnt out.

With the invention in 1954 of the flexible glass-fibre bundle the source of illumination could be moved outside

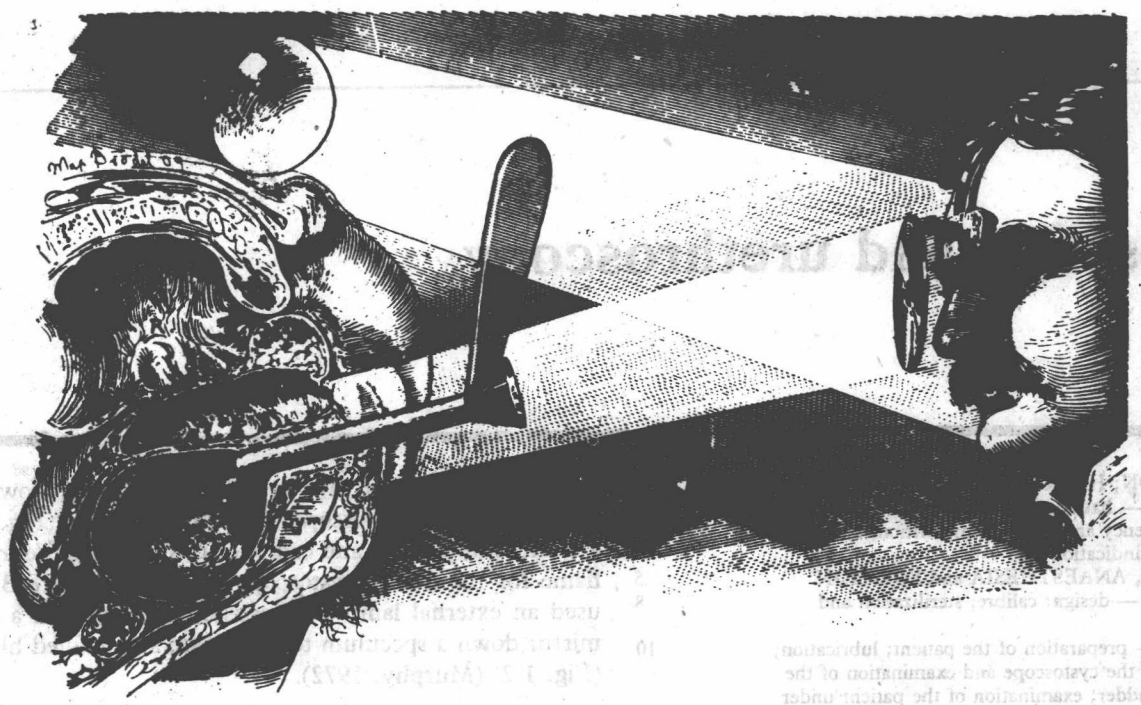

Fig. 1.2 Howard Kelly performing aërocystoscopy. (From Kelly H A, Burnham C F 1914 Diseases of the kidneys, ureters and bladder. By courtesy of Appleton Century Crofts, New York).

the bladder again, the light being transmitted along these fibres to the tip of the cystoscope. The possible intensity of light was unlimited; its source could be made completely reliable. Six years later vision was further improved by the invention of a system of long glass-rod lenses for the telescope. Now the trainee can dazzle himself with light from a projector bulb, see with crystal clarity through a glass-rod telescope or be shown what to do through a flexible teaching attachment. For these two inventions — the flexible glass-fibre bundle and the glass-rod telescope — urologists are indebted to the genius of one man — Professor H. H. Hopkins of Reading University, England.

Essential features

The essential features in performing cystoscopy are:
— Watch the bladder as it fills.
— Examine all parts of it systematically.
— If you see anything suspicious, biopsy it.
After cystoscopy:
— In men, examine the prostate against the cystoscope.
— In women, examine the cervix and vagina.
— In both, perform bimanual examination under full muscular relaxation.

Indications

Cystoscopy is indicated in almost every adult with urinary symptoms. The reason for this is simple: those symptoms may be caused by a tumour of the bladder.

Haematuria

Cystoscopy should always be performed in any adult with haematuria. An intravenous urogram is also mandatory and should be performed first to exclude a tumour of the upper urinary tract. When no cause for bleeding can be found either on the urogram or on cystoscopy, have the urine examined cytologically (Papanicolaou & Marshall, 1945) and tell the patient to come back 'hot-foot' if the haematuria recurs, so that cystoscopy can be repeated while it is taking place. However severe the bleeding, it should then be possible to identify its source if this is in the bladder or urethra, and the sight of an efflux of blood from one ureteric orifice may lead to the early removal of a renal or ureteric tumour. Apart from tumour, the other causes of bleeding which may be diagnosed on cystoscopy include cystitis (acute, tuberculous or interstitial), schistosomiasis and stone.

Haematuria in a child is different: cystoscopy is not usually indicated. Tumour is rarer, haematuria is more commonly caused by acute or focal glomerulonephritis, and the risk of damaging the urethra by passing an instrument is greater than in an adult (Dunn et al, 1978). Nevertheless, when haematuria is persistent cystoscopy should be performed.

Difficulty in passing urine

This symptom in an elderly man is usually caused by prostatic obstruction. Cystoscopy will be performed prior to prostatectomy. The danger occurs when prostatectomy, for one reason or another, is deferred and cystoscopy is deferred also. A significant number of men with prostatic obstruction also have a tumour of the bladder; in a few the obstructive symptoms are caused by the tumour and not by the prostate. Whenever a patient decides to postpone prostatectomy insist on performing cystoscopy, or at least have the urine examined cytologically. Usually no tumour will be found on cystoscopy, but at least the cause of the obstruction will have been diagnosed accurately; if cystoscopy precipitates retention of urine, what better proof does the patient need that prostatectomy cannot be delayed?

Frequency, urgency and pain on micturition

These symptoms occurring for the first time in a woman late in life are so often caused by carcinoma of the bladder that cystoscopy should always be performed. In younger women of childbearing age they are usually caused by cystitis, trigonitis or urethritis, and respond to appropriate treatment; cystoscopy is not needed unless the symptoms are recurrent or persist in spite of this treatment.

In men, symptoms of cystitis are always suspicious and cystoscopy should be performed to exclude an obstructive cause or a tumour.

Pain

Usually the symptoms which demand cystoscopy are urinary, but sometimes the indication is pain. Suprapubic or perineal pain may obviously be caused by a lesion of the bladder or prostate. Loin pain suggests a renal or ureteric lesion and an intravenous urogram will be the first investigation. Cystoscopy, and perhaps retrograde ureterography (see Ch. 2, p. 37), will be indicated if the urogram shows an obstructed or non-functioning kidney.

Symptom-free patient

Occasionally, cystoscopy is indicated in a patient who has no symptoms at all. A lower abdominal mass or sterile pyuria may have been found on routine medical examination; red blood cells or malignant cells may have been found on screening a dye-worker's urine; an intravenous urogram may have shown a filling defect in the bladder or a non-functioning kidney. In all these instances cystoscopy is indicated to exclude a 'silent' carcinoma of the bladder.

Contraindication

Acute urethritis

Do not perform cystoscopy or urethroscopy on any patient with acute urethritis. Urethritis can be diagnosed without inserting an instrument and to do so in the presence of acute inflammation may produce a stricture.

Preparation

No preparation is needed normally. Prophylactic antibiotics are unnecessary in most patients, but should be given to anyone who has had rigors after previous instrumentation to prevent bacterial shock, and to anyone with valvular disease of the heart to prevent bacterial endocarditis (Traut & Miller, 1949).

Intravenous urogram

When indicated, this should have been performed first. The 'X-rays', or radiographs*, should be available. Look at them. Do they alter your plan of action? Was the haematuria caused by a renal tumour? Is retrograde ureterography indicated? Should the patient be admitted so that a corrective operation can be performed immediately after cystoscopy?

Anaesthesia

Although many urologists perform cystoscopy under local anaesthesia (see Ch. 5, p. 69), there is much to be said for performing it routinely under general anaesthesia. Men find this less painful and women less embarrassing. Hurt or distress a patient in any way and he or she may not come again. This is often the reason why patients default from check cystoscopy and, when this is being performed because of a previous carcinoma of the bladder, defaulting may have serious consequences.

However, local anaesthesia is definitely indicated when testing for stress incontinence in a woman (see Ch. 11, p. 169), or when the risk of general anaesthesia is too great, yet it is essential to examine the bladder.

Out-patient cystoscopy unit

Such a unit, where cystoscopy can be performed under general anaesthesia, is one of the most valuable assets any department of urology can have. Patients come up to this unit, are examined and go home a few hours later. Cystoscopy can be advised with complete freedom for all who need it and so becomes a part of routine urological investigation. Most conditions can be fully diagnosed on an out-patient basis: some patients will not need to be admitted at all; those who need admission can be accurately categorized according to their degree of urgency; time will not be wasted on investigation when they *are* admitted. These

*'Radiograph' is, of course, much more correct, but the term 'X-ray' is in such common usage it will be employed throughout this book.

factors save hospital beds, shorten waiting lists and improve patient care.

There are few contraindications to cystoscopy in an out-patient unit. Distance and age are no bar. Some patients are elderly, others come from far off, but all that needs to be provided is suitable transport, someone to accompany them home and someone to receive them when they get there. The contraindications are:

— Previous coronary or cerebral thrombosis.
— Severe diabetes mellitus, pulmonary disease or hypertension.
— Myxoedema.
— Sickle cell disease.
— Treatment with antihypertensive drugs.
— Steroid therapy within the previous year.
— Previous anaesthetic difficulty.

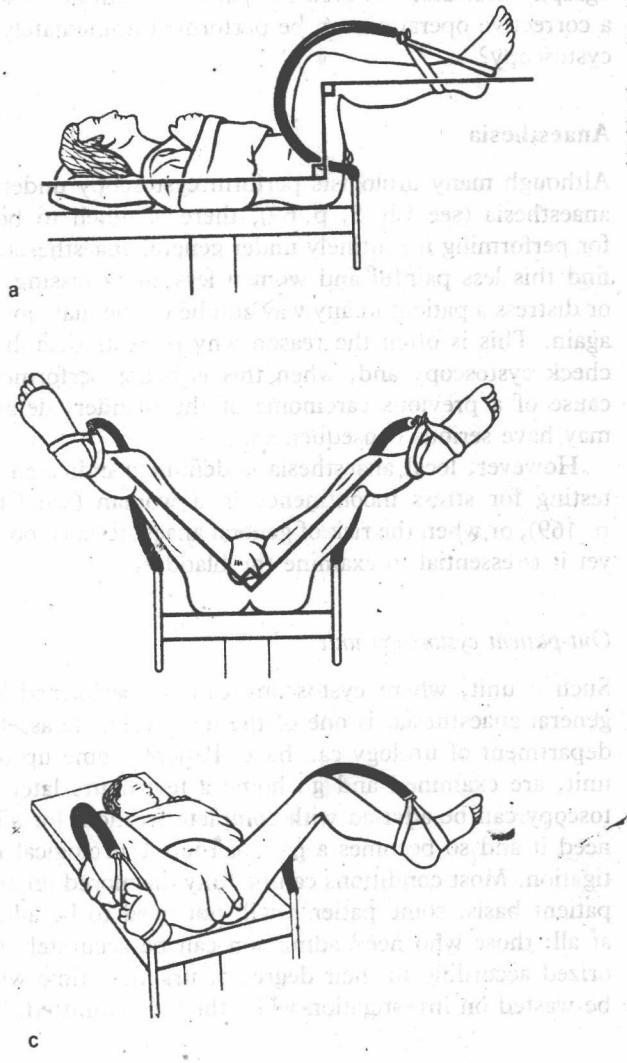

Fig. 1.3 The lithotomy position. (a) Lateral view. (b) View from the foot of the table. (c) Perspective view.

Anaesthetic difficulties and disasters may, of course, occur in the out-patient cystoscopy unit, just as they may in the main operating theatre. The 'crash-wagon' can get there just as easily. However, cystoscopy should only be performed in an out-patient unit on the strict understanding that if there is any difficulty whatever, during cystoscopy, during recovery or after the patient's return home, the patient can be admitted to hospital immediately.

Position

Use the 'lithotomy' position routinely for cystoscopy. It allows the cystoscope the greatest freedom of movement. It is made up of a series of right angles — a right angle at each hip, at each knee and between the two thighs. The patient's body and legs remain parallel to the operating table; the thighs extend laterally on each side at right angles to it (Figs. 1.3a, b and c). Historically, perineal lithotomy was performed with the hips and knees fully flexed — this is now known as the 'exaggerated lithotomy position'.

Gentleness is essential in putting patients up into, and taking them down from, the lithotomy position, especially if they are old, arthritic or have a past history of prolapsed intervertebral disc. Wait for the anaesthetic to provide suf-

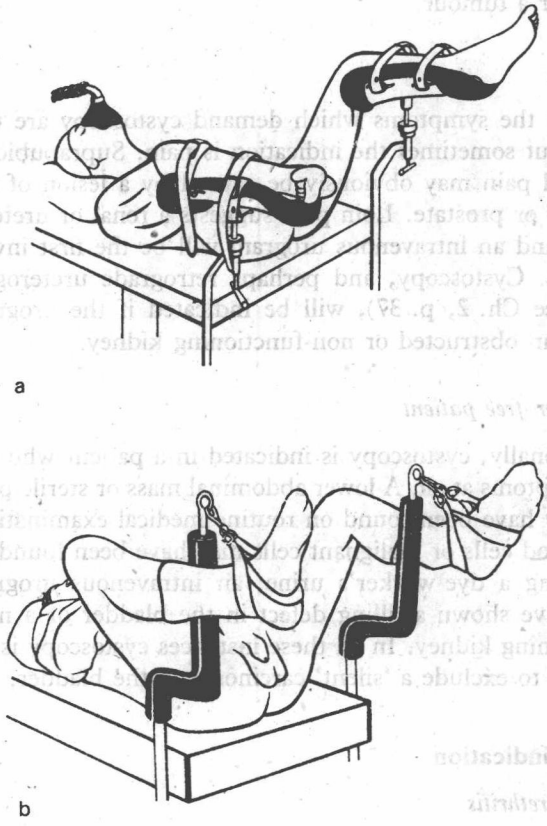

Fig. 1.4 Types of stirrup. (a) Kifa. (b) Eschmann.

ficient muscular relaxation, then raise both legs simultaneously and place them in the stirrups — to move one leg at a time would put an unfair strain on the ligaments. One person should not try to put a patient into the lithotomy position — two are needed. Some of the different types of stirrup used to support the legs are shown in Figures 1.3c and 1.4a and b.

Having placed the legs in the stirrups, the patient should be lifted down the table until the buttocks are central and flush with its edge; if they project too far the pelvis may rotate and strain the lumbar spine (Fig. 1.5a); if they are not central the legs and thighs may be contorted (Fig. 1.5b).

A drainage tray fitted to the end of the operating table catches the irrigating fluid as it cascades from the sheath of the cystoscope (Fig. 1.6a); pads are sometimes fitted to each side of it on which the urologist may rest his elbows, thereby increasing his comfort (Fig. 1.6b).

The Raper cystoscopy trolley (C. F. Thackray, Ltd.) was specially designed for use in an out-patient cystoscopy unit and is illustrated in Figures 1.7a, b and c.

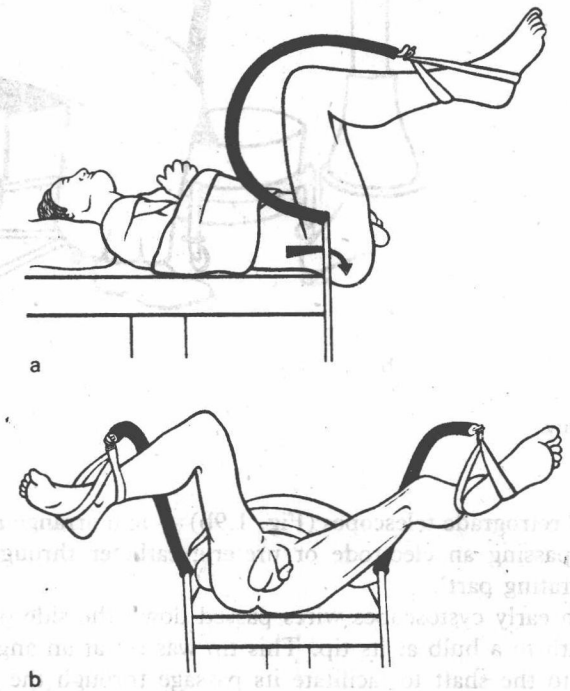

Fig. 1.5 The buttocks should be central and flush with the edge of the table. (a) Protruding, curving the spine. (b) Not central, contorting the legs.

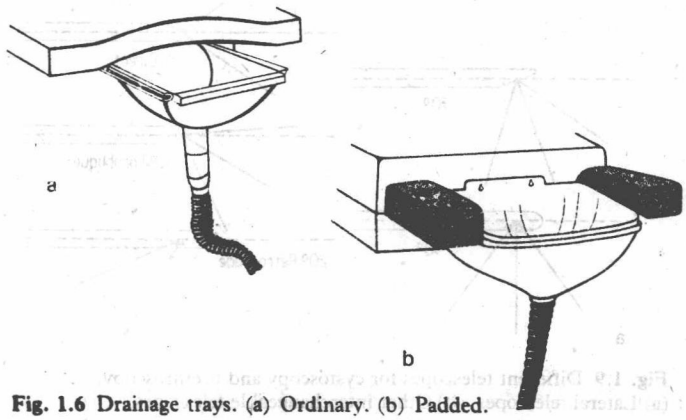

Fig. 1.6 Drainage trays. (a) Ordinary. (b) Padded.

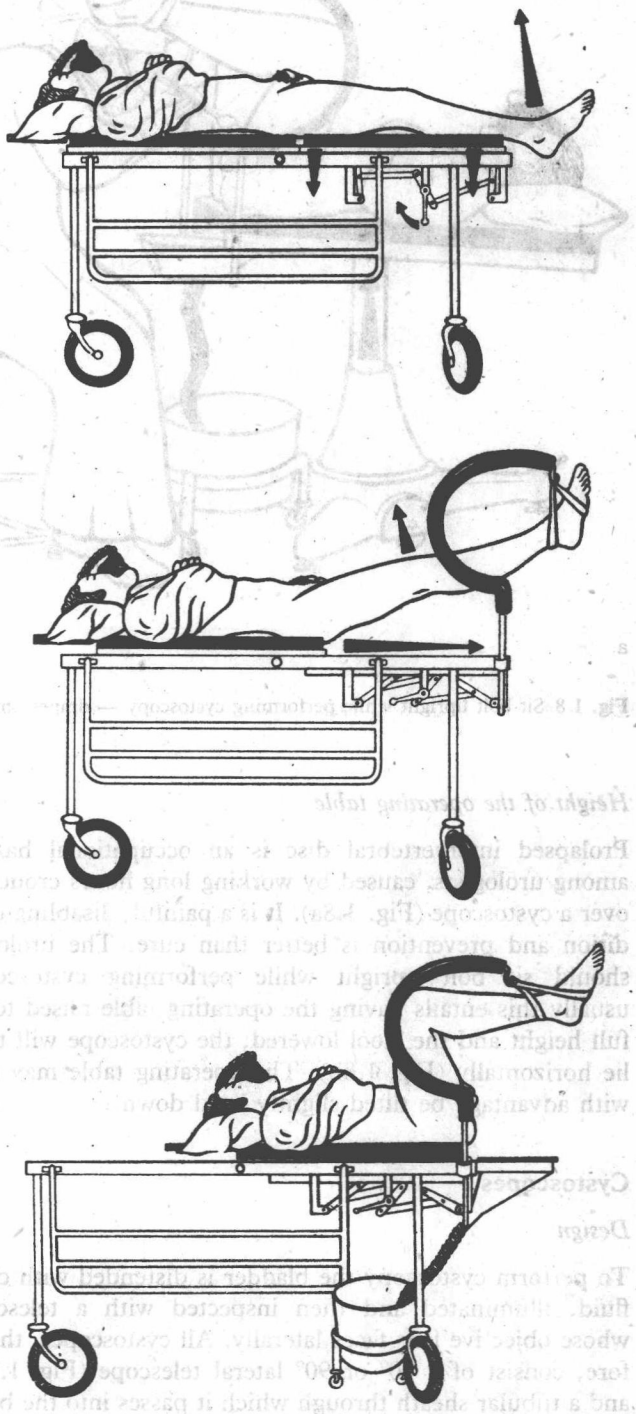

Fig. 1.7 The Raper cystoscopy trolley. (a) Place the feet in the stirrups and lower the end of the trolley. (b) Bend the knees and slide the top of the trolley towards its foot. (c) Lock the trolley top and attach the drainage tray.

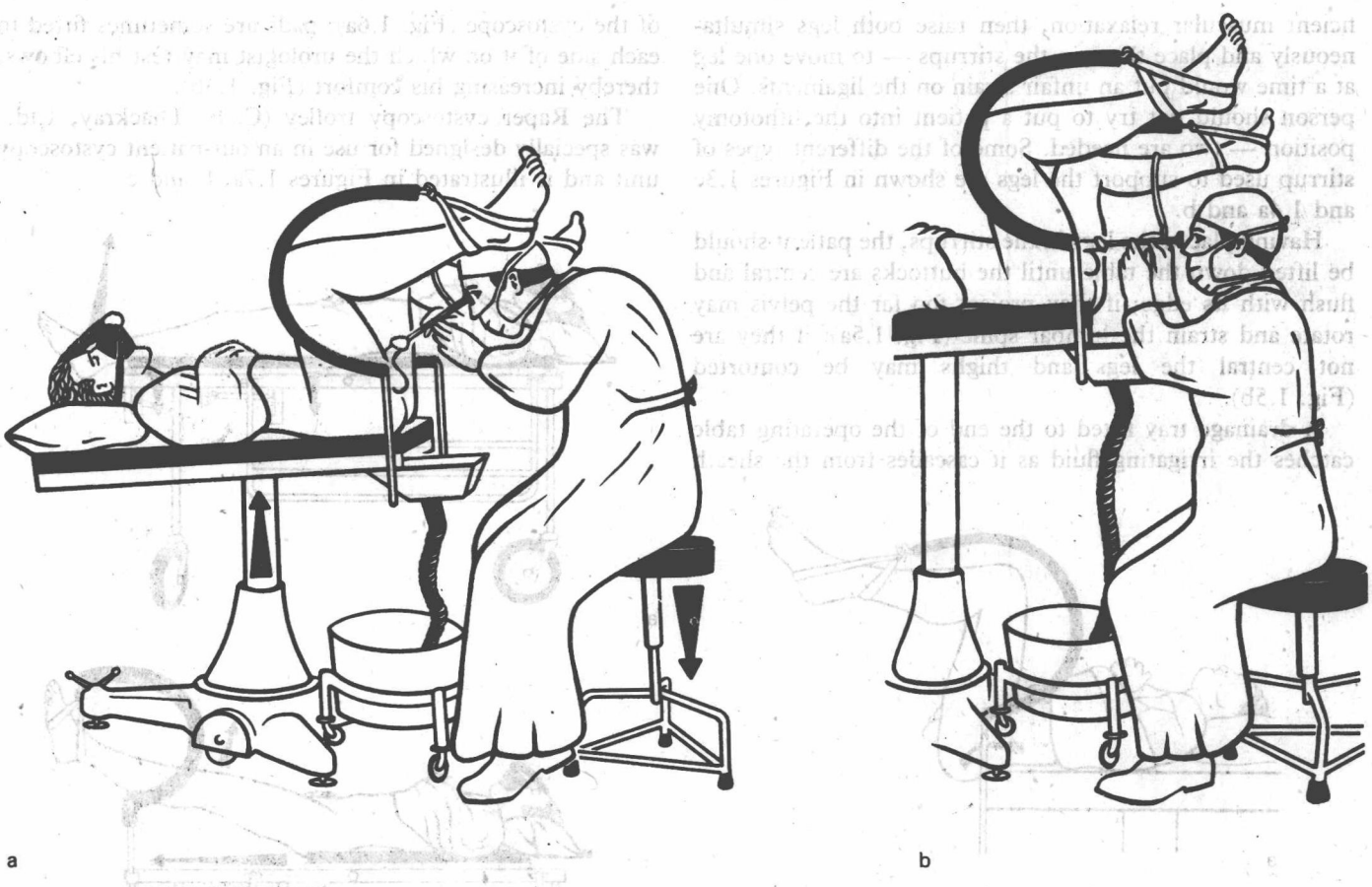

Fig. 1.8 Sit bolt upright while performing cystoscopy — drapes omitted for clarity.

Height of the operating table

Prolapsed intervertebral disc is an occupational hazard among urologists, caused by working long hours crouched over a cystoscope (Fig. 1.8a). It is a painful, disabling condition and prevention is better than cure. The urologist should sit bolt upright while performing cystoscopy; usually this entails having the operating table raised to its full height and the stool lowered; the cystoscope will then lie horizontally (Fig. 1.8b). The operating table may also with advantage be tilted slightly head down.

Cystoscopes

Design

To perform cystoscopy the bladder is distended with clear fluid, illuminated and then inspected with a telescope whose objective lens faces laterally. All cystoscopes, therefore, consist of a 70° or 90° lateral telescope (Fig. 1.9a), and a tubular sheath through which it passes into the bladder. It is the arrangements for irrigation and lighting which vary. In addition, there may be other interchangeable telescopes — 0° direct or straight forward, 30° foroblique and 120° retrograde telescopes (Fig. 1.9b) — and arrangements for passing an electrode or ureteric catheter through an 'operating part'.

In early cystoscopes wires passed down the side of the sheath to a bulb at its tip. This tip was set at an angle of 45° to the shaft to facilitate its passage through the male urethra. The viewing telescope completely filled the lumen

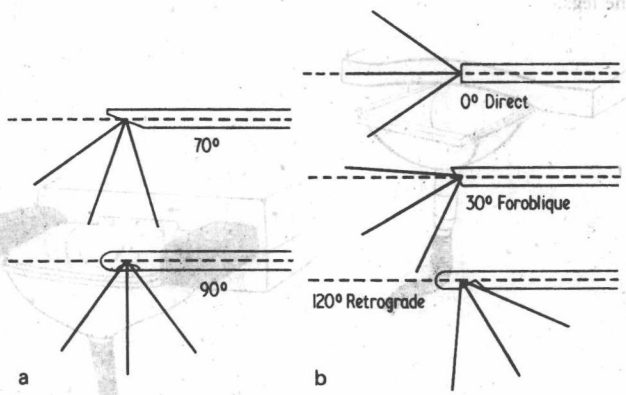

Fig. 1.9 Different telescopes for cystoscopy and urethroscopy. (a) Lateral telescopes. (b) Other interchangeable telescopes.

of the sheath, so that the bladder had to be emptied of urine and filled with water before the telescope was inserted. When the operating part was used its telescope was narrower to make room for the ureteric catheters, and because of this its field of vision was narrower too. To convert this cystoscope into an irrigating one, so that the bladder could be watched as it filled and any blood obscuring the view could be washed away, the diameter of the sheath had to be increased to create a channel between it and the telescope.

In the first cystoscopes with glass-fibre illumination, the wires down the side of the sheath and the bulb were simply replaced by glass fibres, and a light from an external source, or 'fountain', shone down them to the tip of the sheath. The revolution came in 1965, when Karl Storz made a new cystoscope specially designed for glass-fibre illumination and incorporating Hopkins' new lateral and foroblique glass-rod telescopes. These telescopes were narrower than the earlier viewing telescopes, had a wider field of vision and contained the glass fibres for illumination. The sheath, therefore, became a simple straight tube, its wall could be thinner and its calibre narrower, while still retaining the same irrigating capacity. These telescopes, with their different angles of vision, could be used for viewing and operating, both within the bladder and the urethra. Many other cystoscopes now incorporate some or all of these desirable features.

Calibre

Use the narrowest cystoscope which has adequate irrigation. One of 21F* is satisfactory for routine use and only rarely is a wider one needed. When the urethra is seen on urethroscopy to be too narrow for a 21F cystoscope, change to one with a sheath of smaller calibre, for example 17F, or even 15F. In children use a paediatric instrument, for example a 10F panendoscope.

Sterilization

Although most cystoscopes can be pasteurized at 70°C and some can be boiled or autoclaved, all will probably last longer if not heated at all. Modern bactericidal solutions are so effective that many urologists will prefer to use them, rather than sterilize their cystoscopes by heat. For example, immersion of the cystoscope in a tank containing a 2% solution of activated glutaraldehyde (Cidex — Surgikos Ltd.) for 10 minutes will kill all except spore-bearing organisms (O'Brien et al, 1966).

* 'F' represents the French catheter, or Charrière, gauge, which is used universally for the calibration of cystoscopes. It is equivalent to the circumference in millimetres. Thus, 22F is equal to a diameter of 7 mm. A conversion table giving the equivalent sizes of the French and English catheter gauges will be found in the Appendix, p. 438.

The cystoscope should be dismantled and cleaned, and then its parts should be suspended vertically in the tank with all the taps open, so that air bubbles can escape, allowing the bactericidal solution to come into contact with the whole instrument (Fig. 1.10).

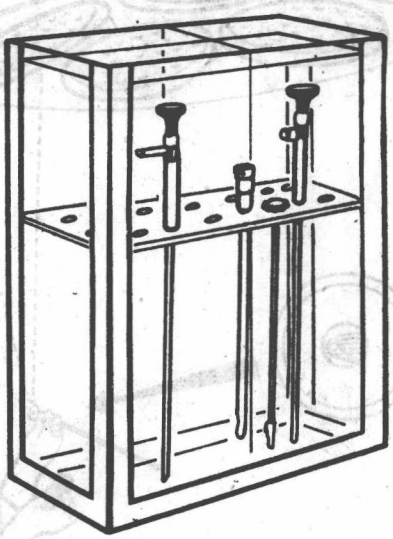

Fig. 1.10 A sterilizing tank.

CAUTION! Great care must be taken to rinse the instrument thoroughly before reassembling it, and on no account to allow the solution of activated glutaraldehyde — an excellent tissue fixative! — to come into contact with either the patient's urethra or your own cornea.

Preparation

In preparing the cystoscope, the scrub nurse should make sure:

— The telescope is clean.
— The light is shining at its correct intensity.
— There are no air bubbles in the irrigating tubing.

Telescope. She should first clean and dry the lenses with a clean swab. Then she should hold them up against a light to see its reflection mirrored in the surface of the lens (Fig. 1.11). When the lens is very dirty it may be cleaned with a swab soaked in a solution containing methyl alcohol, provided the cystoscope is not an old one with its lenses embedded in soft cement which might be dissolved by the alcohol.

Light. The sterile fibre light cable should be plugged into the light source and the light should be turned up to the correct intensity. Have a bright light by all means, but do not blind yourself! In the early days of glass-fibre illumination, some urologists used such a bright light for cystoscopy that they gave themselves central scotomas,