Practical Points of Diagnosis and Treatment in Surgery and the Specialities.

SOME PRACTICAL POINTS IN THE TECHNIQUE OF CYSTOSCOPY.

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THE purchase of a cystoscope does not make a cystoscopist! Experience only, allied to a "smooth" technique and meticulous attention to detail, leads towards perfection.

ANÆSTHESIA.

General anæsthesia should be the invariable rule in children, and in nervous adults gas and oxygen may be desirable, but the vast majority of cystoscopies may be carried out under local anæsthesia of the urethral mucous membrane. For this purpose there is no satisfactory substitute for cocaine. This substance has earned a deservedly unsavoury reputation when used in strengths above 1 per cent., but the following $\frac{1}{2}$ per cent. solution is eminently satisfactory and has been used without mishap for more than twenty years at All Saints' Hospital.

Cocaine Hydrochlor.	...	...	grs. xii
Sodii Bicarb.	...	...	grs. xii
Chloretone	...	...	grs. vi
Aqua Dest.	...	ad	oz. v

Alternative, but less satisfactory, solutions are percaine (1 in 500), phenolaine (3 minims to the oz.) and eucaine lactate (2 per cent.).

To secure satisfactory urethral anæsthesia, fifteen minutes should be allowed for its induction. The following modification of the Canny Ryall technique is recommended. The patient is instructed to urinate, emptying the bladder as completely as possible. He next lies supine on a couch, where a careful toilet of the glans penis and external meatus is made, using any suitable antiseptic. One dram of the anæsthetic solution is then introduced into the anterior urethra with a blunt-nosed glass urethral syringe of the rubber bulb pattern. Piston syringes should be avoided for this purpose. The fingers of the left hand, encircling the penis, compress the urethra and squeeze the solution into the bulbous portion of the canal. The palmar surface of the fingers of the right hand, applied to the perineum immediately behind the scrotum, readily drive the fluid through the "cut-off" muscle (sphincter of the membranous urethra) into the posterior urethra and bladder. If the preliminary act of micturition has completely emptied the bladder, the anæsthetic now acts on the bladder base. A further dram of the solution is introduced into the anterior urethra and a penile clamp applied, close to the external meatus, to

prevent escape of the fluid. This second dram is thus left for five minutes, during which time, in addition to anæsthetizing the mucous membrane of the anterior urethra, it paralyses the "cut-off" muscle and a quantity seeps through into the posterior urethra. The clamp is removed, any escape of solution being prevented by compressing the external meatus with the thumb and index finger of the left hand. A third dram is introduced slowly and the clamp applied for another five minutes, when the process is repeated and the final or fourth dram introduced. The greater part of this three drams seeps through into the bladder and so effects anæsthetization of the highly sensitive posterior urethra. Fifteen minutes from the commencement, the contents of the anterior urethra are massaged back into the bladder as in the case of the first dram. This method, in addition to giving a satisfactory analgesia, enables the trained fingers to detect a stricture of such calibre as precludes the passage of a cystoscope, so avoiding the preliminary use of a bougie.

Where lengthy instrumentation is required, as in certain forms of operative cystoscopy and in intolerant tuberculous bladders with marked frequency, a caudal or low spinal analgesia is recommended.

In women anæsthesia is seldom required. Where considered desirable, a crystal of cocaine hydrochloride is laid just within the external meatus by means of a pair of forceps and left for a few minutes to dissolve.

CHOICE OF INSTRUMENT.

For routine diagnostic cystoscopy, any good observation instrument of about 20 F. calibre will suffice in the vast majority of cases. Exceptions are met with from time to time where a special type is required. Children's cystoscopes are procurable from size 8 F. upwards. In certain types of prostatic enlargement, an instrument with an extra long beak is desirable, if not a necessity. In bladders intolerant of distension, as in gross tuberculous ulceration, in extensive papillomatous disease where hæmorrhage is not readily controlled by means of copious lavage and the use of adrenaline, and in some cases where a suprapubic fistula is present, a type of instrument enabling continuous irrigation to be employed is an essential. For this purpose a cysto-urethroscope may be used, fitted either with a right-angled or foroblique optical system. Operative cystoscopic procedures, of course, require special instruments but will not be discussed here.

He who values his cystoscopes should make it an invariable rule to clean and dry them himself after use.

STERILIZATION OF THE CYSTOSCOPE.

Prostatic cases, where residual urine is present to form a nidus for any bacterium, and those afflicted with tuberculous disease demand, above all, the most scrupulous asepsis. The cystoscope is preferably kept in a formalin cabinet for twenty-four hours and then left standing, immediately before use, in oxycyanide of mercury (1 in 1,000) for fifteen to thirty minutes. Before introduction into the urethra, it is thoroughly rinsed in saline and dried on a sterile towel. Generously coated with lubafax, or some such suitable water-soluble lubricant, it is ready for use. Oily substances as liquid paraffin should be avoided.

Immediately before introduction, the integrity of the electrical connections is verified and a suitable illumination secured. Omission of this detail may lead to the humiliation of being compelled to withdraw the instrument from the bladder owing to deficient lighting. The absolute cleanliness of the ocular and prism windows of the telescope should also be established.

POSITION OF THE PATIENT.

The lithotomy is now universally recognized as the most satisfactory position for cystoscopic work. There is no need to dilate on the obvious advantages over the dorsal position with buttocks elevated on a sandbag. This latter position is satisfactory for children and is necessary in certain deformities, as adduction contractures and ankylosis of the hip-joints.

INTRODUCTION OF THE CYSTOSCOPE.

In introducing the cystoscope, the penis is held vertically upwards and drawn taut to obliterate the bulbar *cul-de-sac*. The instrument is allowed to proceed slowly to the bulbous urethra, more by virtue of its own weight than by help from the operator. *Festina lente* should be the precept at this stage, so gaining the patient's confidence before attempting to traverse the more sensitive posterior urethra. Keeping the instrument strictly in the mid-line, the beak is engaged in the membranous urethra by feel, all semblance of force being avoided, and the ocular end depressed between the patient's thighs when a slight advancement will carry the beak into the bladder. In the grosser types of prostatic enlargement, very considerable depression of the ocular end of the cystoscope may be necessary to overcome the accentuated angle of the prostatic urethra. In marked middle-lobe hyperplasia, a general rotation of the instrument in its long axis may aid passage through the tortuous supramontine canal.

When the beak is within the bladder, there is no longer the marked resistance to rotation in the long axis. The instrument should be steadied either by means of one of the special holders or by an assistant, the heel of whose hand rests on the pubis. Unnecessary movements of the cystoscope cause discomfort or even pain and may give rise to troublesome bleeding.

The telescope is withdrawn and any residual urine allowed to flow into a sterile graduated glass vessel. It is inspected and set aside for bacteriological investigation. The amount, representing residual urine, is noted. Where accuracy is required, as in prostatic cases, urine should be passed immediately before the cystoscope is introduced.

Oxycyanide of mercury (1 in 8000) is a useful irrigating solution, as it has a reasonably high bactericidal value and, properly prepared, affords a perfectly clear medium. Sterile water is preferable if ureteric specimens are to be taken for bacteriological examination.

The two most satisfactory methods of introducing the solution are: (1) By means of an irrigating apparatus with sufficiency of sterile rubber tubing and a special nozzle with stop-cock, such as the Canny Ryall type; or (2) using an 8-oz. syringe, preferably metal. The tube and funnel method should not be employed; it is cumbersome and excessive amounts of air are apt to be introduced.

The bladder must be thoroughly irrigated until the washings collected in a glass

vessel are absolutely clear. A hazy medium interferes considerably with the view, detail being lost and exact diagnosis rendered difficult or impossible.

When the return flow is clear, the bladder is filled with 8 to 12 oz. of fluid according to distensibility. The female bladder as a general rule is more tolerant of distension than the male.

During reinsertion of the telescope into the sheath, it is important to hold it close to the distal end, as the leverage obtainable when it is held close to the ocular may only too easily lead to buckling and ruination of the lens system.

After attachment and switching on of the coupling, inability to see anything through the cystoscope may result from a number of causes, of which the commonest are:—

- (1) Non-illumination due to faulty lamp or imperfect electrical connections; preliminary testing of these as advised above minimizes the likelihood of this happening.
- (2) Prism of the telescope being in the urethra.
- (3) Prism being embedded in the bladder wall, in a growth, or in close contact with a large stone.
- (4) The telescope not being fully home and so not opposite the fenestrum of the sheath.
- (5) Water being on the ocular of the telescope.

EXAMINATION OF THE BLADDER.

A very definite scheme for examination of the bladder is essential, or important pathology may be missed. As a general rule, it is best first to direct attention to the ureteric orifices. With the knob on the ocular looking directly downwards, the beak is withdrawn or advanced until the interureteric ridge (bar of Mercier) is seen. The instrument is then rotated in its long axis through about 45°, keeping the ridge in view until an orifice comes into the field. Each is inspected in turn, attention being paid to position, shape, size, surrounding mucosa, nature and frequency of efflux. The relative position of the orifices may be important, as retraction of one may indicate ureteric fibrosis brought about by chronic inflammatory processes. Aberrant and supernumerary orifices are met with from time to time. The general vesical mucosa is next inspected, following some definite scheme. It is convenient to proceed thus. Commencing with the ocular knob in the 6 o'clock position, i.e., looking directly downwards, the instrument is advanced from the bladder neck inwards until the beak impinges against the dome of the bladder. The cystoscope is then rotated so that the knob is at 7 o'clock and withdrawn to the neck, the mucosa being scrutinized the while. In this way, by a series of advances and withdrawals with systematic rotation, the entire bladder wall is inspected in a series of bands disposed cephalo-caudally. Areas of doubtful pathology call for approximation of the prism towards the site to secure a larger magnification. The greater vascularity which is normal in the trigone should not be mistaken for pathology. Finally, the bladder neck is examined. The close approximation of the beak to it is prone to induce hæmorrhage, and it is for this reason that the region is scrutinized last. The normal concavity of the vesico-urethral rim is replaced in intravesical prostatic enlargement by convexities. It may be possible to see a ureteric orifice and prostatic lobe in the same telescope field (Zuckerkannd's sign). Sometimes it will be impossible

to view with the cystoscope a ureteric orifice on account of obstructing prostatic lobes. Small nodules or elevations are common in the female bladder neck but have no pathological significance.

Hæmorrhage is one of the greatest bugbears of the cystoscopist. The lesser degrees clear up rapidly with irrigation of the bladder, but grosser degrees, especially seen in extensive vesical growths, call frequently for other measures. It is in such that adrenaline is of the greatest service. Whereas this substance is very dangerous in the highly absorptive posterior urethra, it may be injected safely into the bladder whose transitional epithelium has a very low absorptive index. One to two drams are injected into the empty bladder through the sheath of the cystoscope, followed by 1 oz. of irrigating fluid, and the mixture left *in situ* for three to five minutes. It is then allowed to escape, and one or two washings will usually suffice to give a sufficiently clear medium. Occasionally recourse must be had to the use of liquid paraffin as a distending fluid for the bladder, this substance being immiscible with blood.

The scheme outlined above for inspecting the bladder must be modified under certain circumstances. Where the hæmorrhage is troublesome or in intolerant bladders, when a presumptive diagnosis has been made clinically, such as bladder neck obstruction, stone or growth, systematic cystoscopy is less important (being done of course if possible) and the close scrutiny of the ureteric orifices left until later or omitted.

In catheterizing a ureter it is best to move the ocular end of the cystoscope towards the opposite side, so that the line of the instrument corresponds roughly with the intramural portion of the ureter. It usually suffices to elevate the Albarran lever through quite a small angle. Undue elevation of the lever leads frequently, in the hands of the beginner, to bruising of the vesical mucosa below the orifice and to clouding of the field, so that catheterization of one or both ureters is rendered difficult or impossible. The point of the catheter is directed towards the lower margin of the orifice, and by means of a forward movement of the whole instrument the catheter slips readily into the ureter. One cannot stress too strongly the importance of ensuring that the lever is fully depressed before withdrawal of the cystoscope along the urethra.

Before collecting ureteric specimens of urine, the catheters should be allowed to drip for a minute or so to empty of irrigating fluid, sterile water being used for preference.

In conclusion, let us stress that the most important practical point in the art of successful cystoscopy is gentleness.