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PROSTATIC OBSTRUCTION AND THE INDICATIONS FOR THE VARIOUS METHODS OF TREATMENT

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Progressive changes occur from year to year in prostatic surgery, but enough has already been achieved to apply a more or less stabilized classification and to institute a routine and reasoned method of approach. A study of recent papers suggests that urological opinion is sharply divided into two well-defined schools of thought. Some authorities consider the suprapubic approach essential in all cases, while others urge transurethral resection for even the largest prostates. Impressive series of cases and their excellent results can be, and are, shown by both sides. When opposing views are thus held on medical problems it is customary to find that the truth lies at some intermediate point, and it is our duty to determine so far as possible its approximate site.

A series of cases dealt with during a period of two and a half years is quoted here in an attempt to indicate roughly the proportions treated by each particular method. This covers the period during which I have performed resections by the urethral route.

Preliminary Treatment

I have used this phrase "preliminary treatment" rather than "pre-operative treatment" for reasons which will subsequently be apparent. On the average seventy cases of acute retention of urine, the great majority of which are due to prostatic obstruction, are admitted to the City Hospital, to which I am attached, during the twelve months. After a prolonged trial of alternative procedures, the apparatus I now use for "gradual decompression" of the bladder is the inverted U-tube controlling the flow of urine by hydrostatic pressure.

From admission to discharge from hospital profuse quantities of fluids are given by mouth in addition to the usual urinary antiseptics; by these means the urinary excretion is pushed up to seventy or eighty ounces per day, and has in some cases actually reached the 100 mark. Following the decompression of the bladder, the patient enters into a period of investigation of his renal function and preparation for the operation which may be necessary. While the estimation of the non-protein nitrogen and urea clearance tests are being carried out, including an x-ray examination of the whole urinary tract, the patient continues to be treated by the indwelling catheter. When his condition permits cystoscopy is performed under low spinal anaesthesia.

The Cystoscopy

It is probably most injudicious to attempt any prostatic operation without previous cystoscopy, since this procedure is our only accurate method of classification. At cystoscopy the size of the middle and lateral lobes and

the presence of bar formation or sclerosis of the bladder neck are carefully noted.

There is one sign to which I have not found much reference in the literature, and which appears to provide a means of actually measuring the degree of prostatic enlargement. I refer to the anterior aspect of the bladder neck as seen through the cystoscope; this is closely affected by the degree of enlargement of the lateral lobes. Normally, and in cases of bar formation, the anterior aspect of the bladder neck appears as a concavity representing a small arc of a wide circle, whereas enlargement of the lateral lobes converts this concavity into an angle of perhaps 70, 40, or even 15 degrees. Should this angle be 40 degrees or under, any operation short of suprapubic removal of the prostate will most probably fail.

Another indication of the degree of enlargement of the lateral lobes is the angle made between the lateral and the middle lobes; the ability to view the summit of the middle lobe of the prostate and the ureteric orifice in the same cystoscopic field is also of value. Ainsworth Davis¹ divides the bladder neck as seen by the cystoscope into nine overlapping cystoscopic fields; by careful mapping out of the convexities or concavities seen an accurate estimate may be made of the constriction and distortion of the bladder neck. Trabeculation is noted to indicate the duration of time during which obstruction has been present, and this feature may be especially marked in sclerosis of the bladder neck. The presence of complicating stones, diverticula, or cystitis is noted. Another useful part of the examination, facilitated by low spinal anaesthesia, is rectal examination made before removal of the cystoscope. This gives an accurate method of estimating the volume of the prostate, of the elongation of the prostatic urethra, and of the actual height of the intravesical projection of the middle lobe.

Chromo-cystoscopy—that is, recording the length of time required for the ureteric efflux to become coloured after the intravenous injection of 10 c.cm. of 0.4 per cent. indigo carmine—is a valuable adjunct to the tests of renal function.

Largely on the cystoscopic findings, a decision is made regarding the further treatment of the patient. In the event of there being a small fibrous prostate with sclerosis of the bladder neck (probably due to chronic prostatitis), or small adenomata arising from the glands of the prostatic urethra (that is, the glands of Albarran), or interureteric bar formation, or enlargement of the middle lobe with little enlargement of the lateral lobes, transurethral resection by diathermy is probably the operation of choice. If, on the other hand, there is a trilobar enlargement, and especially if the anterior aspect of the bladder neck

is contracted, a suprapubic prostatectomy must be performed. Finally, if the prostate presents merely slight enlargement and congestion round the bladder neck accompanied by cystitis, no operation may be necessary, and conservative measures may be completely successful.

Various Methods of Treatment

Conservative Measures.—Recent papers can be searched in vain for the slightest suggestion that any method short of operation should be seriously contemplated. Yet there are numerous cases where micturitional difficulties, and even acute retention, have proved transient and have not recurred. Many such cases do not and never will require operation. It is, of course, essential that in the first place these persons should be kept under observation by their doctor with regular estimation of the residual urine, and that in the second place the treatment should be thorough.

In such cases the underlying pathological changes are congestion and possibly inflammation of a slightly enlarged prostate, impeding the action of the trigonal muscle. Usually the precipitating cause is overloading of the bladder during a prolonged train or motor journey. The importance of this is reflected in the treatment. In cases where the history is short, and where after decompression of the bladder the patient can pass water easily with little residual urine, and cystoscopy reveals a slightly enlarged and congested prostate with little trabeculation of the bladder, conservative measures should be given a trial, and are frequently successful. Again, where cardiac, respiratory, or renal complications preclude operation the patient should receive the benefit of such methods.

Conservative measures involve the regulation of fluid intake and output, what is called "double micturition," and the exhibition of simple urinary antiseptics, controlled by occasional examination and estimation of the residual urine. Regulation of intake is achieved by the patient drinking moderate quantities of fluids by day up to 8 p.m., after which no more liquid is consumed. Since there is frequently an accompanying chronic nephritis this precaution tends to prevent nocturia and overloading of the bladder during the sleeping hours. The output is controlled by regular two-hourly evacuation of the bladder during the day. Residual urine and stagnation can be diminished by the procedure known as "double micturition," described by Kennon.² Patients may thus pass two or three ounces three minutes after apparently emptying the bladder.

Pre-operative Treatment

It is impossible to lay too much stress on the pre-operative treatment, which necessitates the use of an indwelling catheter for at least ten days, whether the suprapubic or transurethral operation is contemplated. Hinman³ quotes Scholl as saying "that the occurrence of pulmonary embolism bears a distinct relationship to the absence of preliminary treatment is beyond question," and states that it is a safe rule never to operate on any patient within at least ten days of the commencement of preparation by catheter. It may be necessary to continue the use of the indwelling catheter for a prolonged period, during which forced diuresis, silver nitrate wash-outs of the bladder, and urinary antiseptics constitute the essential features of the regime.

A man aged 62 was admitted in May, 1934, with overflow incontinence and distended bladder. He stated that he had had previous difficulty, dysuria, and frequency of micturition for three weeks before admission to hospital. On rectal examination the prostate felt firm and exhibited a slight degree of enlargement only. On admission his non-protein

nitrogen was 225 mg. per cent., and after his bladder had been "decompressed" his urea concentration was as follows: 0.85 per cent.; 0.87 per cent.; 0.96 per cent.; and 1.1 per cent.

He was discharged in March, 1935—that is, after treatment by indwelling catheter for the greater part of ten months. For the remaining months of 1934 his condition was precarious in the extreme, and auricular fibrillation recurred on several occasions. His non-protein nitrogen ranged between 150 and 54 mg. per cent., and his uraemia was largely dealt with by intravenous administration of 5 per cent. glucose in saline and forced diuresis. On several occasions the catheter was withdrawn, but he was unable to pass urine voluntarily.

In December, 1934, a cystoscopy was performed. At this examination a slight trilobar enlargement of the prostate was seen, involving the lateral lobes to a very trifling degree, the enlargement being mainly of the middle lobe. This patient would never have been sufficiently fit for a suprapubic prostatectomy, since mere withdrawal of the catheter for a few hours was sufficient to cause auricular fibrillation and oliguria. In January, 1935, I resected part of the middle lobe under low spinal anaesthesia, but in this particular case caution prevented me from removing as much as I would have wished. The following month I completed the resection, and finally obtained a shelving median sulcus at the original site of the middle lobe. A few days after the second resection his catheter was removed and he commenced passing urine normally.

On discharge from hospital his condition was good, and he had 2½ oz. of residual urine. When reporting in November of last year he was passing water freely every two hours, and stated that the volume and strength of the stream were good. He had no residual urine on this occasion. This case has been described in some detail to show not only the importance but the success of prolonged pre-operative treatment; it is interesting to observe in some instances mental symptoms amounting to acute mania subside completely after a few days' treatment.

In the course of treating numerous cases by the indwelling catheter complications have arisen which have necessitated the adoption of a technique designed to eliminate these so far as possible. In addition to the better-known difficulties, such as urethritis, epididymo-orchitis, cystitis, catheter shock, catheter fever, ascending pyelonephritis, three interesting complications which do not seem to have received much attention in the current literature have made their appearance.

Contracted bladder tends to occur should the urine be allowed to run freely and continuously subsequent to the "gradual decompression" of the bladder. The bladder is thus kept in a state of permanent contraction, and in a short time it may be found impossible to inject more than three or four ounces of lotion through a catheter without evoking severe pain and resistance. A contracted bladder may spoil an otherwise good result by causing frequency and nocturia after operation. It can, of course, be readily prevented by maintaining a stopcock on the tubing and releasing this every two or three hours in order to simulate regular micturition so far as possible.

Although numerous writers have commented on the frequency with which meatal stricture is found in elderly patients,⁴ its association with treatment by the indwelling catheter appears to have escaped notice. Such cases exhibit a characteristic appearance. If care is not taken the rubber catheter emerging from the external urinary meatus by its own weight sags downwards, causing pressure ulceration of the lower extremity of the slit-like meatus, and producing a semilunar ulcer in that situation. This ulceration can in the course of time cause definite meatal stricture, but the condition can be avoided by banking up the catheter on flavine-soaked gauze, which lies on a platform formed by two pieces of three-inch strapping running across the anterior surfaces of the thighs.

A third complication is one which, although vaguely appreciated, is not sufficiently emphasized, and consists in the oedema of the prepuce which takes place if whatever appliance is being used for keeping the catheter in the urethra is secured with the foreskin retracted. The prepuce should be replaced forwards before the fixative strapping, tape, or rubber is applied. These complications have been described in more detail elsewhere.⁵

Suprapubic Prostatectomy

The large trilobar enlargement and the rare anterior enlargement are best treated by this method. Forty cases fell into this group. The operation adopted in the great majority of these was a modification of the Harris operation in which an attempt was made to reconstruct the prostatic bed, but primary closure of the bladder was not undertaken. Occasionally, if the patient was in good condition and haemostasis complete, the bladder was closed, but this was exceptional.

Should the bladder be closed at operation, and blood clot necessitate it being opened and drained the same day, the risk in the average case is very grave. Harris himself has repeatedly pointed out that he regards the reconstruction of the prostatic cavity as the essential feature of his operation, although the primary closure has invariably been the focus of widespread interest.⁶ As an alternative, suction drainage was instituted, using a water suction pump in order to keep the abdominal wound relatively dry until healing was almost far enough advanced for the fistula to be closed by strapping over the wound with elastoplast. A large rubber catheter was passed on the tenth day; in the first place to ensure that the posterior flap of mucosa has not come adrift from the urethra, and secondly to promote suprapubic healing.

Suprapubic Prostatic Resection

The average case of sclerosis of the bladder neck can be dealt with satisfactorily per urethram, but occasionally resection must be carried out by the suprapubic route, especially where the obstruction is complicated by large diverticula or by calculi. Four such cases were encountered in the present series. In each a cuneiform piece was excised from the posterior lip of the internal urinary meatus, in addition to diverticulectomy and removal of stones.

Transurethral Prostatic Resection

It is an interesting fact which is steadily becoming more appreciated that probably more than half the cases of prostatic obstruction do not present any prostatic enlargement on rectal examination. While resection through the urethra of part of the prostate by the diathermy cutting loop has not achieved the universal success anticipated, it is the operation of choice for cases such as bar formation, fibrous prostate, sclerosis of the bladder neck, small adenomata arising from the glands in the prostatic urethra, and moderate enlargement of the middle lobe without corresponding enlargement of the lateral lobes. The operation offers numerous advantages, but at the same time presents many technical difficulties and dangers which render it inadvisable for the occasional cystoscopist.

The advantages include a much shorter stay in hospital and the elimination of the suprapubic wound. It is, moreover, possible to operate on cases which, by reason of their poor general condition, cardiac, respiratory, or renal complications, and extreme age, are unsuitable for suprapubic removal. I have recently performed a resection on a man aged 88, and the treatment of his case caused me no anxiety from admission to discharge.

Suprapubic Drainage and Resection

There seems to be a place in prostatic surgery for a preliminary cystostomy, followed later by transurethral resection. This method has proved useful in cases where the prostatic obstruction is due to sclerosis of the bladder neck and where treatment by an indwelling catheter has proved impossible on account of such conditions as urethritis and intolerable pain. The bladder may be gradually decompressed by a de Pezzer catheter inserted into the bladder by a suprapubic stab incision. When the patient's condition permits, the obstruction may be resected in the usual way and the suprapubic fistula be subsequently allowed to close. The operative risk of carrying out a transurethral resection is very much less where a suprapubic fistula exists, since continuous irrigation with sodium citrate solution can be carried out after the operation. This appears to be a method particularly suitable for bad operative risks. There were two such cases dealt with in the present series.

Analysis of Results of Transurethral Resection

The total number of cases attempted was thirty-five. Of these, three were unsuccessful in view of the impossibility of obtaining a medium sufficiently clear to conduct the procedure as it should be done under control of vision. Twenty-six cases were apparently cured. While I label these cases apparently cured, I have been fortunate enough to follow them up periodically since operation with scarcely an exception. When reporting they have stated that the flow of urine was free, and that no frequency or dysuria was present. Estimations of the residual urine revealed between half an ounce and two and a half ounces, depending upon the age of the patient. One or two patients complained that they were unable to hold their urine for longer than one and a half hours. In the absence of infection of the urine I am inclined to attribute this complaint to contracted bladder, a complication which I hope can be eliminated in the future.

Among these twenty-six cases were five suprapubic fistulae which healed satisfactorily. In these fistulous cases a suprapubic cystostomy had been performed in three elsewhere, but the subsequent condition of the patient had not permitted of the second-stage prostatectomy being carried out. Another case in which obstruction developed at the vesical neck following prostatectomy elsewhere cleared up satisfactorily following resection. Of the thirty-two cases dealt with twenty-six were cured. One patient with carcinoma was unable to pass urine satisfactorily after the resection was performed. He was discharged from hospital with a permanent suprapubic apparatus. Emphasis must be laid on the fact that the majority of these men were totally unable to pass urine voluntarily before operation.

The remaining five patients died from various causes: one was a case of carcinoma, and another developed a cerebral haemorrhage. A third was a feeble old man 82 years of age, with complete retention due to a large adenomatous prostate. This was an unsuitable case for resection, but any attempt at suprapubic removal was negated by his general condition. Two resections were tried without success, and he subsequently succumbed to uraemia. A fourth patient also died from uraemia; in this case I am inclined to blame undue precipitancy in carrying out the resection. Had this man had another ten days' treatment by the indwelling catheter he might well have survived the operation. The fifth patient died as a direct result of a post-operative complication. He developed a thick adherent vesical blood clot, which resisted all efforts at removal through a Bigelow's evacuator. Suprapubic cystostomy was performed and the clot

removed by that route. This was one of my earlier cases, and I have not had any trouble with the development of blood clot since I began half-hourly irrigation of the catheter and the base of the bladder with 3 per cent. sodium citrate for the first twenty-four hours after the operation. The apparatus designed by Cuthbert Dukes,⁷ and in use at St. Mark's Hospital, has been found valuable in this connexion.

Regarding the mortality, several features must be considered. In the first place, many of these cases were recruited from the worst group of operative risks. Another feature is that the actual obstruction is frequently of a gradual onset over a period of years, with the result that the renal efficiency has been imperceptibly depreciated. Thus, these patients are worse risks than men with large adenomatous prostates which become suddenly congested and develop acute retention without any previous history of urinary trouble. Again, many of the milder cases (and therefore those in better condition) were not operated upon, since they reacted satisfactorily to conservative measures.

Cystoscopy, both before discharge from hospital and some months later, revealed in the main a wide shelving sulcus at the posterior lip of the bladder neck. The question which now arises is whether this will be permanent, or whether the sulcus will be obliterated by subsequent fibrosis and contraction. Time alone can solve this problem, but provided resection can be made a safe procedure, a second treatment, perhaps four or five years later, presents no insuperable difficulty, even should such be necessary.

With regard to the instrumentarium, after carrying out many of the earlier resections with those instruments in common use in this country, I have recently been using the von Lichtenberg-Heywalt resectoscope. I have found this instrument generally satisfactory, especially with regard to the better visual field provided.

Conclusions

1. The importance of the classification of prostatic obstruction with a view to treatment is emphasized. Without a preliminary cystoscopy such a classification is impossible.
2. Non-operative measures are described in detail and the type of case suitable is indicated.
3. The pre-operative treatment is dealt with, including the technique to be employed in order to avoid liability to the various complications arising when using an indwelling catheter.
4. The indications for suprapubic prostatectomy and for transurethral and suprapubic prostatic resection are dealt with.
5. A personal series of thirty-five cases of transurethral prostatic resection is analysed.

ADDENDUM

Cases of Prostatic Obstruction (1934-5-6)

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TUBERCULOSIS OF THE LOWER LOBE

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That it is extremely uncommon for the adult form of tuberculosis to start in the lower lobe is an unfortunate generalization which has gained currency even from the time of Laennec. He held that excavations hardly ever develop first in the middle or base of the lungs. Throughout the last century this opinion enjoyed the sanctity of an unquestioned axiom. Fowler, who is quoted in Osler's book on *The Principles and Practice of Medicine*, states that the apex is the first site of parenchymal lesion. Fagge considers that tuberculosis never spreads upwards from the base. Garron, Lyall, and Monta claim that rales of long standing below the middle of the chest are almost as diagnostic of a non-tuberculous lesion as rales in the upper half of the chest in the diagnosis of tuberculosis.

Some of the modern workers also are inclined to believe in the extreme rarity of basal lesions, particularly in the reinfection type of tuberculosis. Landis asserts: "My opinion concerning basal tuberculosis is still unchanged; children may have it at the base, but adults practically never." While the primary lesion may occur in any part of the lung, the reinfection, according to Loeschke, is almost always localized in the territory of the apical bronchus. Fishberg, after emphasizing the extreme rarity of basal lesions, enunciates the diagnostic principle that a lesion at the base while the apex is free should be considered non-tuberculous unless the sputum is positive for tubercle bacilli, or the radiograph shows that the lesion is tuberculous in character. Paterson, Pottenger, and Young hardly make any mention of tuberculosis of the lower lobes.

A fairly large volume of opinion, however, has gathered during recent years in favour of a less dogmatic attitude towards localization of early lesions in tuberculous reinfections. Contributions to the study of tuberculosis of the lower lobe have been made by Sweany, Jacob, Colton, Dunham and Norton, Middleton, Rosenblatt, Reisner, and Hamilton and Fredd. The last two writers consider that one should not be too ready to dismiss a diagnosis of pulmonary tuberculosis because of location of the lesion in the lower lobe. Reisner questions the validity of such a statement as "involvement of the lower lobe is irrelevant and as a rule of late occurrence in the course of progressive cranio-caudate phthisis." He concedes, however, that early involvement limited to the base of the lung is an extremely rare and unusual occurrence in the reinfection forms of adult tuberculosis. But he is definitely of opinion that initial manifestations of tuberculosis are not uncommon in the cranial portion of the lower lobe. He has also tried to prove that the majority of lesions presenting the x-ray appearance of the so-called hilus forms are really lesions involving the apical and subapical portions of the lower lobe.

The contradictory nature of the data available and of the opinions held on tuberculous infections of the lower lobe impelled me to make the following study, which is based on the material of the department of tuberculosis of the King George Hospital, Vizagapatam, over a period of four and a quarter years.

Incidence in Present Series

In 4,494 cases of pulmonary tuberculosis Reisner found thirty-four with primary involvement of the lower lobe. Hamilton and Fredd give an incidence of 3 per cent.