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ORGANIC STRICTURE OF THE URETHRA.

Methods of Treatment Recommended, with Indications for their Employment.

BY

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IN this paper it is proposed to recount only such methods of treating stricture of the urethra as are believed to be most reliable and that at the same time offer the quickest and most permanent results. There is hardly any malady about whose treatment surgeons differ more widely than that of urethral stricture. Many authorities recommend some one of the various methods of dilatation, and condemn all other forms of treatment; others advocate the cutting-operations; and, again some make use of both dilatation and cutting.

At the very outset the patient must be carefully examined, to determine the position, caliber, resiliency, existing irritability of the stricture, and whether there be one or more. The condition of the bladder and kidneys must be ascertained, and a microscopic and chemic examination of the urine must be made to determine whether casts, pus, mucus or blood be present, and whether the urine

[1] Read before the Medical Society of the State of Pennsylvania.

contain albumin or sugar; also the quantity of urea present, and the quantity of urine passed during twenty-four hours.

The various methods employed for the eradication of stricture are gradual dilatation, continuous dilatation, modified rapid dilatation (which is a modification of the method known as divulsion), internal urethrotomy, dilating internal urethrotomy, dilating internal and external perineal urethrotomy, external perineal urethrotomy with a guide, and external urethrotomy without a guide, more generally known as perineal section.

Gradual dilatation is the treatment usually pursued for the relief of stricture, and is by far the safest method that can be used, as death has never been known to follow its employment. In soft, recent strictures, the number of permanent cures resulting from gradual dilatation compares favorably with that of those treated by internal urethrotomy, without incurring the risk attendant upon the latter operation.

To perform gradual dilatation the character, position, and caliber of the stricture should be determined by means of a bougie à boule. The operator should begin, when the caliber of the stricture is large, with a conical steel bougie one or two sizes below the diameter of the coarctation, as there is usually associated with this condition more or less hyperesthesia of the urethra, and the onward progress of an instrument large enough to fill or distend the stricture gives rise to great pain, which causes more or less spasm, interfering with the advance of the bougie. The structures in the neighborhood of

the obstruction are likely to be congested, chronically inflamed, and softened; if there is much distention the mucous membrane is easily lacerated, and more or less blood flows, and there is pain after micturition. In rare cases urine is absorbed into the system in consequence of abrasion or laceration, giving rise to urinary fever; but by beginning with a bougie smaller in diameter than the caliber of the stricture this complication is frequently avoided. The confidence of the patient is gained by the instrument producing but little pain, and after the bougie has been passed a few times much more rapid progress can be made than when force is used.

The rule that I have adopted is to increase the size of the instrument as the pain of insertion diminishes and as the amount of blood following the introduction is lessened in amount, or ceases. The instrument should not be introduced more frequently than every third day, and should be immediately withdrawn.

Both the urethra and the instruments should be put in a thoroughly aseptic condition. The urethral instruments should be washed in a solution of soda, subjected to heat, and dried on an aseptic towel before being used. Over the operating-table should be arranged a receptacle to contain water, to which have been added ten grains of boric acid to each ounce, and, by means of a rubber catheter, which has been sterilized by being immersed in a 1 : 1000 mercuric-chlorid solution, the urethra is irrigated, and a clean bougie that has been lubricated with an ointment composed of a dram of oil of eucalyptus, or boric acid, to the ounce of vaselin is inserted.

Palmer has shown the value of boric acid in sterilizing the urine, if administered internally when the patient is first placed under treatment. It should be given for two weeks, in doses of ten grains three times daily. Urinary fever is most likely to occur at the beginning of the treatment, when the mucous membrane of the canal is in a condition of subacute inflammation, and somewhat softened. It is by employing boric acid that this condition is as a rule avoided.

Examination of the urethra by means of the endoscope will show how rapidly the inflammatory symptoms disappear in the neighborhood of the stricture when partial dilatation has been accomplished. This change possibly accounts for the rapid amelioration of the local symptoms of which patients so frequently complain; it takes place even after the instrument has been passed but a few times and the caliber of the urethra has not yet been restored.

The length of time that the treatment should be continued will vary with the condition of the obstruction to be overcome. If the stricture is extensive, about three months will be required to restore the urethra to its normal size. During this time the patient is to be instructed in the use of the instrument, which he should be directed to pass twice a week for a period of two months longer, after which he must use it once a week for a similar period, then once in two weeks, and finally once a month. The treatment may then be stopped, the individual being directed to return to the use of the instrument whenever there is an indication that recurrence is taking place.

By the method here outlined, of faithfully employing the instrument when necessary, the patient can always keep the urethra clear of obstruction, and need suffer from no further urinary difficulty. In cases of stricture of very small caliber a much longer time than the period here indicated will be required to bring about permanently good results.

Gradual dilatation may be employed for years, with every advantage to the patient, no symptom of obstruction making its appearance, and no indication of trouble from the prolonged use of the bougie.

When this method is pursued with recent strictures they frequently altogether disappear, and give no further trouble. Under such circumstances the further use of the instrument may be dispensed with.

Gradual dilatation is indicated in all cases of recent dilatable stricture in any portion of the urethra, and in all cases in which the stricture is not irritable, resilient or nodular. Firm, well-organized bands, situated within from three-and-a-half to four inches of the meatus require other measures for their relief.

In cases of diabetes and advanced disease of the kidneys gradual dilatation is far safer than any other method of treatment. This is likewise the case in those suffering from debility, disease of the heart, in persons who are broken down in health, or in the very old, especially if there co-exist chronic urinary fever.

In many instances I would have advised in favor of one of the cutting operations instead of dilata-

tion, had not ample experience taught me that in case of a well-organized stricture urethrotomy is followed by recontraction about as frequently as dilatation, the patient at the same time running the great hazard that always follows a cutting-operation, with very little if any better chance of permanent benefit in his favor.

It cannot be denied that every urethrotomy is attended with more or less risk to the patient, whilst dilatation is perfectly safe; moreover, the farther the division of the stricture is made from the meatus the greater will be danger from the operation.

I have seen, in the practice of one of the most distinguished surgeons of this city, death follow from simple division of the meatus. This unfortunate result was due to shock, and occurred four hours after the operation, in spite of every effort to avert the catastrophe. Even in the hands of the most experienced operators the death-rate from internal urethrotomy is two in every hundred cases.

Taking the dangers of the cutting-methods into consideration, and also the fact that they are rarely followed by permanent results, it would seem to be obligatory on the part of the surgeon to give the uninformed the option of the safest course. If the cure from the cutting-operations were radical, and if the strictures did not recontract in a large percentage of cases, it would doubtless be the duty of the practitioner to allow the patient to run the risk of urethrotomy; but when we are assured that the result is by no means certain by any method now employed, we should not hesitate to recommend a course that, whilst it has its disadvantages, yet re-

lieves the symptoms due to obstruction, and is absolutely safe.

Continuous dilatation. In resorting to continuous dilatation, the surgeon should begin with a very small instrument, a filiform bougie being usually employed. This must be allowed to remain *in situ* for three days, when, as a result of continuous pressure, the stricture relaxes sufficiently to allow of the introduction of a larger instrument. As a rule, the tunnelled catheter is the instrument to be used; this is passed over the whalebone and through the obstruction into the bladder. After this the surgeon is free to deal with the stricture in any manner that he may prefer.

There are two conditions under which this method of treatment is applicable: First, when there exists a stricture of small caliber, usually situated in the membranous portion of the canal, and generally accompanied by retention of urine; secondly, when, although the stricture is tight, the patient is enabled to pass urine with sufficient ease to allow him to be prepared for a radical operation.

In the first instance, when a filiform has been inserted, a Gouley tunnelled catheter should, if possible, be threaded over the whalebone, passed through the obstruction, and the urine withdrawn. Should the effort to pass the catheter be unsuccessful the filiform bougie should be fastened so that it cannot come out of the urethra; if the symptoms are urgent the bladder must be aspirated. If the viscus is not overdistended the patient should be given half a grain of morphin and immersed in a hot bath, when he will have but little further trouble in pass-

ing his urine. The stricture can then be treated as the surgeon may deem most expedient.

Under the second condition continuous dilatation is employed simply to enable the operator to overcome the coarctation by the use of either gradual or modified rapid dilatation, or to enable him to enlarge the stricture sufficiently to pass a Syme's staff and thus facilitate the performance of external perineal urethrotomy, should this operation be indicated.

The failure of many practitioners to use filiform bougies successfully depends on various causes: these instruments, as sold in the shops, are more often than otherwise worthless; they are too stiff, not well rounded, and do not terminate in a proper neck, and are generally too large to be threaded over the smaller-sized catheters. The surgeon should make his own filiform bougies; a dozen properly constructed will, with ordinary care, last through several years of active practice. An important rule to follow is to employ the filiform before another bougie, a catheter, or any other instrument has been introduced into the urethra. If an instrument has been previously used it is of very little avail to attempt to pass a filiform, as failure will generally result. The operator must not be sparing of his time in these cases, as infinite patience is a necessary element of success.

It is well first to distend the canal by gently injecting a syringeful of carbolized oil before inserting the filiform, which has been rendered aseptic, and which is to be introduced into the meatus and passed slowly down to the obstruction, while at the same time the patient's face is carefully watched for

the slightest expression of pain, which indicates that the onward passage of the filiform must cease. The slightest impediment to the passage of the bougie should warn the operator that he has proceeded far enough with the instrument, when a second should be introduced in the same manner, and the process thus repeated until six or eight whalebones have been inserted, when the operator very gently tries each in turn to see if he can find the opening in the obstruction; beginning on the left and passing to the right side of the patient, the surgeon naturally tending to work toward himself.

If the stricture be eccentric the opening will probably be found by this manipulation, when the instrument will glide through the contraction with little or no pain; and without force being required it will pass into the bladder and will be freely movable in the urethra.

These instruments are frequently made with a spiral twist at the end, on the supposition that the physician can more readily pass such a one should the stricture be eccentric. I have never had any use for a filiform of this description, as I have in every instance had perfect success with the straight instrument.

In order to successfully insert a tunnelled catheter over the filiform and through the stricture the catheter should be gently passed down to the obstruction, then transferred from the right to the left hand, and whilst the right hand puts the penis on the stretch the filiform is to be withdrawn about a quarter of an inch, and then both the filiform and the tunnelled catheter are to be carried together

through the coarctation. This procedure prevents the catheter from cutting the filiform in two and assists in guiding the instrument through the obstruction.

This method of treatment is of great value as an adjunct to the employment of more radical measures. It is of service in relieving retention of urine due to strictures of small caliber, in preparing the canal for gradual or modified rapid dilatation, and in permitting the passage of a staff for external perineal urethrotomy.

If a stricture exists in the neighborhood of the bulbous or membranous portion of the canal, and is neither irritable, resilient, nor nodular, the employment of continuous dilatation should be followed by the gradual method, and if this is not practicable modified rapid dilatation is strongly recommended.

By *modified rapid dilatation* is meant a modification of the procedure generally known as *divulsion*, by which is understood the passing of a dilator so as to rupture the constricting bands. Divulsion of a stricture by Holt's instrument is generally condemned as dangerous to life, as has been abundantly proved by a large mass of clinical testimony; nor does it offer better results than safer methods.

The operation to which I have given the name of modified rapid dilatation is not in favor with many genito-urinary surgeons. Up to this time I have operated by this method on ninety-six strictures of small caliber situated in the membranous portion of the urethra, and I have had good results in all. In one instance only did the temperature rise above 100° F.; in this case the fever was doubtless owing to

the interference of the patient, who removed the catheter on the second day, in the face of explicit directions to the contrary.

Prof. John H. Brinton, who has been an advocate of this form of operation for many years, and who has operated upon a large number of patients, has had similar results. Patients thus operated on are confined to the house but four days, at the end of which time they are allowed to go about, with directions to report to the surgeon twice a week, in order to have a full-sized bougie inserted, which they soon learn to use themselves. The treatment is to be continued as advised when speaking of gradual dilatation.

I have not observed that strictures thus treated show any greater tendency to re-contract than those in which either internal or external urethothomy has been performed, especially if dilatation is continued afterward.

To properly carry out this method of treatment the patient is to be put to bed, the urethra is washed out with a 4 per cent. solution of boric acid and an aseptic filiform bougie is passed and tied in place. The patient is then given ten grains of boric acid three times daily, and the urethra is to be daily irrigated with boric-acid solution. At the termination of the third day the patient is etherized and the urethra washed with a 1 : 20,000 mercuric-chlorid solution. The Thompson dilator is then passed over the filiform and through the obstruction, when, by means of the thumb-screw attached to the handle, the blades of the instrument are slowly and very gradually separated to a very slight degree,

and after remaining in this position for one minute are again approximated.

This procedure of alternate separation and approximation of the blades of the instrument is repeated, taking care each time to separate the blades of the instrument to a somewhat greater extent, until the stricture is enlarged sufficiently to allow of the insertion of a Gross dilator, which requires that the caliber of the urethra should not be less than 18 F.

The Thompson instrument is then removed and the Gross instrument inserted. In the same gradual manner the caliber of the urethra is brought to the full size of the canal, which has previously been ascertained by means of a bougie à boule. The time occupied in carrying out this treatment should be from *twenty to thirty minutes.*

Strictures so treated are stretched rather than lacerated or torn ; this is shown by the little or no hemorrhage that follows, and on examination with the endoscope two weeks later, the walls of the urethra will be found to be smooth and not ragged, as might naturally be expected if laceration had taken place.

After the Gross instrument is removed a full-sized bougie is passed, to ascertain whether all obstruction has been removed; if this is found to be the case the urethra should be irrigated with a 1 : 20,000 mercuric-chlorid solution and a sterilized catheter passed and tied in place; then a small quantity of warm boric-acid solution is to be injected into the bladder. The patient is put to bed; the urethra and bladder are to be daily irrigated with a warm

boric-acid solution, and on the fourth day the instrument is removed and a full-sized bougie is passed. The patient is allowed to sit up, and may resume his duties on the following day.

This method is applicable to the treatment of filiform strictures situated in the neighborhood of the bulbous and membranous portions of the urethra, and which are neither irritable, resilient, nor nodular, and which cannot be treated by gradual dilatation. It likewise offers the best chance when time is an object, as for instance, when the individual is about to undertake a journey or is about to be married. It should not be performed in the aged, nor in those suffering from disease of the kidney, urinary fistula, or abscess of the perineum. In many cases in which the stricture was resilient, the caliber very small, and a perineal section was indicated I have employed it primarily to facilitate the passage of the grooved staff, immediately afterward performing the cutting-operation.

It would surely seem that an operation that is so free from complications, attended with so little danger to life, and which at the same time produces such favorable results, with no greater tendency to relapse than is to be encountered after other methods, is entitled to a prominent place among the resources that the surgeon possesses wherewith to overcome obstructions in the bulbous and membranous portions of the urethra.

When it is observed that in performing modified gradual dilatation the stricture is dilated gradually, and that an effort is simply made to restore the contracted portion of the canal to its normal caliber,

that it is not over-dilated, and that in conjunction with the operation the strictest aseptic and antiseptic precautions are employed, it will be seen that it differs very materially from the method of divulsion, which should become obsolete.

Internal urethrotomy should be limited to well-organized strictures situated within from three-and-a-half to four inches from the meatus. If they be of such small caliber that a urethrotome cannot be passed, they should be first cut on the roof of the urethra, from before backward, by means of the Maisonneuve instrument, and the constriction should be divided on the floor of the canal by the Gross urethrotome, which, being of the shape of a bulbous bougie, locates the constricting band with great exactness. Strictures of the meatus and of the neighborhood of the fossa navicularis should be divided on the floor of the urethra, especially if they give rise to reflex symptoms.

Dilating internal urethrotomy, though very thorough, is not indicated in many instances. Some of the worst obstructions with which I have met have followed it.

Its sphere of usefulness is confined to those conditions in which the stricture is well organized, of long standing, situated within three-and-a-half inches of the meatus, and is either nodular or resilient. In the latter conditions it is the only operation that offers permanent relief; but unless the patient employs the bougie in the manner recommended when treating of gradual dilatation, the coarctation will be likely to re-form.

Dilating internal urethrotomy should not be em-

ployed in a case of ordinary stricture of the penile portion of the canal, unless this be complicated in the manner already described, as the operation is likely to be followed by a curvature of the penis, which may last for a period ranging from six weeks to a year, and is, of course, a source of great mental anxiety to the individual. What is far worse, however, is that the knife of the instrument cuts so deeply that an extensive division of the muscular fibers of the urethra follows, and as a result dribbling of urine after the act of micturition takes place; as the canal is unable to expel the last drops of urine, it slowly oozes from the meatus. This condition is permanent.

If it can be avoided, dilating internal urethrotomy should not be performed on persons suffering from impotence, neurasthenia, abnormal nocturnal losses, or sexual hypochondriasis. Very naturally, the incurvation of the penis and the dribbling of the urine produce very depressing mental effects on these patients, which are difficult to overcome. When these complications exist I much prefer to rely upon internal urethrotomy by the Gross instrument. I have resorted to dilating internal urethrotomy in forty-eight cases in which the conditions indicated were present, without a single death.

Combined internal and external urethrotomy is resorted to for the relief of nodular strictures of the penile portion of the urethra and of strictures of the bulbous portion of the canal. The object in opening the membranous portion of the tube is that in cases of nodular stricture situated on the anterior portion of the urethra, and which has been divided,

the parts may be put at physiologic rest, and thus the indurated tissue of which they are formed is permitted to undergo fatty degeneration, atrophy, and absorption.

I have twice performed combined internal and external urethrotomy with success; on three occasions I modified it with equally good results. The strictures were situated about two-and-a-half inches from the meatus, and were nodular, resilient, and of very small caliber. By means of the Maisonneuve instrument they were divided on the roof of the canal, and the insertion of the Otis dilating urethretome thus permitted; the constricting bands on the floor were now freely divided and the caliber of the urethra brought to its full size. A silver catheter was then passed, fastened in place, and allowed to remain *in situ* for two weeks; temporarily removing it every third day in order to sterilize it. The urethra and bladder were daily irrigated with boric-acid solution. The induration around the seat of the stricture disappeared, and the patients recovered without the necessity for complicating the cases by the addition of perineal punctures.

In *external perineal urethrotomy by means of a guide* the membranous urethra is opened, the surgeon being guided in reaching that portion of the canal by either a Syme's staff or a filiform bougie. It is employed in cases of non-dilatable, resilient, nodular strictures of small caliber, of obstructions of the canal associated with fistulæ and abscesses of the perineum, and in conjunction with internal urethrotomy performed upon some part of the penile portion of the urethra.

External perineal urethrotomy without a guide, generally known as *perineal section*, is performed when no guide of any kind can be passed through the obstruction. It is usually necessary in cases of stricture of traumatic origin, of obstructions associated with fistulæ and abscesses, and of false passages, with retention of urine. It may be performed either by carefully dissecting down upon the urethra until it is found, and then cutting through the stricture, or by resorting to the Cocks or the Wheelhouse method.

With the aid of a modification of the Wheelhouse staff which I have designed I have been enabled to very materially simplify the operation of Wheelhouse. The modified staff consists of two blades terminating at one end in the ordinary hook, like that of the Wheelhouse instrument. At the handle is a thumb-screw, by means of which the blades of the shaft may be separated. An indicator serves to show the extent to which the blades have been parted. This instrument is passed into the canal until it comes in contact with the stricture; it is then withdrawn for a distance of a quarter of an inch, when, by means of the thumb screw, the blades are separated and the instrument is set; the urethra is thus fixed and made prominent. After the skin is divided in the median line of the perineum, the surgeon, by a single incision, opens the urethra one-fourth of an inch in front of the contraction; the blades of the instrument are then brought into apposition, and the staff is turned so that the hook engages the upper angle of the incision. The

remainder of the operation is completed in the manner recommended by Mr. Wheelhouse.

Electrolysis. Of ten cases in which I attempted to treat strictures by this means, all did badly. In most, either urethritis, prostatitis, cystitis, or epididymitis followed, and the treatment was necessarily abandoned. In those wherein these complications did not arise there was no improvement. In one only was there slight benefit, and this was due to the gradual dilatation of the coarctation produced by the electrode. This method of treatment is therefore not recommended.