CLINICAL LECTURES ON STRICTURE OF THE URETHRA.

Delivered in University College Hospital.

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LECTURE IV.—INTERNAL AND EXTERNAL URETHROTOMY.

IN describing the mode of operating by internal urethrotomy, I need not take up your time with showing you the numerous armament of instruments, each of which is intended to carry out the special fancy of its contriver for cutting through the stricture. They may all be collected into two classes: those which cut from behind towards the meatus urinarius, and those which cut as they proceed backwards along the passage. Civiale's, which I have here in my hand, is a good representative of those which cut from behind forwards, and is, perhaps, more generally used than any other urethrotome constructed on that principle. It consists of a stem with bulbous extremity, from which can be protruded a sharp knife. It has two disadvantages: the first, that it cannot be employed for very narrow strictures—those too narrow for its bulb to pass through—as it cuts when withdrawn along the passage. Next—a far more serious objection—there is no means for fixing the stricture in the perinæum, so that it is difficult to obtain sufficient division of the fibrous tissue. The knife often slips through without doing more than scoring the tissue it ought to divide. The absence of any means for fixing and tightening the tissue to be cut is a defect that belongs to nearly all urethrotomes, and which has been a principal cause of the uncertainty of cure attributed to internal urethrotomy. By a moment's reflection, you will comprehend that division of the non-expanding fibrous tissue is far more likely to be accomplished if the bands to be cut be held steady and stretched before the sharp edge attacks them. Everyone adopts this principle before cutting a bit of string; he pulls tight the string before the knife crosses it.

Having pointed out this cardinal principle in the construction of an efficient urethrotome, but of which too many instruments are devoid, I will proceed to describe to you the one which I have now employed for some years.

This urethrotome or "wedge-incisor" is devised in accordance with the following principles. 1. It approaches the stricture from before backwards; hence it divides all anterior bands as they are approached before the deeper contractions are attacked. And, further, the narrowest stricture through which a filiform bougie can be passed may be at once divided without a preliminary dilatation by wearing catheters. 2. The constricting fibres are alone attacked, and are cut until they yield sufficiently to give to the urethra at the strictured parts the same calibre it has at the unstrictured parts; but the cutting edge does not invade the normal highly elastic vascular tissue. 3. All fibres to be cut shall be fixed and stretched tightly before the knife reaches them.

Before operating, the patient, if not in condition for it, is prepared by rest in bed and attention to the natural functions. When fit, his temperature is normal; his urine acid, or at least neutral, nearly free from pus and albumen, and of specific gravity not lower than 1012 or 1010; in amount, forty or fifty ounces per twenty-four hours. Later on, I shall explain the importance of these conditions. The urethra itself should also be clear of purulent discharge or active congestion. These precautions having been observed, the patient is first anaesthetised; and, if the natural gauge of the urethra have not been previously ascertained, the passage is explored by a bullet-sound, or, if there be stricture near the meatus, by the urethrometer; the largest bullet-sound or widest expansion of the meter that slides without force along the urethra in its non-strictured part being taken as the size to which the strictured part must be incised. Should the meatus be too contracted to permit the wedge to enter, that is divided by a touch of a bistoury. The meatus being freed, a split sound is next passed to the bladder. The two halves of this sound are welded together at the point, but separated for the rest of their length. When closed, they equal in size No. 2 of the English and No. 8 of the French scale. (See Fig. 4.) When the stricture is tight or tortuous, the introduction of the split sound is facilitated by previously passing a filiform guide-bougie

(No. 2 French) of silkworm gut mounted with a screw-head, to which the split sound may be screwed. Should it be doubtful whether the guide has reached the bladder, a No. 3 French (No. $\frac{1}{2}$ English) flexible catheter is screwed to the guide-bougie, and the whole pushed onwards till the catheter has passed eight inches inwards. A small exhausting syringe is then applied to the catheter, and a few drops of urine are drawn through it. The communication with the bladder being

Fig. 4.

put beyond doubt, the catheter is withdrawn and unscrewed from the guide-bougie; the split sound is screwed on instead, and then guided into the bladder. In practice, this preliminary testing of the path followed by the guide-bougie is seldom needed; the presence of the end of the bougie in the bladder is sufficiently indicated by the freedom with which it can be pushed in and withdrawn, having no tendency to slip out spontaneously, as has the bougie which is engaged in a false passage or is only partly through a stricture.

The split sound being thus safely in the bladder, a wedge containing a concealed knife is then pushed down the urethra between the halves of the split sound, on which it runs in dovetail grooves. The wedge separates the blades of the split sound, and when a stricture is approached sets tight the constricting fibres. The knife is then pushed forward between the separated blades, and, dividing the tense fibres, allows the wedge to advance until it traverses the urethra from end to end. The knife retreats within the wedge, and is only protruded when a tight band opposes the free passage of the wedge. Thus, band after band of fibres are cut, and a calibre is given to the urethra, equal to the size of the easily fitting bullet-sound previously used. The size of the wedge employed depends upon that of the urethra, and may be obtained either by having a wedge that expands like a parallel ruler, and so can be set to any size, such an one as I hold in my hand; or by having a

series of wedges, Nos. 24, 26, 28, 30 (French), being found sufficient in practice to meet the varying widths of different urethrae. Of course, one split sound and one knife fit them all. After the strictures are fairly divided, the wedge-cutter is removed, and a wedge a size or two larger may be passed without force along the split sound to test the completeness of the division of the strictures. After the split-sound is removed, a flexible catheter of moderate size (No. 20, French) is passed, and tied in for twenty-four or forty-eight hours; that is, until free secretion of mucus allows it to be withdrawn easily. The patient is further cautioned not to micturate, even through the catheter, for at least five or six hours afterwards. This delay gives time for a blood-clot by fibrinous exudation to protect the wound from the contact of urine. The catheter withdrawn, the urine flows through the natural channel, and no instrument is again passed until the sixth day after the operation. Then a steel sound of the size to which the strictures were cut is passed beyond them; and this operation is repeated, at first every fourth day, then every week for two or three months afterwards, and ultimately every three months by the patient, who is trained in the use of the maintaining bougie before he leaves the hospital.

Instead of the steel sound, I frequently use a dilating sound, one that can be passed to the bladder at the size of No. 16 or 18 (French), and by turning a screw at the handle can be widened to any size required. It is then withdrawn in its widened state, and thus demonstrates the width of the passage. It is a process easier to the patient than that of passing a full-sized sound.

After the operation, usually no opiate or anodyne is needed. The patient remains in bed for three days; but is then generally able to get up, dress, and move about the ward; and in ten days may leave the hospital for his usual occupation. During the remainder of his stay there after the first week has elapsed, he is trained to pass the bougie for himself, that he may be able to keep the passage wide for the remainder of his life.

I have stated that I tie a catheter in the urethra from twenty-four to forty-eight hours after operation. This custom being condemned by some, I must tell you why I do so. About three years ago, I tied in a catheter in every alternate case in a series of thirty-eight urethrotomies, leaving the urethra unprotected from the urine in half the cases, without regard to the gravity or lightness of the case. On comparing the after-progress of these cases, I found that elevation of temperature and rigors occurred in both sets of cases, but far more frequently in the set where a catheter was not tied in. Though shivering was not invariable, a rise of temperature *always* took place where a catheter did not lead off the urine during the first twenty-four hours. This effect of the flow of urine over the wound is unmistakable. The temperature after the operation remains normal for as many hours as the patient refrains from micturition. But within half an hour after urine has flowed through the urethra, the thermometer shows unnatural heat; in some cases not rising above 100° Fahr., and subsiding in five or six hours to a normal range. When the reaction is great enough to produce higher elevation of temperature and rigor, the amount of previous kidney degeneration is probably considerable, and the approach to danger is pretty close. In Mr. Davies's table, there are 20 cases where the temperature after incision of sub-public strictures was noted hourly: in 12, a catheter was tied in; in 8, it was omitted. In all of the 8, the temperature rose in the first twenty-four hours; the lowest being 102° Fahr., and the highest 106.6° Fahr. Of the 12 where the catheter was tied in, in 6 the temperature remained normal throughout. In 3 others, the temperature remained normal until after the catheter had been removed. In the last 3 cases, notwithstanding the presence of the catheter, the temperature rose on the night of the operation to 100°, 102°, and 103° Fahr. respectively, becoming normal the next day.

Now, before leaving internal urethrotomy, I must explain to you wherein lie the dangers of the operation. Considering the large number of times this operation is said to have been performed, without a single death directly due to the proceeding, in France and in the United States, the risk ought not to be very great, even supposing this statement to be not quite exact. But, confining myself to my own experience, I have found the risk of danger to arise in two ways. First, the knife may penetrate the normal vascular erectile tissue of the corpus spongiosum or corpora cavernosa. This I have already described to you. Second, shock may be caused to the kidneys by the operation on the genito-urinary organs. This is of trifling importance if the patient have not previously degeneration of the kidney, for, after the shock has passed off, the natural action of the kidney is resumed. The explanation of this consequence of operating on the urinary tract, however slight the operation may have been, we owe to Mr. Marcus Beck; and, since he has demonstrated it, I have always found the signs of it in serious operations on the deeper urethra or bladder when I have looked for them, and oftentimes in slight ones.

Even the passage of a catheter done with skill and gentleness is sufficient to arouse it. It is not unknown after lithotomy. I have seen it follow the trifling operation of meatotomy, though this is excessively rare, for commonly no such reaction occurs unless the deeper urethra be invaded. The signs are these: from two to five hours after an operation on the deeper urethra, the urine, at first free from albumen and blood, is often tinged deep red with blood, and, if not charged so copiously, a short exploration with the microscope is sufficient to discover the discs. The blood is evenly diffused through the urine and free from clots, thus differing from blood derived from the wound even if precautions have not been taken to prevent such admixture. Moreover, in many cases urine can be collected, which is at first mixed with clots of blood from the wound, then free from blood, and lastly charged with evenly diffused blood from the kidney. This condition of the urine generally continues for eighteen or twenty-four hours, but in slight cases not more than eight or ten hours. Before the blood appears, the urine may be scanty or almost suppressed, and gradually increase in quantity as it becomes mixed with blood. Less frequently, an increase in *quantity* may occur almost immediately after the operation, before blood begins to escape from the kidney; such urine is then watery and of low specific gravity. The quantity of blood is rarely sufficient to cause casts of the kidney-tubules to appear in the urine. The pathology of this phenomenon Mr. Beck explains to be due to irritation of the sympathetic system, whereby the shock applied to the membranous urethra or base of the bladder is communicated to the kidney, producing first contraction of the arteries and anæmia of the kidney. This stasis is soon followed by expansion of the arteries, increased afflux of blood, and active congestion. The consequences of these effects show themselves, first, in a temporary diminution of the secretion of urine; next comes the increase, and with it escape of blood into the urine.* Sometimes the period of contraction is so short as to be not recognisable, and the increased flow of urine, soon to be bloody urine, seems to begin immediately. Should the kidneys be healthy or only moderately affected, this temporary disturbance of function settles down, and no further mischief ensues. But as frequently, in cases of stricture so far advanced as to induce their bearers to seek treatment, the impediment to the flow of urine has existed, always for some months, generally for some years, the kidney is no longer healthy: chronic interstitial nephritis, if not also attacks of subacute or acute nephritis, has altered the structure of the organ to a greater or less extent. The connective tissue is increased, impeding the flow of blood, especially in the veins and Malpighian tufts, many of which are frequently found to be obliterated by the pressure; and further, a large part of the pyramids may have been absorbed. Hence, in two ways is the kidney less able to recover from a sudden congestion, and consequently the danger of the congestion becoming either complete stasis, when suppression of urine, that must be fatal if not speedily relieved, takes place, or, if the congestion be less complete, the chronic interstitial nephritis becomes acute, and so damages the organ that it can no longer perform its functions.

The foregoing demonstrates the great importance of the following three points in the treatment of stricture. 1. Strictures should be treated early, before serious operations are requisite, and before the long-continued obstruction has produced changes in the kidney's structure. The stricture itself is only indirectly an impediment to the exudation of urine from the kidney-tubules. As a cause, it is only in operation during micturition. During that act, it excites increased effort on the part of the bladder to void its contents. To meet this, hypertrophy of the muscular coats of that viscus takes place. This thickening, together with that caused by chronic inflammation of the mucous lining, narrows the outlets of the ureters. These ducts become charged; and, as the overloading of the ureters increases that in the kidney-tubules, impediment to secretion of urine into the overcharged tubules is constantly present, and thus the changes in the kidney tissue are slowly brought about. 2. The contraction in the deep urethra should not be attacked until those anterior to it in the penile part are thoroughly divided, lest the knife be applied deeply to a stricture which is mainly spasmodic in its nature, and disappears when that condition is removed. 3. Before operating at all in cases of long duration, every effort should be made to ascertain the condition of the kidneys, and to remove temporary congestion. Unfortunately, symptoms of the presence or of changes produced by bygone interstitial nephritis are very few. A kidney that is even seriously affected may do its work so well as to cause the patient very little inconvenience under ordinary circumstances, but might very likely be excited into fatal inflammation if subjected to the shock of an operation, and is still more likely

* For further details, see Mr. Beck's article on "Nephritis and Pyelitis consecutive to Affections of the Lower Urinary Tract", *Reynolds' System of Medicine*, vol. v. p. 529.

to be so if directly irritated by putrid ammoniacal urine in its pelvis and calyces. There is not necessarily oedema or marked anæmia; nor pain nor tenderness of the loins to mark the occurrence of these changes in the kidney.

Most important is the examination of the urine. The daily quantity and specific gravity of the whole amount should be ascertained for several days. Large increase in the quantity and low specific gravity indicate impediment to the circulation by interstitial thickening and excessive blood-pressure in the Malpighian tufts. The further examination of the urine as it escapes from the urethra is almost always impeded by admixture with pus and mucus from the bladder, and not unfrequently by blood. Hence it is often necessary to wait, before drawing further inferences, until rest and regular drainage and washing of the bladder have prevented the secretion of much of the pus and mucus added to the urine after its arrival in the bladder. It is often possible to obtain a small quantity of urine comparatively pure by carefully washing the bladder with warm water and collecting, through the retained catheter, the first few drops of urine exuded from the kidneys; thus putting the test-tube into almost direct connection with the pelvis of the kidneys. In such unmixed urine, free from bladder and urethral pollution, an examination may be carried out. Albumen may be present only in traces or altogether absent in chronic interstitial nephritis; when tolerably copious, it indicates much congestion or subacute inflammation. Casts are few, and, if found, are hyaline. The reaction of the urine is a valuable indicator. It is usually alkaline when, or soon after, being voided, if cystitis be present, from putrefactive changes set in motion by the bladder-mucus. The urine is always acid before it reaches the bladder, unless putrefaction take place in the pelvis of the kidney from advanced pyelitis. With such a state of the pelvis, it is rarely possible that the kidney can withstand the shock of an operation. Hence the invariable rule, that before urethrotomy the patient's urine shall be acid. The amount of urea in the daily excretion is not necessarily affected, and sometimes is normal. Thus, the most important indicators of chronic interstitial nephritis are, increased bulk of the urine, with specific gravity lower than corresponds to the increase of fluid. Nevertheless, they are not always present, nor are they always sure guides. In estimating their value in a given case, moreover, reference must be taken to the amount of liquid imbibed, the season, etc. But on the other hand, in forming a judgment of the degree to which this destructive change has advanced in the kidneys, the previous history gives assistance; the length of the period of marked difficulty in micturition or increased frequency, the number of attacks of retention, the continuance of ropy urine, all show how long the kidney has been exposed to irritation and continual unnatural pressure of urine from the stricture upwards to the beginnings of the tubules. You will now understand why, when describing the operation, I told you the patient must be prepared for it. Briefly to recapitulate, the urine shall be acid as it is voided, quite free from blood, almost if not quite free of albumen, pus and bladder-mucus scanty in quantity, if present at all; the whole quantity of urine forty to sixty ounces at most, and the average specific gravity not under 1010. If a more or less complete approach to this condition of the urine be not obtained, no cutting operation is justifiable, except in very exceptional cases, where the suffering to be relieved calls for any method having chance of success.

As just said, it is a standing rule that the albumen should have disappeared almost entirely from the urine before any operation is carried out; a rule which has its exceptions, nevertheless. There comes to us occasionally a retired police-sergeant, for whom, five years ago, I performed external urethrotomy to cure a perineal fistula, which had opened a second time, after the dilatation of his stricture by simple bougie-passing had enabled it to close. At the time of the operation, the man excreted urine with one-fifth to one-third albumen; yet he made a fairly rapid recovery, the albumen disappeared, and he has been in the enjoyment of excellent health ever since. Some of you may identify him, as he has a short congenital fistula of the neck; and when he comes to the hospital to report himself, the attention of the students is generally attracted to that abnormal peculiarity.

Another condition which justifies urethrotomy with advanced renal disease is rapid and repeated contraction of a very irritable stricture, after dilatation by gentler methods. Such a case was operated on last winter. The patient was aged 52, old for his years, and had, a year before, been in hospital for stricture, with cystitis and much renal disturbance. His urine was, on admission, alkaline, 1010 specific gravity, with one-third albumen; blood-discs, granular casts; and when the pus had been nearly got rid of, hyaline casts were detected. As soon as the urine had become acid, as it escaped from the bladder, and the patient's temperature had become normal at night as well as in the forenoon, and his general condition as favourable as could be expected, internal urethrotomy was performed. The recovery was slow, delayed

by considerable reaction in the kidneys, resulting in the production of some small septic abscesses in the cellular tissue of the axilla, loin, and groin. The patient is now (ten months after operation) much improved, and his stricture, with the occasional passage of No. 23 French bougie, shows no sign of shrinking. The albumen has disappeared; the urine is only slightly turbid, pale, and the specific gravity of the specimen he brought with him to the hospital lately was 1015; hence the condition of the kidneys has very decidedly improved, while the patient has gathered flesh and strength to an amount much greater than he had before enjoyed for several years.

5. *External Urethrotomy.*—In Mr. Davies' table are three cases where the perinæum was opened for the division of stricture, and three more for extravasation of urine into the cellular tissue with urethral stricture. As you know, the external division of stricture is now much less frequently adopted than it was thirty years ago. Still it is called for in certain cases, which may be thus classified. 1. Where there is much induration of the perinæum, and more than one fistula from the urethra behind the stricture to the surface; such cases, if treated by dilatation or by internal division, seldom recover rapidly or satisfactorily. They are liable to formation of a fresh abscess and continued irritation. For these reasons, such strictures do best when thoroughly divided in the perineal part from without. At the same time, all penile strictures must be carefully searched for and divided internally, or the patient will recover from his external section only half cured of his disease. 2. When urine has copiously escaped into the cellular tissue from a rent in the urethra behind the stricture, and there is impending or actual sloughing inflammation of the integuments, it is often possible, by an incision in the middle line, to give free outlet to the urine as it passes from the bladder, and thus, by relieving the patient from irritation, afford him some chance for recovery. Sometimes this is not possible, and the operator must be content to incise the integuments freely wherever the urine is collecting and setting up gangrenous action, waiting until the febrile action and swelling have subsided before dividing the stricture. The bladder is relieved through these devious channels, and chance given to the patient to struggle through the effects that follow the outpouring of foetid decomposing urine into the cellular tissue; for it is its putrid condition that renders urine noxious. Normal urine, when injected into the cellular tissue, is quickly absorbed and excreted by the kidneys, without causing local inflammation or general constitutional disturbance. Such urine is, however, rarely present in cases of extravasation from stricture. Before the urethra gives way, the morbid bladder mucus excites putrefaction in the urine before it leaves the bladder, producing sulphide of ammonia and other products in considerable quantity. 3. When the urethra is impassable for a guide to the bladder, it is necessary to open the urethra from without, either behind the stricture or just in front of it. Such cases are very rare; and when urine escapes along the urethra, though it be only in small quantity, by patience an instrument can be nearly always introduced to the bladder. I say nearly always, because in two of the cases of external urethrotomy in Mr. Davies' tables, the patients habitually passed all the urine through perineal fistulae, but they maintained that occasionally a little urine escaped from the meatus. Be this as it might, we never saw it do so, and protracted attempts to pass catheters or bougies of any kind utterly failed, though repeated during many weeks. One patient had, two years before his admission to hospital, suffered from a crushing injury to the pelvis by a mass of earth falling on him. In the other, a negro, the perinæum and genitals were much altered by elephantiasis.

Mr. Guthrie, in his surgical works, has described two methods of reaching the bladder and dividing the stricture from the perinæum. In the first, he opens the urethra in the membranous part between the rectum and the stricture, for gonorrhœal strictures never occupy all the membranous portion, and generally do not even reach it; and only rarely in cases of traumatic stricture is the membranous part either destroyed, or so involved in the cicatrix as not to be traceable. In the operation referred to, and which I adopted in one of the three cases of extravasation of urine in Mr. Davies' tables, Mr. Guthrie (*Lancet*, 1851, vol. i, p. 595), bases his directions on the fact that the membranous portion can be reached without any guide through a cellular interval between the last part of the rectum and the bulb of the urethra, *i.e.*, behind the situation of stricture, provided that the incision be made exactly in the mesial line. The patient is directed to hold his urine that the bladder may fill, and is then put into the lithotomy position with a good light. The surgeon has at hand probes, probe-pointed directors, scalpel, artery forceps, No. 20 silver catheter, sponges, tapes, etc. He begins the operation by passing the left forefinger into the rectum to indicate the precise position of that part; a straight, short, sharp-pointed bistoury held in the right hand with its cutting edge forwards, makes an incision in the middle line one inch and a half long,

starting half an inch in front of the anus. Should that be much indurated, a transverse crucial cut through the skin may also be made across the first to give freedom to the deeper cuts of the knife, which henceforth must continue precisely in the mesial line. This mesial incision is gradually deepened for one inch, the left forefinger still in the rectum, and the knife's edge directed forwards throughout. At this depth, the urethra can often be distinguished by the left forefinger in the wound, especially if the patient cough or strain. It is sometimes dilated, but generally is not sufficiently enlarged to be distinguished the more readily on that account. The left finger still guarding the gut, the knife punctures the urethra during a strain, and if the bladder be full, the ease with which the urethra is reached is greatly increased. While urine escapes at the puncture, a fine director is passed into the urethra, and the track to the bladder made certain. Along this guide a catheter may be passed at once, or the stricture in front attacked by carrying a director forward along the urethra into the stricture, and bringing towards it, along the penile urethra, a staff or silver catheter. Sometimes the staff will slip into the stricture and meet the guide from behind. The complete division of the stricture is then easily accomplished. The next step, Mr. Guthrie warns his pupils, is often by no means easy, namely, the introduction of a catheter along the urethra, and past the wound into the bladder, if the guide to the bladder have been incautiously removed before the catheter also reaches the bladder. He advises the operator to have ready a director, narrow at the point, but widening rapidly at the handle; along such a guide the beak of the catheter can be readily directed into the bladder. The last stage in the operation consists in fastening securely the catheter, which is worn for twenty-four to forty-eight hours, according to the patient's condition.

In the patient on whom the mass of earth fell, the urethra, from the scrotum to the neck of the bladder, was converted, with the other structures of the perineum, into gristly tissue about three inches deep, through which several fistulae let out the urine from the bladder, but where the membranous urethra could not be traced. It was not possible, therefore, to carry out the operation exactly according to Guthrie's directions. But, beginning the incision half an inch in front of the anus, the gristly tissue was gradually cut through stroke by stroke, exactly in the middle line, until the neck of the bladder was reached and the forefinger could be introduced. The incision through this indurated perineum was then prolonged forwards until the end of a No. 20 French (No. 12 English) silver catheter that had been passed along the anterior urethra was laid bare. This was then directed through the deep incision, and guided by the finger to the bladder, where it was secured. There was very little hæmorrhage to obscure the steps of the operation, far less than would take place if the natural condition of the parts had existed; this cicatricial tissue being only slightly vascular. The patient made a slow recovery, but is now, nearly three years after the operation, working in a mine, in good health, and maintaining patency of his channel for the urine by a daily introduction of No. 18 or 19 French bougie.

Mr. Guthrie also practised another operation for dividing strictures and reaching the bladder from without, which has been revived and greatly improved in its details by Mr. Wheelhouse of Leeds. It should be reserved for cases where no guide can be passed, and yet where a track exists through the stricture to the portion behind. I selected it for the second case of perineal section, where the perineum and genitals were much altered by elephantiasis, and the track of the urethra lost in false passages. The patient was placed, as in the other case, in the lithotomy position, and the same preparations as to instruments are needed. To the instruments, Mr. Wheelhouse has added some special ones that greatly facilitate the operation. They are (1) a straight staff, in which a deep groove is continued to one-fourth of an inch from its tip. The tip itself is turned backwards, to form a knob or blunt hook. (2) A gorget, tapering to a point that is small enough to run along the groove of the fine director to the bladder. (3) Two pairs of straight-toothed forceps, with spring catch. The staff is steadily held in the urethra by an assistant, so that its groove is directed forwards, but the beak is kept from pressing closely against the stricture, so as not to chafe or tear its anterior opening before the urethra is incised. The incisions in this operation, as in the other, are limited to the mesial line. The first was carried through the skin, from an inch in front of the anus to the juncture of the perineum and scrotum, to which point a No. 18 French catheter could be passed by previous dilatation. The urethra was opened on the staff, and the margins of the incision seized on each side by the toothed forceps, and held steadily apart. The staff was then turned round, so that its hook caught in the anterior end of the cut into the urethra, and drawn upwards, to hold the opening steady while the passage through the stricture was sought and found; when with a little delay a fine director was coaxed through the stricture into the bladder. On this director the thickened walls of the urethra were cut, and the

pointed gorget run until it also reached the bladder. It served as a guide for a catheter, which replaced the staff, and was tied into the bladder.

If reserved solely for cases where no guide can be passed along the urethra to the bladder before the operation is commenced, this form of perineal section is seldom required, and becomes rare in proportion as the surgeon has been persevering in his preliminary attempts to coax a guide along the urethra.

External urethrotomy with a guide, an operation perfected by Syme, is a very much simpler procedure, and much more often practised. It is, however, with us reserved for cases where the perineum is honey-combed by abscesses and urinary infiltration, with considerable amount of subpubic induration of the urethra. Here, external section is preferable, as it gives free drainage through the wound and thus obtains speedy closure and sound healing of the fistula. Syme's operation requires a curved staff, of which the five inches next the handle are straight, and as large as 20 or 22 French; beyond this, the staff is narrowed abruptly, to the size of No. 7 French, and grooved on its convexity in the mesial line from the shoulder or thick part to the tip. The operation begins by passing this staff along the urethra to the bladder, until the narrow part has traversed the stricture, and the thick part is arrested by the contraction. The urethra is then opened on the grooved staff, held steady by an assistant, so that its curve projects well in the perineum, and the knife at last reaches the groove. The edge of the knife is now directed forwards, and thus the bands of stricture which check the onward passages of the thick part of the staff are thoroughly divided, till no obstacle remains. The staff is then withdrawn, and replaced by a catheter. Here often begins a difficulty; the part of the urethra from the wound to the bladder cannot be hit by the beak of the catheter. This obstruction is prevented, if the tapering gorget of Mr. Wheelhouse be led along the groove of the staff to the bladder before the latter is removed. The gorget then acts as a guide for the catheter past the wound to the bladder.

Mr. Marshall, years ago, devised a simple apparatus for ensuring the entry of the catheter into the bladder. Instead of a shouldered staff, he uses a staff the size of No. 7 French throughout, and without a handle, but with an additional stem of the same thickness, on which a flexible No. 20 French catheter can be threaded. The beak of the catheter is cut off and replaced by a silver mount to receive the strokes of the scalpel when the stricture is being divided against it. When the narrow staff has been passed through the stricture, the flexible catheter is slid down the urethra till it is arrested by the stricture, and there waits until, that impediment having been reached and divided from without, the catheter can be pushed along the staff into the bladder. Then the staff is withdrawn through the catheter, and the latter remains in its place.

Now, as to the results of external division. Complete division of the stricture from without is no more a permanent cure than internal division. The sound or bougie must be passed every third or fourth day during the healing of the wound, and, after that, at intervals of gradually increasing length is still necessary. This interval can seldom be extended beyond three months.

SLOW PULSE.

I.

THE following case is similar to that recorded by Mr. Noble in the BRITISH MEDICAL JOURNAL of November 22nd. Mr. E. has been a carver and gilder, and, I am informed, has been "a heavy drinker" for some years. He is now in his seventy-second year, and first came under my notice just twelve months ago. His pulse was then 40, regular, and full in tone. He is in full possession of all his faculties; and, upon my visiting him on November 24th, I found him in good spirits, with a pulse 36, temperature 96, respiration normal. He is rather lethargic, and spends most of his time in bed.

JOHN WHEELER, M.D., Ch.M., Bayswater.

II.

I HAVE seen a patient aged sixty-eight frequently in consultation, during the last four years, whose pulse, in his best health, is 26 in the minute. There is hypertrophy of the heart amounting to the "cor taurinum". There is occasionally a slight mitral musical murmur, and albumen has been found in his urine on two or three occasions by his regular medical attendant. The patient is subject to attacks of syncope, and has for some months had swelling about the ankles. I may also mention that I have frequently had pulses varying from 30 to 40 in the minute, in cases of typhoid fever, when the temperatures were typical of typhoid.

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