FOUR YEARS' EXPERIENCE OF CASES OF STRICTURE OF THE URETHRA TREATED BY ELECTROLYSIS, WITH A RECORD OF FIFTY CASES.

By W. BRUCE CLARKE, M.B.Oxon., F.R.C.S.,
Assistant-Surgeon to St. Bartholomew's Hospital.

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THE method which I now usually employ in carrying out this treatment is the following: the patient can either be treated in bed, or in slighter cases he may follow his employment, but it is always advisable, immediately after the first sitting, that he should go quietly home and go to bed. A neglect of this precaution may entail pain, possibly accompanied by considerable difficulty in passing water during the first twenty-four hours, especially if the stricture be a tight one. No anæsthetic is required; indeed, it is usually contraindicated, as the patient's sensations often afford an excellent indication of the effect of the current on his tissues, though as a rule the process is practically painless.

The most convenient plan is to place the patient on his back, letting him lie on a well-wetted pad about the size of the palm of one's hand or larger, which pad is connected with the positive pole of the battery. It is essential that the current from the positive pole should be distributed over a large surface and thus subdivided, so as to avoid its destructive action on the skin. Occasionally it is necessary during the course of the operation to change the place of this pad on account of the burning sensation of which the patient complains.

If the stricture has not been already carefully measured, by means of bougies *à boule*, or by any other method the surgeon prefers, this must be done before the exact line of treatment can be decided on. Where one stricture only exists, that alone will require treatment, and the case is simple: but where more than one is present the most anterior should be treated first, and on a subsequent occasion the deeper strictures should be again carefully measured, as they may have in the meantime become somewhat enlarged in calibre. A bougie-electrode is selected which is about two sizes larger than the largest instrument which the stricture will admit; it is oiled and passed down, and allowed to rest by its own weight against the stricture. By means of the binding screw at the top it is connected with the negative pole of the battery. The galvanometer is introduced somewhere into the circuit, that is, either between the bougie-electrode and the battery, or between the pad and the battery. It is preferable to place it in the latter situation, as it is less likely to be disturbed. One of its binding screws, therefore, must be connected by a short length of wire to the positive pole of the battery, and the other by a similar piece of wire to the back pad. When all these details are completed, the battery is brought into action by lowering the zincs and carbons into the acid.

For the first few seconds it is very likely that the patient will scarcely feel the pricking which is manifest later on, as the resistance offered by the skin before it becomes thoroughly soaked is very considerable. Soon, however, the needle of the galvanometer and the patient's sensations clearly point out that the current is passing. If the current strength is more than from 7 to 10 milliampères, or the patient complain of anything approaching to pain, a less number of cells should be at once resorted to. If the stricture that is being attacked is situated anywhere in the penile portion of the urethra, the surgeon will have no difficulty in determining whether the instrument is passing in the right direction; but if the stricture is situated more deeply, one finger in the rectum will readily indicate what is going on, should any difficulty be experienced. During the course of the sitting bubbles of gas can be seen and felt to pass up the urethra, and if the operation be performed in a bath the bubbling up of the gas forms a striking feature. There is no need to change the strength of the current unless the galvanometer or the patient's sensations demand it. After a period varying from a few minutes to half an hour, the bougie usually traverses the stricture. As soon as this takes place the current should be arrested and the bougie gently removed, no further operation being attempted for at least a week. It is better to wait a fortnight, or even three weeks.

Occasionally no passage is effected. Should this be the case after the sitting has exceeded half an hour, it is usually better to withdraw the instrument, and wait till the usual period has

elapsed before making another attempt. These apparently abortive sittings are really not lost time, and it is curious to note how the patient often states that his stream improves, and that the ease with which he makes water is increased though no instrument has been used. With strictures through which no instrument can be passed, I have had as many as five unsuccessful sittings, but patience has at last been crowned with success, and the increase in calibre speedily becomes augmented.

If the urethra proves to be irritable, the sittings must be shortened, and in many instances the progress of the case will be much quickened if a small stricture is dilated say to No. 4 or No. 5 English, and the remainder only of the dilatation effected by electrolysis.

For a day or so after the passage of the bougie-electrode the patient usually complains of a slight soreness in the urethra, as if he had an attack of gonorrhœa, but this rarely lasts for more than forty-eight hours. After the lapse of ten days or a fortnight the urethra should again be carefully examined, when it will usually be found to admit an instrument one or two sizes larger than the bougie-electrode which was employed on the previous occasion. Thus if the stricture admits No. 4 before treatment, No. 6 bougie-electrode will probably be able to be passed, and a fortnight later No. 8 or 9 will pass without difficulty. If this be so No. 10 bougie-electrode should be employed in the manner that has already been described, and its passage on this occasion will probably be only a matter of a few minutes. A further interval of ten days' rest will most likely enable No. 12 to pass.

The object of this plan of treatment is the absorption or softening of the cicatrix which has given rise to the stricture, and it is well to bear in mind what it is that really does take place, for the process can readily be witnessed when a stricture at or within half an inch of the urethral orifice is submitted to treatment. In these cases the surface of the epithelium is seen to be gradually converted into a glutinous saponaceous-looking material, which bubbles up around the tip and sides of the electrode. If this material is wiped carefully away the surface is seen to be red and somewhat congested in appearance, but it is perfectly evident that the epithelium is not entirely removed with such currents as I am in the habit of employing. It is, moreover, evident that a narrow orifice, which is treated by allowing No. 4 bougie-electrode to pass through it, will three weeks later admit a No. 6 with ease, though no instrument has been passed in the meantime, presumably owing to a continuance of the process of absorption after the bougie-electrode is removed.

Such was the description which I gave of the process when I first published an account of the method, and so far as it goes it is undoubtedly perfectly correct. Mere absorption will not, however, explain all the phenomena which may be occasionally witnessed after an electrical sitting.

The following instances will elucidate my meaning more fully; in one of them a tight stricture, which was extremely painful to the passage of bougies, was completely cured by a single electrical sitting (No. 29), whilst another, though readily yielding to the bougie-electrode at the time, always recurred afterwards, and each time when I saw him (from a fortnight to a month elapsed between each visit) his stricture admitted No. 4 English, but as soon as No. 5 had been held against the stricture for about a quarter of an hour it passed, and then Nos. 8, 9, 10, 11, and 12 all passed in rapid succession. Nine times in succession did I dilate the stricture, and nine times did he return at intervals of from fourteen to twenty-eight days with his stricture in the same condition (No. 27).

It was clear that one had to deal with a *bonâ fide* case of spasmodic stricture. I examined the man's urethra with the urethroscope, and detected on the left side of the canal a small red patch, which, as far as I could judge, was situated as nearly as possible in the locality of the stricture. This at once recalled to me the views on the pathology of rectal stricture, which have been so carefully worked out by my friend and colleague, Mr. Cripps, in his well-known book on *Diseases of the Rectum and Anus*, and the case which he records of a spasmodic rectal stricture which completely disappeared under an anæsthetic, but which, two years later, when he examined the rectum, had been converted into a mass of unyielding cicatricial tissue.

I soon came to the conclusion that I really had to deal with a spasmodic stricture set up by a small ulcer in the mucous membrane, and that this muscular spasm was gradually being worried into a permanent cicatricial contraction of the canal. This being the case, I at once changed my method of treatment, and advised

an internal urethrotomy. The patient consented, and after the operation was completed a No. 16 English was tied in for twenty-four hours, and the urethra kept well dilated by the passage of instruments at frequent intervals for a month. His stricture vanished, and nine months later, for the first time since the operation, I passed an instrument for him, and found no trace whatever of his previous trouble. I cannot, of course, say that he will have no return, but I feel fairly confident that his ease is to be regarded as a true cure, the result of an application of that same surgical principle which Brodie so successfully employed in dealing with ulcer or fissure of the rectum.

At first sight there does not seem to be much analogy between the two cases of urethral stricture to which I have just referred, for in one electrolysis proved absolutely useless, and in the other was attended with brilliant success. The first case was under my care some two years ago, and though seen six months later has since gone to that great unknown land to which so many of our hospital cases, particularly in London, vanish.

Upon reflection on this case, I cannot doubt, and there will, I think, be little doubt in the minds of my hearers that a stricture which only admitted a No. 4 English to start with, and was cured by one electrical sitting, must at least have been partially, probably wholly, due to muscular spasm. If this was the case, it is exceedingly probable, I think, that a small ulcer of the mucous membrane was the cause of it; and just as the cauterisation of a small rectal ulcer will, in some instances, be sufficient to cause its disappearance, whilst in others it demands a surgical operation, surely it is at least equally likely that a similar procedure in the urethra may produce a similar result, and this particular case affords strong probability of the truth of my suggestion.

It is of course no new suggestion of mine that spasm forms a considerable element in many urethral strictures, but its importance has, I think, been underestimated. It is, however, referred to in the following terms in Erichsen's *Surgery*, though it has never received the recognition which it deserves.

"The influence of anesthetics in facilitating the passage of instruments through apparently impermeable strictures is very marked. Shortly after the introduction of ether as an anæsthetic agent Liston was going to cut through a stricture that had resisted all attempts made by his most dexterous hand at introducing an instrument into the bladder, but no sooner was the patient put on the table and rendered insensible, than the No. 8 silver catheter, which had been passed down as far as the stricture, and the point of which was to serve as a guide to the knife, slipped into the bladder, and thus rendered a dangerous operation unnecessary."

Since my attention has been so forcibly directed to this question of spasm in the production of stricture, I have employed anesthetics almost as a routine practice before attempting to treat a stricture, and I have been struck with the large number of cases in which the stricture is considerably increased in calibre under the influence of an anæsthetic. But there is a further, and to my mind a more cogent, reason in favour of the view that spasm is the first step in the production of stricture in a large number of cases. Attention has often been drawn to the enormous preponderance of strictures in the membranous portion of the urethra, but no adequate reply has been given to the oft-repeated query of why this should be the case.

The presence of the compressor urethræ muscle offers, I believe, the only adequate explanation, whilst this suggestion is further borne out by the views which were first promulgated by Otis, in which he pointed out that the deeper strictures often yielded readily to dilatation, and in some cases entirely disappeared when the anterior strictures were divided, a result which, from my own experience, I can in many instances fully confirm.

If, however, we can accept the view that spasm of the compressor urethræ is the first stage in stricture, we can, I think, readily explain much that has before been obscure in urethral pathology and treatment. The yielding of some strictures, the unyielding character of others, and the apparently reflex phenomena which surround another class can be explained on this theory, and I believe on this alone. How far this theory is competent to explain these strictures which are situated in other parts of the urethral tract I am at present unable to state; but from what I have seen of them I think there is considerable probability that the large majority of strictures do begin in this manner.

The beneficial effect, then, of electrolysis must be ascribed partly to its absorptive action and partly to the cauterising action

of the caustic alkali which is liberated in the urethra, and which, by acting on the mucous membrane at the seat of the stricture, renders the subjacent muscular fibre less irritable. Probably the presence of mucous abrasion is far more common than it is generally admitted to be, for it must be borne in mind, even if we ignore the tendency to bleed which is shown by strictures, that by the aid of the urethroscope it can be seen that after simple dilatation of a stricture the mucous urethra lining is oftentimes slightly split. This is a point to which attention has been drawn by Mr. Berkeley Hill, and which I have myself had the opportunity of witnessing on several occasions.

If we turn our attention for a few minutes to the cases recorded in the table, we shall see that seven of them are known to have recurred, and in three instances the recurrence was so frequent and so rapid that I am inclined to regard it as being aggravated by the passage of the bougie-electrodes. Of twelve I can give no subsequent history at all; five were unable to give the amount of time requisite for electrolysis, and were treated by urethrotomy. This leaves twenty-three cases, twenty-one of whom are known to have been free from symptoms of stricture from a year and a half to three years after treatment, and two of whom are certainly free after four years.

I will allude somewhat further to these two cases. One of them was mentioned in my previous account in the following terms:—

CASE III.—J. M., aged 37, was admitted in St. Bartholomew's Hospital in August, 1885, with the following history. About nine months previously he noticed he was passing his water *per anum* as well as *per urethram*; he applied for relief at a hospital, where he was taken in and found to be suffering from extravasation of urine, and his perineum and scrotum were incised. At first no catheter could be passed, but later on one was passed, his stricture was dilated, and he was discharged relieved. Since that time his stream has decreased in size, and only a small catgut will pass into the bladder at present. There is a good deal of thickening round the urethra, extending from about two inches in front of the bulb backwards to the bulb itself, or further.

A bougie-electrode was passed down to that portion of the urethra where the thickening commenced, and held there for more than half an hour. Four days later the patient drew my attention to the fact that all the thickening had disappeared. Treatment similar to that which has been previously described was continued for about six weeks, and he was discharged able to pass a No. 12. The bougie-electrode was passed three times in all.

At the present time (that is, August, 1886) his urethra admits a No. 11 easily, and, with the exception of the two occasions on which I have examined his urethra, he has had no instrument passed since he left the hospital just a year ago. Thus it is clear that electrolysis has effected more for him than incision, and there is at least a fair expectation that, if no contraction has taken place so far, it may never supervene at all.

No. 11 was passed for him in June, 1889, and he has never had a single instrument passed, he tells me, except when I have passed them for diagnosis purposes.

CASE XXXVIII.—This case was by accident omitted in the previous papers. So far as his stricture goes, he is well, though I have on three occasions extracted stones from his bladder by the suprapubic operation. At the same time it must be borne in mind that catheters have frequently been passed on him for the purpose of washing out his bladder.

More than one case in which urethrotomy has previously been performed has spoken to me with favour of the greater success of electrolysis, and particularly is this the case with three of my private patients (39, 44, 47), whose opinions as to their own sensations must be regarded as of some value, and they speak of themselves as well sixteen months, eighteen months, and two years after treatment.

Further details will be found in the accompanying table.

Of the future of electrolysis in urethral stricture, even after an experience of four years, it is difficult to prophesy. I never expected, as some American writers seem to have done, to find in it one panacea, and I am not disappointed. Every case of stricture must be separately and carefully considered before resorting to treatment, but I am sure I may appeal with confidence to the results which are recorded in my table, results which, considering the nature and character of the strictures operated on, could not have been obtained by any other method; and certainly in those cases in which there is a tendency to rapid recontraction, or where

no dilatation ensues under an anæsthetic, the benefit of electrolysis is most marked.

Results of Fifty Cases of Urethral Stricture treated by Electrolysis.

No.	Name.	Age.	Date of Treatment.	Result.
1	D. C.	52	1886	Letter eight months after to say he is well.
2	T. W.	53	1885	Recurred a year later; electrolysis again; urethrotomy.
3	J. M.	37	1885	Extravasation in 1884. No. 11 passed June, 1889.
4	J. L.	31	1886	Relieved for a time; recurrence. Lost sight of.
5	B. B.	62	"	No. 12 passed eighteen months later.
6	C. D.	29	1885	Lost sight of.
7	G. S.	27	"	Only came once.
8	W. D.	39	1886	Not seen after treatment.
9	J. F.	46	"	Up to 9 English; bronchitis. In hospital, 1889, with partial recurrence.
10	W. B.	37	"	Well two years after.
11	T. T.	24	1886	(orifice) Only came once.
12	A. L.	29	"	Returned in 1889 for dilatation.
13	T. P.	27	"	No. 12 English passed eighteen months later.
14	W. T.	36	"	No. 10 English passed twelve months later.
15	H. S.	34	"	Not seen after treatment.
16	S. L.	41	"	Letter two years after saying he was well.
17	W. A.	29	"	Lost sight of.
18	F. A.	30	"	"
19	J. B.	22	"	Seen in 1888. Admitted No. 10 English.
20	J. H.	38	"	Sent patient to me from America, 1888, who said he was well.
21	O. L.	36	"	Seen in 1887. No. 10 passed.
22	A. E.	35	"	Not seen after treatment.
23	E. J.	49	"	Constant recurrence; thirteen times dilated.
24	T. Mc.	52	1887	Went away in mid tide of treatment; extravasation two months later.
25	J. P.	38	1886	Seen well in 1888.
26	J. D.	49	1888	One sitting; in a hurry; urethrotomy.
27	W. P.	24	1887	Constant recurrence; cured by urethrotomy.
28	F. A.	30	1884	No progress; not seen since.
29	A. E. E.	25	1887	Seen well in 1889; since lost sight of.
30	W. B.	37	"	Well in 1889; says he has passed catheter once or twice.
31	W. G.	32	"	One sitting; not seen since.
32	S. M.	35	1886	One stricture gone; other admits No. 9 English, 1888.
33	F. H.	36	1887	Admits No. 10, 1888.
34	G. E. P.	39	"	In a hurry; divided later.
35	H. T. N.	23	"	No. 11 passed in 1888.
36	J. McC.	44	"	Constant recurrences.
37	W. G. S.	40	1889	November 2nd, passed No. 12.
38	H. H.	53	1885	No. 12 passes easily; suprapubic lithotomy.
39	K. R. W.	39	1887	Letter to say he has had no trouble since.
40	E. H.	44	"	Not seen since.
41	O. N.	56	1888	Recurrence.
42	E. P. S.	54	1887	Hurry; urethrotomy.
43	J. F. W.	52	1888	"
44	J. P. L.	36	"	Letter, 1889, says he is well.
45	E. W.	39	1887	Recurrence, 1888.
46	M. O.	43	"	No. 10 English passed in 1889.
47	H. R.	51	"	A previous unsuccessful urethrotomy; letter, well, 1888.
48	B. S.	29	1888	Not seen since.
49	W. E.	34	1887	No. 12 passed in 1889.
50	H. A.	59	1888	Hurry; urethrotomy.

CASES OF PELVIC ABSCESS TREATED BY ABDOMINAL SECTION.

By A. W. MAYO ROBSON, F.R.C.S.,

Honorary Surgeon to the Leeds General Infirmary; Honorary Consulting Surgeon Batley Hospital; Lecturer on Practical Surgery in the Yorkshire College, and Examiner in the Victoria University.

ABSCESSSES situated in the pelvis frequently offer very unfavourable conditions for rational treatment, since the abscess cavity either cannot be safely reached, or, if reached, is with difficulty cleared out and drained. These considerations have so influenced gynaecologists that the great majority of them in such cases are content with expectant treatment, although the feasibility and safety of opening the abdomen, searching for, employing, and draining such cases, has been proved by Mr. Lawson Tait and others.

The pelvic abscesses referred to below have nothing to do with lumbar, psoas, and other collections of pus, which have distinct origins outside the pelvis, but are to be considered as mere sequels to certain diseases, such as pelvic cellulitis, pelvic peritonitis, and

hæmatocoele, or to ovaritis, salpingitis, or breaking down of tubercle, the one thing common to them all being the presence of pus in the pelvis.

Every surgeon knows the course pursued by such collections; their tendency towards continuous or intermittent evacuation into hollow viscera, either vagina, rectum, or bladder; or by long circuitous fistulæ on to the surface; the violence of the inflammatory storms which occur at irregular intervals after a delusive period of quietude; the condition of impotency or infirmity in which they leave women, even after a spontaneous cure, which always demands a very long time; and their frequently fatal termination, either by the pus bursting into the peritoneum and setting up acute peritonitis, or by the constant discharge bringing on hectic fever; or, more indirectly, by the supervention of tuberculosis or amyloid degeneration. There are some fortunate cases where the abscess projecting into the vagina allows an opening to be made and drainage to be effected, but these are exceptional; in the greater number it is impossible to discover by the touch a fluctuating point in the hard plastic mass which fixes the uterus. Even if the abscess can be opened by the vagina or rectum, it is a most difficult matter to keep the cavity aseptic and to secure efficient drainage.

If, then, expectant treatment is so unsatisfactory, what other means have we at our disposal? First, aspiration, which, according to Mundè, is a successful mode of procedure. In several cases where there have been small and localised abscesses, I have found this simple method efficient, but it is uncertain in large, and useless in multiple, abscesses, and its indiscriminate use is not unattended by danger, for it must be borne in mind that important structures often overlie the tumour, and have to be pierced before it can be reached. Secondly, subperitoneal laparotomy, as performed and advocated by Dr. Pozzi, of Paris, of which Case III is an instance. It would seem to me, however, that this method can only have a very limited application, and can only be safely adopted where there are signs of the abscess approaching the side of the pelvis, as in the example I have mentioned. And, lastly, abdominal section, of which the other cases form good examples.

CASE I.—Pelvic Abscess Discharging into Rectum for Six Years: Opened and Drained Anteriorly through the Peritoneum: Cure.—Mrs. A., aged 29, consulted me in July, 1886, saying that she had been married five years, but that she had had no children. About three months after her marriage, during a menstrual period, she caught a chill when at a picnic, and was seized with a severe pain on the left side of her abdomen; this was followed by a serious illness, which kept her in bed for three months, at the end of which time the abscess burst into the rectum, giving immediate relief to her urgent symptoms but leaving a persistent discharge of pus, which during the whole period of four years before she saw me had never been less than from 1 to 2 ounces a day. She had had feverish attacks from time to time, accompanied by severe pain in the lower part of the abdomen, especially on the left side. From having been a stout, good-looking, rosy-cheeked woman she had become thin, pale, and cachectic. Night sweats and a short cough made her friends fear that phthisis was developing, and she spent the winter of 1886 at Bournemouth, without receiving any material benefit, as the discharge from the rectum was as free as before. Her menstrual periods, normal and painless before her inflammatory attack, had since been preceded for several days and accompanied by pain on the left side, often of an agonising character. During 1886 difficulty in defecation came on, so that aperients were regularly required, the motions being flattened and not larger than the little finger. On vaginal examination a tumour could be felt on the left of the uterus, the size of a large orange, which was firmly fixed to the uterus and to the contiguous parts. Bimanually it could be felt above the pubes but did not form a tumour evident to the eye. The right appendages felt perfectly normal. The uterine sound passed the normal distance.

On examination by the rectum, within reach of the tip of the index finger a stricture could be felt, which would only admit a small rectal ball the size of a large pea; above this stricture the abscess cavity evidently opened, but the opening could not be felt by the finger. As all forms of medical treatment had been fully tried before the patient consulted me, and as there seemed to be no chance of approaching the abscess from below, I advised that the abdomen should be opened and the abscess evacuated in that direction, as the opening into the rectum was situated in such a position that the sac of the abscess could never empty itself; and, moreover, the constant irritation threatened soon to produce