INCIDENCE OF URETHRAL STRICTURE IN THE MALE AFTER URETHRITIS*

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With the development of new methods in medicine, established procedures are often abandoned and sometimes this happens without due regard to the factors involved.

This study was undertaken to find out the present incidence of urethral stricture in men after urethritis, and to determine whether the *routine* examination of the urethra with instruments, as a test for cure, was necessary after the treatment of urethritis by modern methods.

The investigation was planned in 1951. By that time it was becoming usual, even in specialist practice, to omit examination of the urethra with instruments after apparently successful treatment of urethritis. To ascertain whether this test for cure was still essential it was decided to continue routine instrumental examination of the urethra in the following groups of male patients:

- (1) Those presenting because of gonococcal urethritis;
- (2) Those presenting because of non-gonococcal urethritis (N.G.U.) or urinary infection;
- (3) Those with a history suggestive of previously treated urethral discharge or previously treated urinary infection.

Method of Examination

Two weeks after urethritis had apparently responded to treatment the fluid expressed by massage of the prostate and seminal vesicles was examined and this test was repeated one week later. The next week the urethra was examined. The largest curved sound that the external urinary meatus would readily admit was passed to the bladder in cases in which the response to treatment had been prompt and complete; if there was any evidence of obstruction the anterior urethra was then examined with a

Harrison urethroscope. In cases in which evidence of inflammation had persisted or recurred in spite of treatment, the passage of a curved sound was preceded by urethroscopy. All these examinations were carried out by the same observer except in a small number of cases during periods of annual leave.

At the time of examination patients were instructed that, if any discharge developed, they should attend for tests of the urethral secretion in the morning before passing urine; otherwise they should not pass urine for 4 hours before attending one week after examination. On that occasion a culture and wet and dry smears were taken of any excessive urethral secretion. The urine was inspected and, if indicated, cultured, and the centrifuged deposit was examined, any threads being examined microscopically.

Material

Patients were studied at four clinics (metropolitan, country town, suburban, and seaport) which formed widely different groups.

At the Metropolitan Hospital in the East End of London in 1955, white patients outnumbered coloured patients by over 2 to 1; by 1958 this position was reversed and the clinic then dealt mainly with coloured patients, most of whom were local residents. As shown in Table I (opposite), instruments were passed in 61 per cent. of coloured as against 45 per cent. of white patients. Here non-gonococcal urethritis (N.G.U.) was only slightly more common than gonorrhoea (1.3 to 1) and patients suffering from these conditions were subjected to instrumental examination in a similar ratio (Table II, opposite).

At the Chelmsford and Essex Hospital there were no coloured patients and at Oldchurch Hospital, Romford, there was one. At these centres N.G.U.

* Based on a paper read before the Medical Society for the Study of Venereal Diseases on January 30, 1959.

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TABLE I
RACE AND AREA

Hospital and Dates	Race	Patients		Instrumental Examinations		Strictures Found	
		No.	Per cent. Coloured	No.	Per cent.	No.	Per cent.
Metropolitan 14.7.54 to 1.10.58	White	182		83	45.6	4	4.8
	Coloured	236	56.5	144	61	5	3.5
	Total	418		227	54.3	9	4
Chelmsford 1.12.51 to 1.8.56*	White	111		43	38.7	2	4.7
	Coloured	0	0				
	Total						
Oldchurch 1.12.51 to 31.12.57*	White	522		199	38.1	10	5.0
	Coloured	1	0.2	1		1	
	Total	523		200	38.2	11	5.5
Tilbury 1.12.51 to 1.8.56*	White	150		25	16.6	1	4
	Coloured	42	21.9	3	7.1	—	
	Total	192		28	14.6	1	3.6
Total All Areas		1,244		498	40	23	4.6

*Except 13 months from June, 1952, to July, 1953.

TABLE II
DIAGNOSIS, BY DISTRICT AND BY STRICTURES FOUND

Hospital		N.G.U.	Gonorrhoea	Pre-vious Treatment	Ratio N.G.U./Gon/Prev. Tr.
No. of Patients	Metropolitan	220	164	34	1.3/1/0.2
	Chelmsford	77	27	7	2.9/1/0.3
	Oldchurch	321	118	84	2.7/1/0.7
	Tilbury ..	92	52	48	1.8/1/0.9
	Total ..	710	361	173	2/1/0.5
No. of Instrumental Examinations	Metropolitan	121	86	20	1.4/1/0.2
	Chelmsford	28	8	7	3.5/1/0.9
	Oldchurch	163	13	24	12.5/1/1.8
	Tilbury ..	16	6	6	2.7/1/1
	Total ..	328	113	57	2.9/1/0.5
No. of Strictures ..		16 (4.9 per cent.)	2 (1.8 per cent.)	5 (9 per cent.)	

was the local disease and nearly three times as common as gonorrhoea which occurred mainly in transients who had caught their disease elsewhere. Selective default occurred in the gonorrhoea group, so that at Romford the urethral examinations were over twelve times as many in the N.G.U. group as in the gonorrhoea group (Table II).

At the Tilbury and Riverside Hospital there was a mixed attendance of white and coloured patients; N.G.U. was twice as common as gonorrhoea, the group previously treated for urethral discharge was relatively large, and there was a high proportion of transients.

Essentially the same incidence of stricture was found in these four clinics serving different sections

of the population (Table I). Follow-up proved more effective in coloured patients than in white (Table III), but the incidence of stricture was similar in the two groups (4.9 per cent. in white patients and 4.1 per cent. in coloured).

TABLE III
INCIDENCE, BY RACE

Race	No. of Patients	Instrumental Examinations		Strictures Found	
		No.	Per cent.	No.	Per cent.
White ..	965	350	36.3	17	4.9
Coloured ..	279	148	53.1	6	4.1
Total	1,244	498	40	23	4.6

The incidence of positive findings has remained relatively constant over the years (Table IV).

TABLE IV
INCIDENCE, BY YEAR

Year	No. of Instrumental Examinations	Strictures Found	
		No.	Per cent.
1951	5	0	—
1952	32	2	6.2
1953	29	1	3.4
1954	63	4	6.3
1955	96	4	4.2
1956	90	5	5.5
1957	103	4	4.0
1958	80	3	3.7
Total	498	23	4.6

In all, twenty-three strictures were found in 498 patients in whom instruments were passed (4.6 per cent.). The figure of twenty-three is, of course, considerably less than the number of cases of urethral stricture actually seen during the years under review, because it excludes all patients already attending for treatment of stricture. The small group of seven patients who presented with urinary infection or with a past history of that condition are considered together with those who presented with N.G.U. or who gave a past history of discharge. In this group of seven, three patients were found to have urethral stricture.

Relationship of Disease to Stricture Formation

Gonococcal Urethritis.—361 patients presented themselves because of gonococcal urethritis, instruments were passed in 113, and stricture was found in two (1.8 per cent.). In the first case the stricture could have been due to gonorrhoea with secondary N.G.U., or to N.G.U. itself; there was a history of previous N.G.U. and mild urethritis had persisted after the treatment of gonorrhoea. In the second case, that of a young man aged 22 years, the stricture was probably of congenital origin, for there was a history of previous "cystitis", the urinary stream had been rather small since boyhood, and the stricture was a non-sclerotic diaphragm at the proximal entrance or "star-shaped figure" of the bulb, which had not contracted 7 months after the completion of dilatation to 24 Charrière.

Non-gonococcal Urethritis.—Instruments were passed in 328 out of 710 patients in this group and stricture was found in sixteen (4.9 per cent.). Thirteen of the sixteen gave a history of previous urethral discharge, but in one case this history was only obtained on re-questioning after the stricture had been found. In seven of these thirteen cases, there was a history of previous "gonorrhoea" on one occasion only, and in six this had occurred during the penicillin era and the disease had been treated with penicillin with apparent success.

One of the six patients with a past history of a single attack of urethral discharge treated with penicillin had a stricture which was probably of congenital origin. The patient was aged 22. After four courses of treatment for persistent mild N.G.U., tests of the prostatic-vesicular fluid and of the urethral secretions before passing urine in the morning were satisfactory, but urethroscopy revealed a membranous stricture with small lumen at the "star-shaped figure". This non-fibrotic stricture was dilated in stages to 26 Charrière. 14 months later

there had been no contraction and urethroscopy showed a narrow filament of mucous membrane crossing the urethra at the former site of the stricture as the only residual abnormality. This stricture was one of the two which, in contrast to the remainder, were non-sclerotic and probably of congenital origin.

Recurrent urinary infection without urethral discharge at any time, led to the finding of urethral stricture in one patient suffering from neurosyphilis and he is included in this group.

History of Previous Urethral Discharge or Previous Urinary Infection.—Instruments were passed in fifty-seven of the 173 patients in this group and strictures were found in five cases (9 per cent. of those examined). Three of these five patients had attended because of previous treatment for urethral discharge, and one of the three had received penicillin for his only attack of "gonorrhoea" with apparent response.

In two patients a history of urinary infection, without urethral discharge at any time, led to the finding of stricture. One of them was suffering from "tabetic bladder".

Findings Associated with Stricture.—Before urethroscopy there was microscopic evidence of chronic prostatic-vesiculitis in eight of nineteen cases, *Trichomonas vaginalis* was detected in smears of the urethral secretion and prostatic-vesicular fluid in one of nineteen cases, and the complement-fixation test for gonorrhoea was positive in seven of twenty cases.

Modern Treatment and Stricture Formation.—In seventeen of the twenty-three cases of stricture all treatment for urethritis or urinary infection had been carried out by modern methods. Thirteen of these seventeen patients had been treated because of gonococcal or non-gonococcal urethritis, two because of episodes of urethritis and urinary infection, and two because of urinary infection alone.

Site of Stricture (Table V, opposite)

Urethral stricture involved the bulb, which was the site most commonly affected, in eleven cases; seven were at the proximal extremity or "star-shaped figure", and four were just distal to that point and involved the proximal bulb or so-called pars nuda where, as pointed out by Morales and Romanus (1953), the ventral surface of the urethra is closely applied to the diaphragmatic fascia and is unprotected by muscle.

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TABLE V
SITE OF STRICTURE

Site		Number
Meatal (2 Balanitis Xerotica Obliterans) (1 probable Balanitis Xerotica Obliterans) ..		5
Intrameatal		2
Shaft	Distal	1
	Mid	1
	Proximal	1
Bulbar Entrance ("Star-Shaped Figure")		7
Proximal Bulb ("Pars Nuda")		3
Shaft and Pars Nuda		1
Total No. of Strictures		23

Of the six patients without a history of urethral discharge in the past, two attended because of N.G.U., the stricture being meatal in one and intrameatal in the other. Three had urinary infection or gave a history suggesting that condition in the past; in two of them the stricture was at the bulb and in one it was intrameatal. One patient attended with a first attack of gonorrhoea, but he gave a past history of "cystitis" and, as already described, was found to have a diaphragmatic stricture, which was probably congenital, at the proximal entry to the bulb.

Complications of Examination

The clinical course after examination of the urethra with instruments was studied in patients who attended the Metropolitan Hospital and Oldchurch Hospital. Patients who received treatment after urethral examination that might have affected the development of urinary infection or urethritis were excluded from this study as were those with Littritis or stricture. Of 300 patients twenty did not return and subsequent observation was confined to the remaining 280. Of the patients who attended 1 week after the passage of instruments, 192 were without evidence of urinary infection then and at subsequent attendances, and showed no signs of urethritis then or at any further examination during the next 7 weeks. Of the patients who did not attend 1 week after examination but did return for subsequent observation, 69 were similarly clinically satisfactory. Thus in 261 of 280 patients (93 per cent.) the passage of urethral instruments was not followed by any clinical evidence of urinary infection or urethritis. Of these 261 patients, 144 were followed up for 1 month or more, 83 for 2 months or more, 47 for 3 months or more, and 31 for over

3 months. Of the remaining nineteen patients, urinary infection developed in one case; 2 weeks after the passage of instruments the urine was hazy, the centrifuged deposit showed pus, and *B. coli* was grown on culture. This patient had attended because of recurrent burning on micturition during the previous 18 months, and it seems likely that the passage of instruments activated an existing low-grade urinary infection. Response to treatment was prompt but the patient defaulted before the urinary tract could be investigated further.

Urethritis occurred in eighteen cases (6.8 per cent.) within 7 weeks of urethral examination. It is possible that, in some of them at least, examination of the urethra with instruments stimulated latent infection (either freshly acquired or of long standing) into clinical activity. Thus the one patient who developed gonococcal urethritis did so 3 days after examination, 7 weeks after the apparently successful treatment of gonorrhoea. Another patient, who developed N.G.U. after 3 days, admitted that a scanty morning discharge had been present for 2 days before the examination. In ten of the eighteen cases, urethritis had developed 1 week or less after examination. In six of these ten, an excess of pus had been noted in the prostatic-vesicular fluid, and in one other there had been recurrent attacks of N.G.U. After the urethritis which had followed the passage of instruments had responded to treatment, the urethra was examined again in five of the eighteen cases and the findings were normal.

Urethral bleeding occurred after examination in one case; this was due to a minute and previously unnoticed area of corrosion on a chromium plated curved sound.

Urethroscopy 2 weeks later revealed a normal urethra. After this episode curved sounds made of stainless steel were used.

Discussion

Examination of the urethra with instruments appeared clinically innocuous in 280 cases, with the possible exception of urinary infection in one. Work recently summarized by Kleeman, Hewitt, and Guze (1960) has shown that bacteriuria frequently occurs, particularly in women and in elderly people, and is often clinically silent and may be related to previous catheterization. In cases of stricture without previous local surgery, trauma, or in-dwelling catheter, the anterior urethra is involved; hence examination of the posterior urethra after urethritis, with any attendant risk of infecting the bladder, may seem unnecessary except in selected cases. However, in the present series, seven of

twenty-three strictures involved the proximal extremity of the bulb. Without considerable distension of the "star-shaped figure" with air at urethroscopy, it is possible to overlook a stricture at this site. The passage of a curved sound to the bladder obviates this possibility and permits urethroscopy to be performed at low air pressure in most cases. Nevertheless, should further studies on young males show that a significant incidence of bacteriuria follows the passage of a curved sound to the bladder, then it would be desirable to replace that method of examination by anterior urethroscopy alone, except in selected cases.

In none of the seventeen cases of stricture in which there was a history of previous urethral discharge had the urethra been examined with instruments as a test for cure. Nor, in the remaining six cases, had instruments been passed previous to the finding of stricture.

Over 160 years ago Benjamin Bell (1797) recognized that symptoms of obstruction could not be used as the guide to patients requiring examination of the urethra. He wrote:

"Where strictures are not suspected as the cause of Gleet, as often happens where the obstruction to the flow of urine is not considerable, the patient as well as the surgeon is apt to be deceived and to proceed . . ." with irrigations. "None of these remedies, however, have any influence . . . The passage should be examined with a bougie by which alone any certainty upon this point can be obtained."

Before diagnosis only three out of the twenty-three patients in whom strictures were found gave any history of symptoms of urinary obstruction. On direct questioning after the urethral stricture had been found, four more patients admitted to some symptoms of urinary obstruction. Clearly, if the urethra had been examined with instruments only because of such an indication, twenty of the twenty-three strictures would have been missed.

However, after dilation of the stricture, twenty-two of the twenty-three patients stated that the urinary stream had improved. The patient who was an exception had a stricture of wide-bore in the penile urethra which stretched to 21 Charrière at the first dilatation.

A reason for the absence of symptoms may lie in the youth of the patients in whom strictures were detected by routine instrumental examination. Excluding the two patients suffering from neurosyphilis and urethral stricture, the average age in this group was only 33 years, the youngest patient being 22 and the oldest 48 years of age.

Benjamin Bell (1797) also recognized that urethral stricture was associated with persistent urethritis.

He wrote:

"Whenever Gleet, therefore, resists the usual remedies and is thus particularly obstinate, it should be our first object to ascertain the real state of the urethra, and to learn whether strictures exist in it or not".

A cause for the clinical silence of urethral stricture at the present day is the fact that concomitant urethritis can be cleared entirely or suppressed, for varying periods, with antibiotics and sulphonamides. In ten of the twenty-three cases discussed above, however, two or more courses of treatment for the current episode of urethritis had been necessary to produce this result before urethroscopy was undertaken.

The clinical features of urethral stricture are now inconstant and unreliable guides to the selection of cases of urethritis for urethroscopy and selection appears inadvisable for the following reasons:

(1) Clinical latency in both N.G.U. and gonorrhoea may mean that the history gives little indication of the duration of the disease.

(2) A history of a previous episode of discharge may not be forthcoming until the stricture has already been found and occasionally, as in six cases in this study, not even then.

(3) Although persistent or relapsing urethritis was a feature in ten cases it did not occur in thirteen. Urethral stricture may be clinically silent and can only be excluded by examination of the urethra with instruments.

(4) It is only by carrying out the examination as a routine procedure after urethritis that young clinicians will receive the training necessary to make it the painless and accurate diagnostic test that it should be.

(5) The yield of positive findings where unselected cases were examined was high. For every twenty-two such examinations one stricture was found. The work of Stephenson (1956) on a rather different group suggests that this high incidence is not exceptional. He studied 243 men referred to a Canadian Urological Clinic for investigation because of urethral discharge, and found urethral stricture in thirteen cases (5 per cent.).

The high incidence of abnormal findings does not include other conditions, such as Littritis, which can only be diagnosed by examining the urethra with instruments. In the present study, three cases of severe Littritis and one of urethral sinus were diagnosed at urethroscopy.

It appears that examination of the urethra with instruments is necessary in all cases of urethritis.

Summary and Conclusion

The routine examination of the urethra with instruments in 498 patients led to the finding of urethral stricture in twenty-three (4.6 per cent.). Thus, for every twenty-two such examinations, one stricture was discovered. It seems that, despite modern methods of treatment, this is one of the most important of the tests for cure following urethritis and that its use should be continued.

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Fréquence du rétrécissement urétral chez l'homme après l'urétrite

Résumé

Une exploration instrumentale régulière de l'urètre de 498 malades révéla un rétrécissement urétral chez 23 d'entre eux (4,6%). On découvrit ainsi un rétrécissement sur 22 explorations. Il semble que, malgré les méthodes modernes de traitement, cette exploration constitue la plus importante épreuve de guérison d'une urétrite et que l'on devrait continuer à l'employer.