Treatment of urethral stricture disease by internal urethrotomy followed by intermittent 'low-friction' self-catheterization: preliminary communication

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Summary

The aim of this study was to determine whether the natural course of urethral stricture disease could be modified following urethrotomy by teaching patients intermittent self-catheterization. Preliminary results in 42 patients show that postoperative urine flow rates can be maintained if this method of 'low-friction' catheterization is adopted. The technique has been well received by an elderly group of patients and can be recommended for wider use.

Introduction

The treatment of urethral stricture disease is one of the oldest problems facing the urological surgeon and the earliest records of medicine are concerned with the management of strictures by means of catheters and sounds. Treatment by regular bouginage has been advocated for many years and, despite the vogue for blind urethrotomy during the 18th and 19th centuries, dilatation has remained the standard for comparison. In 1964 Helmstein[1] advocated the use of urethroscopy before and after blind urethrotomy to enable the stricture to be accurately localized and checked for a satisfactory incision. However, during the last 10 years internal urethrotomy under direct vision, popularized by Sachse in 1974[2], has become the mainstay of treatment in many urological departments, while urethroplasty operations have often been reserved for complex strictures or for those cases where other simpler methods have failed. The objective using precision endoscopic surgery compared with traditional dilation has been to keep trauma to a minimum, but the essential problem of how to stop the raw edges from sticking together again and how to stop the scar from shrinking still remains[3] (Figure 1).

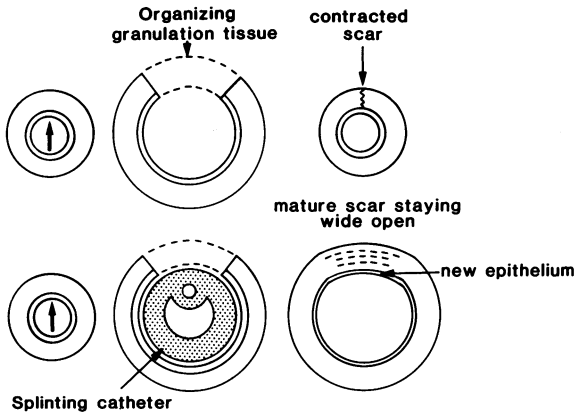

Figure 1. Cutting the stricture leaves a gap; the kernel of the problem in internal urethrotomy is how to stop the scar from shrinking. A splinting catheter may keep it widely open until the scar tissue is mature. (Reproduced from Blandy[3], with kind permission)

Some surgeons have left catheters of different materials in the urethra for more or less prolonged periods of time[4-7], some have instilled steroids in the hope of preventing fibrosis[4,8], while others have used a regimen of autodilatation, instructing the patient to void against resistance formed by pinching his urethra at the tip[9]. We have used a different technique, teaching patients intermittent self-catheterization using a disposable Lofric catheter with a surface coating of hydrophilic polymer, polyvinylpyrrolidone (PVP), to enable easy lubrication when dipped in water and so reduce friction on the urethral mucosa[10].

Patients and methods

Since November 1985, over 85 patients have been started on intermittent low friction self-catheterization (ILSC) following optical urethrotomy, in the hope of preventing or modifying restenosis of the urethra. The first 42 patients had the longest follow up period and are reported here. The majority ($n=37$) were under urological review for many years and had many urethral dilatations and multiple urethrotomies for recurrent stricture disease (recurrent stricture group). A small number ($n=5$) presented with a stricture for the first time (new stricture group). The age range of all 42 patients was 23-82 years (mean 62 years) compared with 23-58 years (mean 43 years) for the 5 patients in the new stricture group.

The diagnosis of a recurrent or new stricture was confirmed by urethroscopic evaluation under general anaesthetic. The sites involved were the penile or bulbar urethra, and several had narrowing in more than one segment. In all cases the procedure suggested in 1974 by Sachse[2], and more recently recorded by Smith *et al.*[5] and Gaches *et al.*[4], using the Storz urethrotome was adopted. In those cases where urethral narrowing was severe, after visualizing the face of the stricture, the channel was canulated by passing a small retrograde ureteric catheter (without stylet) down the instrument and through the stricture. Incision into the strictured urethra was confined to the 12 o'clock position, with the cutting blade extended and moving the whole instrument in an upward and outward direction. The length of the incision extended from normal urethra proximally to normal urethra distally and included the full thickness of the strictured segment. Bleeding points were occasionally diathermized using an electrode down the operating port of the urethrotome.

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It has not been our routine policy to catheterize patients following urethrotomy, but a few patients were catheterized for up to 48 hours for urethral bleeding. All the patients were discharged home when voiding comfortably and were followed up as out-patients in a weekly 'stricture clinic' started for this purpose.

Patients were first seen 3-7 days after their urethrotomy and a flow rate was obtained. For the purpose of the study this initial visit was designated *time 0*. Forty patients were then taught the technique of intermittent self-catheterization using 16 Ch or 18 Ch Lofric (Astra Meditec) hydrophilized disposable urinary catheters. The remaining 2 patients were unable to catheterize themselves due to tetraplegia and a right hemiparesis respectively. In these cases a relative and the district nurse were invited to the clinic to be shown the procedure.

All patients were given enough catheters to pass a new one twice a week for a month. They were given a 'diary card' to fill in, recording whether urine drained during catheterization and if any difficulty was encountered. After this first month the frequency of catheterization was reduced to once a week, and the patients were reviewed at 2-3 monthly intervals. A flow rate was obtained at each of these clinic visits. All patients were encouraged to attend the clinic on an 'open access' basis if any problems arose.

Catheterization was continued for 3 months in patients with new strictures and for a longer period of 6 months or more in the recurrent stricture group. The reason for the different times in this second group is that they were randomized at 6 months to a group continuing catheterization and a group who have stopped catheterization, but in this paper all the results refer to patients on or at the end of their period of catheterization (Figure 2). Flow rate traces were analysed and the maximum flow rate (QMAX) was recorded.

Results

New stricture group

This comprised 5 patients, mean age 43 years, all of whom were able to catheterize satisfactorily and maintain urinary flow rates over the 3-month period. The mean values were 32 ml/sec at *time 0* and 36 ml/sec at 3 months (Figure 3).

Recurrent stricture group

This comprised 37 patients, mean age 64 years, 32 of whom were able to catheterize satisfactorily and maintain urinary flow rates for 6 months or more (range 6-10 months, mean 6.6 months) (Figure 2). Despite satisfactory catheterization, urodynamic assessment was not possible in 3 patients: 2 had neurological disease and the third debilitating carcinoma of the prostate, making hospital visits impractical. Urinary flow rates were assessed in 29 patients, the mean values being 19 ml/sec at *time 0* and 20 ml/sec at 6 months plus (Figure 3). Using the Wilcoxon signed rank test for paired data, there was no significant difference between the two values ($P > 0.1$).

The remaining 5 patients either had some difficulty or failed with this technique. The ages of these patients are widely scattered and are not just an elderly group as might be expected. The mean flow rates fell from 25 ml/sec at *time 0* to 12 ml/sec at 6 months plus (Figure 3). Details of these patients follow.

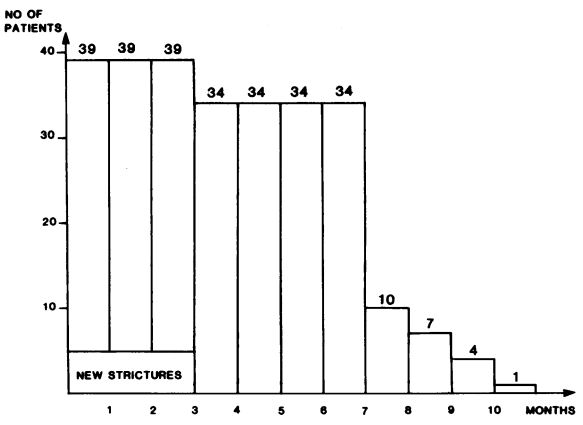


Figure 2. Cumulative follow up of patients

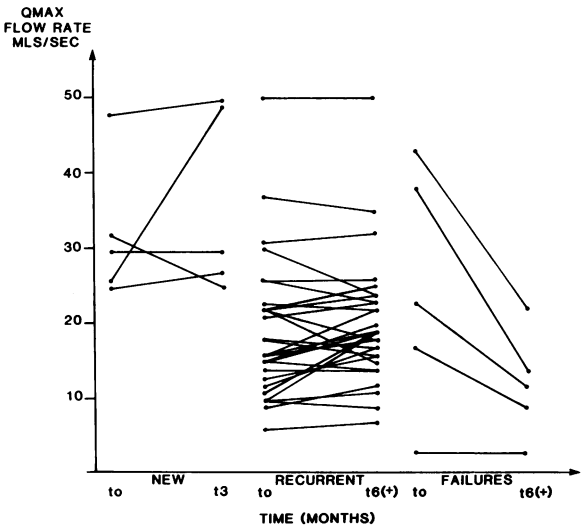


Figure 3. Paired results for maximum flow rate postoperatively (t0), and at 3 months (t3) for new strictures and at 6 months or more (t6(+)) for the recurrent stricture group

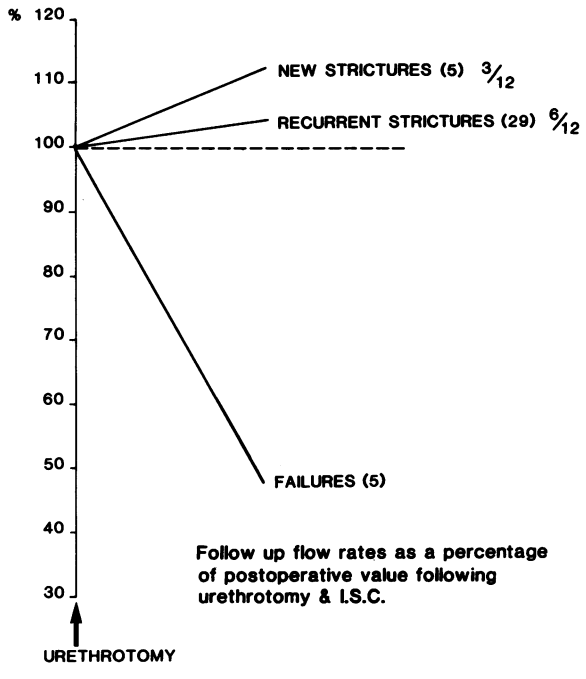


Figure 4. The 'Three Flow' test applied to patients in this study. It should be noted that 4 of the 5 'failures' are now well on ILSC

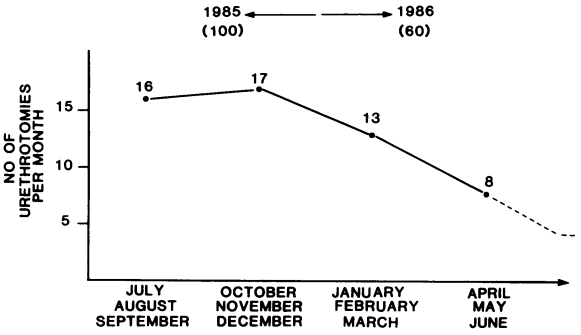


Figure 5. Analysis of operating theatre logbook showing the number of urethrotomies per month

Case 1 (age 37): The patient stopped catheterizing after some weeks as he felt 'so much better'. A urethroscopy showed a recurrence of his stricture, and another urethrotomy has been performed. His flow has been maintained on ILSC postoperatively.

Case 2 (age 57): The patient stopped catheterizing after a few weeks as his urinary flow was 'much better'; however the stricture returned within two months and a urethrotomy was needed. For a second time he failed to use the catheters as directed, and the same sequence of events took place. His flow has now been maintained on ILSC for several months.

Case 3 (age 64): The patient stopped catheterizing after a few weeks and has failed to attend several outpatient appointments. We are awaiting his return with recurrent symptoms.

Case 4 (age 74): The patient was unable to drain urine when catheterizing even from the outset; however, he was unwilling for a repeat urethroscopy, but eventually after many months with a flow of 3 ml/sec agreed to a further examination which showed a wide urethra with no stricture but a very tight bladder neck stenosis which was incised. His urinary flow has improved and he is continuing on ILSC.

Case 5 (age 82): The patient has some difficulty passing catheters 'now and again' but symptomatically maintains a good flow.

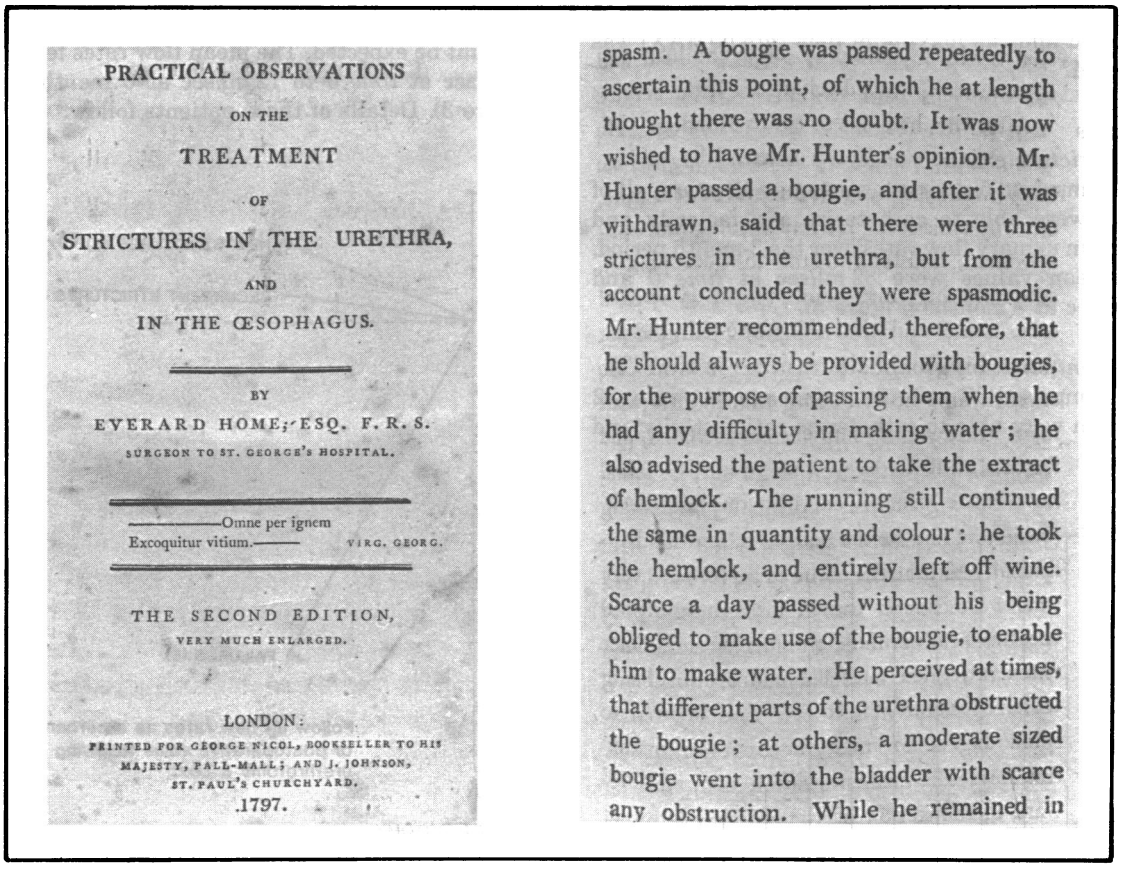
It can be seen that 4 of these 5 patients are now being maintained on intermittent low friction catheterization and flow rates are being well maintained.

Complications

Two of the 42 patients developed a symptomatic urinary infection and one of these developed epididymitis. Both were successfully treated with antibiotics and have subsequently continued catheterization.

Discussion

Intermittent self-catheterization is a well recognized and widely practised technique which we have applied to prevent recurrent urethral stenosis after optical urethrotomy. Many patients were elderly and the majority had been subjected to multiple previous operations and urethral dilatations for recurrent stricture disease. This new form of treatment using Lofric catheters has been well received by this group of patients. The simplicity of catheterization without the need for extra lubrication or local anaesthetic gel has resulted in very good patient compliance. In only 3 patients whose neurological disease or debility prevented self-catheterization, did we encourage a relative or district nurse to pass the catheters.



PRACTICAL OBSERVATIONS
ON THE
TREATMENT
OF
STRICTURES IN THE URETHRA,
AND
IN THE ŒSOPHAGUS.

BY
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SURGEON TO ST. GEORGE'S HOSPITAL.

——————Omne per ignem
Excoquitur vitium.—— VIRG. GEORG.

THE SECOND EDITION,
VERY MUCH ENLARGED.

LONDON:
PRINTED FOR GEORGE NICOL, BOOKSELLER TO HIS MAJESTY, PALL-MALL; AND J. JOHNSON, ST. PAUL'S CHURCHYARD.
1797.

spasm. A bougie was passed repeatedly to ascertain this point, of which he at length thought there was no doubt. It was now wished to have Mr. Hunter's opinion. Mr. Hunter passed a bougie, and after it was withdrawn, said that there were three strictures in the urethra, but from the account concluded they were spasmodic. Mr. Hunter recommended, therefore, that he should always be provided with bougies, for the purpose of passing them when he had any difficulty in making water; he also advised the patient to take the extract of hemlock. The running still continued the same in quantity and colour: he took the hemlock, and entirely left off wine. Scarce a day passed without his being obliged to make use of the bougie, to enable him to make water. He perceived at times, that different parts of the urethra obstructed the bougie; at others, a moderate sized bougie went into the bladder with scarce any obstruction. While he remained in

Figure 6. Mr. Hunter's opinion recommending intermittent self-bouginage. (From Practical Observations on the Treatment of Strictures in the Urethra *by Everard Home, 1797)*

Following urethrotomy, surgeons have advised continuous catheterization of the urethra for varying lengths of time[4-7], and have used different catheter materials[6]. Some have claimed that indwelling catheterization for up to 6 weeks has given a more lasting effect in maintaining urinary flow. Significant disadvantages of this policy are risk of urinary infection and inconvenience of emptying a leg-bag, particularly for elderly patients. Furthermore, if ILSC is adopted as a method of treatment in the post-operative period, indwelling catheterization can be completely avoided in the majority of cases, thereby shortening any postoperative hospitalization.

George and his colleagues[11] have described the 'Three Flow' test to identify patients with 'problematic urethral stricture' disease. Performing urinary flow rates preoperatively, postoperatively and after a period of 3 months, they found that this 3-month value was accurate in discriminating cases effectively cured by one urethrotomy (mean 88% of postoperative value) from those who repeatedly deteriorated despite multiple further optical urethrotomies (mean 33% of postoperative value). We analysed our new stricture group at 3 months but have taken a flow at 6 months or more for the recurrent stricture group. Our patients have maintained their flow rates and the mean values were 112% (postoperative value) for the new strictures and 105% (postoperative value) for the recurrent stricture group (Figure 4).

It is not yet clear whether low-friction catheterization needs to be continued indefinitely for patients with difficult recurrent stricture disease or whether some degree of urethral stabilization occurs when a critical time has passed. We have not found any obvious difference using 16 Ch or 18 Ch catheters, but routinely now prefer the larger size as this enables easy instrumentation at a later date when necessary.

Analysis of the operating theatre logbook, as an independent record, showed that there has been a dramatic reduction in the number of urethrotomies performed since this treatment was started (Figure 5).

To conclude we have found this a very satisfactory method of managing patients with recurrent strictures. The Lofric catheterization is new, but many references can be found in 18th and 19th century literature when self-bouginage was clearly commonplace. An example from 1797 (Figure 6) records Mr Hunter's opinion recommending intermittent self-bouginage.

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