

Direct Vision Internal Urethrotomy in the Management of Urethral Strictures (A Four Year Experience)

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Direct vision internal urethrotomy is a safe, effective means to treat urethral strictures and bladder neck contractures. Over a period of 4 years, we have treated 225 patients of urethral stricture to find out the aetiology of this disease in the study group and to evaluate the factors effecting the outcome of internal urethrotomy. All patients were evaluated with detailed history, clinical examination, routine urine examination, urine culture if required and retrograde / voiding cystourethrogram to determine the site, number, length and severity of stricture. The majority of strictures in our study were iatrogenic in nature (51%) and were located in bulbous urethra (49%). Urethroscopy was performed and strictures were incised with cold knife at 12 O'clock along the whole length and depth. Following urethrotomy, an indwelling catheter was placed for a variable time depending upon the severity of the disease. Two hundred and five patients were followed up for a period of 6 months to 2 years. Satisfactory voiding was achieved in 78% of all cases. The results of the urethrotomy were better in short strictures and those managed with less period of catheterization. Traumatic and strictures at multiple sites responded poorly to optical internal urethrotomy. The overall complication rate was 9%. It is concluded that internal urethrotomy is a safe technique that should be exercised as a therapeutic trial before a final decision to perform definite urethroplasty.

Key words : Urethral stricture, endoscopy, internal urethrotomy

A stricture is a scar causing a decrease in the calibre of the urethra, most often as the result of injury or inflammation¹. Urethral strictures reduce the urine flow velocity and calibre of urinary stream. Symptoms of more severe outlet obstruction appear as the bladder decompensates. The combination of obstruction and bladder decompensation eventually will reach the point that the patient is unable to void².

The earliest recorded attempts to treat urethral strictures dates back to sixth century BC when dilators of metal and wood were described in the Ayurveda³. The procedure was changed little during next 2400 years until the early 1800's when Civiale developed the prototype urethrotome⁴. Direct vision urethrotomy with electrocautery was described by Ravasini in 1957. Sachse introduced an instrument with a sharp cold blade to incise strictures under direct vision in 1971. The instrument provided visual precision and control over the blind passage of the older internal urethrotomes of Maisonneuve in 1854 and Otis in 1872⁴.

The use of direct vision urethrotomy in the management of urethral strictures has steadily increased since its introduction in 1971¹. It has provided urological surgeons with the means of treating most urethral strictures effectively and safely and does not require the specialised techniques of the reconstructive urologist or a major commitment of operating time⁵. Despite this, the long term results of urethrotomy have not been compared with those of urethroplasty. The overall place of urethrotomy in the management of urethral strictures, its success rate, the reasons for failure and the best methods of postoperative management requires further discussion.

The present study was conducted at the Department of Urology, Jinnah Hospital, Lahore to assess the efficacy and safety of internal urethrotomy technique in the treatment of urethral stricture disease and to study the complications, drawbacks and limitations of this procedure.

Materials and methods :

Between January 1996 and December, 1999, urethral strictures in 225 male patients were treated by direct vision internal urethrotomy. Strictures not requiring hospitalisation, or those treated with urethral dilatations, were not included in this series. Preoperative assessment included a complete history, thorough physical examination, routine urine examination, urine culture if required and retrograde / voiding urethrocytography. All preoperative infections were treated with antibiotics.

The patients were treated with internal urethrotomy using a Karl Storz or Wolf urethrotome under spinal or general anaesthesia. The stricture was incised at 12 O'clock position along its entire length and depth. The site, length, size and density of strictures were noted. After internal urethrotomy, a 16F Foley's silicon catheter was inserted. The catheter was left for variable time depending upon the severity of stricture.

Postoperative management consisted of sterilising the urine with antibiotics in all patients and removing the catheter as early as possible. Some of the patients who had long strictures were taught clean intermittent self catheterization (CISC). All patients have been followed for at least 6 months and the majority for 2 years after the initial procedure. If recurrence of the stricture(s) was found the primary procedure was repeated. If more than 3

recurrences occurred in 1 year urethroplasty was performed.

Postoperative results were classified into five categories⁴.

1. Excellent (4+) if there was no further treatment after a single urethrotomy
2. Good (3+) if the patient required only a single dilatation per year after 1 urethrotomy,
3. Fair (2+) if a complication of urethrotomy occurred and/or 2 dilatations per year were required to keep the patient asymptomatic
4. Poor (1+) if a complication of urethrotomy occurred and/or repeat operation was required to treat voiding symptoms (a repeat operation in this category includes repeat urethrotomy or suprapubic cystostomy: it does not include urethroplasty) and
5. Failure if reconstructive urethroplasty.

We have also analysed our results on the basis of site and length of strictures and duration of catheterization. In case of multiple strictures, the cumulative length of all the strictures was taken into consideration. Results of urethrotomy in excellent, good and fair categories were considered as satisfactory while those in poor and failed were unsatisfactory.

Results

Age of patients ranged between 10 to 82 years with a mean age of 57 years. The aetiology of strictures is enumerated in Table-1. The majority of strictures in our series were iatrogenic in nature (51%) followed by traumatic strictures (27%). Infective stricture (9%) were less common. In 30 patients (13%) the cause of strictures could not be ascertained.

Table-1 Aetiology of urethral strictures.

Causes	No. of Pts	(%)
a) Iatrogenic	115	51%
1. Transurethral Prostatectomy	60	27%
2. Transvesical Prostatectomy	25	11 %
3. Catheterization / Urethral Inst.	30	13%
b) Infective	20	09%
c) Traumatic	60	27%
d) Unknown	30	13%
Total No.	225	100%

Figure-1 shows the distribution of cases according to the site of stricture. The most common location of strictures was bulbous urethra (49%). The other sites were penile (20%) and membranous urethra (13%). Forty patients (18%) had strictures at multiple sites in urethra. The length of the stricture was < 1.5 cm in 75 (37%) patients, between 1.5-3 cm in 85 (41%) patients, and it was > 3 cm in 45(22%) patients (Table 4).

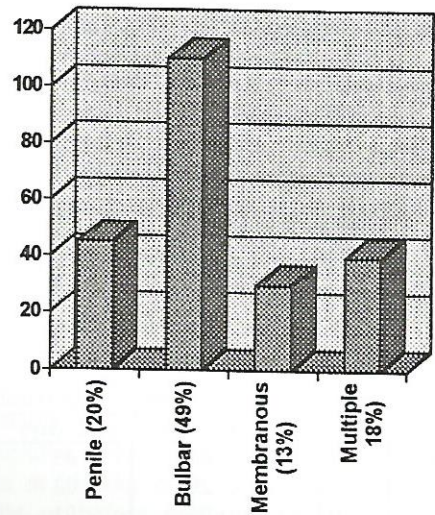


Fig.1.Distribution of cases according to site of stricture

A total of 205 patients were available for evaluation of results (Table-2). Eighteen patients were lost to follow up and 2 elderly patients died 2 months post-operatively of ischemic heart disease unrelated to operation. Of 205 patients evaluated, 115 had excellent results, 35 had good results and 10 had fair results. One hundred and sixty patients (78%) were voiding satisfactorily 12 months after the operation. Of the 10 failures, 9 under-went a successful reconstructive urethroplasty and one patient with severe stricture was stable with dilatation every one month.

The results of internal urethrotomy depending upon site of stricture are shown in Table-3. It shows that 54% of patients with multiple strictures had the most unsatisfactory results. As expected, patients with multiple strictures were less responsive to treatment than those with distinct strictures localised to 1 region of urethra. The second most common location with unsatisfactory results occurred in patients with bulbous stricture (20%). The best results were observed in patients with single stricture in penile urethra.

Table-2 Results of internal urethrotomy.

Results	No. of Pts	(%)
Excellent (4+)	115	56%
Good (3+)	35	17%
Fair (2+)	10	05%
Poor (1+)	35	17%
Failed	10	05%
Total No.	205	100%

Table-3 Results compared to site of urethral stricture

Site	Excellent	Good	Fair	Poor	Failed	Satisfac-tory	Un-satis-factory
Penile	34	02	1	02	1	91%	09%
Bulbar	60	23	1	15	6	80%	20%
Membranous	19	04	0	02	0	92%	08%
Multiple	02	06	8	16	3	46%	54%

Table-4 Results compared to length of urethral stricture

Stricture length (cm)	Excellent	Good	Fair	Poor	Failed	Satisfac-tory	Un-satis-factory
> 3	16	05	2	15	7	51%	49%
1.5 - 3.0	46	10	8	19	2	75%	25%
< 1.5	53	20	0	01	1	97%	03%

Table-5 Results on the basis of duration of catheterization

Results	< 3 days	3-7 days	8-21days	>21days
Excellent	46	63	05	1
Good	12	20	02	1
Fair	03	05	01	1
Poor	10	13	08	4
Failed	03	04	02	1
Total No.	74(36%)	105 (51%)	18 (9%)	8 (4%)

Table-6 Results compared to aetiology of strictures.

Causes	Poor	Failed	Totals
Iatrogenic	12	3	15 (13%)
Infective	05	1	06 (30%)
Trauma	15	5	20 (33%)
Unknown	05	1	06 (20%)

The results of internal urethrotomy were also compared with the length of stricture (Table-4). Satisfactory results were obtained in 97% cases in strictures of < 1.5 cm. The same were 75% and 51% in strictures measuring 1.5 to 3 cm and > 3 cm respectively.

Table-5 shows the analysis of the results on the basis of duration of catheterization. The duration of catheterization was < 3 days in 36% of cases, 3-7 days in 51%, 8-21 days in 9% and > 21 days in 4% of cases. In general, the patients who were catheterised for < 1 week had better voiding results than those catheterised longer. The satisfactory voiding results were obtained in 82% of cases in < 3 days of catheterization and 83% in 3-7 days of catheterization

A comparative analysis was done to identify the causes of urethral stricture that may be responsible for unsatisfactory results. Table-6 shows that results of internal urethrotomy were not satisfactory in post-traumatic and postinfective strictures.

In our study, twenty patients had complications, resulting in overall morbidity rate of 9% (Table-7)

Discussion

Urethral stricture in the male still presents one of the most common and challenging problems to the Urologists. The methods available for treating urethral strictures consists of urethral dilatation, external urethrotomy, internal urethrotomy - blind or optical, excision and suture and urethroplasty^{2,7}. Urethral dilatation by graduated bougies

used to be standard treatment, and there were few strictures to which it was not applied. Most uncomplicated strictures are amenable to trial of dilatation. If dilatation of urethral stricture has to be performed more frequently than every 3 to 4 months, direct vision internal urethrotomy should be considered⁸. Strictures that fail dilatation or internal urethrotomy or are complicated by false passages, infections or fistulas, require an open surgical procedure^{7,8}.

Internal urethrotomy under optical control was introduced in 1974 by Sachse, the method reviving the primary treatment of new as well as recurrent urethral strictures^{8,9}. The operation is simple and preoperative and postoperative morbidity is low. Optical urethrotome allows the urologist to incise the stricture under direct visualisation without making a skin incision and is the procedure of choice for nonobliterated strictures proximal to the fossa mavericaris. Even deep bulbar or membranous strictures near the distal sphincter can be precisely incised with minimal risk of incontinence^{9,10,11}. Since the introduction of the direct vision urethrotome, this principle has been widely adopted and has become the most important treatment of urethral stricture.

Some decades ago the most important cause of urethral stricture was infection but with the introduction of efficient antibiotic treatment and extensive use of transurethral surgery, iatrogenic strictures have become more common. In our study, 51% of our cases had iatrogenic reasons. The causes of iatrogenic strictures in the present study was transurethral prostatectomy (27%), transvesical prostatectomy (11%) and catheterization / urethral instrumentation (13%). It is important to avoid stricture complications in transurethral surgery by refining techniques and instruments and by performing prophylactic procedures such as urethrotomy¹⁶. The second most common cause of strictures in our series was trauma either direct or indirect. Infective strictures (9%) were less common. This is also in agreement with other workers^{4,5}.

Initial reports of internal urethrotomy were extremely favourable, reporting success rates of 75 to 85%^{12,13}. However, some studies have shown lower cure rates^{14,15} and it is evident that further controlled prospective work is needed on this subject. In the present study, satisfactory results were achieved in 78% of the cases and the overall

morbidity was 9%. Unsatisfactory results were noted in patients with multiple strictures and those with >3 cm long strictures. Better results occurred in those patients managed with a silicon catheter post-operatively for < 7 days. The common factors in all failure were the length of the diseased urethra and extensive periurethral fibrosis. While length itself is not a contraindication to visual urethrotomy, the best results were obtained in patients in whom the stricture was single and short. Forty-nine percent of our patients with strictures >3 cm long had treatment failures. Next to length important is aetiology. Of the 47 patients out of 205 patients considered failures, 20 patients (33%) had traumatic strictures, 6 patients (30%) had infective strictures and 15 patients (13%) had iatrogenic strictures. (Table-6).

Table-7 Complications of cold knife urethrotomy.

Complications	No. Pts
Bleeding	4
Infection	5
Urinary Retention	3
False passage	3
Extravasation	3
Urethrorectal fistula	2
Total :	20

Although internal urethrotomy under vision itself is fairly standardised, the post-operative regimen differs greatly, particularly the duration of catheterization. This period has varied from 7 days or less^{4,17} to 3 to 6 weeks^{5,18}. It has been argued that the catheter should be left indwelling until re-epithelization has taken place usually about 5 days. Benizri and his associates (1992) reported the duration of postoperative catheterization to be 10 days; catheterization for longer period did not provide significant advantage¹⁹. This was observed in our study also that better results occurred in those patients whose duration of post-operative catheterization was less than 7 days.

The success rate obtained in our centre correlates well with the cure rate reported by other workers. Kirchheim and associates (1978) found that 80% of the patients treated with internal urethrotomy had good results, with at least 6 months of follow up¹². Sacknoff and Kerr (1980) reported success rate of internal urethrotomy in 71% of their patients⁴. Holm-Neilsen and his co-workers (1984) employed direct vision internal urethrotomy on 369 occasions in 225 patients during a 4 year period. They showed an overall cure rate of 77%¹³. Heyns and associates (1993) evaluated the efficacy of internal urethrotomy as treatment of male urethral strictures in 210 men and found it successful in 70% of all patients²⁰.

The technique of internal urethrotomy under direct vision, although precise and simple, may produce such serious complications as haemorrhage, extravasation, priapism, impotence and penile pain. Twenty patients in our study had complications, resulting in overall morbidity

rate of 9% (Table-7). This rate compares favourably to a 15.9% complication rate in other larger series¹². Though complications can occur with urethrotomy, these are significantly less than with other methods of stricture treatment^{1,2}. Most of the complications occurred in early days of urethrotomy and with better case selection, preoperative antibiotics and reduced postoperative urethral care, their incidence has been considerably reduced.

When carefully performed, internal urethrotomy under direct vision is highly useful for the primary management of any urethral stricture. Direct vision cold knife urethrotomy should be exercised as a therapeutic trial before final decision to perform definite urethroplasty. If severe stricture formation recurs within six months requiring repeat urethrotomy, reconstructive urethroplasty is recommended. This versatile technique may be used in the urethra or bladder neck, before transurethral or open prostaticomy or before resection of bladder tumours or removal of bladder stones. It is a safe procedure with low morbidity that can be performed under general, spinal or local anaesthesia^{7,8}.

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