

# The Role of Internal Optical Urethrotomy in the Treatment of Male Urethral Stricture

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## Abstract

**Background:** Male urethral stricture is as yet considered one of the very popular and defying dilemmas to the urologist. Treatment modalities include dilation, endoscopic urethrotomy and urethroplasty, however internal optical urethrotomy displays rapid cure, lower scarring, and minimal hazard of infection. **Purpose:** To evaluate the efficacy of internal optical urethrotomy in the treatment of patients with urethral stricture. **Patients & Methods:** This study was carried out at Al-Yermouk Teaching Hospital/Baghdad/Iraq in the period between January 2015 and January 2018. A group of 75 male patients (16 - 25 years of age) presented with urethral strictures had been treated with internal optical urethrotomy. Follow-up period ranged from 1 - 3 months. Outcome was graded as good, fair and poor. **Results:** Out of 75 patients, 28 (37.3%) were (21 - 30) years of age. Trauma was the most popular source of stricture found in 40 (53.3%) and the most widespread presenting feature was poor urinary flow in 32 (42.6%) patients. Stricture in the bulbous urethra in 48 (64%) cases was found to be the most prevalent area followed by penile urethra in 16 (21.3%) cases. Overall response rate was good in 52 (69.3%) patients. Eleven (14.6%) patients exhibited only minor bleeding postoperatively with no other considerable complications. **Conclusion:** Internal optical urethrotomy is a dependable and effective procedure in treating urethral stricture.

## Keywords

Optical Urethrotomy, Urethra, Urethral Stricture, Penile

## 1. Introduction

Urethral stricture commences as fibrous lesion of urethral mucosa with decreased lumen and eventual symptom complex [1]. This narrowing blocks the

urine flow producing proximal urethral dilatation [2]. The overall stricture incidence is 0.6% in particular populations [3].

Urethral strictures are a recurrent cause of adult lower urinary tract troubles, like infection of urinary tract, acute urine retention, elevated voiding pressure producing secondary thickening and irritability of the bladder, diverticula or fistulas and abscess of the perineum [4].

Blunt perineal injury, urethral instrumentation, lichen sclerosus, and sexually transmitted diseases are the utmost repeated source of strictures; great portions are iatrogenic [5].

Patients who have urethral strictures often times exhibit obstructive emptying symptoms and urinary tract infections like infection of the epididymis or prostate gland [6].

The treatment patterns differ in accordance with site, stricture extent and etiological factors [7]. At present, urethral strictures treatment comprises many options, like dilation, urethrotomy, stent and reconstructive surgical procedures [8].

Most urethral stricture patients are treated with optical internal urethrotomyutilizing a soft mobile scalpel to slit the stricture under direct view. In fact this procedure is employed as the fundamental treatment of recent in addition to recurrent strictures [9] [10] [11] [12]. Generally an average recovery of 20% - 30% is attained with optical urethrotomy [13].

The objective of our study was to appreciate the place of optical urethrotomy in treatment of urethral stricture and to shed the light on post procedure complications and their relation to sample variables. (Estimate the symptomatic perfection and effectiveness of this treatment option).

Novelty: This study was the first study conducted in our center to evaluate the use of optical urethrotomy procedure among our patients providing a baseline for future studies.

## 2. Patients and Methods

This study was carried out at Al-Yermouk Teaching Hospital/Baghdad/Iraq in the period between January 2015 and January 2018.

A group of Seventy five male patients, with an age ranged from 16 - 52 years (mean age 36.3 years) presenting with history of urethral stricture, were included in the study. Exclusion criteria were patients with neurological deficit, diabetes mellitus, bladder stone, enlarged prostate & meatal stenosis.

All patients were evaluated clinically via medical history, physical examination & laboratory evaluation by doing urinalysis, urine culture & sensitivity, blood urea, serum creatinine levels, blood sugar & complete blood picture along with abdominal & pelvic ultrasonography. The urethral stricture was diagnosed primarily by performing uroflowmetry & retrograde urethrogram ... However, the final diagnosis was established by urethroscopy.

The procedure was performed undergeneral or spinal anesthesia. Patients were placed in dorsal lithotomy position & were properly draped. A 21 Fr

optical internal urethrotome with 0 telescope was introduced into the urethra aided by a guide wire to act as a guide for proper incision of the stricture which was done at 12 o'clock positions cutting the fibrous tissue until the urethroscope could pass with ease into the urinary bladder. Irrigation with normal saline (0.9%) was used. An indwelling 16 Fr silicon urethral catheter was inserted & left for 3 days to 2 weeks depending on the stricture length & complexity. A prophylactic antibiotic was given prior to the procedure and continued post operatively for few days following the catheter elimination. All patients were instructed to visit the department at 1 month & 3 monthly intervals for 1 year (mean 6 months) for subjective and clinical assessment (the caliber and force of urinary stream).

The criteria used to assess the success of the procedure were subjective feeling of the patient regarding his urinary stream, the uroflowmetry result and appearance of urethra on retrograde urethrogram. Outcome was graded as good (continuous strong urinary stream, maximum flow rate > 23 ml/s without proof of narrowing at the site of stricture on retrograde urethrogram), fair (diminished, intermittent urinary stream, maximum flow rate > 17 ml/s and irregular reduced diameter at the stricture level) & poor (weak urinary stream, maximum flow rate > 12 ml/s with decisive narrowing at the stricture site)

Limitation of the study included the low sample size, the lack of comparison group and the sampling from one center in Baghdad city.

Univariate and bivariate statistical analysis was used, P values of equal or less than 0.05 were considered significant.

### 3. Results

This was a cross-sectional study that involved 75 male patients with urethral strictures; the biggest group 28 (37.4%) patients were extending in age from 21 - 30 years. **Table 1** illustrated the age distribution of the studied sample.

Regarding the etiological factors of stricture; as seen in **Figure 1**, nearly half 40 (53.3%) patients had history of trauma, while 20 (26.7%) patients and 10 (13.3%) patients developed stricture secondary to iatrogenic injury and infection respectively. Idiopathic cause was found in only 5 (6.7%) patients.

The most widespread complaint was poor urinary flow in 32 (42.7%) patients followed by dribbling of urine in 16 (21.3%) cases (**Table 2**).

Out of 75, 16 (21.3%) patients had penile urethral stricture, 48 (64%) had bulbar urethral stricture while in 11 (14.7%) cases, the stricture was prostatic-membranous. As seen in **Figure 2**.

Overall response rate was good in 52 (69.3%) patients, fair in 15 (20%) and poor in 8 (10.7%) cases, **Table 3**.

Immediate post-operative complications included minor bleeding in 11 (14.6%) patients, only one of them needed blood transfusion, fluid extravasations in 3 (4%) patients, treated conservatively and did not require any surgical intervention. Six (8%) cases had urinary tract infections, treated with appropriate antibiotics.

Recurrent stricture was recorded in 8 (10.7%) patients. Five of them (6.7%) were managed through re optical urethrotomy while 3 (4%) patients needed urethroplasty (Table 4).

Statistical analysis of the data to explore the association and relationship of post procedure complications to sample variables were illustrated in Table 5 and Table 6.

Patient with penile strictures were 29.2 times more likely to develop complications after an optical urethrotomy compared to patients with urethral stricture elsewhere.

Patients who reported a good response after the procedure were 0.05 times less likely to develop complication compared with those who reported not good responses following procedure.

**Table 1.** Age distribution of participants.

| Age (years)  | No. of patients (%) |
|--------------|---------------------|
| ≤20          | 18 (24)             |
| 21 - 30      | 28 (37.4)           |
| 31 - 40      | 19 (25.3)           |
| 41 and above | 10 (13.3)           |
| Total        | 75 (100)            |

**Table 2.** The presenting complaint in the patients.

| Presenting complaint         | Frequency | Percent |
|------------------------------|-----------|---------|
| Poor urinary stream          | 32        | 42.7    |
| Dribbling                    | 16        | 21.3    |
| Intermittency                | 10        | 13.3    |
| Sense of incomplete emptying | 9         | 12.0    |
| Recurrent UTI                | 5         | 6.7     |
| Urine retention              | 3         | 4.0     |
| Total                        | 75        | 100.0   |

**Table 3.** Outcome of optical urethrotomy.

| Outcome | Frequency | Percent |
|---------|-----------|---------|
| Good    | 52        | 69.3    |
| Fair    | 15        | 20.0    |
| Poor    | 8         | 10.7    |
| Total   | 75        | 100.0   |

**Table 4.** Postoperative complications distribution of the sample.

| postoperative complications | Frequency | Percent |
|-----------------------------|-----------|---------|
| Bleeding                    | 11        | 14.6    |
| Fluid extravasation         | 3         | 4.0     |
| UTI                         | 6         | 8.0     |
| Recurrent stricture         | 8         | 10.7    |
| Total                       | 28        | 37.3    |

**Table 5.** The distribution of the studied sample by developing complications after optical uerthrothomy according to characteristic features of the sample.

| Characteristic features | No complication                           | complication | Chi square | P value                    |                      |
|-------------------------|---|--------------|------------|----------------------------|----------------------|
| Age                     | <30                                       | 29 (65.9%)   | 15 (34.1%) | $X^2 = 0.478$<br>d.f. = 1  | 0.489<br>N.S         |
|                         | $\geq 30$                                 | 18 (58.1%)   | 13 (41.9%) |                            |                      |
| Etiology                | Traumatic                                 | 24 (60.0%)   | 16 (40.0%) | $X^2 = 0.627$<br>d.f. = 2  | 0.731<br>N.S         |
|                         | Iatrogenic                                | 14 (70.0%)   | 6 (30.0%)  |                            |                      |
|                         | Infective or idiopathic                   | 9 (60.0%)    | 6 (40.0%)  |                            |                      |
| Presenting complaint    | Poor urine stream                         | 21 (65.6%)   | 11 (34.4%) | $X^2 = 0.889$<br>d.f. = 2  | 0.641<br>N.S         |
|                         | Dribbling, intermittency                  | 17 (65.4%)   | 9 (34.6%)  |                            |                      |
|                         | Incomplete emptying, UTI, urine retention | 9 (52.9%)    | 8 (47.1%)  |                            |                      |
| Site                    | Penile                                    | 4 (25.0%)    | 12 (75.0%) | $X^2 = 12.334$<br>d.f. = 1 | 0.000<br>Significant |
|                         | Others                                    | 43 (72.9%)   | 16 (27.1%) |                            |                      |
| Response post op        | Good                                      | 40 (76.9%)   | 12 (23.1%) | $X^2 = 14.731$<br>d.f. = 1 | 0.000<br>Significant |
|                         | Not                                       | 7 (30.4%)    | 16 (69.6%) |                            |                      |

**Table 6.** The binary logistic regression analysis of the studied sample.

| Characteristic features of the sample | B      | df | Sig.  | OR     | 95% C.I. for OR |         |
|---------------------------------------|--------|----|-------|--------|-----------------|---------|
|                                       |        |    |       |        | Lower           | Upper   |
| <30                                   | -0.849 | 1  | 0.215 | 0.428  | 0.112           | 1.639   |
| 30 and above *                        |        |    |       |        |                 |         |
| Traumatic                             | 0.005  | 1  | 0.994 | 1.005  | 0.292           | 3.455   |
| Others *                              |        |    |       |        |                 |         |
| Poor urine stream                     | -0.104 | 1  | 0.900 | 0.901  | 0.177           | 4.582   |
| Dribbling intermittency               | -0.729 | 1  | 0.375 | 0.482  | 0.096           | 2.412   |
| UTI, retention *                      |        |    |       |        |                 |         |
| Penile                                | 3.375  | 1  | 0.000 | 29.223 | 4.885           | 174.818 |
| Others *                              |        |    |       |        |                 |         |
| Good response                         | -2.885 | 1  | 0.000 | 0.056  | 0.013           | 0.237   |
| Not *                                 |        |    |       |        |                 |         |
| Constant                              | 1.329  | 1  | 0.168 | 3.776  |                 |         |

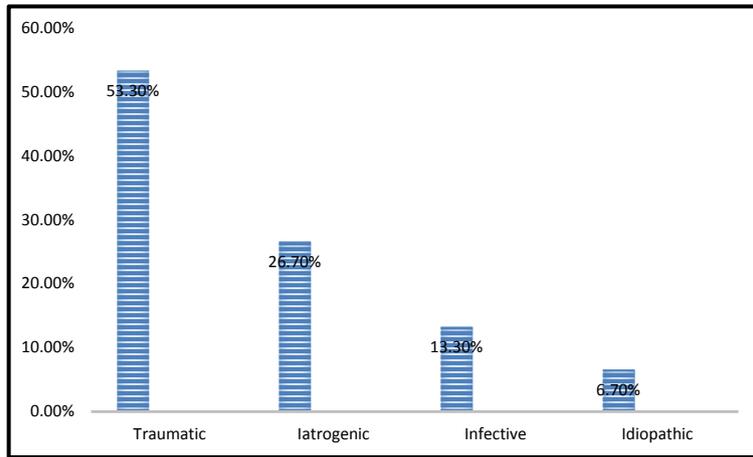


Figure 1. Etiological factors of urethral strictures.

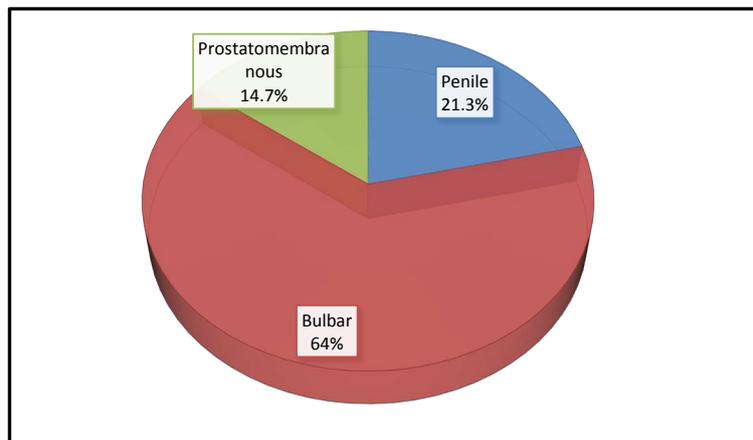


Figure 2. Site of urethral strictures.

#### 4. Discussion

Nowadays internal optical urethrotomy is taken into account as the typical modality of treatment of urethral stricture because of its simplicity and easy performance which leads to worldwide popularity of this procedure for treatment of urethral stricture [14].

In our study the patients' age extended from 16 - 52 years (mean 36.3 years) which was comparable to 39 years reported by Mathur M *et al.* [7] but lower than the 46.9 years notified in two various studies by Balindi SS [1] and Meneghini A *et al.* [15], 42.2 years by Shittu OB [9].

The traumatic etiology of stricture in our study was 53.3% followed by iatrogenic injuries in 26.7% cases. These figures were consistent with 59.2% for trauma & 27.2% for iatrogenic injuries recorded by Mathur RK *et al.* [16], Shaikh NA reported trauma in 70% patients [17]. While Younas M *et al.* [18] stated that 70% were trauma and 30% were iatrogenic injuries. Rasool M *et al.* declared 66.66% were traumatic [19]. On the other hand Chelton *et al.* [10] recorded 11.5% due to trauma. The high incidence of traumatic stricture in our study was because of road traffic mishaps & war injuries.

**Table 7.** Comparison of successrate percentage with other studies.

| Author                          | Year | No. of patients | Followup (mean) | Success rate % |
|---------------------------------|------|-----------------|-----------------|----------------|
| Chilton <i>et al.</i> [10]      | 1983 | 151             | 5 yr            | 50             |
| Holm Nielsen <i>et al.</i> [20] | 1984 | 225             | Not specified   | 77             |
| Albers <i>et al.</i> [21]       | 1992 | 937             | 3.9 yr          | 62             |
| Pansadoro <i>et al.</i> [13]    | 1996 | 224             | 8 yr            | 32             |
| Steenkamp <i>et al.</i> [22]    | 1997 | 101             | 14.4 mo         | 77             |
| Santucci <i>et al.</i> [23]     | 2010 | 74              | 14 mo           | 8              |
| Present study                   | 2018 | 75              | 6 mo            | 69.3           |

As regard to urethral stricture sites, 48 (64%) of the patients in the present study had stricture of bulbar urethra which was lower than that of Ali MN [14] recorded 70% to 80% of the stricture in such site & Younas M *et al.* [18] reporting 73.33% involvement of the bulbar urethra.

In our study, in 52 (69.3%) patients, the response to optical urethrotomy was good while 8 (10.7%) were having poor response. These were quite comparable with Holm-Nielsen *et al.* [20] reported success rate 77% & Pansadoro V [13] reported 11% poor results (Table 7).

In our series, the most common post-operative complication was bleeding noted in 14.6% which was minor bleed & ceased in one day of hospital stay. This number was fair by matching with other studies (Younas M [18] & Shaikh NA [17]), however it was higher than 4.4% notified by Balindi SS [1]. The fluid extravasation occurred in 4% of our patients which was identical to 2.5% recorded by Shittu OB *et al.* [9]. Nevertheless it dissolved within 2 days. Post-operatively, urinary tract infection happened in 8% patients. This was due to indwelling catheter and responded to treatment with appropriate antibiotic. In our series, postoperative urethral stricture was manifested in 10.7% cases.

This was consistent with 9.2% recorded by Mathur RK *et al.* [16] but lower than that of 26.2% by Shaikh NA *et al.* [17].

## 5. Conclusion

Internal optical urethrotomy is an effective, dependable, repeatable and minimally invasive method for patients with urethral stricture.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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