

**Clinico-Etiological Profile of the Urethral Stricture in Adult Patients: An Observational Study**Mukesh Jaysawal<sup>1</sup>, Amit Ranjan<sup>2</sup>, Khursheed Alam<sup>3</sup><sup>1</sup>Senior Resident, Department of Surgery, Government Medical College and Hospital, Bettiah, Bihar, India<sup>2</sup>Senior Resident, Department of Surgery, Government Medical College and Hospital, Bettiah, Bihar, India<sup>3</sup>Assistant Professor and HOD, Government Medical College and Hospital, Bettiah, Bihar, India

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Conflict of interest: Nil

**Abstract****Aim:** The aim of the present study was to assess the etiological spectrum of urethral stricture in adult patients.**Methods:** The present study was conducted in the Department of Surgery. We prospectively collected a database on all male patients with urethral stricture disease who underwent urethroplasty. In all patients, stricture was diagnosed and evaluated by retrograde urethrography combined with voiding cystourethrography. A total of 250 male patients underwent urethroplasty. Of the patients 150 were 45 years old or older and 100 were younger than 45 years.**Results:** In the penile urethra hypospadias surgery, idiopathy, urethral catheterization and lichen sclerosus were the main causes. Hypospadias surgery was significantly more important as an etiology than etiologies at all other locations ( $p < 0.005$ ). Lichen sclerosus was the cause of stricture making it by far the most important etiology of stricture in the distal penile area. In the bulbar urethra idiopathic strictures were most prevalent, followed by TUR. Idiopathic strictures were significantly more prevalent in the bulbar urethra than at other locations ( $p < 0.001$ ). The main cause of multifocal or panurethral anterior stricture disease was urethral catheterization. Respectively 58 and 125 were strictly located at the penile or the bulbar urethra. Panurethral or multifocal anterior urethral involvement was present in 32 patients. Posterior urethral strictures accounted for 35 cases.**Conclusion:** Iatrogenic causes such as TUR, urethral catheterization, cystoscopy, prostatectomy, brachytherapy and hypospadias surgery account for about half of the cases of urethral stricture disease treated with urethroplasty. Further research is needed on the cause of these so-called idiopathic strictures. Pelvic fracture was the main cause of posterior urethral stricture and an important cause in young patients. The etiology is significantly different in younger vs older patients and among stricture locations.**Keywords:** etiological spectrum, urethral stricture, adult patients

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**Introduction**

A urethral stricture is a narrowing of the urethra caused by scarring, which functionally has the effect of obstructing the lower urinary tract. The consequences of this obstruction can enormously impair the patient's quality of life by causing micturition disturbances; they can also damage the entire urinary tract, resulting in loss of renal function. It is therefore essential that urethral strictures, which can occur at any age and in either men or women (though they are much rarer in women), are recognized early and appropriately treated. The prevalence in industrial countries is estimated at around 0.9%. [1]

Morphologically, the stricture is an alteration of the urethra by scarring. [2] In men, the corpus

spongiosum— in which the urethra is embedded— is also involved in the scarring. This spongiofibrosis is a reaction to various extrinsic irritants and can lead to complete replacement of the spongy tissue by scar tissue. This disease entity can be a clinically relevant problem in patients with a urological medical history, since the development of urethral stricture may be related to endourological diagnostic procedures and treatments. [3]

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The aim of the present study was to assess the etiological spectrum of urethral stricture in adult patients.

### Materials and Methods

The present study was conducted in the Department of Surgery, Government Medical College and Hospital, Bettiah, Bihar, India for one year. We prospectively collected a data-base on all male patients with urethral stricture disease who underwent urethroplasty. In all patients, stricture was diagnosed and evaluated by retrograde urethrography combined with voiding cystourethrography. A total of 250 male patients underwent urethroplasty. Of the patients 150 were 45 years old or older and 100 were younger than 45 years. The study was approved by the ethical committee.

The database was analyzed for possible causes of stricture and for previous interventions with special

attention to repetitive (greater than 2) internal urethrotomies and/or intermittent dilation. When no cause was identified, the stricture was classified as idiopathic. For some urological procedures (TUR, hypospadias surgery and prostatectomy), a urethral catheter was placed postoperatively. These cases were classified according to the urological procedure performed. Cases were classified as urethral catheterization when urethral catheter insertion was the only urethral manipulation. In many patients urethral catheterization was performed a long time before stricture diagnosis or in an anesthetized, sedated or confused patient. For this reason exact data are lacking on the reason, exact duration and urethral catheter type, and whether catheterization was traumatic. When data were available, the duration of catheterization was heterogeneous, varying from a single catheterization to catheterization more than 3 months in duration in a patient with tetraplegia and neurogenic bladder.

Sub-analysis was done of stricture etiology by patient age less than 45 years vs 45 or greater and stricture site. A cutoff of 45 years was chosen since above this age the probability of iatrogenic manipulation of the urethra increases due to the increasing incidence of benign prostatic hyperplasia, prostate cancer, bladder tumor and urethral catheterization. Four stricture location groups were determined, including penile urethra, bulbar urethra, panurethral/multifocal anterior urethra and posterior urethra. In the penile urethra further attention was given to stricture etiology in the distal penile area (meatus and fossa navicularis).

Statistical analysis was done using Fisher's exact mid p test with  $p < 0.05$  considered statistically significant.

### Results

**Table 1: Stricture etiology by patient age**

	No.	45 or Greater	Less than 45	p Value
Prostatectomy	8	8	0	0.0024
Perineal trauma	4	3	1	0.986
Urethral catheterization	38	30	8	0.876
Idiopathic/unknown	68	28	40	0.005
TUR	48	46	2	<0.001
Hypospadias	24	4	20	0.005
Pelvic fracture	30	10	20	0.0004
Urethritis	6	3	3	0.789
Lichen sclerosus	16	12	4	0.927
Cystoscopy	2	2	0	0.389
Tumor	2	1	1	0.389
Penile fracture	2	1	1	0.578
Brachytherapy	2	2	0	0.910
Totals	250	150	100	

In the penile urethra hypospadias surgery, idiopathy, urethral catheterization and lichen sclerosus were

the main causes. Hypospadias surgery was significantly more important as an etiology than

etiologies at all other locations ( $p < 0.005$ ). Lichen sclerosus was the cause of stricture making it by far the most important etiology of stricture in the distal penile area. In the bulbar urethra idiopathic strictures were most prevalent, followed by TUR. Idiopathic

strictures were significantly more prevalent in the bulbar urethra than at other locations ( $p < 0.001$ ). The main cause of multifocal or panurethral anterior stricture disease was urethral catheterization.

**Table 2: Etiology by stricture site**

	No. Penile	No. Bulbar	No. Panurethral	No. Posterior
Prostatectomy	0	3	1	4
Perineal trauma	0	6	0	0
Urethral catheterization	8	10	7	0
Idiopathic/unknown	10	61	3	0
TUR	6	32	9	3
Hypospadias	19	5	2	0
Pelvic fracture	0	0	1	26
Urethritis	1	6	3	0
Lichen sclerosus	9	0	3	0
Cystoscopy	0	1	2	0
Tumor	3	0	1	0
Penile fracture	2	1	0	0
Brachytherapy	0	0	0	2
Totals	58	125	32	35

Respectively 58 and 125 were strictly located at the penile or the bulbar urethra. Panurethral or multifocal anterior urethral involvement was present in 32 patients. Posterior urethral strictures accounted for 35 cases.

### Discussion

Urethroplasty is the most definitive treatment for urethral stricture, especially for those strictures which have failed endoscopic measures. [7,8] Despite these well-established outcomes, urethroplasty is underutilized relative to temporizing measures such as direct visual internal urethrotomy (DVIU). [9-12] Reasons include lack of access to a urethroplasty surgeon, repeated management with conservative measures, or concerns about urethroplasty complications. [12]

In the penile urethra hypospadias surgery, idiopathy, urethral catheterization and lichen sclerosus were the main causes. Hypospadias surgery was significantly more important as an etiology than etiologies at all other locations ( $p < 0.005$ ). Lichen sclerosus was the cause of stricture making it by far the most important etiology of stricture in the distal penile area. In younger patients hypospadias surgery is the most important iatrogenic cause. Urethral stricture after hypospadias surgery was described in 2.5% to 11% of patients. [13,14] Mostly these strictures develop at the distal penile urethra or the meatus. Thus, it is not astonishing that hypospadias surgery is an important cause of stricture at the penile urethra, significantly more important than at other sites. A history of urethral catheterization is another important iatrogenic cause overall and in the penile urethra, and it is even the main cause of panurethral or multifocal anterior stricture. About

10% of inpatients are catheterized and in an intensive care unit the rate even exceeds 90% (unpublished data, Ghent University Hospital). In many cases the clinical indication for catheterization was not mandatory. Improper urethral catheter insertion is a source of preventable injury. A recent report shows that 3.2 urethral injuries per 1,000 inpatients occurred due to improper urethral catheterization. [15]

In the bulbar urethra idiopathic strictures were most prevalent, followed by TUR. Idiopathic strictures were significantly more prevalent in the bulbar urethra than at other locations ( $p < 0.001$ ). The main cause of multifocal or panurethral anterior stricture disease was urethral catheterization. Respectively 58 and 125 were strictly located at the penile or the bulbar urethra. Panurethral or multifocal anterior urethral involvement was present in 32 patients. Posterior urethral strictures accounted for 35 cases. Idiopathic strictures or strictures without an apparent reason are surprisingly common, as observed by others. [16] These strictures are significantly more prevalent in the bulbar area, where idiopathy is the main cause of stricture, and they are significantly more common in younger patients. In the literature there are several explanations for the so-called idiopathic stricture. It may be the delayed manifestation of unrecognized (childhood) trauma. [17] Idiopathic stricture in the bulbar area can also be congenital in origin. Pelvic fracture causing disruption at the bulbo membranous junction is by far the main etiology of stricture in the posterior urethra. In younger patients it remains an important etiological factor but overall, it accounts for 11.2% of stricture cases. Motorcyclists and bicyclists or pedestrians struck by a car are at the highest risk

for pelvic fracture with concomitant urethral disruption.

### Conclusion

Iatrogenic causes such as TUR, urethral catheterization, cystoscopy, prostatectomy, brachytherapy and hypospadias surgery account for about half of the cases of urethral stricture disease treated with urethroplasty. Further research is needed on the cause of these so-called idiopathic strictures. Pelvic fracture was the main cause of posterior urethral stricture and an important cause in young patients. The etiology is significantly different in younger vs older patients and among stricture locations.

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