ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 02 | February - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY ON URETHRAL STRICTURE DISEASE ETIOLOGY: AN INDIAN PERSPECTIVE

Urology

Dr. Arvind Ghanghoria	Professor and HOD, Department of General Surgery, M.Y.H and M.G.M Medical College, Indore, M.P.
Dr. Sanjay Kumar Mahajan*	Assistant professor, Department of General Surgery, M.Y.H and M.G.M Medical College, Indore, M.P.*Corresponding Author
Dr. A. B. Karthikeyan	Resident, Department of General Surgery, M.Y.H and M.G.M Medical College, Indore,
Dr. Saksham Kumar	Resident, Department of General Surgery, M.Y.H and M.G.M Medical College, Indore, M.P
Dr.Samprati Dariya	Resident, Department of General Surgery, M.Y.H and M.G.M Medical College, Indore, MP

ABSTRACT

The urethral stricture is a narrowing of the urethra, causing obstructive symptoms which usually results from an injury to the urethral mucosa and the tissues around it. It can develop anywhere along the entire length of the male urethra and can be due to many etiologies which varies in different regions. It is a very common condition which results in hospital visits and admissions. Urethral occur in both sexes, but are rare in females, which is the cause for a lack of guidelines and protocols on how to diagnose and treat female strictures. Data on male urethral strictures is prevalent and there are many treatment options available. The male urethra extends from the external urethral meatus at the tip of the glans penis to the bladder neck proximally and is contained within the corpus spongiosum. The urethra is divided into anterior (extending from the external urethral meatus to the distal membranous urethra) and posterior (extending from the distal membranous urethra to bladder neck) parts. The new nomenclature states that the urethra is broken up into seven segments: the urethral meatus, followed by fossa navicularis, penile, bulbar, membranous, and prostatic urethra, and finally, the bladder neck. We have conducted our study among males in the Malwa region in central part of India to determine the most common cause leading to a urethral stricture in the community.

KEYWORDS

Urethral stricture, etiology, Malwa, central India, trauma, male urethra.

INTRODUCTION:

Urethral stricture is a reference to anterior urethral disease, which is a scarring process which involves urethral epithelium or the spongy erectile tissue of the corpus spongiosum (spongiofibrosis). The spongy erectile tissue is found underlying the urethral epithelium, and the scarring process is seen extending through the tissues of the corpus spongiosum in some cases and into adjacent tissues. The urethral lumen reduces due to contraction of this scar. There is strong evidence that the scar contraction caused by anterior urethral stricture disease can be asymptomatic for a while, but since the lumen is further reduced, it can be associated with marked voiding symptoms.

In contrast to this, posterior urethral strictures are technically not included in the common definition of urethral stricture. Posterior urethral stricture is an obliterative process in the posterior urethra which results in fibrosis and is generally the effect of distraction in that area which is either caused by trauma or radical prostatectomy. Though the distraction defect can be lengthy in some cases, the complex tissue transfer become more of a problem of urethral reconstruction as for stricture. Because of recent military actions, in which there is injury due to blasts with shrapnel and high velocity non fragmenting projectiles, the thinking on mechanisms in regard to penetrating trauma has been redefined. High velocity projectiles can truly penetrate peripheral structures with very little cavitation effect, which was not the effect previously noted with wounds to the abdomen and chest. But for the sake of our research paper, we will be including strictures of both the anterior and posterior urethra.

Urethral strictures occur in both sexes, but are rare in females, which is the cause for a lack of guidelines and protocols on how to diagnose and treat female strictures. Data on male urethral strictures is prevalent and there are many treatment options available. [1] The male urethra extends from the external urethral meatus at the tip of the glans penis to the bladder neck proximally. It is contained within the corpus spongiosum, which lies in a groove below the two corpus cavernosa. The lining epithelium of the inner side of the urethra is stratified squamous epithelium. The urethra is divided into anterior (extending from the external urethral meatus to the distal membranous urethra) and posterior (extending from the distal membranous urethra to bladder neck) parts. The new nomenclature states that the urethra is broken up into seven segments: the urethral meatus, followed by fossa navicularis, penile, bulbar, membranous, and prostatic urethra, and finally, the bladder neck. [2]

Urethral stricture most commonly results due to Trauma (which is usually straddle injury). This trauma to the urethra is often left unrecognized until the patient lands up with voiding symptoms which is the result of obstruction of the stricture or scar. When a urethral stricture occurs due to straddle injury, reconstruction is generally possible. Posterior urethral injuries which are traumatic, result in obliterative or near obliterative defects that are associated with extensive fibrosis interposed between the distracted ends of the urethra.

Inflammatory strictures associated with gonorrhoea were most commonly seen in the past and have become less common now. Due to the advent of prompt and effective antibiotic treatment, gonococcal urethritis progresses less commonly to gonococcal urethral strictures.

There is a definite association between the development of an inflammatory stricture and lichen sclerosis. Lichen sclerosis begins with an inflammation of the glans for penis and it inevitably leads to meatal stenosis, if not for a true stricture of the fossa navicularis.

AIMS AND OBJECTIVES:

The primary objective of this study is (i) to conduct a study on the changing etiologies of urethral stricture disease in a tertiary care centre in the current scenario, (ii) to identify distribution of urethral stricture disease, (iii) to identify determinants of urethral stricture disease.

Pathophysiology:

Anterior urethral injury is most often the result of a blunt force blow to the perineum, producing a crushing effect on the tissues of the urethra. The initial injuries are often ignored by the patient, and urethral injury manifests years later as a stricture. The stricture is a result of scarring induced by ischemia at the site o f the injury.

Etiology:

The most common causes of urethral stricture in recent times are traumatic or iatrogenic. Inflammatory or infectious, malignant, and

congenital etiologies are less common.

Iatrogenic urethral trauma is usually the result of improper or prolonged catheterization and accounts for 32% of strictures. [3] The size and type of catheter used have an significant impact on urethral stricture formation. Silicone catheters and small-calibre Foley catheters are found to be associated with less urethral morbidity.

Several risk factors for the development of a urethral stricture have been identified. Previous surgical history of transurethral resection of the prostate (TURP) increases the stricture rates up to 15% compared to 6% without prior resection. Previous medical history of arterial hypertension in combination with diabetes mellitus is also a predictive factor, as this may lead to reduced blood supply due to changes in microcirculation. [4]

Lichen sclerosus is a chronic, inflammatory skin condition of the genitalia of unknown origin that accounts for nearly 10% of urethral strictures. [5]

Etiology has been observed to vary according to geographical distribution as well as over time. Historically, infectious diseases were the most common cause leading to a urethral stricture. Those affected by syphilis and gonorrhea were highly susceptible to development of urethral stricture disease in the past. This was especially prevalent in the preantibiotic era. But after the development of antibiotics, the incidence of syphilis and gonorrhea has drastically reduced in the developed world and most of the developing countries. Infectious diseases as an important cause of urethral stricture disease in the present era is recognized only in African countries which are still under-developed. In the developing countries and developed nations, infectious diseases as a cause of urethral stricture disease is almost nil thanks to the timely intervention of STIs by appropriate antibiotics. Balanitis Xerotica obliterans is a chronic inflammatory disease leading to urethral stricture. Balanitis xerotica obliterans (BXO) related strictures are quite complex and generally managed by 2-staged urethroplasty. Left untreated it has been reported to affect the entire urethra, penile skin and scrotum.[6,7]

In the western world, where most of the regions are well developed, it has been observed that the most common etiology of urethral stricture diseases is idiopathic. This is due to the advancements in medical care that has lead to such levels of perfection that every known cause of urethral stricture disease has been ruled out leaving us to tag the cause as idiopathic. Idiopathic urethral stricture disease may be due to a forgotten minor trauma that occurred a long time in the past.

In the underdeveloped world, commonly in African nations, it has been reported that urethritis post-infection is the leading cause. The urban centres in Africa document trauma as the leading cause. This is due to the fact that the African community is lagging behind the rest of the world in terms of access to basic personal hygiene and medical care in the form of timely interventions and antibiotics.

Studies conducted in the Indian population has revealed trauma to be the most common cause of urethral stricture disease in the Indian subcontinent. Iatrogenic cause is a rapidly increasing cause for urethral stricture disease in developing nations like India. External trauma leading to a pelvic trauma threatens the membranous part of the male urethra specifically either by a shear injury resulting from the movement of the pelvic bones or by a laceration injury caused by bony fragments which may cut into the urethra. This may result in a partial or total rupture of the urethra. The associated hematoma formation then further separates both urethral ends and this causes a disruption defect in between. Straddle injuries or a trauma directly impacting the perineum may damage the bulbar urethra as this part of the urethra gets crushed between the area of impact and the pubic bone.

Epidemiology:

The narrowing of the urethra is estimated between 200 and 1200 cases per 100 thousand people, and it will be dramatically increased within people over 55 years. In estimation, the prevalence of urethral stricture in industrial countries is around 0.9%. [8]

Case Report:

History:

The most common presentation includes obstructive voiding symptoms, urinary retention, or urinary tract infections. Obstructive voiding symptoms are characterized by a decreased force of stream, incomplete emptying of the bladder, urinary terminal dribbling, and urinary intermittency. These symptoms are seen to be progressive in many patients.

Patients of urethral stricture disease commonly present with obstructive voiding symptoms or urinary tract infections such as prostatitis and epididymitis. Some patients also present with urinary retention. However, on close inquiry, most of these patients are found to have tolerated notable voiding obstructive symptoms for a long time before progressing to complete obstruction.

Workup:

Approach considerations:

Urethral strictures are diagnosed based on a suggestive history, findings on physical examination, and radiographic or endoscopic techniques. The entire urethra, both proximal and distal to the strictured area, must be evaluated endoscopically and/or radiographically prior to any surgical intervention. [9]

Imaging studies:

Radiographic evaluation of the urethra with contrast studies is found to be best achieved by retrograde urethrogram or antegrade cystourethrogram if the patient has an existing suprapubic catheter. Retrograde urethrograms (RUG) and antegrade cystourethrograms are usually performed by the radiology department, although the urologist can perform them directly. These studies are very useful to diagnose and define the extent of the urethral stricture. Accurate documentation of the extent and location of the stricture is important so that the treatment options can be offered to the patient.

Imaging includes dynamic studies which are performed during retrograde injection of contrast material and while the patient is voiding. Even with gentle technique, extravasation during retro grade urethrography is possible in patients in whom the urethra is markedly inflamed. For this reason, it is essential that contrast studies should be carried out with contrast material that is suitable for intravenous injection and used either directly from the bottle or diluted strictly according to the manufacturer's guidelines. Contrast materials which have been thickened with lubricating jelly or anaesthetic gels is seen to be a source of problems and offer little with regard to enhancement of quality of radiographic studies, and they are not found to make the studies more comfortable.

Uroflowmetry:

Uroflowmetry is a diagnostic test that measures the volume of urine released from the body, the speed at which it is released, and also measures for how long the release takes. It is a simple and noninvasive method to evaluate the voiding function in patients who experience lower urinary tract symptoms.[10][11] In patients with urethral stricture disease (USD) who have undergone urethroplasty, uroflowmetry is one of the most frequently used and useful tests to monitor for stricture recurrence.[12]

MATERIALS AND METHODS:

Source of data:

All cases of urethral stricture disease in Dept. of Surgery, M.G.M Medical College and M.Y Hospital, Indore. The study will include Retrospective cases (5 years backdated) and Prospective cases for 1 year from date of approval.

Method of collection of data:

(I) Study design: Observational, analytical study.
(ii) Study period: 1 year from date of approval.
(iii) Place of study: Department of surgery, M.G.M Medical College and M.Y Hospital, Indore.
(iv) Sample size: Minimum 100 cases.
(v) Inclusion criteria:
  (a)Patients with diagnosed urethral stricture disease.
  (b)Age 18 – 70 years, male.
  (c)Patients who give written informed consent.
(vi) Exclusion criteria:
  (a) One whose clear history is not available.
  (b) Patient not willing to undergo required investigations.
  (c) Non-symptomatic patients.

METHODOLOGY:

1. Informed consent will be taken from all patients included in the study.

2. All patients in study will undergo a detailed history taking including general examination and investigations.
3. Patients will undergo USG KUB, cystoscopy, MCU-RGU, Uroflowmetry and CT pelvis (in traumatic cases).
4. All patients will be symptomatic.
5. Patient outcome and complication will be recorded.
6. Records will be maintained.
7. Record analysis will be done at the end of study period.
8. Patient identity will be kept confidential.

Statistical tools:
Data will be analysed using "SPSS" software and appropriate statistical tests.

RESULTS AND OBSERVATIONS:

Table 1: The above table shows the distribution of patients according to etiology.

Etiology	Number	Percentage
Iatrogenic	20	20.0
Idiopathic	4	4.0
Infection	1	1.0
Trauma	75	75.0
Total	100	100.0

Iatrogenic was seen in 20 (20%), idiopathic in 4 (4%), infection in 1 (1%) and trauma in 75 (75%). Trauma was the most common etiology in our study.

Table 2: The above table shows the distribution according to history of trauma.

History of trauma	Number	Percentage
No	25	25.0
Yes	75	75.0
Total	100	100.0

75 (75%) patients had history of trauma, and rest 25 (25%) did not have any history of trauma.

Table 3: The above table shows the distribution according to history of traumatic foley's insertion or removal.

History of traumatic Foley's insertion or removal	Number	Percentage
No	80	80.0
Yes	20	20.0
Total	100	100.0

20 (20%) patients had history of traumatic foley's insertion or removal, and 80 (80%) patients had no such history.

Table 4: The above table shows the distribution according to type of trauma.

Type of trauma	Number	Percentage
NA	25	25.0
2wh self fall	16	16.0
2wh vs 2wh	13	13.0
2wh vs 4wh	14	14.0
2wh vs truck	2	2.0
Fall from height	21	21.0
Ped vs 2wh	3	3.0
Ped vs 4wh	3	3.0
Stab perineum	3	3.0
Total	100	100.0

16 (16%) patients sustained injury due to self-fall from a 2-wheeler, 13 (13%) patients sustained injury due to accident between 2-wheeler vs. 2-wheeler, 14(14%) patients sustained injury due to accident between 2-wheeler vs. 4-wheeler, 2 (2%) patients sustained injury due to 2-wheeler vs. truck, 21 (21%) patients sustained injury due to fall from height, 3 (3%) patients sustained injury due to accident between pedestrian vs. 2-wheeler, 3 (3%) patients sustained injury due to accident between pedestrian vs. 4-wheeler and 3 (3%) patients sustained injury due to stab perineum. 25 (25%) patients had no such injury.

DISCUSSION:

Urethral stricture disease is a disease commonly seen in middle aged men. It is associated with several factors such as age, comorbidities, site of stricture, trauma history, etc. The etiology of urethral stricture disease is also dependent on demography and it has also been observed that the various causes of urethral stricture disease is known to change with time. We have conducted our study on patients presenting in a tertiary care centre in central India (Malwa region).

Urethral stricture disease trends in Malwa region (Indian perspective):
The study was conducted on 100 male patients in the age group of 18 to 75 years. The patients were selected on the basis of whether they were willing to undergo all the relevant investigations to reach a conclusive diagnosis of urethral stricture disease along with the exact cause of the stricture.

When the patient presents to the emergency casualty with a history of trauma which could be a road traffic accident or a fall from height or a stab to the perineum, he is categorized as a traumatic cause. When the patient presents to the surgical outpatient with voiding complaints and further investigations reveals a urethral stricture, a detailed history is taken. Such a patient is then found to have a past history of trauma or a past history of traumatic foley's insertion or removal (iatrogenic etiology). Very rarely, infectious causes are identified thus classifying such a patient as an infective etiology. When the patient does not come under any of the above categories, he is classified as an idiopathic cause of urethral stricture (cause unknown). In such a manner, 100 subjects were studied over a prospective period of 1 year and a retrospective backdated period of upto 5 years.

It was observed that 75 percent of patients presented with a history of trauma while the rest 25 percent did not have any history of trauma. Among those not having any history of trauma, it was observed that 20 percent of them had history of an event in the past associated with traumatic foley's insertion or removal. 1 patient had a past history of proven infection leading to urethral stricture. This left us with 4 patients falling under no specific category, thus leading to 4 percent idiopathic causes.

Among the patients who presented with a history of trauma, it was observed that fall from height was the most common mode of trauma.

Thus, it was concluded that in a tertiary care setting in India, the most common cause for urethral stricture disease is Trauma.

Urethral stricture disease trends in developed nations:
In a study conducted in Belgium between January 2001 and August 2007, it was observed that the most important causes of urethral stricture disease were idiopathy, transurethral resection, urethral catheterization, pelvic fracture and hypospadias surgery. [33][34] Overall iatrogenic causes (transurethral resection, urethral catheterization, cystoscopy, prostatectomy, brachytherapy and hypospadias surgery) were the etiology in 45.5% of stricture cases. [35] In patients younger than 45 years the main causes were idiopathy, hypospadias surgery and pelvic fracture. [36] In patients older than 45 years the main causes were transurethral resection and idiopathy. [37] In cases of penile urethra, hypospadias surgery, idiopathic stricture, urethral catheterization and lichen sclerosus were the main causes, while in the bulbar urethra idiopathic strictures were most prevalent, followed by strictures due to transurethral resection. [38] The main cause of multifocal/ panurethral anterior stricture disease was urethral catheterization, while pelvic fracture was the main cause of posterior urethral strictures. [39]

Urethral stricture disease trends in underdeveloped nations:
A study conducted by the department of urology at Tygerberg hospital, representative of the demography of an underdeveloped nation, over a period of 12 months in 120 male patients showed that specific urethritis was the main etiological factor for urethral stricture disease (45%) followed by external trauma (38.3%).

CONCLUSION:

Urethal stricture disease is a very important disease that is highly influenced by demography. It is a historical disease whose etiology has been varying over time and according to the socio economic development. Taking the right approach towards the cause leading to the urethral stricture disease is very important to outline the treatment and ideal management of a patient with urethral stricture disease.The epidemiology of urethral stricture disease is further emphasized due to the fact that delayed diagnosis or nonideal treatment of urethral stricture disease can lead to loss of renal function and greatly increase

the morbidity of the patient.

Our study established that Trauma is the predominant cause of urethral stricture disease from an Indian perspective. This gives us insight into further prevention of the occurrence of urethral stricture disease. Early identification of pelvic bone injury might help in salvaging the urethral function. This also enlightens us on the early management of trauma related urethral stricture diseases and further followup of such patients.

REFERENCES:

1. Trends in stricture management among male Medicare beneficiaries: underuse of urethroplasty? Anger JT, Buckley JC, Santucci RA, Elliott SP, Saigal CS, Urologic Diseases in America Project. Urology. 2011 Feb; 77(2):481-5.
2. Latini JM, McAninch JW, Brandes SB, Chung JY, Rosenstein D. SIU/ICUD Consultation On Urethral Strictures: Epidemiology, etiology, anatomy, and nomenclature of urethral stenoses, strictures, and pelvic fracture urethral disruption injuries. Urology. 2014 Mar;83(3 Suppl):S1-7
3. Davis NF, Quinlan MR, Bhatt NR, Browne C, MacCraith E, Manecksha R, et al. Incidence, Cost, Complications and Clinical Outcomes of Iatrogenic Urethral Catheterization Injuries: A Prospective MultiInstitutional Study. J Urol. 20Urol. 196 (5): 1473-1477
4. Moltzahn F, Dal Pra A, Furrer M, Thalmann G, Spahn M. Urethral strictures after radiation therapy for prostate cancer. Investig Clin Urol. 2016 Sep. 57 (5):30915.
5. Erickson BA, Elliott SP, Myers JB, Voelzke BB, Smith TG 3rd, McClung CD, et al. Understanding the Relationship between Chronic S ystemic Disease and Lichen Sclerosus Urethral Strictures. J Urol. 2016 Feb. 195 (2):3638.
6. Depasquale I, Park AJ, Bracka A. The treatment of balanitis xerotica obliterans. BJU Int. 2000; 86:459–65.
7. Singh I, Ansari MS. Extensive Balanitis Xerotica Obliterans (BXO) involving the anterior urethra and scrotum. Int Urol Nephrol. 2006; 38:505–6.
8. Shahsavari R, Bagheri SM, Iraji H. Comparison of Diagnostic Value of Sonourethrography with Retrograde Urethrography in Diagnosis of Anterior Urethral Stricture. Open Access Maced J Med Sci. 2017 Jun 15. 5 (3):335-339
9. Song L, Xie M, Zhang Y, Xu Y. Imaging techniques for the diagnosis of male traumatic urethral strictures. J Xray Sci Technol. 2013. 21(1):11123.
10. Cost-effective uroflowmetry in men. Bloom DA, Foster WD, McLeod DG, Mittemeyer BT, Stutzman RE J Urol. 1985 Mar; 133(3):421-4.
11. Utility and cost-effectiveness of uroflowmetry in a busy pediatric urology practice. Alyami F, Farhat W, Figueroa VH, Romao RL Can Urol Assoc J. 2014 Sep; 8(9-10): E615- 8
12. Stricture r ecurrence after urethroplasty: a systematic review. Meeks JJ, Erickson BA, Granieri MA, Gonzalez CM J Urol. 2009 Oct; 182(4):1266-70.