



URETHRAL STRICTURE: CAUSES AND COMPARISONS OF VARIOUS MODALITIES, A SINGLE CENTRE EXPERIENCE

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KEYWORDS :

Urethral stricture is defined as decrease in the calibre of urethra, due to scar resulting from tissue injury or destruction.

The management of urethral stricture in the male is one of the oldest problems known to mankind.

The goal of treatment of urethral stricture is to provide sufficient permanent patency of the urethra.

Various treatment options being - regular urethral dilation, Visual Internal urethrotomy, excision & urethroplasty and substitution urethroplasty.

A study was conducted for urethral stricture formation a private medical college for a period of 3 years, to analyse the the pros and cons of various treatment modalities of stricture diseases.

AIMS AND OBJECTIVES

1. To study the incidence of stricture urethra in patients admitted in hospital.
2. To study various etiopathologic factors for urethral stricture formation.
3. To study role of various treatment modalities in the management of stricture urethra.
4. To compare the results of different modalities of urethroplasties.

Review Of Literature

Surgical treatment of urethral stricture disease is a continuously evolving process.

Unfamiliarity with the literature and inexperience with urethroplasty surgery have made the use of endoscopic methods more common.

Male urethra is 25 cm long with diameter of 7-10 mm, anatomically has two divisions.

Anterior urethra is a portion distal to its entry into the bulb, and is divided into bulbous and penile portion.

Posterior urethra lies proximal to bulb and is contained within the corpus spongiosum, divided into two parts membranous and prostate portion.

The penis comprises three corpora, single corpus spongiosum ventrally containing the urethra, paired corpora cavernosa dorsally forming most of the body of the penis, and they have a common fibrous envelope and are separated only by a median fibrous septum.

The urethra is narrowest just in from the external urinary meatus at the fossa navicularis and widest at bulbar part. Common sites of strictures include bladder neck, distal and proximal part of bulb, fossa navicularis and meatus.

Aetiology and Pathology of stricture disease

Urethral strictures occur after an injury to the urothelium of corpus spongiosum leading to scar formation.

Urethral gland infection is usually associated with inflammatory strictures.

Chambers et al have shown that the first identifiable change in the urothelium was from a water tight pseudo stratified variant to leaky columnar type which causes fibrosis.

Whatever the pathology, the etiology of many strictures still remains unknown.

Gonococcal infection is also a significant contributor of stricture formation.

Various etiological factors implicated in urethral stricturing are classified as follows:

- 1) Congenital urethral strictures
- 2) Acquired urethral strictures
 - a) Post inflammatory urethral strictures
 - 1) Post gonorrheal
 - 2) Post urethral chancre
 - 3) Tubercular
 - 4) LGV
 - 5) Condylomata acuminata
 - b) Post traumatic urethral stricture
 - 1) with pelvic fracture
 - 2) Indwelling catheter post sounding
 - c) Iatrogenic
 - 1) Passing large size sounds, endoscope or resectoscope
 - 2) Post Turp
 - 3) Post Prostatectomy
 - 4) Restricture after previous surgery
 - d) Malignant
 - 1) Carcinoma of urethra
 - 2) Carcinoma of prostate

Vargas et al in 1980 had inferred that 54% of strictures were of infectious origin and 46% of traumatic origin.

Stormont et al reviewed 199 pts. of bulbar urethral strictures and concluded that etiology was primarily iatrogenic in 47% cases.

Fenton et al studied men with anterior urethral strictures and found that idiopathic and iatrogenic strictures were very common and found that idiopathic and iatrogenic strictures were surprisingly very common and external trauma is a relatively uncommon cause of anterior urethral stricture disease.

History of management of urethral stricture disease

Earliest medical records are of treating urethral stricture disease relied on the use of green bamboo sticks for dilation

purposes.(Sushruta).

Dagus ,1836 reported the first case of resection of the urethra ,treated by an indwelling catheter.

Duplay in 1874 recommended reconstruction of the urethra from a buried strip of skin in cases of hypospadias

Koeing F, 1899 performed total resection and suturing of the separated ends .

Russel 1914, promoted excision of stricture with recanalization ,depending upon the fact that a strip of mucous membrane planted on either side of the raw tissues would be reconverted into a tube.

H Stewart in 1948 suggested establishment of a dystrophic opening proximal to the strictured area and the terminal urethra repaired at a second stage.

Basic principle of urethral surgery

1. Regeneration procedures
2. Excision and anastomosis
3. Substitution and tissue augmentation

MATERIAL AND METHODS:

Study conducted by joint venture between department of Pathology and Surgery in a private corporate hospi from the period of 2017- 2022 and also retrospective data was utilised of last 3 years prior to 2017.

In all patients, following protocol was followed

1. History
2. Presenting complaints
3. Examination
4. Investigations

The investigative protocol followed to assessment included the following parameters:

1. Hb%
2. Blood Glucose
3. Blood urea
4. Serum creatinine
5. Urine - routine microscopy
6. Urine culture sensitivity
7. USG abdomen
8. Preoperative RGU and MCU for patients with SPC in situ.

The operative procedures carried out in the patient of stricture urethra included -

- A. Buccal mucosa substitution urethroplasty.
- B. End to End urethroplasty via a perineal approach.
- C. End to End urethroplasty via a extended perineal approach through inferior pubectomy.
- D. Johanson's two stage linear urethroplasty.
- E. Optical Internal Urethrotomy.

A 16 fr silicon catheter was used for stenting the repaired urethra in the post-operative period which was removed between 3-14 days.

Patients were ambulated on the 1st post operative day. A clear fluid diet was initiated on the 1st post operative day which was then advanced to a soft diet and then onto a regular diet.

Urethrogram and uroflowmetry was done at three weeks duration and repeated as required.

Patients were followed up for a mean duration of 18 months.

Criteria for assessment of post operative results:

1. Good results are those who were having post operative

urethra of uniformly good calibre on RGU and passing urine with good stream. Peak flow rate 20 - 25 ml/sec.

2. Fair results - some narrowing present in post op RGU. Post op peak flow rate of 15 - 20 ml /sec
3. Poor results are those having narrow lumen and weak stream and peak flow rate below 15 ml/sec.

A single post operative Optical Internal Urethrotomy was offered to pts having failure of primary procedure. A recurrence even after single urethrotomy attempt was deemed as failure.

Observations

A. Age incidence of stricture urethra

| Age in years | No. Of patients | % |
|--------------|-----------------|-------|
| 10-20 | 19 | 13.87 |
| 21-30 | 59 | 43.07 |
| 31-40 | 35 | 25.55 |
| 41-50 | 11 | 8.03 |
| 51-60 | 10 | 7.30 |
| >60 | 03 | 2.19 |

Table showing aetiology of stricture urethra

| Aetiology | No. Of pts. | % |
|-------------------|-------------|-------|
| Traumatic | 95 | 69.34 |
| Infective | 24 | 17.52 |
| Idiopathic/Others | 18 | 13.14 |

Site of Urethral stricture

| S.No | Site of stricture | No. of Pts. | % |
|------|---------------------------|-------------|-------|
| 1 | Penile urethra | 15 | 10.95 |
| 2 | Bulbar urethra | 73 | 53.28 |
| 3 | Membranous urethra | 10 | 7.30 |
| 4 | Peno bulbar urethra | 29 | 21.17 |
| 5 | Bulbo- membranous urethra | 10 | 7.30 |

Table - showing the length of stricture

| S.no | Length of stricture in cm | No. Of Patients | % |
|------|---------------------------|-----------------|-------|
| 1 | <1 | 51 | 37.23 |
| 2 | 1-2 | 32 | 23.36 |
| 3 | 2-5 | 35 | 25.55 |
| 4 | >5 | 19 | 13.87 |

Table showing operative procedure carried out

| S.no | Type of Urtehroplasty | No. Of Patients | % |
|------|-------------------------------------|---|----------------|
| 1 | End to End | Perineal - 78 Extended Perineal - 4 | 56.93 2.92 |
| 2 | Buccal Mucosal Substitution | Simple dorsal Onlay- 19 Augmented roof strip - 2 | 13.87 1.46% |
| 3 | Posterior patch of tunica albuginea | 2 | 1.46 |
| 4 | Johanson's two stage | 17 | 12.41 |
| 5 | Optical Internal Urethrotomy | 15 | 10.95 |

Table - Outcome of urethroplasty procedures as determined by increment in peak flow rates

| S.No | Procedure | No.of Patients | Preop Avg. Peak flow rate | Post of peak flow rate | Increment in peak flow (ml/sec) |
|------|----------------------------------|----------------|---------------------------|------------------------|---------------------------------|
| 1 | End to End Anastomosis | 82 | 2.25 | 21.6 | 19.35 |
| 2 | Buccal Mucosa Substitution graft | 21 | 2.44 | 22.6 | 20.16 |
| 3 | Johansson's two satge repair | 17 | 2.39 | 21.6 | 19.21 |

| | | | | | |
|---|----------------------------------|----|------|-------|-------|
| 4 | Tunica Albuginea posterior patch | 2 | 5.85 | 22.7 | 16.85 |
| 5 | Optical Internal Urethrotomy | 15 | 4.2 | 20.94 | 16.74 |

- patch urethroplasty of BULBAR URETHRA. BJU Int 2001;88:385-9.
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Table - Post operative Complications with various types of Urethroplasties for stricture urethra

| S.no | Type of complications | EEA via perineal approach | EEA via extended perineal approach | Buccal mucosa substitution urethroplasty | Johansson two stage | Post. Patch tunica albuginea | VIU | % |
|------|--------------------------|---------------------------|------------------------------------|--|---------------------|------------------------------|-----|-------|
| 1 | Restricture | 16 | 1 | 2 | 0 | 0 | 8 | 13.1 |
| 2 | Wound infection | 21 | 1 | 5 | 6 | 1 | 0 | 24.82 |
| 3 | Incontinence | 1 | 0 | 1 | 2 | 0 | 0 | 2.92 |
| 4 | Urethrocutaneous fistula | 0 | 0 | 0 | 1 | 0 | 0 | 0.73 |

DISCUSSION

In our study the most common etiology was post traumatic ,comprising 69.34 % of the patients and 17.52 % were due to infection.This could be attributed to high incidence of pelvic trauma due to road traffic accidents and high velocity impacts of modern era.

Trauma was the most common of stricture of bulbar (72.6%), membranous (60%) and bulbomembranous (90%) whereas infection is the leading cause of stricture of the penile and penobulbar urethra.

Few patients were cases of post catheterization stricture development ,reflecting the faulty catheterization practices being observed by healthcare professionals.

CONCLUSIONS

The incidence of urethral stricture disease is rising due to increase in high velocity trauma.

The most common age group is between 20-40 years ,male gender.

Trauma is the most common etiology and bulbar urethra is the most common segment involved.

Stricture segments of upto 2 cm can very well managed with resection and anastomosis technique.

Proximal stricture are best managed by Badenoch's pull through -a suture less technique.

Longer strictures should be preferably managed with use of grafts and flaps and mostly buccal mucosal dorsal onlay grafts prove to be the best option.Complex strictures and those with chronic infection and long segment scarring must be managed with staged procedures.

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