Codifying Anterior Urethral Strictures with UREThRAL Stricture Score

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ABSTRACT

Introduction: Urethral stricture description is not standardized. This makes surgical decision-making less reproducible and increases the difficulty of objectively analyzing urethroplasty literature. Wiegand and Brandes[2] developed the URETHRAL stricture score to codify anterior strictures. The objectives of this study were to evaluate urethral stricture score in management of anterior urethral strictures.

Material and methods: This was a prospective observation study, which included all patients operated for stricture urethra between March 2015 to march 2017 after applying exclusion criteria. The URETHRAL STRICTURE SCORE for each patient was calculated. The obtained USS was related to the surgical procedure, intraoperative complexity, complications that patient underwent for any significant correlation.

Results: A total of 94 patients were included in study. A total of 26 (27.66%) patients underwent VIU while 26 (27.66%) and 42 (44.68%) of patients underwent anastomotic urethroplasty and BMG urethroplasty respectively with a overall success rate of 76.60%. Mean URETHRAL Stricture Score of 94 patients was 9.617 with a range of 5 – 21.

Conclusion: This study confirms the validity of URETHRAL stricture score in predicting surgical complexity for anterior urethral strictures with higher USS score patient requiring more complex surgery.

Keywords: URETHRAL Stricture Score, Anterior Urethral Strictures

INTRODUCTION

Urethral stricture disease affects about 300 per 100000 men.[1] The decision to use a specific reconstructive technique depends upon surgeon preference, as well as many other factors, such as length, location and etiology of stricture.

Urethral stricture description is not standardized. This makes surgical decision-making less reproducible and increases the difficulty of objectively analyzing urethroplasty literature. Also, because there are no established objectives scoring system to describe urethral strictures, comparing results is difficult. A numeric scoring system describes the complexity of anterior urethral strictures and enables the comparison of surgical techniques across institutions and surgeons.

Wiegand and Brandes[2] developed the URETHRAL stricture score to codify anterior strictures. This is numerical score based on five components of anterior urethral stricture disease: (1) (UR)ethral stricture (E) tiology; (2) (T)otal number of strictures; (3) (R)etention (luminal obliteration); (4) (A)natomic location; and (5) (L)ength. The objectives of this study were to evaluate urethral stricture score in management of anterior urethral strictures involving variety of surgical techniques and to correlate intraoperative complexity and postoperative results of various techniques with USS.

MATERIAL AND METHODS

This was a prospective observation study, which included all patients operated for stricture urethra between March 2015 to march 2017 after applying exclusion criteria.

Exclusion criteria

1. Patients with posterior urethral strictures
2. Patients with prior open urethroplasty.
3. Patient with associated BPH, on corticosteroids, or uncontrolled diabetes which affects surgical outcomes are also excluded.
4. Patient who did not have a minimum post operative follow up of 10 months were also excluded

Preoperative work-up

All the patients who were suspected of stricture urethra from a thorough history and physical examination were subjected to investigations to establish the diagnosis and aid in surgery. These include Surgical profile (RFT, Complete Hemogram, Coagulation Profile, Viral Markers, B/G/T, Urine C/S) and special investigations to confirm the diagnosis. The latter include UFR, Retrograde Urethrogram, USG abdomen, Cystoscopy(in cases of diagnostic dilemma).

The urethral stricture score for each patient was calculated. Once the diagnosis of stricture urethra was established, patient was subjected to surgical procedure which included Visual Internal Urethrotomy, Anastomotic Urethroplasty, BMG Urethroplasty, considering the various local and general factors of patient.

The local factors include- cause of stricture, length of stricture, site of stricture. The general factors include – general condition of patient, age of patient, other comorbidities,

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surgical fitness of patient.

Intraoperative

The procedure each patient underwent was noted. Intraoperative complexity was measured in terms of time of surgery and need of blood transfusion.

Post-Operative

Postoperatively each patient was followed up for surgical complications (viz. wound infection, fistula formation), stricture recurrence with a minimum follow up of 10 months.

STATISTICAL ANALYSIS

These patients' stricture data was then coded into a Microsoft Excel (Redmond, WA) spreadsheet. The success rate of each procedure was expressed in percentage. The average USS score of each surgical group were calculated.

The obtained USS was related to the surgical procedure that patient underwent for any significant correlation using spearman's correlation coefficient between average USS scores of the three surgical groups. Similarly, significance of association between USS score and intraoperative complexity, significance of association between USS score and overall complications was done with independent t test and ANOVA as appropriate.

A p value of less than or equal to 0.05 was taken as significant value as t value, F ratio, spearman's rho coefficient were obtained when independent t test, ANOVA, Spearman's correlation were used. Statistical analysis in this study was done using SPSS version 21.0.

RESULTS

A total of 94 patients were included in study. Mean age of patients in our study was 45 years with maximum of 76 years and minimum of 16 years.

Overall success rate was 76.60% (72 cases out of 94). A total of 26 (27.66%) patients underwent VIU while 26 (27.66%) and 42 (44.68%) of patients underwent anastomotic urethroplasty and BMG urethroplasty respectively.

UREThRAL Stricture Score

Mean Urethral Stricture Score of 94 patients was 9.617 ranging from 5 – 21.

A. USS Vs Surgery

There was significant difference between average USS scores of patients undergoing each surgery with higher mean in complex surgery (VIU – 26 patients, 5.385; Anastamotic

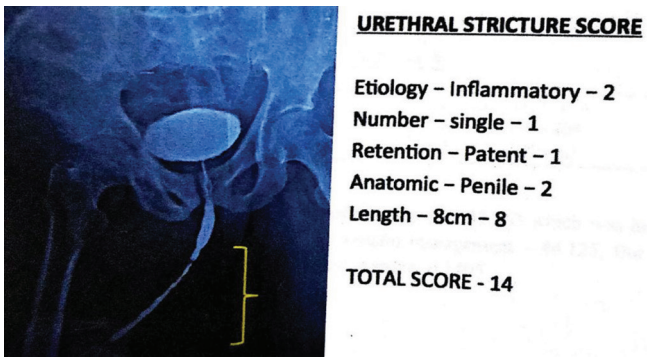

Figure-1: Urethral stricture score from RGU

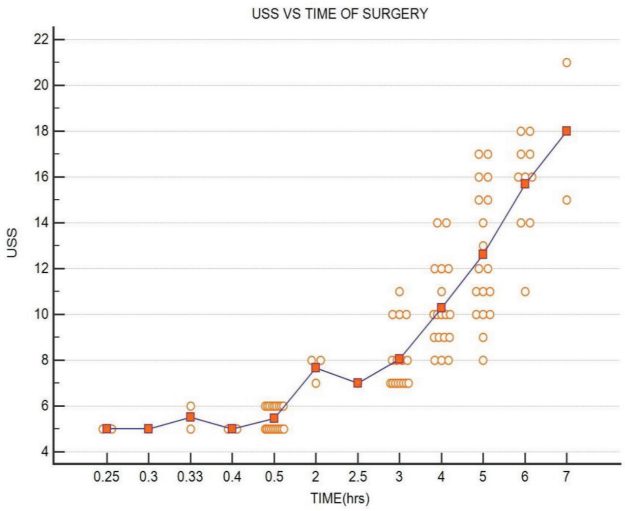

Figure-2: Urethral Stricture Score vs time of surgery

Component	Score	Description
URrethral stricture **E**tiology	1= traumatic, idiopathic, or iatrogenic 2= inflammatory or hypospadias	Inflammatory or hypospadias related strictures are more likely to recur and usually require more extensive reconstruction
Total number of strictures	1 = point per stricture	More than one stricture, especially when not close together, is more difficult to treat
Retention	1 = patent urethra 2= obliterated or near obliterated	Represents the quality of the urethral plate and whether there is a suitable site for a grafting procedure
Anatomic location	1= bulbar urethra 2= penile urethra (including meatus and fossa) 3= pan urethral or both bulbar and penile urethra are involved	Pan urethral ≥ ½ of the anterior urethra. Penile urethral strictures usually require more difficult reconstruction
Length	1 point per cm of length (to the nearest 0.1cm)	Longer strictures are usually more difficult to treat, especially as anastomotic reconstructions become impractical. Length estimated by imaging and confirmed intraoperatively

Table-1: UREThRAL Stricture Score

Variables	Wiegnand study[2]	Rajkumar et al[16]	Our study
Number	95	57	94
Mean	9.10	9.03	9.617
Median	8	9	9
Mode	5.5	10,11	5
Minimum	4.5	5	5
Maximum	22	12	21
Standard deviation	3.99	1.56	4.011

Table-2: URETHRAL Strictures score in various studies

Treatment	Wiegnand Study[2]	Rajkumar Study[86]	Mean USS in our study
VIU	-	-	5.385
EPA	5.78	6.57	8.192
BMG	8.82	-	13.12
AAU	9.23	-	-
Flap	11.01	8.95 (Preputial), 9.0 (Tunica) 10.0 (Scrotal)	-
Combo flaps/grafts	14.97	-	-

Table-3: Mean USS score vs Surgeries in various studies

urethroplasty – 26 patients,8.192; BMG urethroplasty – 42 patients,13.12). So Urethral Stricture score and surgery were positively correlated with spearman's rho coefficient +0.901 which is statistically significant (p value <0.0001) indicating higher USS scores were correlated with complex surgery.

B. USS Vs Intraoperative Complexity

I -Time

Average time in hrs – 3.42 hrs; Range – 0.25 to 7 hrs

With increase in USS there was increase in time of procedure (F ratio 30.634) which is statistically significant with p value < 0.001. (Figure 2)

II -Blood Transfusion

Total number of patients who needed transfusion – 13 (13.82%).

The average USS of patients who needed blood transfusion (13 patients;13.77) was higher when compared to patients who did not have transfusion (81 patients;8.95). This difference was statistically significant (F ratio – 19.359; p value - <0.001).

C) USS Vs Complications

VIU – 4 (all urinary tract infections);

Anastomotic urethroplasty – 5 (Urinary Tract Inf -2, epidydmorchitis – 1, scrotal abscess – 1, chordee – 1);

BMG urethroplasty – 13 (Urinary Tract Infections– 9, epidydmorchitis – 1, oral complications – 2, early ejaculation – 1).

The average USS score was higher in patients with complications (22 patients – 12.09) than patients without complication (72 patients -8.86) and this difference was statistically significant (p value – 0.00072; t value – 3.4997)

D) USS Vs Recurrence

Though the average USS of recurrence group (22 patients – 9.91) was higher than successful group (72 patients- 9.528) it was not statistically significant (p value – 0.7722).

E) USS VS recurrence in VIU

Total number with recurrence – 11

Recurrence rate – 42.3% (11/26)

The average USS score was higher in patients who underwent VIU and had recurrence (5.64 vs 5.2) and it was statistically significant (p value- 0.02, t value - -2.421).

F) USS Vs recurrence in anastomotic urethroplasty

Number of patients with recurrence – 5

Recurrence rate – 19.23% (5/26)

The average USS score of patients who had recurrence was significantly higher than the patients (10.2 vs 7.714) who did not have recurrence (p value – 0.0008; t value- 3.465).

G) USS Vs recurrence in BMG urethroplasty

Number of patients with recurrence – 6

Recurrence rate – 14.29% (6/42)

The average USS of patients who had recurrence post BMG was significantly higher (17.5 vs 12.39) than those patients who did not have recurrence (p value – 0.000087; t value – 4.3649).

DISCUSSION

Mean age of patients in our study was 45 years with maximum of 76 years and minimum of 16 years. This corresponds to previous studies such as Palminteri et al[3] where average age was 45.1 years and was slightly higher than other studies such as Stein et al[4] where average age was 41.4 years and lower than epidemiological studies such as from Medicare and Medicaid services[5,6] which show increased incidence after 55 years of age. These changes in age can be explained by the facts that this study included only those patients who were fit for surgical procedure and another reason being difference arising due to access to health care facilities.

In our study patients were subjected to three different type of surgeries: VIU, anastomotic urethroplasty and BMG urethroplasty. The success rates and complications reported in our series are comparable with previous studies.[7-15]

URETHRAL stricture score ranged from 5 to 21 with an average USS score of 9.617. This was similar to Wiegand et al study[2] and Raj Kumar et al[16] which introduced the concept of urethral stricture score. (Table 2)

In our study increasing urethral score correlated with increasing complexity of surgery with 5.385, 8.192, 13.12 being average USS scores in patients VIU, anastomotic urethroplasty and BMG urethroplasty (Table 3). This was statistically significant with p value <0.0001 and speaman's rho coefficient of +0.901. Similar correlation was also seen in Wiegnand[2] study and Rajkumar et al study.[16]

The mean USS for each surgery differed from study to study as the surgeries compared in each study differed from study to study. However in all studies higher USS scores are associated with more complex surgeries.

In our study for the first time Urethral stricture score was evaluated for its relationship with intraoperative complexity

using two factors that is time of surgery and need of blood transfusion.

There was significant association between time of surgery and Urethral stricture score with patients with increased duration having higher USS scores. (p value < 0.001). The average USS score of patients who needed blood transfusion (13) was significantly higher than the average USS score of patients who did not need blood transfusion. (13.77 vs 8.95; p value - < 0.001).

In a novel attempt, complications were correlated with urethral stricture score and analysis revealed a significant association of complications with USS score (8.86 vs 12.09; 0.00072).

Stricture recurrence was correlated with urethral stricture score. Though the average USS score of patients who had stricture recurrence was higher with 9.91 compared to 9.528 in patients with successful surgery. But this was not statistically significant with p value of 0.7722 which might be explained due to fact that in our study highest recurrences were seen in VIU and average USS score of VIU group is 5.385. To deter this analysis of recurrence in each surgical group with USS score was done.

When only VIU surgical group was evaluated, the mean USS score of patients with recurrence was significantly higher than the mean USS score of patients who did not have recurrence. (5.64 vs 5.2; p value – 0.02). Similar associations were seen in anastamotic urethroplasty group (10.2 vs 7.714; p value – 0.0008) and BMG urethroplasty group (17.5 vs 12.39; p value – 0.00008). This clearly shows that higher USS scores are associated with higher recurrence rate. Similar results were also reported by Eswara et al[17] and Alwara et al[18] where U- score (modified URETHRAL stricture score was associated with urethral stricture recurrence.)

Limitations of study

Though this was first study to evaluate urethral stricture score prospectively, only limited variety of surgical procedures were evaluated. The follow up period in our study was limited and longer follow up would shed better insight of disease process. Further large multi-institutional prospective studies are needed to evaluate the validity of USS score in predicting anterior urethroplasty complexity and outcome. In addition, USS could be a useful way to determine a cost-effective strategy with more intensive surveillance in patients with higher USS scores, since cost has been shown to vary with the post urethroplasty surveillance protocol employed. Further research on the topic is much needed.

CONCLUSION

This study confirms the validity of Urethral stricture score in predicting surgical complexity for anterior urethral strictures with higher USS score patient requiring more complex surgery. Higher urethral stricture scores were associated with increased occurrence of postoperative complications. Though there was no significant association between USS score and overall recurrence, higher USS scores in each surgical group are associated with increased recurrence rates.

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