
ORIGINAL ARTICLE

Outcome of Everted End-To-End Urethroplasty in Traumatic Bulbar and Membranous Urethral Stricture

¹FAWAD NASHRULLAH, ²MUHAMMAD NAZIR, ³KAMRAN ZAIDI, ⁴MUHAMMAD AZEEM MUGHAL, ⁵AMIT KUMAR SHAH, ⁶AHMAD SALMAN WARIS

¹Associate Professor of Urology , Lahore General Hospital / PGMI / AMC Lahore , ²Professor of Urology & Head Department of Urology , Lahore General Hospital / PGMI / AMC Lahore , ³Assistant Professor of Urology , Lahore General Hospital / PGMI / AMC Lahore , ⁴Resident of Urology , Lahore General Hospital / PGMI Lahore, ⁵Resident of Urology , Lahore General Hospital / PGMI Lahore, ⁶ Professor of Urology , Bahawalpur Medical & Dental College , Bahawalpur.

Correspondence Author: Kamran Zaidi , Assistant Professor of Urology , Lahore General Hospital / PGMI / AMC Lahore. Email : drkamranzaidi@yahoo.com , Contact # +92-333-4257695

ABSTRACT

Objective: Objective of this study is to determine the result of everted end to end urethroplasty in those patients who have traumatic bulbar and membranous urethral stricture.

Methods: The conducted place of this study was the department of Urology, Lahore General Hospital, Lahore for a duration of one year from 01-01-2012 to 31-12-2012. The included patients were 30 in number in the study. A single surgical team performed the procedure and Uroflowmetry and subjective evaluation was done on 2nd week, 1st month and 4th month and 12th month post operatively.

Results: 24.43±12.39 years were labeled as mean age of patients. The findings of retrograde and Antigrade Urethrogram were that the stricture at bulbo membranous junction was in 2 patients and the blind stricture at bulbar level was in 28 patients. 6.83±4.25 months were the average interval between the initial injury and urethroplasty. Mean length of the stricture was 1.83±0.63 cm after operation. On follow up of 2 weeks after operation, 15 patients were having subjective grading of 1 and 2 respectively (50 % in each). After 1 month of operation, grade 1 was reported in 23 patients (76.67%) and Grade-2 and Grade-3 subjective grading were present in 2 patients (6.67%) in each. 22 patients (73.34%) had 1 Uroflowmetry grading and 8 patients (26.67%) had 2 Uroflowmetry grade after 14 days of operation. After the follow up of 1 month, grade-1 was present in 19 patients (63.34%), Grade 2 was in 6 patients (20%) and Grade-3 Uroflowmetry was present in 2 patients (6.67%). Only 24 patients (80%) had presentation of grade-1 subjective improvement symptom and uroflowmetry at 4th month and 1 year after operation. The recurrence of stricture at follow up of 1 month was in 3 patients (10%) and at follow up of 4 month another 3 patients (10%) developed recurrent stricture in whom Internal Optical Urethrotomy (IOU) was subjected. Among the 6 patients (20%) of stricture recurrence, single IOU was enough for 2 patients (6.67%), 3 patients (10%) improved with 2 times IOU having 3 months interval and perineal urethroplasty was ultimately performed in 1 patient (3.34%) after repeated IOU. Failure was considered if IOU was repeated along with other intervention.

Conclusion: The treatment of choice for short traumatic bulbar and membranous urethral strictures is everted end-to-end urethroplasty having approximate 100% cure rates with minimum complications.

INTRODUCTION

A stricture urethra can appear anywhere along the urethra in which urethral lumen becomes narrow due to fibrosis affecting the epithelium of urethra and underlying corpus spongiosum. The voiding with obstruction, infection of the urinary tract or retention of urine are leading symptoms to it. If it is not treated, abscess formation in para urethral region, urethrocutaneous fistula and renal failure having bilateral hydronephrosis are the common complications (Jordan et al. 2007). Stricture urethra is a challenging surgical problem for men

since long time and the treatment for stricture urethra are mentioned in Hindu texts of 6 centuries before Christ and the metallic dilator was the 1st instrument used in the treatment of stricture as mentioned in Ayurveda in 16th century (Attwater, 1943). After that blind internal urethrotome was replaced by it and used by Civiale and Otitis in 18th century but not became much popular due to more complications and bad result. Historically; sounds were used for urethral dilation. The 1st surgical procedure to repair the stricture urethra

was described by Hamilton Russell in 1914 (Spirnak et al., 1993).

During the last decade, more the 5000 were admitted in hospitals annually and health care costs exceeded 200 million dollars annually due to urethral stricture disease in American men (Santucci et al. 2007). According to Data collected from the stricture clinic situated at the Sindh Institute of Urology and Transplantation (SIUT), stricture diseases are about three to four percent from all urological diseases and 5760 patients come to the hospital in a year for urethral dilatation and follow up uroflowmetry. In 2006, same institute got 274 indoor admissions due to stricture urethra (Hussain, 2008). In spite of such surprising numbers, it is surveyed that urethroplasty has not performed by 57.8% of urologists (Bullock and Brandes, 2007). The causes of urethral stricture are trauma, such as straddle injury and fracture of pelvis due to strong impact, recurrent UTIs, STDs, congenital problems of urethra, iatrogenic (surgical procedures) such as traumatic insertion or removal of catheter and idiopathic. Pelvic fracture mostly causes the posterior urethral injury in 10% of cases. (Singh et al., 2010)

Due to un-equality of all urethral strictures and wide spectrum of disease severity, it is necessary to find the exact position and length of the stricture by complete preoperative assessment and imaging. Surgical approach and techniques for reconstructive urologist's armamentarium depend on these two factors because no one procedure is suitable for all strictures. There is controversy because open surgical treatment is more supported over endoscopic management by expert reconstructive urologists for most of the urethral strictures (Peterson and Webster, 2004, Doumanian, 2010).

Mostly, the first line of treatment for patients having urethral strictures at bulbar level is visual internal urethrotomy. The long term success rate of this technique is not more than 30-50%. Bulbar urethral stricture having length < 1cm should be treated with it. An end-to-end anastomotic urethroplasty gives good results for all other bulbar urethral strictures in which visual internal urethrotomy is not suitable. It is concerned by some authors that chordae and sexual dysfunction appear while bridging long defects and buccal mucosa substitution urethroplasty is advocated in patients having bulbar urethral strictures > 2cm long (Dubey and Muruganandham, 2008).

90 to 95 % success rate is achieved by Open urethroplasty (scar excision surgery) and considered as gold standard by judging over other methods and overall 87.5% success rate is shown by recent study (Mungadi and Mbibu, 2010, Subhani et al., 2010). Natural elasticity is the key of the success of this procedure (Gupta et al., 2009). On the other hand, it is suggested by Kizer et al. that additional techniques such as splitting of corpora, pubectomy at inferior region and rerouting of corpora are occasionally needed to get effective reconstruction of posterior urethra (Kizer et al., 2007).

Uroflowmetry (UF) is a urological procedure mostly used to in the most common disease of urology, the Benign Prostatic Hyperplasia (BPH). Objective data of patient voiding is obtained by UF and obtained values can be monitored longitudinally to get efficacy of the intervention. UF is also used commonly to assess men with stricture urethra. In a current organized evaluation article, it is verified by Meek et al. that UF was commonly used to follow the progression of stricture disease in about 60% of comprised citations. However, adequate study is not performed on the use of UF in stricture urethra disease. So, UF changes are evaluated in stricture urethral patients having undergone urethral reconstructive surgery (Shoukry et al., 1975, Bloom et al., 1985, Herbison et al., 2008, Erickson et al., 2010, Heyns and Marais, 2002, Meeks et al., 2009).

Urologists face stricture urethra in daily practice. A lot of studies have been performed all over the world to compare different techniques used in the management of stricture and to observe their success rates but not more from the developing countries and the challenge for accurate treatment of stricture urethra is still continued. The purpose of this study was to assess the efficacy of the technique regarding uroflowmetry and improving subjective symptoms.

PATIENTS AND METHODS

This was a descriptive study was performed at the department of Urology Lahore General Hospital for the duration of one year from..... The included patients were 30 in number in the study. Informed consent and bio-data of the patient was noted in written before conducting the procedure. A single surgical team performed the procedure and follow up of the patients was for 12 months. The removal of Foley and Uroflowmetry was done on 2nd week,

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1st month and 4th month and 12th month after operation. Retrograde or flexible cystoscopy is used for urethral evaluation at 4th month and one year after operation.

Inclusion Criteria:

1. Blind stricture urethra at the bulbar and membranous level due to trauma.
2. The length of stricture is 0.5 cm to 2.5cm.

Exclusion Criteria:

1. The history of neurological problem in patients.
2. Urethroplasty is done more than one time in patients with development of urethrorectal fistula.

The standards for the evaluation of good urinary streams are mention in given tables

The Effectiveness of the Urinary Stream in terms of Flowmetry	
Grade 1 - Good	Peak flow rate is more than 15 ml/sec
Grade 2 -Fair	Peak flow rate is between 10-15-ml/sec
Grade 3 -Poor	Peak flow rate is less than 10/ml/sec

Subjective Evaluation	
Grade 1-Good	Patient voids as before the injury
Grade-2-Fair	Patient void with some difficulty, stream is thin and intermittent.
Grade-3-Poor	Voiding is so affected that patient is unable to pass urine in a stream

Everted End-To-End Urethroplasty

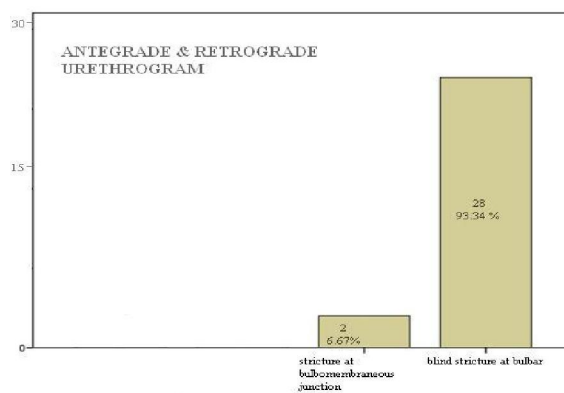
A surgery was performed on patient after all preparations before operation. Urethra was seen endoscopically up to stricture with help of flexible scope from both ends by suprapubic approach to identify the level of stricture. A midline skin incision is made in perineal area and urethra is approached and exposed by cutting the perineal muscles in midline. Urethra is separated from the perineal body. It is mandatory to excise the stricture segment (fibrosed) to get healthy pliable tissue. Per urethra foley passed and directed towards proximal urethra.

6-8 sutures of 4/0 vicryl were applied over foley catheter to get tension free anastomosis. Symmetrical fashion is adopted to place the sutures by everting the edges, initially at the

position of 9, 12 and 3 o'clock position. To avoid jumbling, clear demarcation was done, then remaining sutures at the position of 4, 6 and 8'o clock. Drain placed and suprapubic catheter retained. The shifting of the patient to ward is done after recovery from anesthesia. IV antibiotics and pain killers given for 24 hours and drained also removed after 24 hours as there was no fluid in the drain. IV antibiotics and pain killer changed to oral if no subjective complain of fever and pain. Patient was discharged from the ward after 24 hours. The mobility of the patients was kept limited for 3-4 days after operation.

RESULTS

24.43±12.39 year was the mean age of patient among 30 patients. 22 patients were single and 8 got married. 11 was the minimum age and 50 was the maximum age. 2 patients were barber by occupation, 10 were doing job in private farm and 5 patients are worker in a factory. Suprapubic tube was inserted in all patients and no one voided after clamping the tube. 28 patients got injury by direct trauma and 2 got injury by indirect trauma with pelvic fracture. IOU was performed prior to urethroplasty in 6 (20%) patients and passage of urine at perineal level was present in 1 (3.3%) patient. No other presenting complaint was present in remaining 23 (76.7%) patients. 6.83±4.25 months were mean duration between trauma and urethroplasty having minimum duration of 1 month and maximum duration of 1 year. According to antegrade and retrograde urethrogram, blind stricture at bulbar level was present in 28 (93.34%) patients and stricture at bulbomembraneous junction was present in 2 (6.67%) patients.



Mean stricture size observed per operatively was 1.83±0.63 cm with smallest size observed in

patients was 0.50 cm and largest stricture size observed in patients was 2.50 cm.

Recurrence of stricture was not developed in the patients after 2 weeks of operation. Stricture recurrence developed in 3 patients (10%) at the follow up of 1 month and another 3 patients (10%) developed recurrent stricture at follow-up of four months in whom Internal Optical Urethrotomy (IOU) was performed. Among the 6 patients (20%) of stricture recurrence, single IOU was enough for 2 patients (6.67%), 3 patients (10%) improved with 2 times IOU having 3 months interval and perineal urethroplasty was ultimately performed in 1 patient (3.34%) after repeated IOU. Failure was considered if IOU was repeated along with other intervention.

On follow up of 2 weeks after operation, 15 patients were having subjective grading of 1 and 2 respectively (50 % in each). After 1 month of operation, grade 1 was reported in 23 patients (76.67%) and Grade-2 and Grade-3 subjective grading were present in 2 patients (6.67%) in each.

22 patients (73.34%) had 1 grading of Uroflowmetry and 8 patients (26.67%) had 2 grade of Uroflowmetry after two weeks of operation. At the follow up of 1 month, grade-1 was present in 19 patients (63.34%), Grade 2 was in 6 patients (20%) and Grade-3 Uroflowmetry was present in 2 patients (6.67%). Only 24 patients (80%) had presentation of grade-1 subjective improvement symptom and uroflowmetry at 4th month and 1 year after operation.

DISCUSSION

It is crucially important for the urologist to have proper preliminary management, watchful selection of the operative method and the skill in the reconstructive surgery of the urethra for getting positive reconstruction of the stricture urethra due to trauma. Numerous factors like length and site of the stricture, and the overall health and the age of the patient are very important to decide about the selection of technique used for procedure. In reconstructive surgery of urethral stricture at bulbar level, multiple techniques with new modifications are applied. More than 95% durable cure rates are associated with end to end urethroplasty for stricture urethra at bulbar level having few complications (Berger et al., 2005, Santucci and Mario, 2002).

24.43±12.39 year was the mean age of patient among 30 patients. 11 was the minimum age and 50 was the maximum age. In review of the results

of Santucci et al, 70 urethroplasties were accomplished on patients of age more than 64 years (range 65 to 82) having 30 urethroplasties by end to end anastomosis. The comparison was made among the incidence of restructure in patients' age less than 65 years and outcome rates were not statistically different. According to another study, the outcome result was 89.9% in 139 patients' age less than 65 years ranging from 14 to 63 having mean age of 35 and outcome was 100 % in 14 patients older than 65 years ranging from 66 to 78 having mean age of 71. Thus, it is determined that patient age has no effect on the outcome of end to end urethroplasty (Santucci et al., 2004). Recently, it is debatable that how much length of the stricture is ideal for end to end anastomosis. It is sorted by Guralnick and Webster that stricture of 1cm or less is the limitation for this operation because urethral shortening is 2cm due to 1 cm excision and 1 cm proximal and distal spatulations that can be covered by the flexibility of the urethra at bulbar level without chordae. In another place, it is reported by Morey and Kizer on the basis of a cohort study of 22 patients (hypospadias and pelvic trauma excluded) that reconstructability of urethra and the size and flexibility of the distal urethral segment are proportional to each other on the basis of treatment of bulbar urethral stricture longer than 2.5cm by an extended approach of anastomosis (Guralnick and Webster, 2001, Morey and Kizer, 2006). 1.83±0.63 cm was the mean size of stricture in our study. In literature, 91% success rate was also documented with no effect in the increase of erectile complaints as compared to stricture with short size, concluding that this technique can be adopted for successful treatment of selected strictures ≤2.5 cm. With the reference of results of Barbagli, there was controversy about the interpretation of the outcome of urethroplasty in accordance with the length of stricture (Barbagli et al., 2007). In a concept, primary anastomosis after excising of urethra at stricture level is the simplest open surgical procedure with approximately 100% cure rates in properly selected patients. Criteria must be complied in the selection of the patients i.e. <3cm stricture in length at the level of bulbous urethra.

2-4% patients reported about UTI after the successful urethroplasty. Simple UTI or febrile complication UTI might be included in it. Febrile complicated UTIs are associated with pyelonephritis, epididymitis or sepsis. These rates

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can be decreased by removing Foley catheters as early as possible and keeping patients on antibiotics therapy during the entire period of catheterization. According to this study, 80% of the patients did not developed any type of infection who underwent everted end to end urethroplasty without any other intervention and 6 (20%) patients who developed recurrent stricture underwent IOU after operation also did not developed any sort of infection postoperatively and it was concluded by this study that there is no infection after operation (Al-Qudah and Santucci, 2005, Jakse and Marberger, 1986, Al-Qudah et al., 2005).

Undoubtedly, highest success rate is obtained by end to end urethroplasty in the correctly selected cases with short stricture urethra at bulbar level. About 95% success rate is confirmed by several reports. In accordance with the results of this study, 80% same success rate is achieved in terms of both subjective grading and uroflowmetry. When compared to other studies, it was 15% less. This difference is probably mainly due to the recurrent stricture. These patients underwent IOU later on. Among the 6 patients (20%) of stricture recurrence, single IOU was enough for 2 patients (6.67%), 3 patients (10%) improved with 2 times IOU having 3 months interval and perineal urethroplasty was ultimately performed in 1 patient (3.34%) after repeated IOU. Failure was considered if IOU was repeated along with other intervention that was 3.34%. Patients requiring only IOU were considered as success that was about 96.76%. Mostly, recurrent strictures formed after end to end urethroplasty can be resolved by endoscopic urethrotomy in one to two sessions. When compared to other studies, the cases treated with repeated IOU are considered as successful urethroplasty with better results. So, results of our study shows 96.76% success rate (Martinez-Pi et al., 1997, Santucci and Mario, 2002, Micheli et al., 2002, Aghaji and Odoemene, 2001, Manikandan et al 2011).

CONCLUSION

The treatment of choice for short traumatic bulbar and membranous urethral strictures is everted end-to-end urethroplasty having approximate 100% cure rates with minimum complications.

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