Scientific Research Publishing

Open Journal of Urology, 2024, 14, 179-187
https://www.scirp.org/journal/oju
ISSN Online: 2160-5629
ISSN Print: 2160-5440

Urethroplasty among Elderly Men, Surgical Techniques and Outcomes

Kwaku Addai Arhin Appiah[1], George Amoah[2], Patrick Opoku Manu Maison[3*], Roland Azorliade[2], Kwaku Otu-Boateng[2], Douglas Arthur[3], Dominic Annor Mintah[2], Joseph Yorke[1], George Asafu Adjaye Frimpong[4], Christian Kofi Gyasi-Sarpong[1]

[1]Department of Surgery, School of Medicine and Dentistry, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
[2]Department of Surgery, Komfo Anokye Teaching Hospital, Kumasi, Ghana
[3]Department of Surgery, School of Medical Sciences, University of Cape Coast, Cape Coast, Ghana
[4]Department of Radiology, School of Medicine and Dentistry, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
Email: addaiarhin@yahoo.com, lionamoah1@yahoo.com, *pmaison@uccsms.edu.gh, azor72@yahoo.com, kuuku01@yahoo.com, darthur@uccsms.edu.gh, putinando@yahoo.com, yorkejoseph@gmail.com, george.frimpong@spectrahealthgh.com, gaysek@yahoo.com

How to cite this paper: Appiah, K.A.A., Amoah, G., Maison, P.O.M., Azorliade, R., Otu-Boateng, K., Arthur, D., Mintah, D.A., Yorke, J., Frimpong, G.A.A. and Gyasi-Sarpong, C.K. (2024) Urethroplasty among Elderly Men, Surgical Techniques and Outcomes. *Open Journal of Urology*, **14**, 179-187.
https://doi.org/10.4236/oju.2024.143018

Received: January 5, 2024
Accepted: March 25, 2024
Published: March 28, 2024

Abstract

Introduction: Urethroplasty remains the gold standard for the management of urethral stricture. However, the treatment of stricture disease in the elderly tends to be less invasive due to the presumption that they might not be able to stand long hours of surgery and might have higher rates of recurrence due to poor wound healing from microangiopathy. We present our experience with the outcomes of urethroplasty among elderly men seen at the Komfo Anokye Teaching Hospital from January 2012 to December 2021. **Methods:** This was a retrospective review of data captured in the urology database on all patients 65 years and above who underwent urethroplasty at the hospital over the study period. Data was obtained on patients' demographics, stricture characteristics, urethroplasty technique, and outcome. A successful outcome was defined as peak flow rate > 15 mls/s, a patent urethra on retrograde urethrogram, patient satisfaction with urine stream, or restoration of the normal stream of urine with only one attempt at urethral calibration or internal urethrotomy post-operatively. Data was analyzed using PASW Statistics for Windows, Version 18.0. **Results:** Overall, 43 urethroplasties were done over the study period in elderly men. The age range was 65 to 87 years. The commonest aetiology was catheterization (62.79%) followed by urethritis (32.56%). Stricture length ranged from 0.5 cm to 16 cm with a mean of 3.93 cm. Most patients (60.46%) had bulbar urethral strictures. The repair methods employed were anastomotic urethroplasty (62.80%), fasciocutaneous flap (FCF) ventral onlay (13.95%), buccal mucosa graft (BMG) ventral onlay urethroplasty (4.65%), and staged urethrop-

lasty (4.65%). Three of the patients (6.98%) had a combination of anastomotic and tissue transfer urethroplasty. The overall success rate was 88.37%. Complications included three surgical site infections, two urethral diverticula and one glans dehiscence. **Conclusion:** Elderly men tolerate urethroplasty well and the procedure should not be denied solely based on age.

Keywords

Urethral Stricture, Elderly Men, Urethroplasty, Surgical Techniques

1. Introduction

Urethroplasty remains the gold standard for the management of urethral stricture disease, offering the lowest rates of stricture recurrence [1] and in some circumstances proving to be the most cost-effective compared to repeat dilation or endoscopic incision [2]. Recent studies have indicated that strictures not definitively managed by urethroplasty tend to recur after urethrotomy or dilation [3] [4] [5], further adding to the burden of disease on patients.

However, the treatment of urethral stricture disease in the elderly tends to be less invasive due to the presumption that they are out of reproductive age, have co-morbidities, and might not be able to stand long hours of surgery [6]. The existence of microangiopathy with aging, especially in diabetic and hypertensive elderly men, can be hypothesized to impair wound healing and hence affect the outcome of urethroplasty. Indeed, Mundy reported that, in small numbers of patients requiring posterior anastomotic urethroplasty, age older than 55 was associated with an increased rate of failure, from 7% to 57% [7].

Although direct vision internal urethrotomy (DVIU) or dilation is less technically demanding than urethroplasty, it is considered by many to have an unacceptably high failure rate (50% failure after the first procedure, 100% failure after the second) [8] [9].

To the best of our knowledge, there has been no study on the etiology and characteristics of urethral stricture disease and the outcomes of urethroplasty among elderly men in Ghana. We present our experience with the etiology, stricture characteristics, operative techniques, and outcomes of urethroplasty among elderly men seen at the Komfo Anokye Teaching Hospital from January 2012 to December 2021.

2. Materials and Methods

2.1. Study Type

This was a retrospective review of data captured in the urology database on all patients 65 years and above who underwent urethroplasty for urethral strictures at the Komfo Anokye Teaching Hospital between January 2012 and December 2021.

The study involved all urethral strictures irrespective of location, etiology or technique of reconstruction. Those who were treated with only minimally invasive procedures such as DVIU or dilatation were excluded from the study.

A data recording proforma was used to capture information from the urology database on patients' demographic and clinical data including age, etiology, stricture characteristics, repair technique, and outcome of urethroplasty for all urethral strictures at KATH among elderly men.

2.2. Evaluation of Outcomes

A successful outcome was defined as peak flow rate > 15 mls/s, a patent urethra on retrograde urethrogram (RUG), patient satisfaction with urine stream, or restoration of normal stream of urine with at most one attempt at urethral dilatation or internal urethrotomy postoperatively.

2.3. Statistical Analysis

Extracted data was exported to PASW Statistics for Windows, Version 18.0. Chicago and SPSS Inc. for final analysis. Basic statistics were performed to calculate proportions, means, and corresponding standard deviations on variables such as patients' age, stricture characteristics, and outcome of surgery. Discrete variables were analyzed by means of frequencies and tables.

Ethical Clearance

Ethical approval for this study was obtained from the Institutional Review Board of Komfo Anokye Teaching Hospital.

All patients with comorbidities were optimized before surgery.

3. Results

Overall, 43 urethroplasties were done over the study period in men aged 65 years and above. The age range was 65 to 87 years and the age distribution is as shown in Table 1. The mean follow-up was 73.09 months. As shown in Table 2, the commonest etiology was catheterization (62.79%) followed by urethritis from sexually transmitted infections (32.56%). One patient developed multiple anterior urethral strictures following external beam radiation therapy for prostate cancer. The length of the urethral strictures ranged from 0.5 cm to 16 cm with a mean of 3.93 cm, with 75% of patients having stricture lengths of 3 cm or less. Most patients (60.46%) had bulbar urethral strictures as shown in Table 3.

The repair methods employed were: anastomotic urethroplasty (62.80%), fasciocutaneous flap (FCF) ventral onlay urethroplasty (13.95%), buccal mucosa graft (BMG) ventral onlay urethroplasty (4.65%), dorsal roof strip BMG augmented anastomotic urethroplasty (4.65%), buccal mucosa graftdorsal onlay urethroplasty (2.33%) and staged urethroplasty (4.65%). Three of the patients (6.98%) had a combination of anastomotic and tissue transfer urethroplasty.

Another 42.9% of patients required treatment for co-existent BPH, of which 33.3% had prostatectomy and 66.7% had pharmacologic treatment following

urethroplasty.

The overall success rate for all techniques was 88.37%. Table 4 shows the various techniques employed and their success rates.

Comorbidities included 17 patients with hypertension, 3 with diabetes mellitus, 5 with both hypertension and diabetes mellitus, and one patient who had received radiation therapy for prostate cancer.

Complications included 3 cases of surgical site infection, two of urethral diverticulum and one of glans dehiscence after undergoing FCF urethroplasty on account of pan-urethral stricture. Two needed single dilatations post-urethroplasty to restore normal flow of urine. Five patients had failed repair and needed further procedures. Of these, 3 had extensive stricture disease requiring more than one procedure at a single stage. There were no peri-operative mortality nor neurological deficits related to prolonged lithotomy positioning.

Table 5 shows the distribution of patient age, number of strictures, and number of procedures versus outcome. There was no correlation between patient age group and outcome ($p = 0.446$), outcome and number of strictures ($p = 0.126$), nor outcome and technique of urethroplasty ($p = 0.151$). However, there was a significant correlation between outcome and number of procedures ($p = 0.005$).

Table 1. Age distribution.

Age (years)	Number	Percentage (%)
65 - 69	20	46.50
70 - 74	14	32.60
75+	9	20.90
Total	43	100

Table 2. Etiology of strictures.

Etiology	Number	Percentage (%)
Catheter related	27	62.79
Urethritis	14	32.56
Radiation	1	2.33
Trauma	1	2.33

Table 3. Stricture location.

Location	Number	Percentage (%)
Penile	6	13.95
Bulbar	26	60.46
Penile-Bulbar	8	18.61
Pan-urethral	3	6.98
Total	43	100

Table 4. Surgical techniques employed and outcomes.

Urethroplasty technique	Number	Percentage (%)	Failed repair	Successful outcome (%)
Anastomotic (A)	27	62.80	2	92.60
BMG dorsal onlay (B)	1	2.33	0	100.00
BMG ventral onlay (C)	2	4.65	0	100.00
FCF ventral onlay (D)	6	13.95	1	83.33
Dorsal roof strip BMG augmented anastomotic (E)	2	4.65	0	100.00
Johansen staged repair (F)	2	4.65	1	50.00
A + C	1	2.33	1	0.00
A + D	2	4.65	0	100.00
Total	43	100.00	5	

Table 5. Outcome versus age, number of procedures and number of strictures.

Parameter	Outcome		Total	p-value (<0.05)
	Failed	Successful		
Age (yrs)				
65 - 69	1	19	20	
70 - 74	2	12	14	0.446
75+	2	7	9	
Number of procedures				
1	2	34	36	0.004849
2	3	4	7	
Number of strictures				
1	3	33	36	0.126
2	2	5	7	

4. Discussion

According to the World Health Organization, age 65 and older is chronologically considered elderly. In old age, the interaction between genetic structure and the environment is observed at the highest level and may affect diseases and their treatment outcomes [10]. The effect of age on urethroplasty outcomes has been researched by many investigators [11] [12] [13]. Breyer *et al.* demonstrated that age above 65 years was not predictive for urethroplasty failure [13]. The surgical approaches most commonly used in their study cohort were anastomotic, BMG,

and fascio-cutaneous flap urethroplasties. Similar findings were reported by Levy *et al.* in patients over 60 years of age who underwent anastomotic urethroplasty and buccal mucosa graft urethroplasty [11]. In a study comparing the impact of age on urethroplasty outcomes, Pazir *et al.* did not find a correlation in patients treated with anastomotic and buccal mucosa graft urethroplasty between age and urethroplasty failure, consistent with the findings of the aforementioned studies [14].

In contrast, Viers *et al.* reported that advancing age per decade beyond 50 years was independently associated with the risk of urethroplasty failure in patients who underwent anastomotic and substitution urethroplasty [12]. However, they found that although the failure rate increased with age, about 75% - 80% of men over the age of 60 years remained stricture-free for 5 years and therefore concluded that advanced age alone should not be a contraindication to urethroplasty.

Aging is known to promote wound healing at the microlevel structure of the urethra through matrix metalloprotein (MMP) enzymes, which increase with aging [15]. These extracellular matrixes play an essential role in the healing process [16]. It is known that even the urethral plaques of hypospadias in childhood show significant age-related structural changes, and these changes may play a role in urethral healing after hypospadias repair [17].

However, Hoffer *et al.* found a significant increase in urethral atrophy risk due to a decrease in serum testosterone [18]. For this reason, it has been suggested that there may be an increase in urethral stenosis and an inability to achieve good post-urethroplasty outcomes due to a decrease in androgen, which develops secondarily in the elderly [19].

In this study, the overall success rate for all techniques was 88.37% with an insignificant failure rate, consistent with the findings of other researchers as discussed above. This suggests that urethroplasty with various surgical techniques is well tolerated by elderly men.

Globally, urethral strictures in elderly patients occur most frequently secondary to urological instrumentation [20]. This is as a result of the high number of elderly patients who undergo transurethral resection of prostate. It is therefore not surprising that the incidence of urethral stricture is increasing in the elderly population [21]. In this studyhowever, urethral catheterization was the commonest cause of urethral stricture in the elderly, 62.79% (**Table 2**). These were men on regular catheter changes for urine retention from prostatic diseases while waiting for definitive treatment due to long waiting times, poor quality catheter material, or poor catheterization techniques by poorly trained staff.

Although optical urethrotomy is known to have inferior success rates compared with open urethroplasty, it was still suggested by urologists for elderly men with urethral strictures due to their limited life expectancy [22]. Despite their advanced age, all patients in this study had urethroplasty with a high success rate with no peri-operative mortality.

The findings in this study suggest that elderly men tolerate urethroplasty with satisfactory outcomes and if indicated, the procedure should not be denied on account of their advanced age. Similar to findings in urethroplasty for younger men, our study found no correlation between patient age group and outcome ($p = 0.446$), outcome and number of strictures ($p = 0.126$) nor outcome and technique of urethroplasty ($p = 0.151$) [11] [12] [13]. However, as expected, there was a significant relation between the outcome and number of procedures performed ($p = 0.004849$).

5. Limitation

This study is limited by the relatively small sample size.

6. Conclusion

Elderly men appear to tolerate urethroplasty well and these findings show that urethroplasty should not be denied solely on the basis of age unless there is an absolute contraindication to the procedure. Bladder outlet obstruction from prostatic enlargement must be considered in those patients who have decreased stream after a successful urethroplasty.

Acknowledgments

The abstract of this manuscript was presented at the West African College of Surgeons Congress in Kumasi, Ghana in 2014.

Data Availability

The data supporting the conclusions of the study are available and can be accessed by an email request to the corresponding author.

Funding Statement

This research was self-funded by the authors.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Andrich, D.E. and Mundy, A.R. (2008) What Is the Best Technique for Urethroplasty? *European Urology*, **54**, 1031-1041. https://doi.org/10.1016/j.eururo.2008.07.052

[2] Rourke, K.F. and Jordan, G.H. (2005) Primary Urethral Reconstruction: The Cost Minimized Approach to the Bulbous Urethral Stricture. *Journal of Urology*, **173**, 1206-1210. https://doi.org/10.1097/01.ju.0000154971.05286.81

[3] Heyns, C.F., Steenkamp, J.W., De Kock, M.L. and Whitaker, P. (1998) Treatment of Male Urethral Strictures: Is Repeated Dilation or Internal Urethrotomy Useful? *Journal of Urology*, **160**, 356-358. https://doi.org/10.1016/S0022-5347(01)62894-5

[4] Pansadoro, V. and Emiliozzi, P. (1996) Internal Urethrotomy in the Management of

Anterior Urethral Strictures: Long-Term Follow-Up. *Journal of Urology*, **156**, 73-75. https://doi.org/10.1016/S0022-5347(01)65942-1

[5] Greenwell, T.J., *et al.* (2004) Repeat Urethrotomy and Dilation for the Treatment of Urethral Stricture Are Neither Clinically Effective nor Cost-Effective. *Journal of Urology*, **172**, 275-277. https://doi.org/10.1097/01.ju.0000132156.76403.8f

[6] Heyns, C.F., van der Merwe, J., Basson, J. and van der Merwe, A. (2012) Treatment of Male Urethral Strictures—Possible Reasons for the Use of Repeated Dilatation or Internal Urethrotomy Rather than Urethroplasty. *South African Journal of Surgery. Suid-Afrikaanse Tydskrif vir Chirurgie*, **50**, 82-87. https://doi.org/10.7196/sajs.1081

[7] Mundy, A.R. (1996) Urethroplasty for Posterior Urethral Strictures. *The British Journal of Urology*, **78**, 243-247. https://doi.org/10.1046/j.1464-410X.1996.11617.x

[8] Morey, A.F. and McAninch, J.W. (1997) Reconstruction of Posterior Urethral Disruption Injuries: Outcome Analysis in 82 Patients. *Journal of Urology*, **157**, 506-510. https://doi.org/10.1016/S0022-5347(01)65188-7

[9] Morey, A.F. and McAninch, J.W. (1997) Reconstruction of Traumatic Posterior Urethral Strictures. *Techniques in Urology*, **3**, 103-107.

[10] Yerli, G. (2017) Yaşlilik Dönemi Özellikleri Ve Yaşlilara Yönelik Sosyal Hizmetler. *The Journal of International Social Research*, **10**, 1278-1287. https://doi.org/10.17719/jisr.2017.1979

[11] Levy, M., *et al.* (2017) The Impact of Age on Urethroplasty Success. *Urology*, **107**, 232-238.

[12] Viers, B.R., *et al.* (2018) Urethral Reconstruction in Aging Male Patients. *Urology*, **113**, 209-214. https://doi.org/10.1016/j.urology.2017.09.029

[13] Breyer, B.N., *et al.* (2010) Multivariate Analysis of Risk Factors for Long-Term Urethroplasty Outcome. *Journal of Urology*, **183**, 613-617. https://doi.org/10.1016/j.juro.2009.10.018

[14] Pazir, Y., Yanaral, F., Çağlar, U., Çakmak, S., Erbin, A., Sarilar, Ö. and Özgör, F. (2021) The Impact of Age on Urethroplasty Outcomes: A Match Pair Analysis. *The New Journal of Urology*, **16**, 228-235. https://doi.org/10.33719/yud.2021;16-3-878184

[15] Öztürk, Ö.G. (2013) Matriks Metalloproteinaz Enzim Ailesi. *Archives Medical Review Journal*, **22**, 209-220. https://dergipark.org.tr/en/pub/aktd/issue/2208/29367

[16] Üçgül, İ., Aras, S. and Elibüyük, U. (2018) Ekstraselüler Matris Yapisi ve Görevleri. *Uludağ University Journal of the Faculty of Engineering*, **23**, 295-310. https://dergipark.org.tr/en/pub/uumfd/issue/36268/327376 https://doi.org/10.17482/uumfd.327376

[17] da Silva, E.A., de Marins, R.L., Rondon, A. and Damião, R. (2013) Age-Related Structural Changes of the Urethral Plate in Hypospadias. *Journal of Pediatric Urology*, **9**, 1155-1160. https://doi.org/10.1016/j.jpurol.2013.04.004

[18] Hofer, M.D., *et al.* (2016) Low Serum Testosterone Level Predisposes to Artificial Urinary Sphincter Cuff Erosion. *Urology*, **97**, 245-249. https://doi.org/10.1016/j.urology.2016.04.065

[19] Spencer, J., *et al.* (2018) Hypoandrogenism Is Prevalent in Males with Urethral Stricture Disease and Is Associated with Longer Strictures. *Urology*, **114**, 218-223. https://doi.org/10.1016/j.urology.2017.10.057

[20] Lumen, N., *et al.* (2009) Etiology of Urethral Stricture Disease in the 21st Century. *Journal of Urology*, **182**, 983-987. https://doi.org/10.1016/j.juro.2009.05.023

[21] Barbagli, G., Palminteri, E., Bracka, A. and Caparrós Sariol, J. (2003) Penile Urethral

Reconstruction: Concepts and Concerns. *Archivos Españoles de Urología*, **56**, 549-556.

[22] Albers, P., Fichtner, J., Brühl, P. and Müller, S.C. (1996) Long-Term Results of Internal Urethrotomy. *Journal of Urology*, **156**, 1611-1614. https://doi.org/10.1016/S0022-5347(01)65461-2