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Long-Term Outcomes of Recurrent Bulbar Urethral Stricture Treatment With the Optilume Drug-Coated Balloon: Five-Year Results From the ROBUST I Study

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Study Need and Importance: Although the gold standard for urethral stricture treatment is urethroplasty, endoscopic management continues to be the most commonly utilized procedure. Urethral dilation and/or direct vision internal urethrotomy (DVIU) has a poor success rate, particularly for patients with recurrent stricture. There is an urgent need to improve endoscopic outcomes. The Optilume drug-coated balloon (DCB) is the first DCB indicated for use in male urethral stricture. It has a dual mechanism of action with urethral dilation and circumferential delivery of paclitaxel, a potent antiproliferative drug.

What We Found: We evaluated the safety and efficacy of the Optilume DCB in 53 men with recurrent anterior urethral stricture who were followed for 5 years post procedure. Functional success was achieved in 58% (25/43) patients at 5 years. Average International Prostate Symptom Score improved from a mean of 25.2 at baseline to 7.2 ($P < .001$), and freedom from repeat intervention was maintained through study close at 71.7%, estimated by Kaplan-Meier (Figure). Maximum flow rate improved from 5.0 mL/s at baseline to 19.9 mL/s ($P < .01$), and average postvoid residual was reduced from 141.4 mL to 59.5 mL ($P < .01$). Erectile function remained unaffected. There were no serious treatment-related adverse events.

Limitations: This study did not have a control arm, which may introduce bias. Patients with confounding factors such as penile stricture and prior pelvic radiation were excluded, so it is not known how the DCB would perform in these groups.

Interpretation for Patient Care: Findings from the 5-year follow-up indicate improved objective and subjective outcomes with the DCB compared to standard of care dilation/DVIU for patients with recurrent anterior stricture. The DCB may be considered as an alternative to repeat dilation/DVIU in these patients.

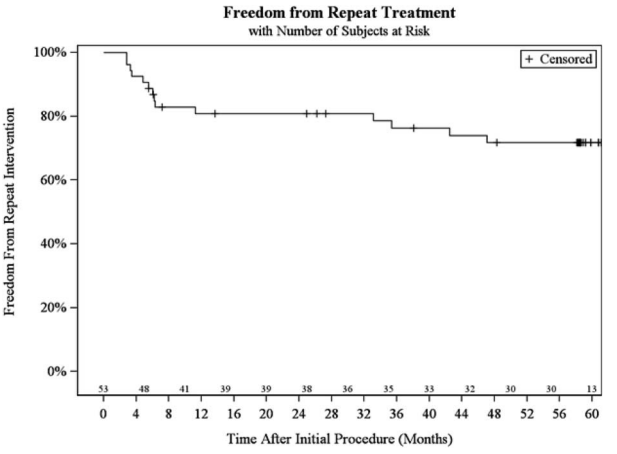

Figure. Kaplan-Meier curve showing freedom from reintervention through 5 years.

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Long-Term Outcomes of Recurrent Bulbar Urethral Stricture Treatment With the Optilume Drug-Coated Balloon: Five-Year Results From the ROBUST I Study

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Purpose: We report the 5-year study closeout results for the ROBUST I trial evaluating the safety and efficacy of the Optilume drug-coated balloon (DCB) for men with short, recurrent bulbar urethral strictures.

Materials and Methods: Adult men with recurrent bulbar urethral strictures ≤ 2 cm long and lumen < 12F were included in the study and treated with the Optilume DCB. Outcome measures included symptom questionnaires, maximum urinary flow rate, postvoid residual, and freedom from repeat intervention. Functional success was defined as improvement in International Prostate Symptom Score $\geq 50\%$ without re-treatment.

Results: Fifty-three men were enrolled and treated, and 31 subjects completed all follow-up. Functional success was achieved in 58% (25/43) patients at 5 years. Average International Prostate Symptom Score improved from a mean of 25.2 at baseline to 7.2 at 5 years ($P < .001$). Freedom from repeat intervention was maintained through 5 years at 71.7% estimated by Kaplan-Meier. Maximum urinary flow

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Author Contributions:

Conception and design: Elliott.
Data acquisition: Pichardo, Estrella, Rodríguez Lay, Espino.
Data analysis and interpretation: DeLong, Elliott.
Drafting the manuscript: DeLong.
Critical revision of the manuscript for scientific and factual content: DeLong, Virasoro, Elliott.
Statistical analysis: DeLong, Elliott.
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rate improved from 5.0 mL/s at baseline to 19.9 ($P < .01$), and average postvoid residual was reduced from 141.4 mL to 59.5 mL ($P < .01$) at 5 years of follow-up. Erectile function remained unaffected. There were no serious treatment-related adverse events.

Conclusions: In this challenging cohort of men with failed prior endoscopic treatment, the Optilume DCB shows sustained improvement in subjective and objective voiding parameters at 5 years. Optilume is a safe and effective treatment option for appropriately selected men with recurrent bulbar urethral stricture who wish to avoid urethroplasty. Results are in line with the ROBUST III randomized controlled trial that will continue follow-up through 5 years.

Clinical Trial No.: NCT03014726.

Key Words: urethral dilation, urethral stricture, paclitaxel, clinical trial, lower urinary tract symptoms

URETHRAL stricture disease remains a significant clinical entity within the field of urology. This condition has long posed a considerable challenge to urologists due to its varied etiology, clinical presentation, and the need for effective management strategies. Affecting approximately 0.6% of males in their lifetime,[1] the most widely used treatments are endoscopic. These minimally invasive procedures involve either mechanical dilation or direct vision internal urethrotomy (DVIU) and are still the most used management strategies.[2] Considered to have equivalent efficacy, these 2 procedures have an unacceptable failure rate with repeat treatments.[3]

Prior studies have investigated the potential benefit of adjunctive therapy at the time of DVIU.[4] Mitomycin C has been shown to have benefit with decreased stricture recurrence[4,5]; however, its use may be limited by a nonstandardized injection protocol as well as some reported significant adverse events (AEs).[5] The data show an overall modest benefit for triamcinolone.[6] The traditional treatment paradigm for urethral strictures failing endoscopic management has therefore been formal urethroplasty.[7] The AUA guidelines on urethral stricture disease were updated in 2023 to include the use of drug-coated balloons (DCBs)[7] after the panel reviewed updated research indicating favorable outcomes, including the ROBUST III randomized controlled trial investigating the use of the Optilume DCB vs standard of care dilation.[8]

The Optilume DCB is the first DCB intended for use in male urethral strictures. In an outpatient procedure the balloon first dilates the strictured area and then circumferentially delivers paclitaxel to the scar. Paclitaxel is a potent antiproliferative drug that stabilizes microtubules, has known antifibrotic properties, and has been used extensively in cardiovascular disease.[9]

ROBUST I is a single-arm, open-label, prospective, multicenter study evaluating the safety and efficacy of the Optilume DCB for recurrent anterior urethral strictures in men. We previously reported the 1-, 2-, and 3-year data.[10-12] At 3 years, functional success was achieved in 67% (29/43) of patients and freedom from repeat intervention in 77% (33/43). Here we report the 5-year study closeout safety and efficacy data for the ROBUST I trial.

MATERIALS AND METHODS

ROBUST I is a prospective, multicenter, single-arm, open-label clinical trial that was conducted at 4 sites in Latin America and was approved by the ethics committee at each site (protocol No. DSC016; Clinical Trial No. NCT03014726). Adult males with a single bulbar urethral stricture with lumen < 12F and length ≤ 2.0 cm on retrograde urethrography were included. Patients were additionally required to have undergone between 1 and 4 prior endoscopic treatments, have an International Prostate Symptom Score (IPSS) ≥ 13, and a maximum flow rate (Qmax) < 10 mL/s. Patients were excluded if they had a history of pelvic radiation, prior urethroplasty, radical prostatectomy, lichen sclerosus, penile prosthesis or artificial urinary sphincter. Additionally, patients were ineligible if they passed a urinary calculus within the previous 6 months, had chronic kidney disease (serum creatinine >2 mg/dL), or received intradetrusor onabotulinumtoxinA injections within the previous 12 months.

Preoperative workup included a retrograde urethrogram in all patients. Strictures were predilated with an uncoated balloon dilator and/or DVIU prior to treatment with the Optilume DCB in the same treatment setting. Choice of predilation method was at the surgeon's discretion. The DCB was inflated to the rated burst pressure for 5 minutes. All DCBs were 3 cm in length, and the 24F or 30F balloons were utilized at the surgeon's discretion. A small Foley catheter was placed (12F or 14F). Postintervention follow up was at 5 days (catheter removal), 14 days, 1 month, 3 months, 6 months, and then annually through the 5-year follow-up.

Recorded outcomes at each visit included IPSS, Urethral Stricture Surgery Patient-Reported Outcome Measure, International Index of Erectile Function (IIEF), postvoid residual (PVR), Qmax, and freedom from repeat intervention. Anatomic success, defined by ability to pass a flexible cystoscope, or in some patients passage of a catheter, was recorded at 6 and 12 months and is previously reported.[10-12] DCB diameter utilized (24F or 30F) was also recorded. Our primary efficacy end point during long-term follow-up was functional success, defined as a $\geq 50\%$ improvement in IPSS compared to baseline without re-treatment. Freedom from repeat intervention was recorded.

All treatment-related AEs were recorded. The primary safety end point was the rate of treatment-related serious AEs and was defined as a composite of fistula formation, de

novo urinary incontinence that did not resolve, or urethral burst.

This trial was powered for the primary efficacy end point improvement in IPSS with hypothesis tests comparing against a prespecified performance goal of at least 50% of patients improving to an IPSS score < 11 at 3 months of follow-up. Additional prespecified hypothesis testing was completed after 12-month follow-up for anatomic success.

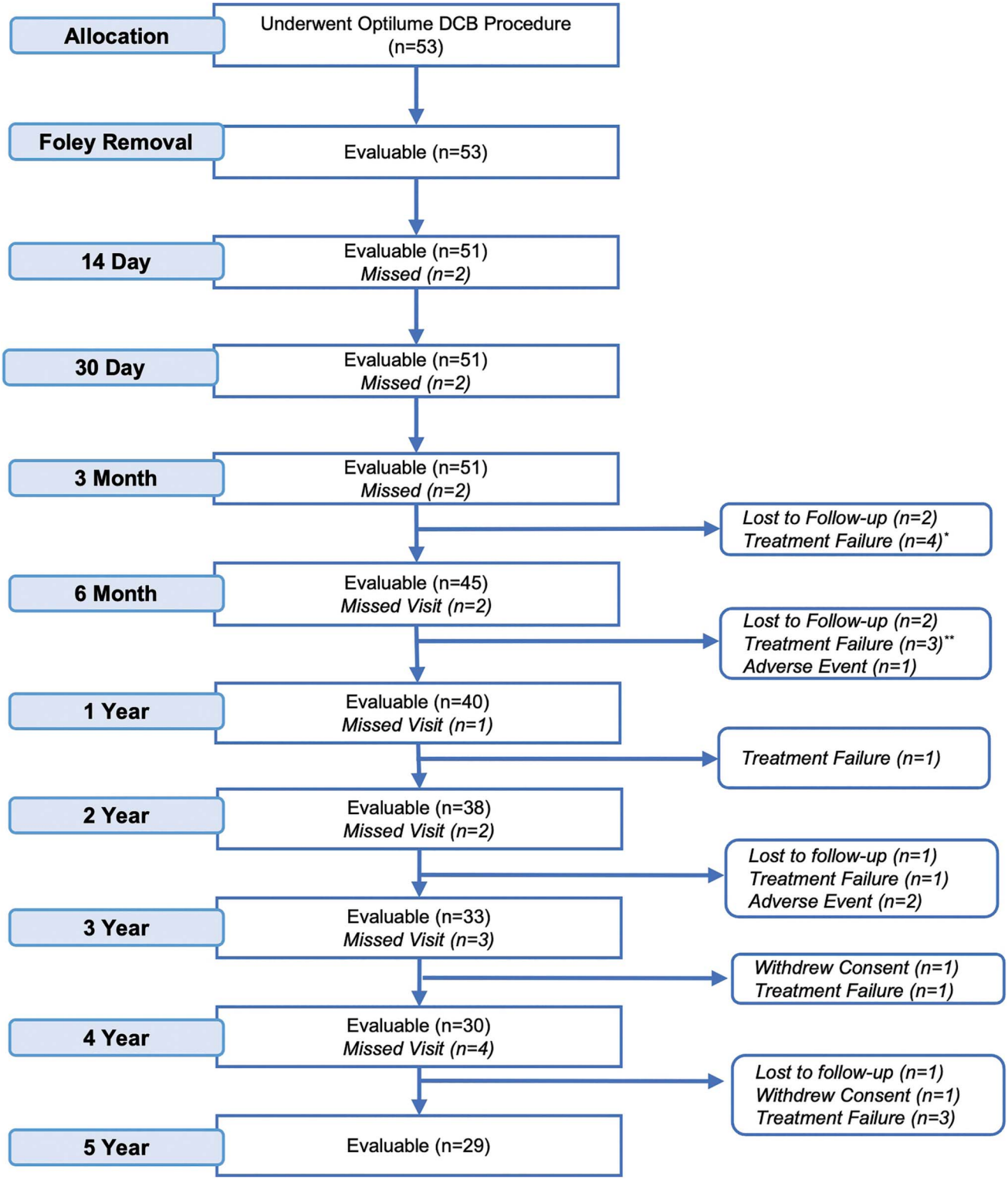

Figure 1. Subject accountability diagram. Two subjects completed all follow-up after re-treatment with the drug-coated balloon (DCB) and were considered failures at the time of initial recurrence/re-treatment for the purpose of analysis. One subject received re-treatment with the DCB but withdrew consent prior to completing follow-up.

Outcomes for both prespecified hypothesis-tested end points have been reported previously.[10] Descriptive statistics were used to present study variables, with continuous data presented as mean (SD) and categorical data presented as proportion (percent). *P* values presented are nominal and are not adjusted for multiple comparisons.

Freedom from reintervention was determined using Kaplan-Meier analysis. Subjects were censored upon exit if they did not require reintervention. Censoring also applied to cases of loss to follow-up, withdrawal from the study, or completion of the study, and was calculated based on the date of last contact or study completion. All patients were followed after primary treatment as well as if they underwent re-treatment with the DCB. The subjects re-treated with the DCB were reported separately and were considered failures at the time of re-treatment for the primary analysis.

Subgroup analyses were performed for functional success rates based on balloon diameter, number of prior endoscopic treatments, and stricture length. χ^2 test was used for categorical comparisons, and unpaired *t* test was used for continuous variables as appropriate. To assess functional success, subjects undergoing additional treatments for their strictures were considered failures from the time repeat treatment was received and were included in the denominator. Other outcome measures were presented as observed values, meaning only those reporting data at each follow-up visit were included. A sensitivity analysis for IPSS, Qmax, and PVR over time utilizing a worst-case failure carried forward methodology was also employed, in which subjects exiting the study early due to stricture recurrence had outcome values at their last visit carried forward to future visits.

RESULTS

Patients

Between November 2016 and September 2017, 53 men were enrolled and treated with the Optilume DCB (Figure 1). Mean age was 50.7 years, average stricture length was 0.9 cm, and diameter 2.3 mm. Mean number of prior endoscopic treatments was 1.7. Detailed demographics were reported previously.[10-12] Table 1 shows baseline stricture characteristics. Of the 53 enrolled subjects, 41 patients completed all follow-up through either an end point event or to 5 years. Of these, 29 completed follow-up to 5 years without any re-treatment and 2 additional subjects completed all follow-up after re-treatment with the DCB. The 2 re-treated patients were considered as failures beginning at the time of initial recurrence and re-treatment for the purpose of analysis. Ten of the 22 subjects who were not evaluable at 5 years had been exited due to failure prior to the 5-year time point, 1 subject received re-treatment with the DCB but withdrew consent prior to completing follow-up, and the remaining 11 were lost to follow-up (6), withdrew (2), or had an AE and were exited (3, related to benign prostatic hypertrophy).

Table 1. *Baseline Urethral Stricture Characteristics*

Characteristic	Data value
Urethral stricture etiology, % (n/N)	
Iatrogenic	45.3 (24/53)
Idiopathic	3.8 (2/53)
Traumatic	50.9 (27/53)
Retention (luminal obliteration), % (n/N)	
Obliterated/near obliterated	50.9 (27/53)
Patent urethra	49.1 (26/53)
Bulbar anatomic location, % (n/N)	100 (53/53)
Stricture length, mean±SD, cm (N)	0.9 ± 0.52 (53)
Diameter of urethra at stricture, mean±SD, mm (N)	2.3 ± 1.77 (53)
Diameter of healthy urethra at normal, mean±SD, mm (N)	10.2 ± 3.62 (53)

Efficacy

At 5 years, 25 subjects experienced functional success, while 14 exited the study early due to treatment failure and 4 subjects completing 5 year follow-up did not experience an IPSS improvement $\geq$ 50%. Therefore the observed functional success rate was 58% (25/43; Table 2). The functional success rate was not significantly different when a threshold of a $\geq$ 30% improvement in IPSS was utilized (63%, 27/43).

When looking at the overall as observed analysis, the baseline average Qmax was 5.0 mL/s and improved to 19.9 mL/s ($P < .01$) at 5 years. PVR also decreased from 141.4 mL at baseline to 59.5 mL ($P < .01$) at 5 years, and IPSS improved from 25.2 at baseline to 7.2 ($P < .0001$) at 5 years (Table 3). These outcomes were not significantly different when utilizing the failure carried forward methodology for missing data, with an IPSS of 9.9, Qmax of 15.7 mL/s, and PVR of 69.9 mL at 5 years.

Treatment success was directly related to DCB diameter. Twenty-five subjects were treated using the 24F DCB, and 28 were treated using the 30F DCB. Baseline stricture length and stricture diameter were similar between these groups. At 5 years, functional success was 38% (8/21) in the 24F group and 77% (17/22) in the 30F group. A similar trend was noted for Qmax and PVR at 5 years in the 30F group compared to the 24F group (Table 4).

Freedom from repeat intervention at 5 years was 71.7% as estimated by Kaplan-Meier (Figure 2). Most failures occurred within 12 months of the Optilume DCB treatment. Anatomic success was achieved at 6 and 12 months in 76% and 70%, respectively. These data are previously reported.[10-12] Mean Urethral Stricture Surgery Patient-Reported

Table 2. *Functional Success Rate: Subjects Who Experienced $\geq$ 50% Improvement in International Prostate Symptom Score From Baseline*

	3 Mo	6 Mo	1 Y	2 Y	3 Y	4 Y	5 Y
Category, No.							
Success	43	41	37	32	29	29	25
Failure	8	9	11	15	14	12	18
Evaluable, No.	51	50	48	47	43	41	43
Responder rate, %	84	82	77	68	67	71	58

Table 3. *International Prostate Symptom Score Over Time (as Observed)*

Variable	Baseline	3 Mo	6 Mo	1 Y	2 Y	3 Y	4 Y	5 Y
IPSS								
Mean±SD	25.2 ± 4.46	6.1 ± 7.63	4.6 ± 5.18	4.5 ± 3.90[a]	6.9 ± 7.66[a]	5.5 ± 6.90[a]	4.5 ± 3.21[a]	7.2 ± 6.6[a]
Range	15-34	0-30	0-25	0-31	0-34	0-27	0-14	0-29
Median	26.0	3.0	3.0	4.0	4.5	3.0	4.0	5.0
No. of patients	53	51	45	40	38	33	30	29
IPSS QOL								
Mean±SD	4.9 ± 0.86	0.8 ± 1.32	0.7 ± 0.93	0.7 ± 0.93[a]	0.9 ± 1.47[a]	0.7 ± 1.19[a]	0.5 ± 0.63[a]	0.7 ± 1.2[a]
Range	2.0-6.0	0.0-5.0	0.0-4.0	0.0-4.0	0.0-6.0	0.0-5.0	0.0-2.0	0-5
Median	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
No. of patients	53	51	40	40	38	33	30	29

Abbreviations: IPSS, International Prostate Symptom Score; QOL, quality of life.
[a] Compared to the baseline value, $P < .0001$ (paired t test).

Outcome Measure scores improved from 15.9 at baseline to 3.3 at 5 years (as observed).

A total of 5 subjects received re-treatment with the DCB over the study period; all patients were treated initially with the 24F balloon. Four of the 5 occurred after the 3-month follow-up and 1 was performed after the 6-month follow-up. Three of the 5 re-treated subjects were an anatomic success at 6 months (1 patient missed the test, and 1 patient exited study with IPSS > 11 and was considered a failure).

Safety

No serious treatment-related AEs were reported throughout the 5-year follow-up. A total of 93 mild or moderate AEs were reported, and 15 were considered treatment or device related. All were mild or moderate in nature (Table 5). Of the 6 serious AEs reported, none were considered device or procedure related.

Erectile function, measured utilizing the validated IIEF questionnaire, was unaffected by treatment. IIEF score when considering subjects who were sexually active within the month prior to treatment did not change significantly (25.9 at baseline vs 26.8 at 5 years; Table 6).

DISCUSSION

ROBUST I is a multicenter, prospective, single-arm clinical trial that investigated the safety and efficacy of the Optilume DCB for men with short, recurrent bulbar urethral strictures. At 5 years, there were no treatment-related serious AEs, and functional success was achieved in 58% of subjects.

The 5-year data are in line with previous reports from years 1 to 3, showing sustained response in patient-reported outcomes, as well as freedom from repeat intervention. There is no universal definition of success following treatment of a urethral stricture, and variables taken into consideration typically include freedom from repeat intervention, Qmax, anatomic success, and patient-reported symptoms. Using different definitions of success, some authors have found widely variable outcomes for first-time anterior urethroplasty patients.[13]

What is clinically meaningful for the patient? With a 58% functional success rate correlating with a 71.7% freedom from reintervention rate at 5 years for patients treated with the DCB, an argument can be made that, as with urethroplasty patients, patient-reported measures are indicative of success. In recent years there has been more of a focus on these subjective outcomes, which our data would support.[13]

Treatment success was not dependent on baseline stricture characteristics such as number of prior treatments or stricture length; however,

Table 4. *Maximum Flow Rate and Postvoid Residual by Device Size*

	Qmax (mL/s), mean ± SD (n)		PVR (mL), mean ± SD (n)	
Time	8 mm (24F)	10 mm (30F)	8 mm (24F)	10 mm (30F)
Baseline	5.2 ± 2.2 (18)	4.9 ± 2.8 (28)	128.0 ± 88.4 (15)	148.6 ± 113.9 (28)
14 D	16.9 ± 10.5 (24)	26.7 ± 12.8 (27)	43.9 ± 43.3 (21)	30.1 ± 26.6 (27)
30 D	18.2 ± 9.4 (23)	26.9 ± 14.4 (27)	34.7 ± 41.2 (22)	31.7 ± 26.4 (27)
3 Mo	17.2 ± 10.9 (25)	26.9 ± 12.4 (26)	46.7 ± 45.0 (25)	26.6 ± 26.2 (26)
6 Mo	17.2 ± 11.5 (19)	21.8 ± 10.0 (26)	46.9 ± 59.3 (19)	17.7 ± 18.1 (26)
1 Y	20.7 ± 11.9 (15)	19.7 ± 8.8 (24)	23.7 ± 28.9 (15)	25.2 ± 34.5 (24)
2 Y	14.6 ± 8.6 (16)	19.6 ± 11.2 (22)	56.8 ± 65.7 (16)	37.2 ± 32.7 (22)
3 Y	12.6 ± 7.4 (12)	16.6 ± 8.6 (21)	44.8 ± 47.0 (12)	53.3 ± 70.7 (21)
4 Y	12.7 ± 8.3 (11)	19.1 ± 10.9 (19)	51.5 ± 36.8 (11)	37.8 ± 37.0 (18)
5 Y	12.8 ± 9.4 (10)	24.3 ± 20.6 (18)	51.9 ± 40.6 (11)	64.1 ± 86.2 (18)

Abbreviations: PVR, postvoid residual; Qmax, maximum flow rate.

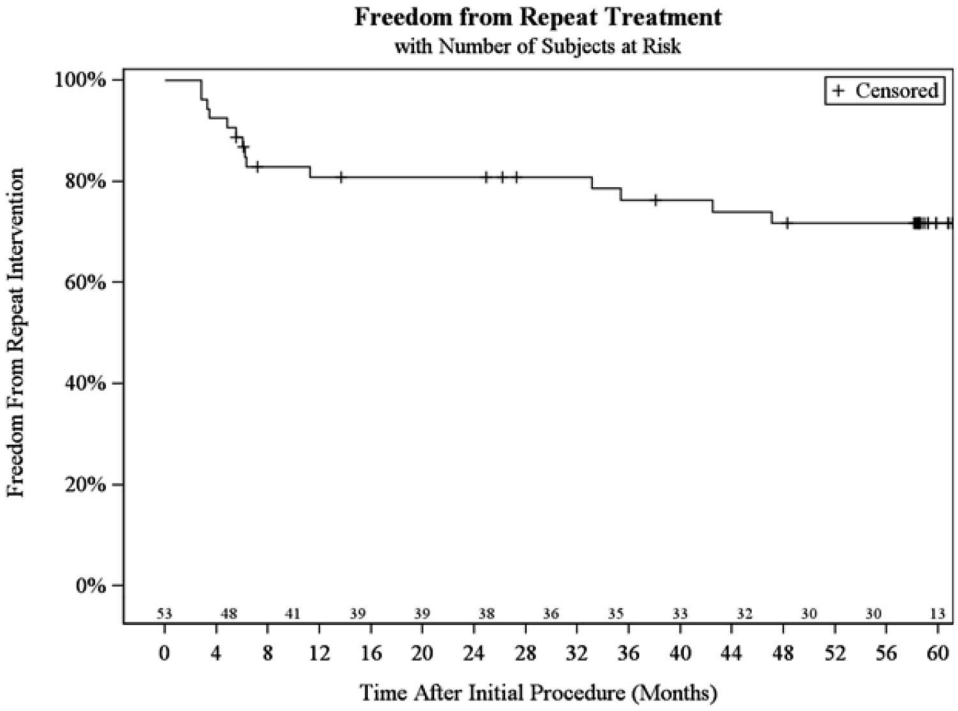

Figure 2. Kaplan-Meier curve showing freedom from reintervention through 5 years.

success was strongly correlated with balloon size. At 5 years, 25% of subjects treated with the 24F DCB achieved functional success, while 76% were considered a success who were treated with the 30F DCB. Qmax and PVR followed a similar pattern (Table 4). These findings led to the consistent use of the 30F balloon in the bulbar urethra in subsequent trials.

The Optilume DCB improves the durability of standard dilation by both mechanically dilating the stricture and delivering local, precision-dosed paclitaxel. In this first-in-man trial, subjects with symptomatic recurrent anterior urethral strictures were recruited and treated with the Optilume DCB. Encouraging interim results in this challenging patient population led to the performance of ROBUST II and ROBUST III, the pivotal randomized controlled trial. Due to the known high failure rate of repeated endoscopic treatment,[3,14] the recommended therapy for these patients has historically been urethroplasty. The AUA guidelines were updated to reflect expanded treatment options utilizing the DCB, in part due to data from the ROBUST III trial.[7] The DCB can be considered an alternative to repeated dilation or DVIU in some men with recurrent bulbar urethral stricture.

Table 5. *Device- or Procedure-Related Adverse Events*

Adverse event	Device-related, No.	Procedure-related, No.	Total, No.	CTCAE severity
Dysuria	1	2	3	Grade 1-2
Fever	0	2	2	Grade 1-2
Hematuria	2	2	4	Grade 1-2
Orchitis	0	1	1	Grade 1-2
Extravasation of contrast during retrograde urethrogram	0	1	1	Grade 1-2
Urinary retention	2	1	3	Grade 1-2
UTI	1	0	1	Grade 1-2
Total	6	9	15	

Abbreviations: CTCAE, Common Terminology Criteria for Adverse Events.

There were no serious treatment-related AEs. Recorded AEs were generally mild to moderate, self-limited, and typical of endoscopic urinary procedures (Table 5). Erectile function was not adversely impacted by treatment (Table 6). There were no cases of unresolved de novo urinary incontinence following DCB treatment.

A significant limitation of this study is lack of a control arm. Data, however, are in line with 1-year reports from ROBUST III, the randomized controlled pivotal study,[8] which indicates a low risk of bias. Patients with penile urethral stricture, prior pelvic radiation, or other potential confounders (eg, lichen sclerosus, additional anatomic locations) were excluded, so performance in these groups is unknown. ROBUST III included patients with prior pelvic radiation, as well as some with penile urethral strictures, and though the groups were too small to draw conclusions, the DCB seemed to perform well. This is an area for future study. Anatomic success was only evaluated at 6 and 12 months, which is in line with typical clinical practice patterns.[15] Urethral patency has not been shown to be correlated to patient symptoms.[13] Additional cystoscopies were not performed to

Table 6. *International Index of Erectile Function for Patients Who Were Sexually Active the Month Before Assessment*

Category	Baseline	3 Mo	6 Mo	1 Y	2 Y	3 Y	4 Y	5 Y
Erectile function								
Mean±SD	25.9 ± 5.7	27.8 ± 4.4	28.4 ± 3.2	27.7 ± 4.7	27.1 ± 5.6	28.0 ± 3.9	27.1 ± 5.6	26.8 ± 4.0
No.	30	36	31	30	29	26	22	23
Range	13-30	8-30	16-30	9-30	10-30	11-30	8-30	15-30
Median	29.0	29.0	30.0	29.0	29.0	29.0	29.0	29.0
Overall satisfaction								
Mean±SD	8.0 ± 2.0	9.0 ± 1.4	8.8 ± 1.9	8.8 ± 1.9	8.5 ± 1.8	9.1 ± 1.2	9.0 ± 1.9	8.3 ± 1.8
No.	31	36	31	30	29	26	22	23
Range	4-10	4-10	2-10	2-10	3-10	6-10	2-10	5-10
Median	8.0	10.0	10.0	10.0	9.0	10.0	10.0	8.0

avoid further invasive procedures, but these data may have been a useful component of longer-term follow-up.

The study was not powered to detect a difference in outcomes due to balloon size. Initially only the 24F balloon was available, and the 30F was utilized predominantly once available. The relationship of balloon size to efficacy is reported only as a correlation. Additionally, the choice of predilation method (DVIU vs balloon dilation) was at the surgeon's discretion, which may have introduced some variability. Balloon size was similarly at the surgeon's discretion.

CONCLUSIONS

Treatment with the Optilume DCB for men with short, recurrent bulbar strictures resulted in sustained improvement in both subjective and objective voiding parameters through 5 years. The technology is safe and has no negative impact on erectile function or urinary continence. The Optilume DCB is supported by current guidelines and represents a viable treatment option for appropriately selected men with recurrent bulbar strictures who wish to avoid or delay urethroplasty.

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EDITORIAL COMMENTS

DeLong et al present the final results of their 5-year multicenter study examining functional success of the Optilume drug-coated balloon treating recurrent urethral stricture.[1] At trial closure, freedom from repeat intervention was an astounding 71.7% without any serious treatment-related adverse events. This is impressive in a study where enrolled patients had an average of 1.7 endoscopic procedures prior to the drug-coated balloon. This success rate of a second or third dilation is much higher than the 0% stricture-free rate

after a third dilation or urethrotomy reported in the series by Heyns et al.[2] However, the difference in rates may not be as stark as the numbers imply as these 5-year results in ROBUST I highlight functional success and freedom from intervention while the Heyns study examined anatomical success (retrograde urethrogram, ability to pass a 16F catheter). Even so, ROBUST III is starting to confirm the durability of Optilume where the drug-coated balloon had a freedom from repeat intervention of 75% at 1 year compared to 22% freedom from repeat intervention after a surgeon's preferred endoscopic management.[3]

It is important to note that patients in ROBUST I had recurrent, short (average 0.9 cm) bulbar urethral strictures, so rates and adverse events outside of this specific population may be different. Furthermore, the cost of the drug-coated balloon is significantly higher than most, if not all, other forms of endoscopic management. Still, while we wait for the closure of ROBUST III, the current ROBUST I study demonstrates that the Optilume drug-coated balloon offers an additional safe and effective option for the treatment of recurrent, short bulbar urethral stricture disease.

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This article presents the long-term results of the ROBUST I study—a single-arm, open-label, industry-sponsored trial—on the safety and efficacy of the Optilume paclitaxel-coated dilation balloon for the treatment of short, recurrent bulbar urethral strictures.[1] The 5-year closeout results confirm that drug-coated balloon dilation results in a sustained improvement in this challenging group of patients, with 58% of men showing improvement in International Prostate Symptom Score and—arguably more importantly—a 71% freedom from reintervention.[2] It should be noted that only 31/53 (58.5%) enrolled and treated patients completed all follow-up. There were no serious treatment-related adverse events.

As noted previously, a notable drawback of the study design is the heterogeneity of predilation modality (direct vision internal urethrotomy vs uncoated balloon dilation), which was left up to surgeon discretion. The role of and mechanism of stricture predilation also have yet to be elucidated. Interestingly, the authors also note that while the study was not powered to detect treatment differences in different balloon sizes, patients appear to be more likely to require re-treatment if initially treated with the 24F vs the 30F balloon. These questions will almost certainly guide future studies in this space.

Regardless, these closeout results clearly support the durability of paclitaxel-coated balloon dilation treatment effects out to 5 years. Certain populations of interest—such as those with a history of radiation, lichen sclerosus, and previous urethroplasty—were excluded from this trial and will need to be studied in the future. Although we await the updated results of the ROBUST III randomized control trial comparing the drug-coated balloon to standard-of-care endoscopic management,[3] it seems clear that drug-coated dilation is an effective and safe option for the management of recurrent, short bulbar urethral strictures, and will be a part of the urologists' armamentarium for the foreseeable future.

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