Stents and Urethral Strictures: A Lesson Learned?

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Originally developed for vascular use, the concept of maintaining the patency of a lumen with a self-retaining endoprosthesis dates back to 1969. In 1980, Fabian was the first to describe the use of a stent in the lower urinary tract to maintain patency of the prostatic urethra in patients with benign prostatic hyperplasia [1]. Subsequently, the indications expanded to include treatment of detrusor sphincter dysynergia due to spinal cord injury and, in 1988, treatment of urethral strictures [2].

Initially, a temporary Urocoil stent was tested, but since 1990 the permanent Urolume has been advocated as the endoprosthesis of choice for urethral stricture disease; it is a biocompatible stent made from a super-alloy and woven into a tubular mesh [1].

After initial enthusiasm and expanding indications for various stenoses, the stents have been shown to fail in posterior strictures resulting from pelvic trauma or from prostatic surgery [1,3]. To date they have not been promoted for use in penile strictures.

The advocated use in the bulbar urethra has still to be fully evaluated. Numerous reports have been published regarding the efficacy, safety, and reversibility of this device in bulbar strictures. The Urolume has been reported to have an 86–100% success rate for treating stenoses in the short term (<18 mo) and a 42–90% success rate in the medium term (24–36 mo) [4–7]. Long-term results (>10 yr) show further deterioration with only a 13–45% success rate reported [4,8]. Shah et al report a 67% success rate, but only 24 of 179 patients who had stents implanted were available for follow-up, and this may have biased the results [1]. These results do not seem competitive with the excellent long-term >80% success rate of urethroplasty.

Articles about stents report results on lumen patency but understate the side effects such as perineal pain, sexual discomfort, erectile disorders, stent encrustations, stones, recurrent urinary tract infections, dysuria, postvoiding dribbling, and incontinence [4,5,9]. Currently, reconstructive experts make efforts to reduce these complications by performing less aggressive and more refined urethroplasties. Modern stricture management should be concerned not only with the urethral patency but also the quality of life.

The principal stent-related problems are hyperplastic overgrowth with intraluminal stricture or new stricture development at the distal or proximal end of the prosthesis. These problems may be managed by repeated optical urethrotomies and dilatations, but they carry high failure rates [1,4]. Some authors have even ventured to advise inserting an additional stent inside or near to the first stent, as in a game of Chinese boxes [9].

Endoscopic removal of a stent is often impossible, necessitating resorting to challenging open surgery; sometimes it will be possible to remove the stent piecemeal wire by wire, but often it will require an en bloc removal of the fibrosed urethra together with the entrapped stent. The subsequent choice of urethral repair in one or more stages will depend on the local conditions; some authors have experienced problems in managing these complex strictures developing after implanting the stents [4,8,10,11]. Only a few articles in the literature on
stents report the real percentage of severe failures requiring subsequent open surgery; this ranges from 14% to 20% [5,7,8].

The stents represent a dream of urologists to resolve urethral stenoses by a simple and noninvasive method comparable to dilatations and internal urethrotomies. Unfortunately, stents have likewise failed to show good results on long-term follow-up. Perhaps the reasons for promoting stents and the development of endourology are due to the fact that historically few urologists were trained in urethral reconstructive surgery. This situation may be changing because whilst today there is increasing literature on urethroplasty and its acceptable results, we note a decrease in reports on the use of stents.

We should highlight the fact that the principal author (Dr. Chapple) of this paper on the management of complex failures of stents is not only an expert reconstructive surgeon, but was also an author of the first article pioneering the use of Urolume stents [2,10]. He shows with honesty the difficulties in managing the strictures arising from implanted Urolumes and, therefore, advises against their use in bulbar strictures due to trauma or failed urethroplasties. His paper confirms that urethroplasty after stent removal is a surgical challenge and has a significantly lower success rate than urethroplasty before stent implant. Of 14 patients who underwent stent removal and one-stage urethroplasty he reported 8 (57%) failures (requiring subsequent internal optical urethrotomies or intermittent self-dilatation or new urethroplasty) and 6 successes (43%). All four urethroplasties with buccal mucosa were successful, but it is debatable if this good result was due to the choice of graft or due to less adverse local urethral conditions. Conversely, the failures of other augmentation urethroplasties after stent removal were due to the compromised quality of the residual urethral plate [10].

Perhaps Chapple is being diplomatic and the real question today is whether there in fact remains an indication for stents in any type of urethral strictures.

Can we still consider Milroy’s assertion to be valid? “The human urethra seems remarkably tolerant of foreign material within its lumen. Providing that a stricture has been adequately cut by means of urethrotomy, or dilated, the majority of urethras will tolerate both permanent and temporary stents with few problems” [12].

Milroy advised against the implant in short virgin strictures or in urethras with extensive fibrosis such as strictures after trauma and urethroplasty. His only advocation was for recurrent bulbomembranous strictures with a moderate fibrosis and a short history (after at least one urethrotomy or dilatation but before multiple urethrotomies and dilatations resulted in extensive fibrosis) [12]. In my opinion this risks converting a simple stricture that is curable with a primary urethroplasty into a complex stricture with a stent that is trapped in the wall of a badly scarred urethra. These disasters are difficult to manage by a one-stage surgical solution, often requiring a two-stage option or a definitive peri-neostomy. Furthermore, endoprotheses implanted in the bulbomembranous tract could compromise the external sphincter, making it difficult to remove the stent without damaging the sphincter.

The modern principles of stricture management are based on preservation and augmentation of urethral tissues or on anastomotic removal of the scarred urethra. The use of the urethral stent does not respect either of these two concepts because the preexistent spongiosfibrosis is not removed and a stent further damages the tissues, promoting expansion of the fibrosis.

In every international meeting, urologists can attend courses or round table discussions on urethral stricture disease where experts speak about techniques and results, including urethrotomy. Perhaps the absence of presentations about urethral stents reflects the general opinion on their efficacy. However, it would be desirable to involve the proponents of stents to discuss the indications for endoprosthesis and to define the guidelines. Otherwise it is time to stop advocating a “permanent” procedure that could “permanently” damage the quality of life.

In the meantime, hopefully to address these obvious shortcomings, authors are researching new types of drug-eluting biodegradable stents.

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References


