Cost-effective Strategies for the Management and Treatment of Urethral Stricture Disease

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KEYWORDS

• Urethroplasty • Cost-effectiveness • Utilization

KEY POINTS

- Urethroplasty is a cost-effective strategy for operative management of urethral stricture disease.
- An accurate estimation of stricture recurrence will guide urologists toward the appropriate intervention.
- Symptom-based surveillance of postoperative urethral stricture disease will reduce unnecessary diagnostic procedures and cost.

INTRODUCTION

Urethral stricture disease (USD) is a narrowing of the urethra from scar tissue, attributed to traumatic urethral injury, infections of the genitourinary tract, pelvic radiation, inflammatory skin conditions, and/or prior lower urinary tract instrumentation.[1] USD causes both obstructive and irritative voiding symptoms and can result in bladder and renal impairment.[1] The prevalence of USD among men from industrialized countries is estimated to be 0.9%.[1] In the United States between 2007 and 2012, an estimated 1.2 million patients sought medical care for USD.[2]

Treatment options for USD include endoscopic and/or open surgical techniques. The mainstay for endoscopic managements include urethral dilation or direct vision internal urethrotomy (DVIU). Open reconstructive surgical techniques include urethroplasty, which may be performed in conjunction with a graft or flap.[1] The management of USD has shifted from periodic dilation to DVIU and now urethroplasty, as the definitive procedure of choice for recurrent USD.[3,4] Although DVIU may be used for short, bulbar strictures,[5] its long-term efficacy has been called into question.[6] Urethroplasty is considered to be the gold standard for USD and has high success rates.[7] Despite the convincing evidence for urethroplasty, a recent Cochrane review concluded that there are insufficient data to determine which intervention is best for USD in terms of balancing efficacy, adverse effects, and costs.[8]

To date, many urologists report repeating a DVIU or dilation procedure despite the high rate of recurrence.[9] Repeated endoscopic interventions for recurrent USD are futile and have been proven to be cost-ineffective.[3,4,10] Estimates of procedural costs for USD are limited.[11] With the passage of the Affordable Care Act and paradigm shift toward cost-effective medicine, urologists are urged to perform efficacious procedures at lower

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costs.[12] There is an increased attention toward high-value, low-cost health care in the United States as the projected cost of current practices may be unsustainable.[13] Policy makers, government officials, and insurance companies have scrutinized procedural costs and surgical outcomes to maximize quality care at lower costs.[14] Such scrutiny has led to the development of quality reporting clearinghouses like the American Urologic Association Quality Registry and the National Surgical Quality Improvement Program.[14,15]

Within the last 10 years, several studies have been published on cost-effective management strategies for USD as part of a growing focus on high-quality, low-cost health care. Here the authors present a review of current literature on minimizing cost for patients with USD. In particular, the authors focus on the costs of managing USD with DVIU versus urethroplasty, inpatient hospital costs following urethroplasty, and the costs of USD surveillance strategies.

COST OF INTERNAL URETHROTOMY/ DILATION VERSUS URETHROPLASTY

In 1974, optical DVIU was first reported and quickly gained acceptance because of its simplicity, reliability, safety, and short convalescence.[9] Today, urologists use either a cold-knife or a laser source to perform cuts within the urethra at the level of the stricture. Although initial reports suggested short-term success to be around 80%,[16] it is well known that the success of DVIU is much lower with longer follow-up and well-designed prospective studies.[5,17] In patients with at least 60 months of follow-up, DVIU was found to be successful in only 32% of men.[5] Urethral dilation has a similar success, as several studies have shown dilation to be equal in efficacy to DVIU.[17,18] Nevertheless, DVIU remains the most common procedure performed for USD in the United States.[19] In a nationwide survey, 31% of urologists reported repeating a second DVIU after the first failed DVIU.[9] However, DVIU has been proven to be cost-ineffective in several well-reported studies.

In 2004, Greenwell and colleagues[3] developed an algorithm for the management of USD based on cost-effectiveness. The investigators used the UK's medical insurance reimbursement rates and applied them to 126 men treated for USD over an 8-year period. Men with preexisting USD that previously required intervention were excluded from the study. The investigators followed patients for a mean of 25 months (range 1–132 months). Of the 126 men with a new diagnosis of USD, 60 (47.6%) required more than 1 endoscopic treatment (mean 3.13 treatments). In total, 194 additional procedures were performed for recurrent USD, of which 7 were urethroplasties. The investigators calculated the total costs of care for USD over their follow-up period by multiplying the number of procedures by the costs of endoscopic treatments, the costs associated with clean intermittent catheterization, and ultimately the costs associated with urethroplasty. They concluded that the total cost per patient with USD was $9170; however, this cost could be lowered if urethral dilation or DVIU was performed as a first-line treatment and then subsequent urethroplasty was performed for recurrent USD. In doing so, the cost per patient would be reduced to $8799.[3] Despite a theoretic savings of $371 if urethroplasty was performed after endoscopic failure, the article has several limitations. The investigators presumed a second-stage urethroplasty would require only 2 postoperative visits; they assumed the hospital length of stay for all patients to be standard (24-hour hospital stay for DVIU or dilation, 3 days for simple urethroplasty, and 5 days for complex urethroplasty); the investigators assumed a ratio of first- to second-stage urethroplasties to be 1.9:1.0; and lastly they assumed a 10.5% stricture recurrence rate, both figures derived from their historical data. They also included data from both bulbar and penile urethral strictures, which are not comparable groups. Each of these factors could dramatically alter the costs of USD.

In 2005, Rourke and Jordan[4] constructed a decision model using decisional analysis (DA). Briefly, DA is a statistical method whereby a systematic framework for decision-making is applied between 2 competing options. One outcome of a DA is a cost-effectiveness ratio that attempts to maximize the outcome for a given budget.[10] In this study, the investigators used published data on the costs of bleeding, urinary tract infection, and stricture recurrence following DVIU and compared this with published data on the costs of a wound complication, complications from high lithotomy positioning, and stricture recurrence. The primary aim was to determine the least costly approach for a hypothetical male patient seeking treatment of a 2-cm bulbar urethral stricture.[4] Cost estimates for the postoperative complications, surgeon's fees, hospital fees, operative costs, and costs of follow-up procedures were based on Medicare reimbursement and data from the investigators' home institutions. Total costs for DVIU were calculated to be $17,748 versus $16,444 for anastomotic urethroplasty yielding a cost savings of $1304 per patient. Only when a theoretic success of DVIU approached

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