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National Trends in the Management of Urethral Stricture Disease: A 14-Year Survey of the Nationwide Inpatient Sample

Jill C. Buckley,* Nishant Patel, Song Wang and Michael Liss

From the Departments of Urology, University of California-San Diego Health System, San Diego, California, and University of Texas Health Science Center at San Antonio (ML), San Antonio, Texas

Abstract

Introduction: Urethral strictures are common in general urology practice and can initially be treated with urethral dilation or incision. Unfortunately, many patients require retreatment. Urethroplasty provides a more durable effect but may be underused. We examined national trends in the management of urethral stricture disease.

Methods: Using the NIS (Nationwide Inpatient Sample) database from 1998 to 2011 we identified patients with a primary or secondary admitting ICD-9 diagnosis code of 598.X (urethral stricture) and excluded patients with urethral cancer, urethritis, urethral stone, abscess or epispadias. Inpatient procedure codes were used to classify 2 treatment groups, including 1) urethral dilation/incision and 2) urethral reconstruction. Linear regression was performed to determine the change in the utilization rate of incision/dilation and urethral reconstruction per 1,000 urethral strictures with time.

Results: A total of 240,108 procedures were identified for 471,596 urethral stricture diagnoses upon hospital admission, including 217,869 (90.7%) for incision/dilation and 22,239 (9.3%) for urethral reconstruction/urethrostomy. Mean utilization of incision/dilation per 1,000 strictures decreased slightly by 10.74 per year (1%) ($p \leq 0.001$). Mean utilization of urethral reconstruction increased slightly by 1.65 per year (0.17%) ($p = 0.0062$). For every 1 increase in urethral reconstruction there were 12 fewer urethral dilations per 1,000 urethral strictures per year.

Conclusions: Urethral dilation/incision continues to be the foremost management of urethral stricture disease with known high recurrence and failure rates. Patients should be referred for urethral reconstruction to optimize treatment outcomes.

Key Words: urethral stricture, dilatation, reconstructive surgical procedures, palliative care, morbidity

Abbreviations and Acronyms

UD = urethral dilation

UI = urethral incision

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* Correspondence: Department of Urology, University of California San Diego Health System, 200 West Arbor Dr., No. 8897, San Diego, California 92103 (telephone: 619-543-2009; FAX: 619-543-6573; *e-mail address:* jcbuckley@ucsd.edu).

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Urethral stricture disease has been a major source of morbidity and mortality in the last 2 centuries.[1] As we have progressed in our ability to detect and identify urethral stricture disease direct mortality has decreased with the temporizing measures of UD or internal urethrotomy. However, lifelong morbidity remains a prominent phenomenon.

The reason for extended morbidity has been overuse of palliative maneuvers (UI or urethral dilation) known to have a 0% cure rate when performed for the third time.[2] Practicing urologists and other treating providers still largely perform urethral dilation and incision as the primary treatment modality for urethral stricture disease.[3] Patients are directed to manage urethral stricture disease by self-dilation or repeat office/operative dilations/incisions. The emotional trauma, anxiety and frequent visits to the clinic or operating room have physiological and financially negative consequences for the patient.

Our aim was to examine national trends in the management of urethral stricture disease requiring hospitalization. We hypothesized that despite recent efforts to educate residents and practicing urologists about the underuse of urethral reconstruction and the overuse of urethral dilation and incision, contemporary practice patterns would still reveal that urethral stricture disease is largely managed by the palliative maneuver of urethral dilation and incision.

Our hope is to improve the quality of life of patients with urethral stricture disease by increasing awareness and understanding of the overuse of urethral dilation/incision. Our aim is to identify changes in the treatment of urethral stricture disease with time using a large inpatient database that would capture all procedures performed at the hospital.

Materials and Methods

Patient Population and NIS

We analyzed data from 1998 to 2011 using the NIS database, which is part of HCUP (Healthcare Cost and Utilization Project) sponsored by AHRQ (Agency for Healthcare Research and Quality). The data include all-payer inpatient care that is publicly available in the United States. NIS contains data on 5 to 8 million hospital stays per year. The database has grown to include more than 1,000 hospitals in a total of 42 states, making up a 20% stratified sample of American hospitals. Inpatient stay records include clinical and resource use information available from discharge abstracts. Weighted sampling allows estimates of national trends.

Primary Outcomes

The primary diagnosis code of urethral stricture (ICD-9 codes 598, 598.0, 598.1, 598.2, 598.9, 598.8 and 599.2) was used to select our population of interest. Primary outcome measures were based on the procedures performed, including urethral incision/dilation (ICD-9 580, 585 and 586) or urethral reconstruction (ICD-9 5843, 5844, 5845, 5846, 5847 and 5849). Urethral reconstruction was further categorized by the method of urethral reconstruction, including oral mucosal graft (ICD-9 2749, 2755, 2756, 2759, 2792 or 2799), other graft (ICD-9 8660, 8662, 8663, 8665, 8669, 8671, 8687 or 8689) and/or use of a flap (ICD-9 8670 or 8672). The NIS data set lacks certain key elements in the management of stricture disease, including stricture length and location, etiology and potential prior procedures performed.

Variables

Other variables included race, gender, year, income by ZIP Code™, geographic region of treatment (Northeast, South, Midwest or West), insurance type, hospital size, hospital location (rural vs urban) and hospital type (teaching vs nonteaching). Assessed comorbid conditions included hypertension (Dx CCS 98 and 99), diabetes (Dx CCS 49 and 50) and obesity (ICD-9 278.0, 278.01 and 278.00).

Study Design and Statistical Analysis

The 20% NIS sample was weighted to estimate all national inpatient stays and used for all calculations. The primary outcome was the association between trends in the rates of urethral reconstruction vs urethral incision/dilation. Univariate analysis was performed to compare the 2 treatment modalities using the chi-square test with the Rao and Scott second order correction, and the Student t-test with the Bonferroni correction for intergroup comparisons. Multivariate analysis was performed to assess for variables favoring urethral reconstruction over UI/UD. We assessed trends of urethral incision/dilation and urethral reconstruction procedures per 1,000 urethral stricture diagnoses. After the rates were obtained linear regression was performed on each rate to provide R^2 values. SVY coding in STATA®, version 11.1 was used to account for NIS sampling methodology. The probability of type I error was defined a priori as $\alpha = 0.05$.

Results

We identified 471,596 admissions with a diagnosis of urethral stricture from 1998 to 2011 in the NIS database.