Office Dilation of the Female Urethra: A Quality of Care Problem in the Field of Urology

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Purpose: Historically dilation of the female urethra was thought to be of value in the treatment of a variety of lower urinary tract symptoms. Subsequent work has more accurately classified these complaints as parts of various diseases or syndromes in which scant data exist to support the use of dilation. Yet Medicare reimbursement for urethral dilation remains generous and we describe practice patterns regarding female urethral dilation to characterize a potential quality of care issue.

Materials and Methods: Health care use by females treated with urethral dilation was compiled using a complementary set of databases. Data sets were examined for relevant inpatient, outpatient and emergency room services for women of all ages.

Results: Female urethral dilation is common (929 per 100,000 patients) and is performed almost as much as treatment for male urethral stricture disease. Approximately 12% of these patients are subjected to costly studies such as retrograde urethrography. The overall national costs for treatment exceed $61 million per year and have increased 10% to 17% a year since 1994. A diagnosis of female urethral stricture increases health care expenditures by more than $1,800 per individual per year in insured populations.

Conclusions: Urethral dilation is still common despite the fact that true female urethral stricture is an uncommon entity. This scenario is likely secondary to the persistence of the mostly discarded practice of dilating the unstrictured female urethra for a wide variety of complaints despite the lack of data suggesting that it improves lower urinary tract symptoms.

Key Words: urethral diseases; incidence; demography; female; urinary bladder, overactive

Urethral stricture (narrowing of the urethral lumen causing increased voiding pressure) is rare in women.[1] Despite this lack of prevalence urethral dilation, urethrotomy and other surgical procedures have historically been advocated to treat women with lower urinary symptoms such as urgency, frequency and bladder pain despite a lack of objective findings of urethral stricture.[2] Dilation of the female urethra as treatment for what is more accurately classified as recurrent urinary tract infection, interstitial cystitis, detrusor instability/overactive bladder or bladder neuropathy (among other conditions) is of questionable value.[1–4]

The increase in popularity of internal urethrotomy or dilation for the treatment of recurrent infection and chronic urethritis was an idea first popularized in the 1960s, and whose history is well documented by McLean and Emmett.[5] They chronicle the first report of the technique in 1923 and describe that by the 1960s some authors were advocating dilation of the female urethra to 32Fr to avulse a putative "contraction ring in the distal urethra of little girls." Some authors even advocated cutting this supposed urethral ring with an Otis urethrotome up to 45Fr, even in infants, to treat voiding complaints. These procedures became so commonplace that series reporting results in as many as 800 women were read at the national American Urological Association meeting in 1967.[5]

Dilation of the female urethra in the absence of urethral stricture has lost its scientific backing. Modern urological reference texts do not even mention dilation as a therapeutic regimen for these syndromes.[6] The last reference to urethral dilation or urethrotomy in the English language literature for the treatment of female urgency/frequency syndrome in the absence of true stricture was before 1970.[5] Modern studies have demonstrated that urethral dilation is of no value in treating symptoms of urgency/frequency in females in the absence of true urethral stricture.[2,4] These data have been persuasive for some urologists. Research suggests that the procedure is viewed as ineffective and is rarely done by urologists who completed training after 1989.[7] However, Medicare reimbursement for urethral dilation remains relatively high, and evidence about the lack of benefit of dilation may not have disseminated uniformly to physicians. To characterize a potential quality of care problem, we sought to describe practice patterns regarding female urethral dilation.

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MATERIALS AND METHODS

Nationally Representative Data Sets

We analyzed several public data sets to produce nationally representative data regarding use of relevant services. To describe physician office visits we used the NAMCS. To achieve adequate descriptive power data were pooled from 1992, 1994, 1996, 1998 and 2000. Hospital outpatient visits and visits to ERs were measured using the NHAMCS. Data on inpatient use were captured using the HCUP-NIS. Detailed comments regarding our methods have been previously published.[8]

Diagnostic Codes

We identified females with visits based on diagnostic codes (see Appendix). Analytical files for outpatient visits included those with a relevant diagnosis code listed as 1 of any reasons for the visit. Tables were produced reflecting service use when the diagnosis codes in question were listed as any of the reasons for the visit, and when they were listed as the primary reason for the visit. Analytical files for inpatient stays included only those records of inpatient hospitalizations for which a relevant diagnosis code was listed as the primary diagnosis during the hospitalization. The raw number of visits in each subset varied by condition and by year. Analyses were conducted at the visit level or the stay level depending on which database was being analyzed. Using the weights provided by the survey administrators raw counts were weighted to give nationally representative estimates of use.

Calculations of Visits

National estimates of the annual frequency of visits were calculated when the raw counts were deemed large enough to produce reliable estimates. Under National Center for Health Statistics guidelines the 2 conditions that must be met for the creation of reliable national estimates are 1) there must be at least 30 unweighted counts and 2) estimates must have a relative standard error of less than 30%. When insufficient data were available subgroups (eg age categories) were combined to create adequate unweighted counts. SAS® was used to derive the standard errors and compute the 95% CIs for these estimates. The sample design of the database was taken into account when computing statistics to ensure the proper estimation of variance in each case.

National annual outpatient visit rates were calculated using the United States Census noninstitutionalized civilian population estimates corresponding to demographic and visit characteristic groupings for each survey year used. Population estimates were obtained from the CPS for select demographic categories of the United States civilian noninstitutionalized population. Stratification variables evaluated for all databases include age, race/ethnicity, gender, region and/or metropolitan statistical areas, and other variables selected as appropriate for the database of interest. For the purposes of comparison the frequency of visits for male urethral stricture disease was also calculated.[9]

Medicare Data

Data on inpatient and outpatient care for women older than 65 years were examined using claims data from CMS. Data from the 3 Medicare files (MEDPAR [Medicare Provider Analysis and Review], carrier and outpatient) were linked to determine inpatient, ambulatory surgery center, hospital outpatient, physician office and ER use, as well as to calculate average payments for urethral stricture disease in women.

Because a 5% sample of Medicare records was used national estimates of service use were obtained by multiplying counts by a constant weight of 20 to represent use in the entire Medicare eligible population. The data were stratified by age, gender and race variables. Confidence intervals were calculated using standard methods for proportions.[10]

Calculation of Economic Data

To produce a model examining incremental costs associated with a urethral stricture diagnosis we used the Ingenix® data set of medical and pharmacy claims of 25 large United States employers covering 322,556 beneficiaries 18 to 64 years old who were continuously enrolled for the entire 2000 calendar year. We excluded dependents and employees 65 years old or older because we could not be sure their medical and pharmacy use was not covered by other insurance. Claims files captured all health care claims and encounters including prescription drugs, inpatient, emergency and ambulatory services. The medical claims included date of service, diagnosis and procedure codes, types of facility and providers, and expenditures including billed charges, negotiated discounts, excluded expenses, deductibles, co-payments, and payments made by the employer, employee and other third-party coverage. Drug claims included information on the type of drug (drug name, national drug codes, dose, supply), place of purchase (retail or mail-order) and expenditures.

Multivariate regression models were used to predict medical and pharmacy spending in 2000 for persons with and without a primary diagnosis of urethral stricture in the medical claims. The primary outcomes of interest were annual medical and pharmacy expenditures for each person. Expenditures consisted of total annual payments made by the enrollee (co-payments, deductibles, excluded expenses) and by all third-party payers (primary and secondary coverage, net of negotiated discounts) for medical services and outpatient prescription drug claims.

We included a detailed set of covariates to control for observed differences between individuals with and without a primary diagnosis of urethral stricture. We used the eligibility file to control for demographic characteristics such as age, sex, work status (active or retired), urban residence and median household income in the zip code of residence. The medical claims were used to identify individuals treated for 34 chronic conditions such as hypertension, diabetes, congestive heart failure and asthma. A binary indicator for each condition was included in the models. We used the benefits data to control for the generosity of medical and drug coverage. Plan characteristics included individual deductibles, co-payments and/or coinsurance rates for medical services and prescription drugs, and a binary indicator for plan type (HMO [Health Maintenance Organization], POS [Point of Service], PPO [Preferred Provider Organizations], FFS [Fee-For-Service]).

We used OLS to estimate medical and drug expenditures for each individual in the sample. The parameter estimates were used to predict average annual spending for persons

with and without urethral stricture, controlling for other factors known to affect use. We chose OLS because it predicted component expenditures better than generalized linear models and other 2-part estimators.

RESULTS

National Data

The annual rate of physician office visits for female urethral stricture was 186 per 100,000 (0.19%). Rates of outpatient visits for this indication were 7 times higher in women 65 years or older than in younger women. Office visits for female urethral stricture were always coded urethral stricture unspecified in the NAMCS survey from 1992 to 2000 and other codes (such as traumatic or infection) were never used. The average annual rate of ambulatory surgery center visits as determined by data pooled from 1994 to 1996 was 34 visits per 100,000 persons. Again, use was several times higher in older women. Visit rates were highest in the South (table 1). Rates of hospitalization for urethral stricture in women were much lower and remained stable during the 1990s (0.5 per 100,000).

Medicare Data

Age adjusted rates of physician office visits by female Medicare beneficiaries decreased with time from 357 per 100,000 in 1992 to 161 per 100,000 to 147 per 100,000 in 2001. Visit rates were consistently higher among white patients compared to black patients (table 2). ER visits by female Medicare beneficiaries with urethral strictures occurred at a rate of 0.8 per 100,000 patients in 2001. The rate of outpatient visits for Medicare patients was much lower (4.5 per 100,000 in 2001). Similarly low visit rates were seen for inpatient stays by Medicare patients. Of female Medicare patients with a stricture diagnosis 60% were also given a diagnosis of urinary tract infection in the same year. More than 10% of women (11,698 per 100,000) with a diagnosis of urethral stricture disease in the Medicare population underwent evaluation with retrograde urethrography in 2001 (table 3). This rate has increased 30% since 1992. This database does not provide information as to the findings on these studies and the actual frequency of diagnosis of true stricture disease.

Economic Impact

Total annual expenditures for female urethral stricture disease were estimated to be $69 million in 2000 (table 4). The majority (67%) of these costs were for ambulatory surgery visits. A multivariable model using 2002 data from Ingenix demonstrated that for a privately insured woman with a diagnosis of urethral stricture total health care costs are $8,444 compared to $4,658 in total costs for similar women without a diagnosis of urethral stricture.

DISCUSSION

Female Urethral Dilation is Common

The diagnosis of female urethral stricture continues to be a common reason for office and ambulatory surgery visits despite evidence that true urethral strictures are rarely present. This suggests that nonspecific female voiding complaints are still being treated with urethral dilation instead of true underlying conditions being addressed such as overactive bladder, recurrent urinary tract infection, interstitial cystitis, atrophic vaginitis, urethral diverticulum and others. Office treatment of female urethral stricture disease is performed at rates so high that they are similar to rates of treatment for male urethral stricture disease despite the rarity of true female strictures.

This practice pattern may represent a limitation in the diffusion of the latest medical knowledge. As such, educational efforts (Continuing Medical Education, Board recertification courses) may be useful in targeting physicians who may not be familiar with newer treatments for voiding complaints in women. Patient preference may also have a role in preserving dilation as a practice pattern. Visits for urethral stricture were more common in older women, and in certain demographic groups (white patients, women in the South). Older females may have begun treatment with urethral dilation before its eventually being discarded as a treatment for many urological complaints. These women may desire continued treatment with dilation regardless of changes in medical knowledge. Placebo effects are associated with surgical interventions and may have a role in this setting.[11]

Female Urethral Dilation is Costly

We found that expenditures related to the diagnosis of female urethral strictures are a burden on the health care system. Annual expenditures for employed females with a diagnosis of urethral stricture are almost $4,000 higher than for women without such a diagnosis after adjusting for age, comorbidity, region and several other factors. Almost $70 million was spent in care for this diagnosis nationally in 2000. While this amount is small relative to treatment for common conditions such as diabetes, much of the money spent in this setting could have been redirected toward treatments with documented efficacy. Generous Medicare reimbursement for urethral dilation may in part be a reason for the persistence of this diagnosis.

Female Urethral Dilation is Mostly Unnecessary

Work by others suggests that the incidence of female urethral stricture should be vanishingly low. PubMed® citations of female urethral stricture back to 1965 reveal only isolated case reports except for 3 small series which describe only 30 total patients. These series are reported from large referral centers which would be expected to see this rare condition.[1,3,12] Other isolated case reports add only 7 more cases during the last 40 years.[13–18] A recent study of 587 female patients referred to a specialty center for abnormal voiding revealed only 5 cases (0.9%) of proven urethral stricture.[3] Another large referral center reported only 17 cases of true female urethral stricture.[12] A third report of true urethral stricture in females from a major referral center had only 8 patients during an 8-year reporting period.[1] The obvious implication is that women are being treated for symptoms attributed to a condition that does not exist. It would be enormously more helpful if patients were simply given the symptomatic diagnosis (urgency/frequency, pelvic pain, slowing of the stream, etc). At least that approach could provide the basis to critically analyze the efficacy of dilations and other such treatments.

Limitations

Our study is limited by the use of claims based analyses that rely on data collected for administrative rather than clinical

TABLE 1. *National inpatient hospitalizations for females with urethral stricture listed as primary diagnosis*

		Age					Region*		
	Total	Younger than 18	18–34	35–54	55–74	75+	Northeast	Midwest	South
1994–1996:									
Count	137,249	17,908	23,106	31,151	47,135	17,949	14,869	41,702	75,483
Rate (95% CI)†	103 (91–115)	52 (36–69)	70 (50–90)	85 (64–105)	226 (178–274)	222 (161–284)	56 (40–73)	133 (105–160)	163 (136–190)
Annualized rate‡	34	17	23	28	75	74	19	44	54
Age adjusted rate§	102						54	133	159
1994:									
Count	43,766	6,402	6,435	10,472	14,079	6,378			
Rate (95% CI)†	34 (27–40)	19 (8.8–30)	20 (12–27)	30 (19–41)	69 (42–95)	82 (44–120)			
Age adjusted rate§	34								
1995:									
Count	47,119	‖	8,516	11,255	17,308	6,427			
Rate (95% CI)†	35 (28–42)	‖	26 (13–38)	30 (20–41)	83 (52–113)	79 (39–119)			
Age adjusted rate§	35								
1996:									
Count	46,364	7,893	8,155	9,424	15,748	5,144			
Rate (95% CI)†	34 (27–42)	23 (12–33)	25 (11–38)	25 (12–38)	75 (49–101)	62 (33–90)			
Age adjusted rate§	34								

Counts may not sum to totals due to rounding.

Source is National Survey of Ambulatory Surgery, 1994, 1995, 1996.

* Data from West do not meet standards for reliability or precision.

† Rate per 100,000 is based on 1994, 1995, 1996 population estimates from CPS, CPS Utilities, Unicon Research Corporation, for relevant demographic categories of United States female civilian noninstitutionalized population.

‡ Average annualized rate per year.

§ Grouped years age adjusted to the United States Census derived age distribution of the midpoint of years. Individual years age adjusted to the United States Census derived age distribution of the year under analysis.

‖ Figure does not meet standard for reliability or precision.

TABLE 2. *National physician office visits for female Medicare beneficiaries with urethral stricture listed as primary diagnosis*

	1992			1995			1998			2001		
	Count*	Rate (95% CI)†	Age Adjusted Rate‡	Count*	Rate (95% CI)†	Age Adjusted Rate‡	Count*	Rate (95% CI)†	Age Adjusted Rate‡	Count*	Rate (95% CI)†	Age Adjusted Rate‡
Total:§	65,180	326 (314–337)		55,280	274 (264–284)		41,680	219 (209–228)		29,100	147 (139–154)	
Total younger than 65	3,720	154 (132–176)		3,540	132 (112–151)		3,660	132 (113–151)		2,340	72 (59–85)	
Total 65+	61,460	349 (337–361)	357	51,740	296 (284–307)	302	38,020	234 (223–244)	238	26,760	161 (153–170)	161
Age:												
Younger than 65	3,720	154 (132–176)		3,540	132 (112–151)		3,660	132 (113–151)		2,340	72 (59–85)	
65–69	16,080	325 (303–347)		14,000	304 (281–326)		7,640	193 (174–213)		5,620	141 (124–157)	
70–74	16,360	377 (351–403)		14,520	330 (306–354)		10,640	269 (246–292)		5,500	142 (125–159)	
75–79	13,980	402 (372–432)		10,400	304 (277–330)		9,480	281 (256–306)		6,640	189 (168–209)	
80–84	9,180	370 (336–404)		7,980	312 (281–342)		5,840	237 (210–264)		5,000	195 (171–219)	
85–89	4,360	298 (258–337)		3,340	217 (185–250)		3,280	214 (181–247)		2,700	168 (140–197)	
90–94	1,340	212 (161–263)		1,140	166 (123–209)		900	130 (92–168)		1,140	158 (117–199)	
95–97	120	81 (16–146)		260	171 (78–264)		180	111 (38–183)		80	51 (1.3–101)	
98+	40	36 (0.0–85)		100	76 (9.2–143)		60	41 (0.0–87)		80	49 (1.2–97)	
Region:												
Midwest	14,000	279 (258–300)	292	10,920	212 (194–230)	216	6,740	137 (122–151)	139	5,740	115 (102–128)	113
Northeast	10,600	234 (214–254)	237	9,880	220 (201–239)	218	7,600	194 (175–213)	191	5,160	129 (114–145)	126
South	30,300	434 (412–455)	438	25,220	349 (330–368)	351	21,040	300 (282–318)	302	13,760	185 (171–199)	189
West	9,800	321 (292–349)	284	8,800	307 (279–336)	297	5,760	212 (187–236)	212	4,280	146 (127–166)	143
Race/ethnicity:												
White	59,620	351 (339–364)	349	49,040	283 (271–294)	282	36,980	229 (218–239)	227	26,480	157 (148–165)	156
Black	3,540	210 (179–241)	209	4,440	241 (210–273)	242	3,320	188 (160–217)	200	1,960	101 (81–121)	105
Asian	Not available	Not available	Not available	180	191 (67–315)	212	220	124 (51–196)	102	40	15 (0.0–35)	7.4
Hispanic	Not available	Not available	Not available	480	239 (143–334)	299	740	201 (137–266)	218	220	52 (21–84)	57
North American native	Not available	Not available	Not available	20	124 (0.0–365)	124	20	77 (0.0–226)	77	0	0.0	0.0

Counts less than 600 should be interpreted with caution.
Source is CMS 5% Carrier and Outpatient Files, 1992, 1995, 1998, 2001.
* Unweighted counts multiplied by 20 to arrive at these values.
† Rate per 100,000 female Medicare beneficiaries in the same demographic stratum.
‡ Age adjusted to the 2000 United States Census.
§ Persons of other races, unknown race and ethnicity, and other region are included in the totals.

TABLE 3. *Urethrocystography or injection procedure for urethrogram or retrograde cystogram*

	1992			1995			1998			2001		
	Count*	Rate (95% CI)†	Age Adjusted Rate‡	Count*	Rate (95% CI)†	Age Adjusted Rate‡	Count*	Rate (95% CI)†	Age Adjusted Rate‡	Count*	Rate (95% CI)†	Age Adjusted Rate‡
Total§	8,020	8,846 (8,020–9,672)		7,180	8,690 (7,831–9,550)		6,860	10,865 (9,780–11,950)		5,940	11,698 (10,447–12,948)	
Age:												
65–69	2,080	8,919 (7,281–10,557)		1,640	7,892 (6,251–9,533)		1,340	10,737 (8,309–13,165)		1,280	12,929 (9,970–15,889)	
70–74	2,260	9,528 (7,858–11,197)		1,880	8,430 (6,798–10,063)		1,820	11,166 (9,006–13,325)		1,620	13,433 (10,713–16,153)	
75–79	1,560	7,580 (5,962–9,198)		1,920	10,835 (8,787–12,884)		1,620	10,398 (8,254–12,542)		1,380	10,952 (8,516–13,389)	
80–84	1,200	8,721 (6,613–10,828)		760	5,975 (4,135–7,814)		1,040	10,136 (7,524–12,749)		1,040	11,454 (8,524–14,383)	
85–89	580	9,063 (5,922–12,203)		660	9,880 (6,677–13,084)		640	10,191 (6,847–13,535)		440	8,730 (5,238–12,222)	
90–94	260	11,111 (5,427–16,795)		260	12,871 (6,337–19,406)		260	13,978 (6,935–21,022)		180	10,714 (4,107–17,321)	
95–97	60	14,286 (0.0–29,286)		40	16,667 (0.0–37,917)		100	38,462 (11,923–65,000)		0	0.0	
98+	0	0.0		20	12,500 (0.0–35,625)		0	0.0		0	0.0	
Region:												
Midwest	2,320	10,017 (8,290–11,744)	10,276	2,240	10,438 (8,607–12,269)	10,158	1,780	11,001 (8,844–13,158)	11,496	1,260	10,553 (8,090–13,015)	10,385
Northeast	1,800	10,429 (8,389–12,468)	9,733	1,180	7,856 (5,932–9,780)	8,256	1,440	12,903 (10,125–15,681)	11,649	1,400	15,021 (11,781–18,262)	14,378
South	3,240	8,612 (7,344–9,880)	8,772	3,000	8,484 (7,186–9,782)	8,597	2,660	9,589 (8,039–11,139)	9,877	2,500	11,353 (9,478–13,229)	11,626
West	560	4,706 (3,008–6,403)	4,538	680	6,576 (4,439–8,714)	5,996	920	12,042 (8,783–15,301)	11,518	660	9,429 (6,371–12,486)	9,143
Race/ethnicity:												
White	7,060	8,486 (7,638–9,333)	8,462	6,400	8,495 (7,604–9,385)	8,415	6,240	10,833 (9,698–11,969)	10,903	5,220	11,363 (10,065–12,660)	11,276
Black	560	12,670 (8,281–17,059)	11,765	560	12,335 (8,062–16,608)	12,335	340	9,827 (5,405–14,249)	10,405	460	14,744 (9,167–20,321)	15,385
Asian	Not available	Not available	Not available	0	0.0	0.0	20	5,263 (0.0–15,263)	5,263	60	23,077 (0.0–46,154)	23,077
Hispanic	Not available	Not available	Not available	100	13,889 (2,639–25,139)	13,889	140	16,279 (5,233–27,326)	13,953	80	14,286 (1,250–27,321)	14,286
North American native	Not available	Not available	Not available	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0

Counts less than 600 should be interpreted with caution.
Source is CMS data from 1992, 1995, 1998, 2001.
* Unweighted counts multiplied by 20 to arrive at these values.
† Rate per 100,000 female Medicare beneficiaries 65 years or older with urethral stricture.
‡ Age adjusted to the 2001 United States Census.
§ Persons of other races, unknown race and ethnicity, and other region are included in the totals.

TABLE 4. *Expenditures for female urethral stricture and share of costs by site of service*

	$ in Millions (%)			
	1994	1996	1998	2000
Hospital outpatient	— (0.0)	— (0.0)	— (0.0)	— (0.0)
Physician office visit	$ 9,175,876 (19.6)	$ 9,992,848 (18.7)	$13,940,964 (23.6)	$23,091,875 (33.4)
Ambulatory surgery	$37,575,278 (80.4)	$43,349,885 (81.3)	$45,112,172 (76.4)	$46,049,031 (66.6)
ER visit	— (0.0)	— (0.0)	— (0.0)	— (0.0)
Inpatient	— (0.0)	— (0.0)	— (0.0)	— (0.0)
Totals	$ 46,751,154	$ 53,342,733	$ 59,053,136	$ 69,140,906

Source is NAMCS, NHAMCS, HCUP, Medical Expenditure Panel Survey, 1994, 1996, 1998, 2000.

purposes. As such, the specificity and sensitivity of our data may be affected by errors in coding or by diagnostic distortions in coding incentivized by reimbursement schemas. The nationally representative data sets we used are also dependant on correct coding and do not contain CPT codes, which allow for better procedural specificity than do ICD-9 procedure codes. Additionally, they may lack sensitivity to produce estimates for lower frequency conditions and procedures, and so our estimates of the public burden of urethral stricture disease may be low. Finally, while we extrapolate a low rate of true female urethral strictures from published case series, the true rate has never been systematically studied and may be higher or even lower than we predict.

CONCLUSIONS

While there are no more than 40 reports of true female urethral stricture in the recent literature, the numbers of female urethral strictures reported in claims databases is in the hundreds of thousands, likely due to persistence of outmoded methods of treating female voiding dysfunction. Female urethral stricture disease resulted in at least 1.2 million office visits between 1992 and 2000 at a national cost of at least $61 million yearly. There is a great need for more information about the actual symptoms and underlying conditions of these patients as well as the efficacy (or lack thereof) of the treatments.

APPENDIX

Codes Used in the Diagnosis and Management of Urethral Stricture

ICD-9 diagnosis codes	
598	Urethral stricture
598.0	Urethral stricture due to infection
598.01	Urethral stricture due to infective diseases classified elsewhere
598.1	Traumatic urethral stricture
598.2	Postoperative urethral stricture
598.8	Other specified causes of urethral stricture
598.9	Urethral stricture unspecified
CPT procedure codes	
52270	Cystourethroscopy, with internal urethrotomy; female
52283	Cystourethroscopy, with steroid injection into stricture
52276	Cystourethroscopy with direct vision internal urethrotomy
52282	Cystourethroscopy, with insertion of urethral stent
53430	Urethroplasty, reconstruction of female urethra
53450	Urethromeatoplasty, with mucosal advancement

Abbreviations and Acronyms

CMS	=	Centers for Medicare and Medicaid Services
CPS	=	Current Population Survey
ER	=	emergency room
HCUP-NIS	=	Healthcare Cost and Utilization Project-Nationwide Inpatient Sample
NAMCS	=	National Ambulatory Medical Care Survey
NHAMCS	=	National Hospital Ambulatory Medical Care Survey
OLS	=	ordinary least squares

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