
Ureteropelvic Junction Obstruction

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Purpose: We quantified the burden of ureteropelvic junction obstruction in the United States by identifying trends in the use of health care resources and estimating the economic impact of the disease.

Materials and Methods: The analytical methods used to generate these results were described previously.

Results: Inpatient hospitalization rates were highest in children younger than 3 years. Most patients were male and hospitalizations occurred almost exclusively at urban centers. Patients with a primary diagnosis of ureteropelvic junction obstruction between 1994 and 2000 had an overall decrease in the age adjusted rate of inpatient hospitalization from 1.1/100,000 to 0.8/100,000. Physician office visits by Medicare beneficiaries with ureteropelvic junction obstruction as the primary diagnosis showed stable overall age adjusted rates during the reported years. Between 1999 and 2003 mean inpatient length of stay and cost per child hospitalized with the primary diagnosis of ureteropelvic junction obstruction was 2.9 days and \$7,728, respectively. Average length of stay decreased more for children than for adults but total inpatient spending remained stable at about \$12 million.

Conclusions: The majority of ureteropelvic junction obstructions are diagnosed in the perinatal period. Surgical intervention for pediatric patients has decreased with time, while there has been an increasing trend toward the conservative management of this condition.

Key Words: ureter, ureteral obstruction, kidney, cost and cost analysis, health care costs

Ureteropelvic junction obstruction typically refers to blockage at the junction of the renal pelvis and the beginning of the ureter. The etiology of UPJ obstruction includes congenital and acquired conditions. Most cases are congenital due to an intrinsic and/or extrinsic cause with approximately 13,000 newborns each year in the United States diagnosed with this condition.¹ Acquired conditions include stone disease, postoperative or inflammatory strictures and urothelial neoplasms. Before the introduction of routine perinatal imaging the majority of patients with UPJ obstruction were symptomatic at presentation. The introduction of perinatal sonographic screening dramatically changed the presentation and treatment of UPJ obstruction. Most cases of congenital UPJ obstructions are now diagnosed in the prenatal period. Historically there was a trend toward early surgical intervention with the hope of preserving renal function.² However, since 1988, management for prenatally diagnosed UPJ obstruction in select cases has changed from surgical intervention to observation.³ The goal of surgery is relief of symptoms and/or the preservation of renal function but it is becoming clear that some asymptomatic cases of UPJ obstruction may be followed conservatively. We quantified the burden of UPJ obstruction in the United States by identifying trends in the use of health care

resources and estimating the economic impact of the disease.

MATERIALS AND METHODS

The analytical methods used to generate these results were described previously.^{4,5}

RESULTS

Trends in Health Care Use

Inpatient care. According to HCUP KID for 1997 and 2000 the rate of inpatient hospitalizations of patients younger than 18 years for UPJ obstruction remained unchanged at 2.4/100,000 population (table 1). KID is based on a sample of pediatric discharges from community hospitals in the United States. Since it samples only pediatric discharges, KID allows more in-depth analysis of pediatric resource use than that available in the all ages HCUP data set. KID for 1997 and 2000 includes 2,521 hospitals from 22 states and 2,784 hospitals from 27, respectively. Hospitalization rates were highest in children younger than 3 years in 1997 and 2000 at 8.8/100,000 and 9.3/100,000, respectively. In 1997 and 2000 the majority of patients were male (71% and 72%, respectively) and hospitalizations occurred almost exclusively at urban centers. Hospitalization rates in the Midwest and South were consistently lower than those in the Northeast and West.

HCUP data on patients with a primary diagnosis of UPJ obstruction for 1994 to 2000 revealed an overall decrease in the age adjusted rate of inpatient hospitalization from 1.1/100,000 to 0.8/100,000 population (table 2). These data included adults and children and yet the trend was seen only

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TABLE 1. Inpatient hospital stays for UPJ obstruction as primary diagnosis in 1997 and 2000

	1997		2000	
	Count	Rate (95% CI)	Count	Rate (95% CI)
Totals	1,696	2.4 (2.0-2.7)	1,725	2.4 (1.9-2.8)
Age (yrs):				
Younger than 3	1,036	8.8 (7.3-10)	1,089	9.3 (7.3-11)
3-10	433	1.3 (1.0-1.6)	432	1.3 (1.0-1.6)
11-17	227	0.8 (0.6-1.0)	204	0.7 (0.5-1.0)
Sex:				
M	1,197	3.3 (2.7-3.8)	1,250	3.4 (2.8-4.0)
F	498	1.4 (1.2-1.7)	476	1.4 (1.0-1.7)
Region:				
Midwest	334	2.0 (1.4-2.6)	322	1.9 (0.8-2.9)
Northeast	399	3.0 (1.8-4.2)	420	3.2 (1.8-4.7)
South	471	1.9 (1.2-2.7)	541	2.2 (1.4-3.0)
West	491	2.9 (2.1-3.8)	443	2.6 (1.6-3.4)
MSA:				
Rural	43	*	60	*
Urban	1,653	3.0 (2.6-3.5)	1,650	2.9 (2.4-3.5)

Rate per 100,000 based on 1997 or 2000 population estimates from CPS, CPS Utilities, Unicon Research Corp. for relevant demographic categories of civilian noninstitutionalized population younger than 18 years in the United States, and individuals of other races, and with missing race and ethnicity, and missing MSA included in the total (counts may not sum to total due to rounding and race/ethnicity breakdown not included because of large percent of missing values in 1997 or 2000) (source: HCUP KID, 1997 and 2000).

* Value does not meet reliability or precision standard.

in patients younger than 18 years. The overall rate for these patients decreased from 2.8/100,000 to 1.7/100,000 population. The rate of inpatient hospitalizations for patients 18 years or older varied minimally during 1994, 1996, 1998 and 2000 at 0.60/100,000, 0.60/100,000, 0.50/100,000 and 0.50/100,000 population, respectively (table 2). Hospitalization rates were greater for males than for females in all years reported at 60%, 66%, 65% and 58%, respectively, according

to calculations based on data in table 2. The hospitalization rate appeared lower than that reported in male patients younger than 18 years, which would suggest a greater incidence of acquired UPJ obstructions in female patients or an increased likelihood for female patients to become symptomatic from congenital UPJ obstruction as they become older. Hospitalization rates in the West were consistently less than those in the Northeast, Midwest and South. Data also indicated that white individuals had the highest rate of hospitalization in all study years except 1996, in which Hispanic individuals had the highest rate. Most hospital admissions occurred in urban areas.

The database from the National Association of Children's Hospitals and Related Institutions from 1999 to 2003 showed mean inpatient LOS for admissions associated with a diagnosis of UPJ obstruction in the pediatric population (table 3). Mean LOS during this period was 2.9 days. LOS was similar in all age groups. LOS was longer in males than in females (3.0 vs 2.7 days). LOS was greatest in the Northeast, and least in the Midwest and South (3.5 vs 2.7 days). According to HCUP data mean hospital LOS for admissions associated with a primary diagnosis of UPJ obstruction consistently decreased from 5 days in 1994 to 3.3 days in 2000 (table 4). The longest LOS of 4.8 days occurred in the age group of 45 years or older and the shortest of 2.8 days occurred in the pediatric age group of younger than 18 years. Mean LOS was longest in the black American population and hospitalizations tended to be longer in rural than in urban areas. Mean LOS was longest in the South and shortest in the West (3.6 vs 2.6 days). Between 1994 and 2000 LOS decreased further for children than for adults (table 4). Of the patients 63% were younger than 2 years at the time of treatment. This was similar to the trend in HCUP KID, in

TABLE 2. Inpatient hospital stays for UPJ obstruction as primary diagnosis

	1994			1996			1998			2000		
	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
Totals	2,821	1.1 (0.9-1.3)	1.1	2,663	1.0 (0.8-1.2)	1.0	2,304	0.9 (0.7-1.0)	0.9	2,215	0.8 (0.6-1.0)	0.8
Age:												
Younger than 18	1,900	2.8 (2.1-3.4)		1,701	2.4 (1.8-3.0)		1,332	1.9 (1.3-2.4)		1,228	1.7 (1.1-2.3)	
Older than 18		0.6			0.6			0.5			0.5	
18-24	158	0.6 (0.4-0.9)		170	0.7 (0.4-0.9)		225	0.9 (0.6-1.2)		185	0.7 (0.5-1.0)	
25-34	225	0.6 (0.4-0.7)		263	0.6 (0.4-0.8)		173	0.4 (0.3-0.6)		167	0.4 (0.3-0.6)	
35-44	228	0.6 (0.4-0.8)		164	*		175	0.4 (0.3-0.5)		229	0.5 (0.4-0.7)	
45+	295	0.4 (0.3-0.5)		365	0.4 (0.3-0.6)		394	0.4 (0.3-0.6)		406	0.4 (0.3-0.6)	
Sex:												
M	1,690	1.4 (1.1-1.7)	1.3	1,745	1.4 (1.1-1.6)	1.3	1,492	1.1 (0.9-1.4)	1.1	1,288	1.0 (0.7-1.2)	0.9
F	1,131	0.9 (0.7-1.0)	0.9	918	0.7 (0.5-0.8)	0.7	812	0.6 (0.5-0.7)	0.6	927	0.7 (0.5-0.8)	0.7
Race/ethnicity:												
White	1,677	0.9 (0.7-1.1)	1.0	1,563	0.8 (0.6-1.0)	0.9	1,332	0.7 (0.5-0.8)	0.7	1,218	0.6 (0.5-0.8)	0.7
Black	242	0.8 (0.5-1.0)	0.6	185	0.6 (0.3-0.8)	0.5	*	*	*	156	0.4 (0.2-0.7)	0.4
Hispanic	211	*	0.7	322	1.1 (0.7-1.6)	0.9	*	*	*	169	0.5 (0.2-0.8)	0.4
Region:												
Midwest	833	1.4 (1.0-1.7)	1.4	737	1.2 (0.8-1.6)	1.2	623	1.0 (0.7-1.3)	1.0	590	0.9 (0.6-1.2)	0.9
Northeast	516	1.0 (0.6-1.4)	1.0	506	1.0 (0.6-1.4)	1.0	521	*	1.1	424	0.8 (0.5-1.1)	0.8
South	1,111	1.3 (0.8-1.8)	1.3	950	1.0 (0.7-1.4)	1.0	777	0.8 (0.6-1.1)	0.8	644	0.7 (0.4-0.9)	0.7
West	360	0.6 (0.4-0.8)	0.6	470	0.8 (0.5-1.1)	0.8	383	0.6 (0.3-1.0)	0.6	558	*	0.9
MSA:												
Rural	269	0.4 (0.3-0.6)	0.4	272	0.5 (0.3-0.6)	0.4	235	0.4 (0.2-0.6)	0.4	166	0.3 (0.2-0.4)	0.3
Urban	2,552	1.4 (1.1-1.6)	1.3	2,391	1.2 (0.9-1.4)	1.2	2,055	1.0 (0.8-1.2)	1.0	2,049	1.0 (0.7-1.2)	1.0

Rate per 100,000 based on 1994, 1996, 1998 and 2000 population estimates from CPS, CPS Utilities, Unicon Research Corp. for relevant demographic categories of civilian noninstitutionalized population in the United States, age adjusted rate adjusted to the United States Census derived age distribution of the year under analysis, and individuals of other races, and with missing or unavailable race and ethnicity, and missing MSA included in the total (counts may not sum to total due to rounding) (source: HCUP Nationwide Inpatient Sample, 1994, 1996, 1998 and 2000).

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