Published in final edited form as:

J Pediatr Urol. 2017 August ; 13(4): 389.e1–389.e6. doi:10.1016/j.jpuro.2017.04.024.

Comparison of 30-Day Emergency Department Bounce-backs After Pediatric Versus Adult Urologic Surgery

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Summary

Introduction—More pediatric patients seem to present to the emergency department (ED) for non-urgent matters after urologic procedures than adult patients. Under new and expanding healthcare reform, pediatric urologists may be penalized for these visits. We compare our 30-day postoperative bounceback rates to the ED and the acuity of the concerns in these populations.

Materials and methods—All urology consults at our institution are maintained on a prospectively tracked database. We identified all patients who presented to our adult or pediatric ED between July 2013 and June 2015 within 30 days of a urologic procedure. We investigated the patient demographics including age, race, insurance, distance from the home zip code to the ED, procedures performed, chief complaint in the ED, diagnosis, and treatment required.

Results—In our pediatric group, there were 67 visits for 56 patients (19 female, 37 male, mean age 6.8 years), which represents an overall bounceback incidence of 2.7%. Of those, 19% required admission (0.60% overall readmission rate), 10% underwent a procedure (0.32% reoperative rate, 18% required catheter manipulation/placement, 13% were given a prescription (most commonly for constipation), 6% required local wound care, and 33% were reassured only. Most pediatric patients had private insurance (62.5%) and those with private insurance or who were uninsured tended to require only reassurance compared to those with Medicare/Medicaid ($p = 0.053$). In the adult population, there were 369 visits in 310 patients (111 female, 199 male, mean age 55.4 years) for an incidence of 4.4%. Of those, 42% were admitted (2.2% overall readmission rate), 14% underwent a procedure (0.74% reoperative rate), 11% required catheter manipulation/placement, 14% were given medication (most commonly antibiotics and narcotics), 4% were given local wound care, and 12% were reassured. Most adult patients had Medicare/Medicaid (48.7%), but insurance type was not related to treatment required ($p = 0.382$). On multivariable analysis, pediatric patients, closer proximity to the hospital, and earlier postoperative day at presentation to the ED were predictive of requiring only reassurance.

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Conflict of interest
None.

Conclusions—Compared to adults, pediatric patients are less likely to return to the ED postoperatively ($p < 0.001$), but they are significantly more likely to require only reassurance ($p < 0.001$) while adults are significantly more likely to require hospital admission ($p < 0.001$). In both groups, nearly one-third of patients required only catheter care or medication. This difference could have significant implications for new healthcare policy.

Keywords

Urologic surgery; Readmission; Reoperation; Emergency department; Healthcare utilization

Introduction

“Children are not little adults” is a well-known saying used by pediatric providers to explain the differences in pediatric and adult physiology and disease. It may be especially relevant during the current efforts to define quality in healthcare and modify physician reimbursement based on new quality metrics. Programs for adults such as the Bundled Payments for Care Improvement Initiative (BPCI) propose that quality be defined both by the efficacy of the care delivered and the cost [1]. As such, providers are incentivized to minimize preventable expenses from events such as emergency department (ED) visits and hospital readmissions.

Prior to creating and expanding new quality metrics and healthcare policy to pediatric patients, it is imperative to fully understand of the differences between pediatric and adult healthcare utilization patterns. It is known that pediatric patients have lower readmission rates than adults [2]. However, the differences in ED utilization have not been defined. Anecdotally, it seems more pediatric patients than adult patients return to the ED for non-acute concerns requiring only caregiver reassurance and no formal intervention. This possible difference would be important to consider when defining quality metrics for pediatric patients. A comparison of pediatric and adult ED utilization in a single subspecialty such as urology would offer insight into future work in pediatric health policy.

In this context, we conducted a retrospective review of the pediatric and adult patients who returned to our institution’s pediatric or adult ED within 30 days of urologic surgery. We hypothesized that pediatric patients had more possibly preventable ED visits that did not require any type of intervention, while adults were more likely to return to the ED for more acute concerns requiring intervention.

Materials and methods

Data sources

All consults to the urology service at our institution are recorded on an IRB-approved, prospectively collected database, which has been previously described [3]. This database specifies the location of the consult and if the patient has previously undergone a urologic surgery. Additionally, we utilized our institution’s electronic health medical record for further detailed information regarding the patient’s surgery, ED visit, diagnoses, and sociodemographic data.

Study population

After obtaining IRB approval, we performed a search of the database to identify all consults from the ED for patients who had undergone a urologic surgery at our institution within the last 30 days between July 2013 and June 2015. Patients were excluded if they had a urologic surgery performed at a different institution or if they returned to the emergency department after the 30-day window. Patients were classified as pediatric if they had their surgery performed at our pediatric hospital by a pediatric urologist. Adults were defined as patients who had surgery at the adult hospital by an adult urologist.

Outcomes

For each patient, we identified the urologic surgery initially performed, the postoperative day at presentation to the ED, the patient's chief complaint, the number of visits to the ED within the 30-day postoperative period, and the day and time of the consults. Each 24-hour period was divided into three categories. If the consult was during usual work hours (8:00 a.m. to 5:00 p.m.), it was labeled as a day consult. If it occurred from 5:00 p.m. to 12:00 midnight it was designated an evening consult. If it occurred after 12:00 midnight to 8:00 a.m. the following day, it was called an overnight consult. Using the electronic medical record, we also identified the diagnosis given at the conclusion of the ED visit. We identified what intervention was performed, including hospital admission, unplanned procedure, medication administration in the ED, medication prescription, manipulation or placement of any urinary drainage tube, local wound care, or if they were only given education or reassurance. Additionally, we recorded patient demographic information including age, race, insurance status, and zip code. Distance from the patient's home to hospital was estimated by zip code using a software tool (Excel Zip Code Distance Calculator, GS Software, 2015). We also obtained data regarding the total number of urologic procedures performed at our pediatric and adult hospitals during this time period.

Statistical analysis

Bivariate analysis including the Student *t* test and chi-square test was utilized to compare the differences in sociodemographic factors, intervention performed, postoperative day on presentation, the total number of ED visits, the distance from the patient's home to the hospital, and the type of intervention performed between pediatric and adult patients. Bounceback rates were calculated as the total number of patients who returned to the ED within 30 days of a procedure divided by the total number of patients who underwent a urologic procedure. Readmission and reoperative rates were similarly calculated.

We then categorized patients into two groups: patients who did not require intervention in the ED (those who required reassurance only) and those who received any sort of intervention (local wound care, medication administration or prescription, manipulation or placement of a urinary drainage tube, unplanned procedure, or hospital admission). A logistic regression with "no intervention" and "intervention" as the dichotomous outcome and age as the primary predictor variable was run. Other variables included in this model were postoperative day, total number of visits to the ED, distance from the ED, insurance type, race, and sex.

Results

Overall bounceback rates

A total of 56 pediatric patients returned to our pediatric ED for a total of 67 visits within 30 days of a urologic procedure for an overall bounceback rate of 2.7% (Table 1). A total of 310 adult patients returned to our adult ED for a total of 369 visits within 30 days of a urologic procedure for an overall bounceback rate of 4.4%. Adult patients were significantly more likely to return to the ED after urologic surgery than pediatric patients ($p < 0.001$). The overall readmission from the ED after urologic surgery was significantly greater for adults (2.2% for adults vs. 0.60% for children, $p < 0.001$); likewise, the reoperative rate from the ED was significantly greater for adults (0.74% for adults vs. 0.32% for children, $p = 0.045$).

The day and time when patients returned differed. Pediatric patients most commonly returned at the end of the week and weekends (Saturday, 13 visits; Friday, 10 visits; Sunday, 9 visits). Of the pediatric consults, 27 occurred during the day, 23 occurred in the evening, and only six occurred overnight. Adults most commonly returned during the middle of the week (Tuesday, 56 visits, Wednesday, 46 visits; Thursday, 44 visits). Of the adult consults, 142 occurred during the day, 101 during the night, and 67 overnight.

Bounceback rates based on procedure performed

Several trends were noted according to the type of urologic surgery that had been initially performed (see Summary figure). The cases represented the effects of complexity and frequency. The most common procedure of pediatric patients who returned to our ED was hypospadias repair (22.4% of visits) followed by bladder reconstruction (14.9%) and circumcision (11.9%). The most common procedure in adult patients who returned to our ED was ureteroscopy (22.2%) followed by robotic prostatectomy and cystectomy (9.7% each).

Chief complaints and diagnoses

Pediatric and adult patients tended to return to the ED for similar presenting complaints including constitutional symptoms such as nausea, vomiting, or fever (25.4% of pediatric visits, 22.2% of adult visits), pain (14.9% of pediatric visits, 30.9% of adults visits), and wound or dressing concerns (20.9% of pediatric visits, 10.6% of adult visits). The most common diagnosis in both groups was infection (32.8% of children, 19.8% of adults). Other common diagnoses in children were constipation (10.4%) and postoperative pain (10.4%). Significantly, 14.9% of pediatric patients did not have a diagnosis associated with their ED visit. For adults, other common diagnoses included postoperative pain (16.8%) and bleeding-related complications (15.4%).

Treatment required

There were several interesting trends noted when comparing the treatment required in the ED between the two groups (Table 2). As predicted, pediatric patients were significantly more likely than adults to require only reassurance in the ED (33% vs. 12%, $p < 0.001$). Alternatively, adults were more likely than children to require admission (42.2% vs. 19.4%, $p < 0.001$). There was no significant difference in the incidence of requiring a procedure,

medication, catheter treatment, or local wound care between the two groups (Table 2). For children who required medication, the most common medication prescribed was laxatives or enemas (33.3%) followed by antibiotics (22.2%). The most common medication prescribed to adults was antibiotics (35.5%) followed by narcotics (34.6%).

The need for acute intervention was compared between outpatient and inpatient procedures for each group. For children, outpatient procedures resulted in 43 visits whereas inpatient procedures resulted in 24 visits. Compared to children who underwent outpatient procedures, the children who returned to the ED after an inpatient procedure tended to require more acute intervention such as readmission (29.2% of visits for inpatient procedures, 14.0% for outpatient procedures) or reoperation (16.7% vs. 6.0%). However, this did not meet statistical significance ($p = 0.131$ and $p = 0.214$, respectively). For adults, outpatient procedures resulted in 222 visits and inpatient procedures resulted in 147 visits. While adults who returned to the ED after an outpatient procedure were no more likely to require readmission than those who underwent an inpatient procedure (40.1% vs. 43.7% respectively, $p = 0.498$), adults who returned to the ED after an outpatient procedure were significantly less likely to require a reoperation than adults who underwent an inpatient procedure (9.5% vs. 17.1% respectively, $p = 0.040$).

The need for intervention or reassurance was also evaluated by procedure type in each age group. Patients in both groups who underwent any sort of genitourinary reconstructive surgery (bladder reconstruction, pyeloplasty, ureterostomy, and stomal revision in children; bladder reconstruction, urethroplasty, and ureteral reimplant in adults) always required intervention in the ED (see Summary figure). Conversely, both pediatric and adult patients who returned to the ED after ureteroscopy most commonly required only reassurance. Among children, those who returned after circumcision and nephrectomy were most likely to need reassurance only. Among adults, those who returned after percutaneous nephrolithotomy and scrotal surgery (e.g., hydrocele, vasectomy, vasovasotomy) were most likely to need reassurance only.

Prediction of bouncebacks

On logistic regression, the odds of requiring any form of intervention increased with age, later postoperative day at presentation, and further distance from the hospital (Table 3 and Fig. 1). Insurance type, number of total visits to the ED, gender, and race did not predict whether patients would require intervention.

Discussion

Adults were significantly more likely than children to return to the ED after urologic surgery. Adults who returned to the ED were significantly more likely to require any sort of intervention, whereas children were significantly more likely to require only reassurance. Factors that predicted the need for any intervention included older age, longer time since surgery, and living further from the hospital.

While the return rate to the ED after pediatric surgery varies widely in the literature from 2.3% to 18.9% with a readmission rate of 0.78–16.5% [4–11], our findings were similar to

the findings of Arlen et al. [12], who reported a 2.59% return rate, 0.54% readmission rate, and 0.12% reoperative rate. Other studies found race and insurance status to predict return to the ED or readmission, but this was not true of our population [5,13–15]. Ureteroscopy was associated with a high number of potentially preventable visits for both pediatric and adult patients. Bloom et al recently reviewed the patients who returned to the ED after ureteroscopy and found that 15.6% of patients return to the ED, and 5.8% are readmitted [16]. The most common presenting complaint in their series was pain (58%). This was similar to our population, where 40% of pediatric and 58% of adults present with complaints of pain. Perhaps both patients and physicians underestimate the pain of this minimally invasive procedure. Improved preoperative counseling and more appropriate medication for pain control could decrease ED visits. Not unsurprisingly, high frequency procedures (e.g., circumcision), and procedures of higher complexity (e.g., bladder augmentation, robotic cystectomy) are well represented. Hypospadias repair and ureteroscopy may represent the hybrid of a commonly performed and potentially complex procedures, which is reflected in bounceback rates.

There are several important policy implications related to this study. In the recent effort to define quality metrics and decreased healthcare spending, there has been movement to define quality care as requiring less healthcare utilization in the form of readmissions or emergency room use and to reimburse accordingly. For example, the Pediatric Quality Measures Program, created by the Children's Health Insurance Program Reauthorization Act, serves to create quality metrics for pediatric patients [17]. It has identified both pediatric readmissions and ED utilization as quality metrics [17]. The BPCI reimburses a lump sum for an episode of care as opposed to fee for service [1]. This incentivizes providers to decrease costs of both the initial hospitalization and the post-discharge care, including ED utilization and hospital readmission. The program has started with specific diagnoses with the goal of expanding to other diagnoses. If applied to urologic diagnoses, it would encourage urologists to decrease those ED visits that are potentially preventable, such as visits for medications, catheter care, or reassurance.

The ability to significantly decrease preventable visits may vary. As seen by the number of prescriptions given for constipation and pain, better predicting patient's postoperative needs would decrease the number of ED visits for medications. However, decreasing those visits requiring reassurance only would be more difficult. This is perhaps best exemplified by our hypospadias cohort. Our urologic nurses have developed a comprehensive educational and support program for the families of patients undergoing hypospadias repair. This involves extensive one-on-one counseling of the family while the patient is in surgery, educational literature, and easy access to the nursing staff through phone calls and our institution's patient care portal postoperatively. However, despite this effort, patients who underwent hypospadias repair were the largest group that returned to the ED, and 40% of these patients required reassurance only. Interestingly, these visits were most likely to occur after office hours and on weekends when there is not a nurse immediately available. Therefore, decreasing these visits for reassurance only may require more innovative interventions such as having a provider available to replying to the patient portal after hours or expanding the use of telemedicine. We may also have to look at the group of families that needed

reassurance. If patterns in caregiver characteristics are predictive of returning to the ED, we could use to tailor our postoperative care teaching.

There are other concerns with using hospital readmissions as a quality metric specifically for pediatric patients. Srivastava and Keren [2] argued that pediatric patients may have different medical complexities from adults that affect their bounceback rates. Furthermore, non-modifiable factors such as family resources and patient–caregiver relationships may significantly affect pediatric but not adult readmission rates. Additionally, Kangovi and Grande [18] argued that readmissions may be simply due in part to a high level of access to healthcare. This appears to be a factor in our population. Those patients who lived closer to the ED were more likely to require reassurance only, whereas those who lived further were more likely to require treatment.

Children and adults are different both in physiology and in healthcare utilization. These differences need to be taken into account when establishing healthcare policy for the pediatric population. While there is certainly room for improvement to decrease return to the ED after urologic surgery for pediatric patients, further decreasing the number of visits requiring only reassurance only will require innovation and creativity.

Our study has several limitations. First, we only reviewed patients who return to the ED at our institution. Therefore, this is likely an underestimation as visits to other emergency departments for patients who were not subsequently transferred to our institution are not represented here. Additionally, we did not account for patients who may have returned to our clinic instead of the ED with concerns after surgery. As such, this is likely an under-representation of the number of patients who returned to the ED after urologic surgery. But as these types of visits (clinic follow-up within 30 days after surgery) are in many plans already bundled with the cost of the procedure, it may not have any policy effect. As a single institution study, our case mixture clearly has an effect on the number of bouncebacks. Centers that perform more complex reconstructions more often may have different bounceback admission rates. We also did not include parent and patient phone calls and inquiries from the patient care portal associated with the electronic medical record. These are routed to the urologic nurses during the day, who ask the physicians for direction as appropriate. After hours, calls are taken by the on-call resident. As such, it is unclear if these phone calls increased or decreased return to the ED.

Conclusions

Pediatric patients who return to the ED after surgery are different from adults. They most commonly require only reassurance and rarely require readmission. To decrease these pediatric visits, improvements can be made in prescription patterns and caregiver counseling. Innovative measures would be required to decrease the visits which require only reassurance.

Acknowledgments

Funding

This research was supported by a T-32 grant from the National Institutes of Health's National Institute of Diabetes and Digestive and Kidney Diseases (grant number 5T32DK007782-17).

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Figure 1.

Probability of requiring intervention in the ED based on patient age. Shown with 95% confidence intervals. <TS: the figure have been renumbered. Figure 1 is now the Summary figure>

Summary Figure 1. Most common procedures performed and treatment required for pediatric (above) and adult (below) patients who returned to the ED after urologic surgery.

Figure 2. Probability of requiring intervention in the ED based on patient age. Shown with 95% confidence intervals.

Table 1

Patient demographics.

	Pediatric patients	Adult patients	<i>p</i>
Patients	56	310	
Gender			0.597
Male	66% (37)	64% (199)	
Female	34% (19)	46% (111)	
Age (years)	6.8 (± 6.8), range 0–25	55.37 (± 16.62), range 18–93	< 0.001
Race			< 0.001
Black	12.5% (7)	9.7% (30)	
Hispanic	3.6% (2)	0% (0)	
Asian	7.1% (4)	2.2% (7)	
White	69.6% (39)	86.8% (269)	
Other	1.7% (1)	0.6% (2)	
Unknown	5.4% (3)	0.6% (2)	
Insurance			0.011
Private	62.5% (35)	41.6% (129)	
Medicaid/Medicare	28.6% (16)	48.7% (151)	
No Insurance	1.8% (1)	2.6% (8)	
Unknown	5.35% (3)	7.1% (22)	
Distance from ED (miles)	70.87 (± 7.30 , range 1–162)	71.14 (± 2.96 , range 1–164)	0.486
Mean post-operative day number at presentation	8.34 days (SD 7.90 days)	9.47 (SD 7.70 days)	
Total number of visits	1.13 visits (SD 0.46, range 1–4)	1.18 visits (SD 0.49, range 1–4)	
Overall bounceback rate	2.7%	4.4%	

Table 2

Comparison of treatment needed for all 30-day bouncebacks.

	Admission	Procedure	Medication	Catheter Tx	Local wound care	Reassurance
Children	19.4%	10.4%	14.1%	11.4%	4.1%	33%
Adults	42.2%	14.1%	13.4%	6.0%	6.0%	12%
<i>p</i>	< 0.001	0.422	0.886	0.136	0.482	< 0.001

Table 3
Independent associations between potential patient risk factors and requiring intervention in the ED.

Variable	Odds ratio	Standard error	p	95% Confidence interval	
Age	1.03	0.01	< 0.01	1.02	1.05
Post-op day	1.09	0.03	< 0.01	1.03	1.15
Distance from Hospital	1.01	0.00	0.02	1.00	1.02
Insurance					
Public	Reference				
Private Insurance	1.00	0.35	0.993	0.51	1.99
Uninsured	0.28	0.23	0.12	0.06	1.36
Number of Visits	1.83	0.88	0.21	0.71	4.69
Gender					
Female	Reference				
Male	1.13	0.40	0.73	0.57	2.26
Race					
White	Reference				
Black	2.19	1.45	0.24	0.60	8.05
Other/unknown	3.38	2.54	0.106	0.77	14.78