

A retrospective evaluation of patients with genitourinary system symptoms in a pediatric emergency department

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ABSTRACT

Aims: Pediatric genitourinary system symptoms are one of the principal causes of admission to pediatric emergency departments (PEDs). This study describes the characteristics and management of genitourinary system symptoms in patients admitted to our PED.

Methods: This retrospective, observational study was conducted in a PED at Samsun University between January 2019 and October 2023. Children younger than 18 who presented to our PED and were diagnosed with urogenital pathologies were included. The patients' sex, age, arrival time, presenting complaint, diagnosis, length of stay in the emergency room, emergency surgery requirements, and length of hospital stay were extracted from the electronic medical records.

Results: A total of 1265 children with a mean age of 8.2 ± 5.17 years, 855 (67.6%) boys and 410 (32.4%) girls, presented to the PED during the study period. The mean duration of symptoms was 10.95 ± 5.01 hours. The most common presentation symptoms were dysuria (40.9%), scrotal pain/swollen/erythema (32.5%), and fever (11.8%), while the most common diseases were urinary tract infection (56.5%), epididymitis/epididymo-orchitis (24.8%), and testicular torsion (4%). The mean time from diagnosis to treatment was 2.9 ± 0.82 hours, and the mean time elapsing in the waiting room was 3.4 ± 1.01 hours. Two hundred ninety-five (23.3%) patients were hospitalized, while emergency surgical procedures were performed on 82 (6.5%).

Conclusion: The majority of children presenting due to genitourinary system symptoms can be safely treated in the emergency room. Severe urological emergencies resulting in morbidity and mortality in pediatric patients are rare.

Keywords: Children, genitourinary system, pediatric emergency

INTRODUCTION

Pediatric emergency care is particularly problematic in terms of patient safety. Emergency pediatric physicians are required to perform rapid and accurate evaluations in the face of limited time and resources, especially considering the vulnerability of their patients. The numbers of presentations to pediatric emergency departments (PEDs) are rising, and this can impact on the care received by acutely ill and injured children. This in turn can lead to worsened health care quality, poor clinical outcomes, and low patient satisfaction.¹

Children represent 40% of emergency department patients in the USA, and demands for PED services have also risen significantly in China.^{1,2} Urological emergencies constitute approximately 2.5-10% of cases presenting to the PED.^{3,4} The etiologies of pediatric urinary emergencies vary widely, from urinary to genital pathologies, and these may involve both sexes. Urological emergencies exhibit various different manifestations, but are rare in the pediatric population.⁵ While very few pediatric urology emergencies are fatal, such genuine emergencies can result in the affected organ being lost

or severely damaged (such as testicular torsion or priapism) or even to mortality (as in severe renal trauma or urosepsis) unless recognized and treated promptly.

Similarly to pediatric urology, pediatric emergency medicine is a relatively recent field of specialization.⁶ Pediatric urological emergencies represent only a small fraction of all pediatric emergencies. Our search of the literature revealed only a limited number of studies of patients presenting to the PED due to pediatric urogenital symptoms. This study describes the clinical and other characteristics and management of patients with genitourinary system symptoms presenting to the Samsun University Department of Pediatric Emergency Medicine, Türkiye.

METHODS

Ethics

The study was carried out with the permission of the Samsun University Clinical Researches Ethics Committee (Date: 18.10.2023, Decision No: 2023/19/13). All procedures were

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carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Study Population

This retrospective observational study involved children aged 18 and younger who presented as emergency/urgent cases to the PED with pathologies of the urogenital system at the Samsun University, Samsun Women & Children’s Training and Research Hospital between January 2019 and October 2023.

Inclusion Criteria

- Age 0-17 years,
- Children diagnosed with urogenital pathologies such as urinary tract stones, testicular torsion, hydrocele, urinary retention, etc.
- Children with isolated urinary tract infection
- Patients with isolated genitourinary trauma

Exclusion Criteria

- Patients with co-existent acute gastroenteritis, respiratory tract infections, acute otitis, or acute sinusitis
- Genitourinary trauma with multiple traumas such as accompanying liver, spleen, extremity, or cranial traumas
- Patients who were not examined in the PED

The first symptom regarded by us as the most important urogenital complaint during presentation to the emergency department was included in the evaluation, and additional symptoms were not considered.

Setting

The Samsun Women & Children’s Training and Research Hospital is a tertiary institution that also receives referrals from neighboring cities. The PED admits any child with illness and/or injury, irrespective of severity. All patients are first evaluated by an emergency physician. The attending physician then decides on the need for consultation with a specialist and on subsequent referral or discharge.

Data Collection

Data including the patient’s sex, age, arrival time, presenting complaint, examinations, diagnosis, length of stay in the emergency room, emergency surgery requirement, and length of hospital stay were retrieved from the medical records and recorded.

Statistical Analysis

Data analysis was carried out on SPSS version 25 software (statistical package for social sciences- IBM Corp., Armonk, NY, USA). Nominal data were expressed as frequencies and percentages and continuous data as mean±standard deviation.

RESULTS

A total of 1265 patients with a mean age of 8.2±5.17 years were included in the study. Presentations to the emergency department were most frequent among children aged 0-0.9 years. Patient distributions by age groups are shown in **Figure**. Eight hundred fifty-five (67.6%) patients were boys and 410 (32.4%) were girls. The mean complaint duration was 10.95±5.01 hours, and the mean waiting time in the emergency room was 3.4±1.01 hours. The patients’ characteristics are listed in **Table 1**.

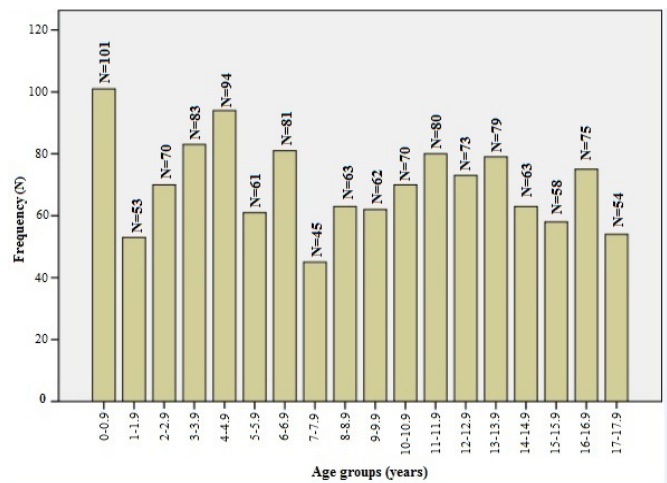


Figure. The patients’ age distributions

Table 1. Detailed characteristics of the patients in the study	
Clinical variables	Values
Total number	1265
Age (years, mean±SD)	8.2±5.17
Sex, girls (n, %)	410, 32.4%
Complaint duration (hours, mean±SD)	10.95±5.01
Mean interval between diagnosis and treatment (hours, mean±SD)	2.9±0.82
Length of stay in the emergency room (hours, mean±SD)	3.4±1.01
Hospitalization rate (n, %)	295, 23.3%
Referral to another hospital (n, %)	17, 1.3%
Emergency surgery rate (n, %)	82, 6.5%
Length of hospital stay (days, mean±SD)	3.81±2.59

SD: Standard deviation

Each child’s major symptom at presentation to the PED was included in the evaluation, any additional symptoms being excluded. Accordingly, the most frequent symptom was dysuria (40.9%), followed by scrotal pain/swollen/erythema (32.5%), and fever (11.8%). The least frequent symptom was acute urinary retention (0.5%). The presentation symptoms are summarized in **Table 2**.

Table 2. Presenting genitourinary system symptoms in a PED		
Presenting symptoms	Patients (n)	Patients (%)
Dysuria	517	40.9
Scrotal pain/swollen/erythema	412	32.5
Fever	149	11.8
Hematuria	65	5.1
Renal colic	49	3.9
Nausea/vomiting	46	3.6
Trauma symptoms	21	1.7
Inability to pass urine	6	0.5

PED: Pediatric emergency department

The most frequently encountered urogenital system pathology in this study was urinary tract infection, observed in 715 (56.5%) patients, with a mean age of 6.17±4.73 years. The second most common entity was epididymitis/epididymo-orchitis, seen in 314 (24.8%) patients, with a mean age of 10.96±4.38. This was followed by urinary tract stone, in 82 (6.4%) children. Urogenital trauma was observed in 29 (2.3%) patients.

Testicular torsion was seen in 51 (4%) children, with a mean age of 12.94 ± 3.5 years. Five (9.8%) of these were transferred to another center, and 46 (90.2%) were taken for surgery. Bilateral orchidopexy after successful detorsion was performed on 36 of those patients, and orchiectomy on 10. Emergency surgical procedures involving intracorporeal lithotripsy and/or ureteral catheterization were performed on 23 (28%) of the 82 patients with urinary tract stone disease. Fifty-nine (72%) of the patients with urinary tract stone received medical treatment. Isolated genitourinary trauma was determined in 29 (2.3%) patients, and renal trauma was present in 11 (37.9%) cases. One patient underwent nephrectomy, the others receiving conservative treatment. Circumcision injuries were observed in nine (31%) patients. All circumcision injuries, such as bleeding, were treated in the emergency room by pressure application and ligation of the bleeding vessels. Primary surgical repair was performed on one child with intraperitoneal bladder trauma and on another with bicycle accident-related penile trauma.

Nine hundred seventy (76.7%) of the patients with urogenital system pathologies were discharged from the emergency room for follow-up by the outpatient clinic, 295 (23.3%) were admitted to the ward for further care, and 17 (1.3%) were referred to other centers, for social/technical reasons. Emergency surgery was performed on 82 (6.5%) patients. All patients presenting due to urogenital trauma were hospitalized, apart from those with circumcision injuries, none of whom were hospitalized. Forty-six of the patients with testicular torsion were hospitalized, while five were referred to another center on an emergency basis (at their own request). One hundred fifty (20.9%) of the 715 patients with urinary tract infection, 31 (9.8%) of the 314 with epididymitis/epididymo-orchitis, and 23 (63.8%) of the 36 with ureteral stone were hospitalized. The total length of stay among the hospitalized patients was 3.81 ± 2.59 days. No mortality occurred in any case. The patients' specific diagnoses, mean ages according to diagnosis, and hospitalization rates are shown in **Table 3**.

Table 3. Specific diagnosis in a PED

Diagnosis	Patients (n, %)	Age (years, mean \pm SD)	Discharged/ward/referred (n)
Urinary tract infection	715, 56.5%	6.17 \pm 4.73	150/565/-
Epididymitis/epididymo-orchitis	314, 24.8%	10.96 \pm 4.38	31/283/-
Testicular torsion	51, 4%	12.94 \pm 3.5	-/46/5
Acute hydrocele	45, 3.6%	9.13 \pm 3.34	40/5/-
Kidney stone	42, 3.3%	11.42 \pm 5.09	30/8/4
Ureter stone	36, 2.8%	11.33 \pm 5.16	10/23/3
Parenchymal kidney disease	16, 1.3%	5.05 \pm 4.98	12/4/-
Renal trauma	11, 0.9%	11.09 \pm 3.8	-/11/-
Circumcision injuries	9, 0.7%	7.11 \pm 1.83	9/-/-
Bladder/urethra trauma	8, 0.6%	9.12 \pm 4.58	-/8/-
Urinary retention	6, 0.5%	13.33 \pm 3.26	-/6/-
Bladder stone	3, 0.2%	10 \pm 3.6	2/1/-
Renal mass	3, 0.2%	12.66 \pm 0.57	-/-/3
Testis tumor	2, 0.2%	13.5 \pm 3.53	-/-/2
Ureterocele	2, 0.2%	13.5 \pm 0.7	2/-/-
Penis trauma	1, 0.1%	4	-/1/-
Urethra stone	1, 0.1%	16	-/1/-

PED: Pediatric emergency department, SD: Standard deviation

DISCUSSION

This study describes the epidemiological profile and management of pediatric urogenital pathologies seen in a PED. Boys (67.6%) significantly outnumbered girls. Similar studies have also reported a male predominance in terms of urological emergencies.^{4,7-9} The reason for this is unclear, although variations in the anatomical characteristics of the male and female urogenital system may be involved.⁴ The mean age of the children presenting to the PED with pediatric urogenital pathologies was 8.2 ± 5.17 years, a figure consistent with other studies.^{4,9} The two most commonly involved age groups in the present study were 0-0.9 years and 4-4.9 years. This is in contrast to a previous study from Türkiye, in which the most frequent age groups were 2-5 and 6-10 years.⁹ However, those authors did not ensure homogeneous distribution when establishing their age groups, and this may explain the inconsistency between the two studies.

The most common diagnosis in this study was urinary tract infection, seen in 715 (56.5%) patients. This is a frequent entity among pediatric patients presenting to the emergency department.^{10,11} A previous study from Türkiye reported a prevalence of 48.1%.⁹ Our finding is thus consistent with that study and also with research from other countries.

The surgical procedure applied depended on the etiology of the urological emergency concerned. Patients with testicular torsion underwent bilateral orchidopexy following successful detorsion in case of a viable testis and orchidectomy in case of non-viable testes. Time is of the essence in such cases. The state of the testis at surgery depends on the time elapsing between the onset of symptoms and treatment. Orchidectomy and contralateral testicular fixation were performed on 10 (21.7%) patients. Previous studies have reported rates of testicular torsion-related orchidectomy of 21-39.6%.¹²⁻¹⁵ Our study is thus consistent with the previous literature from that perspective.

Trauma is a frequent cause of urological emergencies seen in the emergency room.⁵ Pediatric genitourinary trauma can be either iatrogenic, following surgical procedures such as circumcisions and pelvic and abdominal surgeries, or may result from road traffic accidents, falls from heights, assaults, and sports injuries.^{5,16,17} Traffic accidents are one common cause among older children. When the kidneys are affected, this is usually associated with multiple organ injuries. Bladder injuries occur in lower abdominal and pelvic traumas, while urethral injuries are often associated with pelvic injuries.^{5,17} The incidence of genitourinary trauma in the present study was 2.3%, renal, bladder, urethral, and penile trauma representing 1.6%. A study from Nigeria reported an incidence of renal, bladder, urethra, and penile trauma in children of 2.2%.⁴ A figure of 5.3% was reported in a large 75-patient series from Türkiye.⁹ Our incidence of renal, bladder, urethra, and penile trauma was thus lower than those reported in previous publications. This may be due to only patients with isolated genitourinary trauma being included in the present study, with multi trauma patients being excluded.

The incidence of circumcision injuries in this study was 0.7%. A previous study from outside Türkiye reported a much higher figure, of 13.1%.⁴ The law in Türkiye states that circumcision may only be carried out by physicians, and it is illegal for assistant health personnel or non-health personnel to perform it. Iatrogenic injuries to the external

genitalia are not uncommon during circumcisions carried out by untrained personnel.¹⁶ This difference between the two studies may derive from circumcision being only performed by physicians in Türkiye.

The incidence of urinary tract stones in this study was 6.4%. A previous study from Türkiye involving a low number of cases reported a figure of 6.6%.⁹ The stones in this study were located mainly in the kidney (51.3%) and ureter (43.9%), followed by the bladder (3.6%) and urethra (1.2%). Urinary tract stone disease is endemic in Türkiye, and a high incidence of upper urinary tract stone in children may be regarded as normal.¹⁸ One surprising finding from this study is that the incidence of bladder stone was much higher than usual in the country. An extensive multicenter study of pediatric patients in Türkiye reported an incidence of bladder stone of 0.8%.¹⁹ Neurogenic bladder was observed in two of the three children with bladder stones in the current study, while no pathology was detected in the other patient.

The treatment of patients presenting with urinary tract stones was initiated in as conservative a manner as possible. Emergency surgical intervention was planned for the 23 (28%) children who failed to respond to or who were unsuitable for conservative treatment, and these underwent laser lithotripsy and/or ureteral catheterization. Surgery under elective conditions was planned for children with indications for surgery but who were not considered for emergency procedures. Publications from Türkiye and elsewhere have reported rates of 19.4% and 35%, respectively, for emergency surgery among children presenting to the emergency department with urinary tract stones.^{20,21} Our own emergency surgery rate due to urinary tract stone was 28%, compatible with the previous literature.

This study also examined the mean ages at which the emergency urological pathologies occurred. Urinary tract infections were observed at 6.17±4.73 years, and epididymitis/epididymo-orchitis at 10.96±4.38 years. Orchitis occurs more frequently in late adolescence.²² In the present study, epididymitis/epididymo-orchitis was more common in the prepubertal age group, although the prevalence in our patients was similar to that reported in other publications.²²⁻²⁴ The mean age at testicular torsion was 12.94±3.5 years, similar to figures in publications from both Türkiye and elsewhere.^{22,25} In addition, the mean age of the children presenting with kidney stone, ureter stone, and renal trauma was approximately 11 years, while that for children presenting with parenchymal kidney disease was 5.05±4.98 years.

In the present study, 23.3% of patients were hospitalized for further care. A figure of 50.3% was reported in a previous overseas study, and 57.3% in earlier Turkish research.^{4,9} These are both considerably higher than our own rate. The prevalence of urinary tract infection, epididymitis, and epididymo-orchitis in the present study was 81.3%. Patients with those conditions were excluded from the first of those two studies, while that specific patient group constituted 52% of the population in the second. The low number of hospitalized patients in our study may be regarded as normal due to the large number of patients with urinary tract infection, epididymitis, and epididymo-orchitis and to the low hospitalization rate among that group. However, when the patients with urinary tract infection, epididymitis, and epididymo-orchitis were excluded, our hospitalization rate

rose to 52.1%, a figure consistent with other publications in the literature.

Limitations

The principal limitations of this study are its single-center and retrospective character. Another involves the relatively short study period. Further prospective, multicenter studies are now required to corroborate our findings. However, we also think that these results are important in the light of the scarcity of previous publications regarding urogenital system pathologies presenting to the PED.

CONCLUSION

This study indicates that the majority of children presenting to the PED due to genitourinary system symptoms can be safely treated in that setting, that one-fifth of children presenting to the PED may require hospitalization for further care, and that a few cases may require emergency surgery. Severe urological emergencies causing morbidity and mortality in children are very rare.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Samsun University Clinical Researches Ethics Committee (Date: 18.10.2023, Decision No: 2023/19/13).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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