

CHARACTERISTIC OF PEDIATRIC UROLITHIASIS PATIENTS IN ZAINOEL ABIDIN HOSPITAL

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ABSTRACT

Objective: We conducted a study to describe the characteristics of pediatric urolithiasis patients in Zainoel Abidin Hospital, Aceh-Indonesia. **Material & Methods:** Between January 2013 and March 2016, we retrospectively reviewed the medical records of 16 pediatric patients with urolithiasis in Zainoel Abidin Hospital, Aceh-Indonesia. The patients were come from whole Aceh region and the variables are sex, age, family history of stone disease, and stone location. The data were described in graphics and tables. **Results:** From 16 pediatric urolithiasis patients, 9 patients (56.3%) were males and 7 patients (43.7%) were females. In 2013 there were 4 pediatric urolithiasis patients (1.2%), in 2014 there were 5 (1.6%), and in 2015 there were 3 (2.3%). From January – March 2016 there were 4 pediatric urolithiasis patients (4.5% of all urolithiasis patients). The mean age of all pediatric patients were 7.7 ± 5.5 years (1-17 years). The incidence of urolithiasis for group < 5 years of age were 6 patients (37.5%) with mean age of 2 ± 1.14 years (1-4 years), in 5–10 years age group, there were 4 patients (25.0%) with mean age 7 ± 2.16 years (5-10 years), and 11–18 years age group, there were 6 patients (37.5%) with mean age 13.8 ± 2.16 years (12-16 years). Stones were located in the upper urinary tract in 9 cases (56.3%), lower urinary tract in 6 cases (37.5%), and combine stone located in upper and lower urinary tract in 1 case (6.2%). There were 5 patients (31.3%) with family history of stone disease. **Conclusion:** Pediatric urolithiasis case in Aceh Province is slightly predominant in male children, with mean age of 7.7 ± 5.5 years (1-16 years). The most common age group is evenly distribute between <5 years old and 11-18 years old. The most common stone location is in the upper urinary tract.

Keyword: Characteristic, pediatric, urolithiasis.

ABSTRAK

Tujuan: Kami melakukan penelitian untuk menjelaskan karakteristik pasien pediatric urolithiasis di RS Zainoel Abidin Aceh-Indonesia. **Bahan & cara:** Antara Januari 2013 sampai Maret 2016, kami secara retrospektif mereview rekam medis dari 16 pasien pediatri dengan urolithiasis di RS Zainoel Abidin, Aceh-Indonesia. Pasien berasal dari seluruh wilayah Aceh dan variabelnya adalah jenis kelamin, usia, riwayat sakit batu keluarga, dan lokasi batu. Data dijelaskan dalam grafik dan tabel. **Hasil:** Dari 16 pasien pediatri urolithiasis, 9 pasien (56.3%) adalah laki-laki dan 7 pasien (43.7%) perempuan. Pada tahun 2013 terdapat 4 pasien pediatri urolithiasis (1.2%), tahun 2014 terdapat 5 pasien (1.6%), dan tahun 2015 terdapat 3 pasien (2.3%). Dari bulan Januari – Maret 2016 terdapat 4 pasien pediatri urolithiasis (4.5% dari semua pasien pediatri urolithiasis). Rerata usia dari semua pasien pediatri urolithiasis adalah 7.7 ± 5.5 tahun (1-17 tahun). Kejadian urolithiasis untuk kelompok usia <5 tahun adalah 6 pasien (37.5%) dengan rerata usia 13.8 ± 2.16 tahun (12-16 tahun). Letak batu di upper urinary tract ada 9 kasus (56.3%), lower urinary tract ada 6 kasus (37.5%), dan letak batu kombinasi di upper and lower urinary tract ada 1 kasus (6.2%). Terdapat 5 pasien dengan riwayat keluarga sakit batu (31.3%). **Simpulan:** Kasus pediatri urolithiasis di provinsi Aceh sedikit dominan pada anak laki-laki dengan rerata usia 7.7 ± 5.5 tahun (1-16 tahun). Kelompok usia yang paling umum adalah antara <5 tahun dan 11-18 tahun. Lokasi batu yang paling umum adalah di upper urinary tract.

Kata kunci: Karakteristik, pediatri, urolithiasis.

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INTRODUCTION

Urinary tract stone disease in children is unique and different from adult patients in both the clinical signs, symptoms as well as therapy.¹ In general, urinary tract stone disease occurs in about 5-10% of the human population in the world. A total of 2-3% of these patients are children.^{1,2} Pediatric urinary tract stone disease has a low incidence in developed countries, but in developing and underdeveloped countries the incidence is high, including Eastern Europe, Southeast Asia, India and Middle East.¹ Overall sex ratio of female : male for patients under the age of 20 years is 70 : 30. Between the ages of 16 to 20 years, ratio is 77 : 23 while under 5 years old, the ratio is 60 : 40.^{1,3-5} The reasons for distinction number of incidence by sex is still unknown.¹



Figure 1. Multiple right kidney nephrolithiasis of 12 years old boy.

Urolithiasis in pediatric population has a wide spectrum of disease including difference in number of incidence and characteristics by age, gender, and stone location. Difference in environment, diet and lifestyle will make a difference in the incidence, stone type and stone location.^{2,3}

In some European countries, mostly the stones located in the upper urinary tract. In Asia, Turkey and Israel, the majority of urinary tract stones in infants and children located in the ureter and kidney.³ However, there is a stone belt start from Egypt Pakistan, India, Thailand to Indonesia continue to experience cases of urinary tract stones



Figure 2. Bilateral nephrolithiasis of 13 years old girl.

in children as one of the main problems of the lower urinary tract.⁴

OBJECTIVE

There are still no exact characteristics and incidence of pediatric urolithiasis in Indonesia, therefore we interest to conduct a study to describe the characteristics of pediatric patient with urinary tract stones in Zainoel Abidin Hospital, Aceh province, Indonesia.

MATERIAL & METHOD

There were 16 cases of pediatric urolithiasis between January 2013 until March 2016 at Zainoel Abidin Hospital, Aceh Province, Indonesia. We made inclusion criteria based on definition of a child, which is under 18 years old, relevant with the Ministry of Health Republic of Indonesia and the Indonesian Pediatric Association. Meanwhile, age grouping of children was taken from the grouping children Indonesian Pediatric Association (IDAI) that is, 0-28 days (neonate), infants (1 month - 1 year), toddlers (1-5 years), school age children (5- 10 years) and adolescents (11-18 years).

We collected data of pediatric urolithiasis retrospectively based on the patients medical records. All patients who met our inclusion criteria were included in the study. Variables included in the study were age, gender and stone location.

RESULTS

There were 16 pediatric patients with urinary tract stones. There were 9 patients (56.3%) male and 7 patients (43.7%) women. The average age of all patients was 7.7 ± 5.5 years old (1-17 years). The incidence for urinary tract stones in the age group < 5 years old were 6 patients (37.5%) with a mean age 2 ± 1.14 years old (1-4 years). In the age group 5-10 years old, there were 4 patients (25.0%) with mean age 7 ± 2.16 years old (5-10 years). In the age group 11-18 years old there are 6 patients (37.5%) with a mean age of 13.8 ± 2.16 years old (12-17 years).

In 2013 there were four pediatric patients with urinary tract stones, constitute 1.2% of all urolithiasis patients in Zainoel Abidin Hospital. In 2014, there were 5 patients (1.6% of all patients), in 2015 there were 3 patients (2.3%), whereas from January to March 2016 there were a total of 4 patients (4.5%) of children with urinary tract stones compared to all patients with urinary tract stones.

Table 2. Distribution of pediatric urolithiasis compare with all urolithiasis patient.

Years	Frequency	% urolithiasis patient
2013	4	1.2
2014	5	1.6
2015	3	2.3
March 2016	4	4.5

The study showed that the majority of the stones were located in the upper urinary tract, which was 9 cases (56.3%), lower urinary tract in 6 cases (37.5%) and a combination of upper and lower urinary tract is 1 case (6.2%). There were 5 patients (31.3%) patients with a family history of urinary tract stone disease.

Table 1. Age distribution.

Age (Years)	Frequency	%	Mean \pm SD (Age)
0-5	6	37.5	2 ± 1.14 years (1-4)
5-10	4	25	7 ± 2.16 years (5-10)
11-18	6	37.5	13.8 ± 2.16 years (12-17)
Total	16	100	7.7 ± 5.5 years (1-17)

Table 3. Pediatric urinary stone location.

Stone location	Frequency	Percentage
Upper urinary tract	9	56.3
Lower urinary tract	6	37.5
Upper and lower urinary tract	1	6.2

From total 8 patients with upper urinary tract stone, mean age of the patients was 9.3 ± 6.8 years (1-17 years), with the most frequent location was nephrolithiasis in 7 patients (87.5%) and ureterolithiasis in 1 patient (12.5%). Average size of the stone in upper urinary tract was 17.25 ± 9.43 mm (8-38 mm) with the largest was pyelum stone and the smallest was ureteral stone. The most frequent procedure was open surgery in 5 patients (62.5%), ESWL in 2 patients (25%) ureterorenoscopy with stone lithotripsy in 1 patient (12.5%) with ureteral stone.

Table 4. Upper urinary tract stone patients characteristics.

Variable	
Age	9.3 ± 6.8 years (1-17 years)
Stone location	
Nephrolithiasis	(87.5%)
Ureterolithiasis	(12.5%)
Stone size	17.25 ± 9.43 mm (8-38 mm)
Operation	
Open	(62.5%)
ESWL	(25%)
URS	(12.5%)

From total 7 patients with lower urinary tract stone, average age was 5.7 ± 4.5 years (1-12 years), all patients experienced vesicolithiasis. Average size of the bladder stone 37.1 ± 9.73 mm (28-50 mm). The most frequent procedure was endoscopy vesicolitholapaxy in 5 patients (71.4%) followed by open vesicolithotomy in 2 patients (28.5%).

Table 5. Lower urinary tract stone patients characteristics.

Variable	
Age	5.7± 4.5 (1-12 years)
Stone location	
Vesicolithiasis	100%
Stone size	37.1 ± 9.73 mm (28-50 mm)
Operation	
Vesicolitholapaxy	(71.4%)
Open vesicolithotomy	(28.5%)

In pediatric patients with urolithiasis that operated in our hospital, all patients gained 100% stone free rate without any post operative complication at follow-up.

DISCUSSION

Urolithiasis in pediatric population has a wide spectrum of disease including differences in number of incidence and characteristics by age, gender, and stone location. Differences in environment, diet and lifestyle will make a difference in the incidence, type of stone and stone location. The study showed that there were different gender tendency in pediatric urolithiasis, compared with previous studies. In our study, 9 patients (56.3%) were male and 7 patients (43.7%) were female. Whereas in previous studies conducted in Europe and America, the majority of patients are women, although with different proportions in each age group. This difference were not very significant, indicating gender variability in urinary tract stones child was different on each area.^{6,7}

The study showed no significant differences between each age group in the incidence of urinary tract stone (the age group <5 years with 6 patients (37.5%), the age group 5–10 years with 4 patients (25.0%), age group 11–18 years with 6 patients (37.5%). As in previous studies, the highest occurrence of cases of urinary tract stones in children were in the age group 0-10 years.⁸

Table 4. Comparison with previous study.

Variable	Our Study	Previous Study
Sex (Male : Female)	53 : 47	30 : 70
Age	No distinction for each group	The highest 0-10 years
Incidence each year	1.2- 4.5%	1-5% (Asia)
Stone location	Upper urinary tract	Lower urinary tract

The majority of stones in this study was on the upper urinary tract (56.3%) followed by the lower urinary tract (37.5%) and a combination of upper and lower urinary tract (6.2%). These results are consistent with previous studies in different areas, which mentions that the upper urinary tract stones dominate the urinary stones in children.^{1,3-5}

Along with an increased incidence of urinary tract stones in children worldwide, there will be an increasing need for new knowledge about the disease and the treatment options for clinicians. Child health practitioners need to be more aware of the possibility of urinary tract stones in patients with suggestive symptoms such as back pain, fever, or abnormalities in the urinalysis. Urinary tract stones can no longer exclusively incorporated into the disease in adults. Suspicion of urinary tract stones should be increased because of the symptoms of urinary tract stones in children is not as clear symptoms in adult patients. Child health practitioner should be familiar with the risk factors associated with the development of stones in children and must be able to evaluate the patient, including the selection of the appropriate imaging methods as well as other support.

CONCLUSION

Pediatric urolithiasis case in Aceh Province is slightly predominant in male children, with mean age of 7.7 ± 5.5 years (1-16 years). The most common age group is evenly distribute between <5 years old and 11-18 years old. The most common stone location is in the upper urinary tract.

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