

THE SIZE OF EXTERNAL URETHRAL MEATUS ON MAXIMUM STRETCH IN WEST JAVA PEDIATRIC MALE: IS THERE ANY CORRELATION WITH AGE?

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ABSTRACT

Objective: To determine the average size of external urethral meatus in children in West Java, and to find out whether there was a correlation between the size of external urethral meatus and age of boys in West Java. **Material & Methods:** This research was an analytical with prospective study design. Our research subjects consist of children hospitalized between November 2017-November 2018 at Hasan Sadikin General Hospital, Bandung. Measurement is done by measuring the diameter of the external urethra using meatal calibrator, recorded as meatus size on a French scale. Inclusion criteria in this study were all pediatric patients aged 0-12 years who consented to be involved in the study. The exclusion criteria were patients who had urethral diseases such as hypospadias, epispadias, strictures, and history of instrumentation and interventional procedures on the urethra. After data collection, data were analyzed using SPSS 18. **Results:** We included 187 patients in our study, with the youngest being 1 month old and the oldest being 12 years. We documented the mean external urethra meatal measurement and grouped the subjects into 4 age groups. The average size of the external urethral meatus in the infant age group (0-12 months) was 5.82 Fr, the toddler age group (1-3 years) it was 6.34 Fr, in the preschool age group (3-6 years) it was 8.51 Fr, and in the primary school age group (6-12 years) it was 12.90 Fr. Based on the results of measurements, there is a correlation between age and external urethral meatal size ($p=0,000$). The older the child, the greater the size of the external urethral meatus obtained. **Conclusion:** The size of the external urethral meatus maximum stretch in boys in West Java increases with age. The results of this study are expected to be used as a reference of normal anatomical size, particularly the external urethral meatal size in boys in West Java.

Keywords: External urethral meatus, instrumentation, urethral calibration.

ABSTRAK

Tujuan: Menentukan ukuran rata-rata meatus uretra eksternal pada anak-anak di Jawa Barat, dan untuk mengetahui apakah ada korelasi antara ukuran meatus uretra eksternal dan usia anak laki-laki di Jawa Barat. **Bahan & Cara:** Penelitian ini menggunakan metode analitik dengan desain studi prospektif. Subjek penelitian kami terdiri dari anak yang dirawat inap dalam periode November 2017-November 2018 di RS Hasan Sadikin Bandung. Pengukuran dilakukan dengan mengukur diameter meatus urethra externa menggunakan meatal kalibrator yang dicatat sebagai ukuran meatus pada skala french. Kriteria inklusi pada penelitian ini adalah seluruh pasien anak dengan usia 0-12 tahun dengan persetujuan untuk terlibat dalam penelitian, kriteria eksklusi adalah pasien yang memiliki penyakit pada uretra seperti hipospadia, epispadia, struktur, riwayat instrumentasi dan intervensi pada uretra. Setelah pengambilan data, dilakukan analisis data menggunakan SPSS 18. **Hasil:** Pada penelitian kami didapatkan subjek penelitian berjumlah 187 pasien dengan usia paling rendah adalah 1 bulan dan usia paling tinggi adalah 12 tahun. Ukuran meatus uretra eksterna rata-rata pada kelompok usia bayi (0-12 bulan) didapatkan 5.82 Fr, kelompok usia batita (1-3 tahun) 6.34 Fr, kelompok usia prasekolah (3-6 tahun) 8.51 Fr, kelompok usia sekolah dasar (6-12 tahun) 12.90 Fr. Berdasarkan hasil penelitian terdapat korelasi antara usia dengan ukuran meatus uretra eksterna ($p=0.934$). Semakin tinggi usia maka akan semakin besar ukuran meatus uretra eksterna yang didapatkan. **Simpulan:** Ukuran peregangan maksimum meatus uretra eksternal pada anak laki-laki di Jawa Barat meningkat sejalan usia. Hasil penelitian ini diharapkan dapat dijadikan referensi untuk sebagai acuan ukuran anatomi normal khususnya pada ukuran meatus uretra eksterna anak laki-laki di Jawa Barat.

Kata Kunci: Meatus uretra eksterna, instrumentasi, kalibrasi uretral.

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INTRODUCTION

Examination with catheter instrumentation is one of the most frequently performed urological examination. This procedure has been done since 1935 and Foley's catheter is still one of the techniques used with only a few modifications until now. The urethral catheter used is generally 40–45 cm long, but with several modalities for the placement of newly developed catheters, it is important to understand the anatomical variations of the urethra, especially in men, for more effective management and examination.¹⁻³

Catheterization is one of the most frequently performed urological procedure in dealing with pediatric patients. The function of catheter placement is for diagnostic and therapeutic modality. In diagnostic catheterization, cystography can be performed to examine urinary tract patency, urine collection for urinalysis and urine culture, and other procedures that can be used in connection with current technological advances. Therapeutic catheterization can be done for decompression of acute urinary retention, bladder emptying, and intravesical drug administration. The selection of proper catheter size is the first step in catheterization. If the size of catheter used is not appropriate, it can cause treatment failure or complications associated with catheterization.^{4,5}

Measuring the size of the external urethral meatus (EUM) in children can also be a reference for surgeons before performing reconstruction to get the anatomy as similar as possible to normal genital anatomy. Based on these reasons, the measurement of external urethral meatus in children is very useful, and therefore we are interested in researching this matter.

OBJECTIVE

The purpose of this study was to determine the average size of external urethral meatus in children in West Java, and to find out whether there was a correlation between the size of external urethral meatus and age of boys in West Java. The results of this study are expected to be a general picture in West Java and become one of the next reference material for future researches, not only in West Java, but as a reference at the national level. Clinically, this data can be used as standard measurement, so the size for catheter placement can be more precise, as to avoid iatrogenic urethral injury.

MATERIAL & METHODS

This research was analytical with a prospective study design. Cases included in the study were pediatric patients age 0-12 years in urology clinic and inpatient at Hasan Sadikin General Hospital between November 2017–November 2018, with inclusion criteria for children who followed urethral instrumentation and consented to be measured for the maximum stretch of the external urethral meatus. Exclusion criteria for this study were patients who had urethral disease, such as hypospadias, epispadias, urethral strictures, and patients with a history of instrumentation and intervention in the urethra, such as infection, stricture or stenosis of the urethral meatus.

Data collection techniques in this study included urethral inspection, palpation, and instrumentation to measure the maximum stretch of the external urethral meatus. Inspection was done to assess abnormalities of male genitalia and distal urinary tract. Examinations that can be performed including abnormality in the urethral meatus, corpus penis, and glans penis. On inspection of the external urethral meatus, location of urethral meatus was observed, since it can be glandular to perineal. Furthermore, the observation of the shape or morphology of the external meatus was done for deformities such as slits, point-like, horseshoe-like, or mega meatus. The meatus itself was observed for narrowing, such as stenosis. It was also important to notice any swelling, discoloration, and injury during the inspection. Palpation was done by pinching the glans of penis slowly with the index finger and thumb. This examination was used to open the urethral meatus and see if there was fluid coming out of meatus.⁶

After obtaining permission from the ethics committee, urethral instrumentation was done to measure the maximum stretch of the external urethral meatus by the meatal calibrator (Figure 1). The meatal calibrator is a stainless steel handle produced by Kalelkar Surgical, Mumbai, India and has graduation marks. The calibrator was inserted into external urethral meatus with lubrication and sufficient aseptic technique as shown in Figure 2.

Meatus calibrator can be used as done in India to help researchers to obtain data about the size of the well-calibrated external urethral meatus compared to anatomical research, where the meatus is only measured as a vertical slit.⁴ This tool provides definite information about the distensibility and elasticity of the urethral meatus to find the



Figure 1. Meatal calibrator.



Figure 2. Methods used to measure external urethral meatus.

appropriate size for instrumentation in the urethra without damaging the external urethral meatus, thus preventing complications that can occur due to incorrect instrumentation.^{7,8}

Calibrator markers at the level of the external urethral meatus were recorded as a measure of meatus. The calibrator was then introduced into holes of different sizes on the French scale by recording the hole size that corresponds to the calibrator at the measured graduation mark (Figure 3). The size of the external urethral meatus is generally accepted based on concepts without data supported by literature. To examine its size, the external urethral meatus can be measured using the "French Catheter Scale" then record the appropriate hole size at the measured graduation mark. Recording was done on a Fr scale, where 1 Fr = 0.33 mm or 3 Fr = 1 mm.

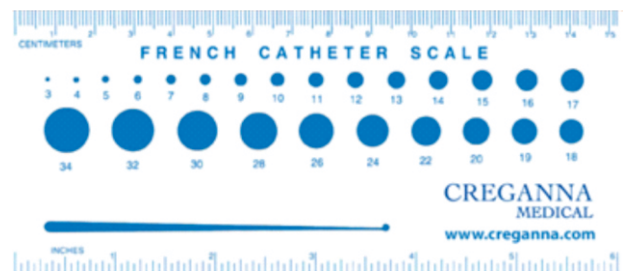


Figure 3. French Catheter Scale.

Data processing and analysis was carried out after completing the data collection process. The data obtained were analyzed descriptively and obtained frequency data. Data was processed and described into 4 age groups according to the National Institute of Child Health and Human Development in 2012. Data processing and analysis was carried out

using Microsoft Excel 2013 software and the Software Package used for Statistical Analysis (SPSS 18).

RESULTS

Analysis using descriptive analysis to determine the description of the external urethral meatus based on the age of the child and correlational analysis to determine whether there is a relationship between external urethral meatus and

age of the child and how is the relationship (Table 1). Table 2 provides an overview of the external urethral meatus based on the age group of the child.

The average size of the external urethral meatus in the infant age group (0-12 months) was 5.82 Fr, the toddler age group (1-3 years) was 6.34 Fr, the preschool age group (3-6 years) was 8.51 Fr, school-age group (6-12 years) was 12.90 Fr. Based on the table above, it can be seen that the size of EUM shows that the average size of EUM does not differ based on age. This is because when age increases in

Table 1. Distribution of External Urethral Meatus Measurement.

Age	EUM Diameter (Fr)
1-5 months	5.39 ± 0.92
6-12 months	6.25 ± 0.68
1-2 years	6.35 ± 0.83
2-3 years	6.32 ± 0.75
3-4 years	6.57 ± 0.93
4-5 years	8.80 ± 1.24
5-6 years	11.16 ± 0.83
6-7 years	11.32 ± 0.82
7-8 years	11.58 ± 0.69
8-9 years	13.31 ± 0.87
9-10 years	13.61 ± 0.70
10-11 years	13.59 ± 0.80
11-12 years	14.00 ± 0.00

Table 2. External Urethral Meatus base on Age Group.

Age	EUM Diameter (Fr)
Infant (1-12 months)	5.82 ± 0.61
Toddler (1-3 years)	6.34 ± 0.02
Preschool (3-6 years)	8.51 ± 2.28
School-age (6-12 years)	12.90 ± 1.15

Table 3. Correlation of EUM with Age.

Correlations			
		Usia	MUE
Spearman's rho	Correlation Coefficient	1,000	,934**
	Sig. (2-tailed)	.	,000
	N	187	187
	Correlation Coefficient	,934**	1,000
MUE	Sig. (2-tailed)	,000	.
	N	187	187

** . Correlation is significant at the 0.01 level (2 -tailed).

size EUM does not necessarily experience an average change.

To ascertain whether there is a correlation or relationship between the size of EUM and age of the child, a statistical test is needed. This analysis is used to calculate the relationship or correlation between the external urethral meatus and age. The test used is the Spearman correlation test because the age data has a categorical scale (Table 3).

The results of the Spearman correlation test obtained a sig value or p-value less than 0.05 with a correlation value of 0.934. The direction of the relationship is positive with a correlation coefficient of 0.934. This means that there is a positive and significant correlation between EUM and age with positive direction. The size of EUM depends on the age of the child. Ideally, the higher the age of the child, the greater the size of the MUE.

DISCUSSION

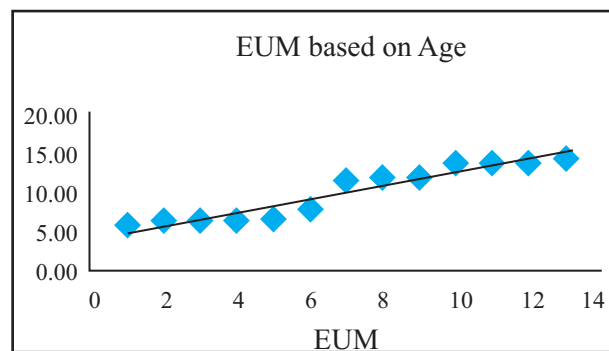


Figure 4. EUM based on Age.

From Figure 4 it can be seen that the size of the external urethral meatus is directly proportional to age, as seen from the average size of the external urethral meatus which increase with increasing age. From some of the results, it can be seen that some children get higher or lower results than the average, but when viewed in outline and overall, a line draw can be done that shows the alignment between increasing size and age.

However, when compared with research in the UK by Kim A.R. Hutton in 2006, it was found that the size of the external urethral meatus of children in West Java was smaller, so the procedure for the external urethral meatus of children in West Java had to be adjusted to the existing size.

CONCLUSION

The maximum stretch size of the external urethral meatus in boys in West Java increases with age. The results of this study are expected to be used as a reference for normal anatomical size, especially in the size of the external urethral meatus of boys in West Java.

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