

PENILE LENGTH OF NEWBORN INFANTS IN DR. SOETOMO HOSPITAL SURABAYA. A PRELIMINARY STUDY

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ABSTRAK

Tujuan dari penelitian ini adalah sebagai studi awal untuk menetapkan norma-norma panjang penis pada bayi baru lahir dalam populasi Surabaya. Metode: Panjang peniles membentang diukur dalam 217 laki-laki yang sehat neonatus bayi selama 48 jam pertama kehidupan di Rumah Sakit Dr Soetomo Surabaya dari Januari-Maret 2005. Ditemukan bahwa dalam 195 neonatus jangka panjang berarti penuh adalah $23,5 \pm 3,9$ mm (dengan rentang 12-32 mm), 22 neonatus prematur berarti panjang adalah $21,7 \pm 4,3$ mm (dengan rentang 14-29 mm). Menggunakan definisi panjang berarti - 2,5 SD untuk definisi mikropenis, nilainya adalah 13,8 mm untuk neonatus jangka penuh dan 11 mm untuk neonatus prematur. Kesimpulannya, rata-rata panjang penis bayi baru lahir neonatus di Surabaya lebih rendah dari daerah lain seperti sebelumnya dilaporkan.

ABSTRACT

The objective of this research was as preliminary study to establish the norms of penile length in newborn infants in Surabaya population. Methods: The stretched peniles length were measured in 217 healthy newborn neonate males during the first 48 hour of life at Dr Soetomo Hospital Surabaya from January–March 2005. It was found that in 195 full term neonates mean length was 23.5 ± 3.9 mm (with range 12 – 32 mm), 22 preterm neonates mean length was 21.7 ± 4.3 mm (with range 14 – 29 mm). Using the definition of mean length - 2.5 SD for the definition of micropenis, the value was 13.8 mm for full term neonate and 11 mm for preterm neonate. In conclusion, mean penile length of newborns neonates in Surabaya lower than other regions as previous reported.

Keywords: *penile length, micropenis, newborn*

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INTRODUCTION

External Genital evaluation is essential part of physical examination in newborn males. The diagnosis of micropenis in newborn has major implication. From psychological point of view, it suggests to the parents that their newborns might be had abnormal genital development; a very inconvenience experience even if the investigations later show the baby is actually a perfectly normal male infant. In the other hand of clinical point of view it implies that several additional investigation like hormonal determination, karyotype and USG might be necessary in order to rule out pathological causes of micropenis such as growth hormone deficiency, hypo or hypergonadotropic hypogonadism or partial androgen insensitivity. Last but not least a diagnosis micropenis whether part of defined endocrine or genetic condition or labeled as idiopathic must be made early in life and has implications from a therapeutic point of view, as injection of testosterone

will usually be considered (Cheng & Chanoine 2001, Walker 1998, Vogts et al. 2008).

Micropenis is defined as a normally formed penis that is at least 2.5 standard deviations (SD) below the mean in size. Previous studies showed racial differences in penile length. The values observed for stretched penile length differ slightly from author to author but a widely used definition of micropenis in full term newborns is a penis that is normally formed but fewer than 24 – 25 mm in length. Normative data for healthy term newborn males were mainly derived from Caucasian infants, and may not be applicable to our population. Some authors have studied to determine the normal value of the length of penile in newborn infants of their population (Cheng & Chanoine 2001, Vogts et al. 2008, Ting & Wu 2009, Aaronson 1994, Trijaya et al. 2002, Reilly & Woodhouse 1989). The aim of this study is as preliminary to establish the norms of penile length in newborn infants in Surabaya population.

MATERIALS AND METHODS

Penile lengths were determined in 217 healthy full term neonate (37 - 42 weeks of gestational age) and preterm newborn neonate males (34 - 36 weeks gestational age). Their gestational ages were determined by Dubowitz evaluation during the first 48 hour of life at Dr Soetomo Hospital Surabaya from January – March 2005. Written informed consent was obtained from the mother. Exclusion criterias were infants with ambiguous genitalia, hypospadias, bilateral undescended testes, dysmorphism, multiple congenital abnormalities or suspected endocrinological disorders; sick neonates admitted to the neonatal intensive care unit; and infants whose mothers had received androgenic medication during pregnancy.

A single examiner according to the method described by Schonfeld and Beebe took all penile measurement. Measurement of stretched penile length was conducted with the baby in supine position. The penis was stretched to the point of increased resistance and its length measured along the dorsal aspect from the pubis to the tip of the glands using a wooden spatula and pressing it alongside the penis onto the pubic bone. A mark was made on the spatula at the level of the top of the glans penis excluding the foreskin, and the length was measured. Three measurements were taken to the nearest millimeter from each infant to minimize errors, and the mean was calculated. No newborn underwent circumcision before the measurement. We analyzed descriptive data with SPSS 12.

RESULT.

The mean values and ranges of measurements are listed in table 1.

Table 1. Penis, and body measurements, gestational age in 217 infants.

Measurement	Mean $\pm$ SD	Range
Penis length (mm)		
1. Full term neonate	23.5 $\pm$ 3.9	12 – 32
2. Preterm neonate	21.7 $\pm$ 4.3	14 – 29
Body weight (gram)	3005.76 $\pm$	1400 – 5150
Body length (cm)	580.45	36 - 58
Head circumference (cm)	49.60 $\pm$ 2.92	27 – 37
Gestational age (week)	33.59 $\pm$ 1.60	34- 41
	30.35 $\pm$ 14.24	

Using the definition of mean length - 2.5 SD for the definition of micropenis, the values were 13.8 mm for full term neonate and 11 mm for preterm neonate. There was no history from mother got hormonal treatment during pregnancy and abortus imminent. There were 7

(3.2%) patients with left undescensus testis. 1 patient with congenital anomaly that is hydrocele testis. Distribution race 7 babies from Madurese and 210 from Javanese.

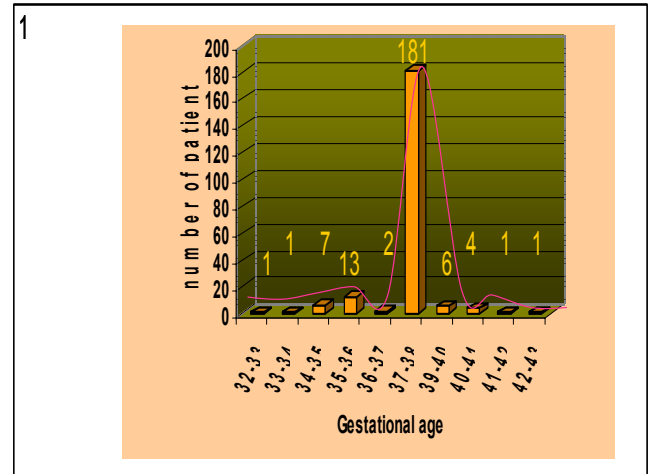


Figure 1. Characteristics of sample.

Table 2. Measurement of penile length.

Penile length	Gestational Age	
	Term infant (37-42 week) n=195	Preterm infant (32-36 week) n=22
Range (mm)	12 – 32	14 – 29
Mean $\pm$ SD (mm)	23.5 $\pm$ 3.9	21.7 $\pm$ 4.3
-2.5 SD (mm)	13.8	11.0

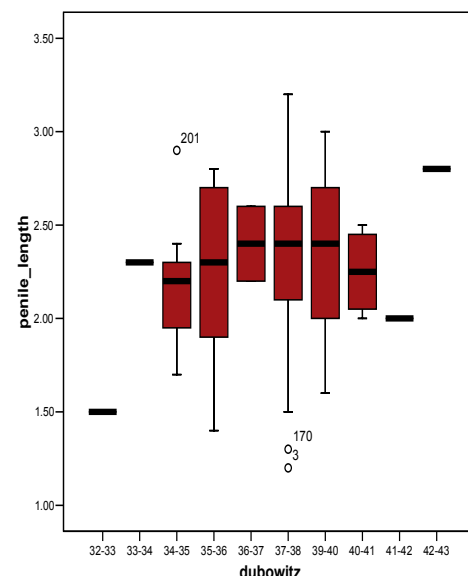


Figure 3. Distribution of penile length based on gestational age.

DISCUSSION

The male phallus is normally formed at 4 to 14 weeks of fetal life by enlargement of genital tubercle and fusion of genital folds under the influence of androgens derived from the testicle. Normal penile growth depends on the presence of a normal Y chromosome, intact hypothalamus-pituitary-gonad and somatotrophic axis as well as normal end organ response. Human gonadotropin (hCG) secreted by placenta stimulates testosterone secretion by the fetal Leydig cell as early as 7 weeks of gestation. Fetal luteinizing hormone (LH) becomes prominent at 15 weeks of gestation. Penile length then increases regularly until delivery. The genital development then enters a period of rapid growth extending about 6 months into the postnatal period. During the first trimester placental chorionic gonadotropin increases to high levels in both male and female fetus. This is apparently the initial stimulus to testicular Leydig cell hyperplasia and testosterone production, which reaches its maximum fetal level between 11 and 17 weeks gestation, resulting in masculine differentiation of external genitals (Cheng & Chanoine 2001, Vogts et al. 2008, Feldman & Smith 1975, Flatau et al. 1975).

Embryonic penile development occurs in 3 phases. In the genital tubercle phase, when the embryo measures between 8 and 15 mm, the phallus appears as a hillock in the perineum. In the phallic phase, which lasts from the 16 to 38 mm. The organ becomes progressively elongated and cylindrical with the urethral groove extending to the tip. The definitive phase begins during month 3, or approximately 38 mm, when the urethral tube closes and the glands become demarcated by the formation of the coronal sulcus. Development of the penis therefore is complete by the end of month 3 or 45 mm, except for the formation of the prepuce which covers the glands during the following few weeks. Micropenis therefore result from a hormonal defect that arises after week 14 of embryonic development (Aaronson 1994).

The mean length of the penis of the newborn in Surabaya was found 23.5 ± 3.9 mm (with range 12 – 32 mm) from the 195 full term neonate, mean of penis length from 22 babies with 34 - 37 weeks of gestational age was 21.7 ± 4.3 mm (with range 14 – 29 mm). This mean penile length was different with the published data from other countries, even from Jakarta Indonesia. Specifically, Feldman and Smith reported a mean penile length of 35 ± 7 mm in 37 Caucasian term newborn infants in the United States of America (Feldman & Smith 1975); Flatau et al reported 35 ± 4 mm in 100 Jewish Israeli infants (Flatau et al. 1975); Al-Herbish reported 36 ± 6 mm in 379 Saudi Arabian infants (Al-

Herbish 2002); Vasudevan et al reported 36 ± 5 mm in 135 south Indian infants (Vasudevan et al. 1995); Lian et al reported 36 ± 4 mm in 228 infants of Malay, Chinese and Indian ethnicity in Singapore (Lian et al. 2000); and Sutan-Assin et al reported a penile length of 29 ± 2 mm in 336 Indonesian infants (Sutan-Assin et al. 1989).

Using the definition of mean length - 2.5 SD for the definition of micropenis, the values were 14 mm for full term neonate and 11 mm for preterm neonate. Ting and Wu found 25 mm of penile length as cut of point of micropenis in newborn infants in Malaysia (Ting & Wu 2009). It is warrant for further endocrine evaluation.

Utilization of various methods indicated that the most useful and reproducible measure of penile size is the stretched length. A small penis may provide a clue to fetal testosterone insufficiency, either secondary to hypothalamic-pituitary insufficiency or to primary testicular insufficiency. Recognition of micropenis in the genetically male infant is important because of the recent therapeutic utilization of short-term testosterone therapy in early life to enlarge the micropenis to within normal size for age (Vogts et al. 2008).

There are reports describing the relationship between ethnicity and size of the penis in the newborn. Phillips, et al found a significant difference in clitoral length but not in penile length between babies of Jewish and Bedouin background in Israel. Recently in Singapore a study that included a few Indian babies reported a small but significant difference between male newborns from Indian and Chinese origins. Ting and Wu, found no significant difference between Malay, Chinese, and Indian in their study at Kuala-Lumpur Malaysia (Cheng & Chanoine 2001, Ting & Wu 2009).

Cheng and Chanoine noted the mean value of penile length was 26, 23, and 25 mm for newborns of Caucasian, Chinese and East Indian background. He reported that penile length and diameter were significantly lower in newborns of Chinese background compared Caucasian or East Indian, when adjust for length at birth penile length remained significantly smaller in Chinese babies compared to Caucasian and East Indian babies (ANOVA: $F = 10.47$, $p < 0.0001$). Adjust for birth weight, penile length were significantly smaller in Chinese and Caucasian babies compared to East Indian babies (ANOVA: $F = 6.95$, $p < 0.0015$) (Cheng & Chanoine 2001). Our data result that 7 babies from Madurese and 210 from Javanese; because too small of number Madurese comparing Javanese, we did not compare between the two.

There are numerous causes of micropenis, including isolated gonadotropin defects without involvement of other organ systems and generalized endocrinopathies that may be associated with central nervous system defects. The causes of micropenis are including (Vogts et al. 2008, Aaronson 1994), the following factors, first, hypogonadotropic hypogonadism that may result from hypothalamic dysfunction, as in Kallmann's syndrome (genito-olfactory dysplasia), Prader-Willi syndrome, Laurence-Moon-Biedl syndrome; second, hypergonadotropic hypogonadism (primary testicular failure) that may result from gonadal dysgenesis or rudimentary testes syndrome, and it also occurs in Robinow's syndrome. Failure of serum testosterone to rise appropriately after stimulation by hCG has been the test most frequently used to identify this subgroup. Third, idiopathic factor, and, finally, micropenis is often associated with major chromosomal defects, including Klinefelter's syndrome (47,XXY), other X polysomy syndromes, and translocations, deletions, and trisomy involving chromosomes 8, 13, and 18.

A karyotype analysis should be performed for all patients with micropenis. Consultation usually is obtained from the pediatric endocrinology service to help determine the cause of the micropenis and to assess whether other abnormalities are also present. Several issues need to be addressed, the most important of which is the growth potential of the penis. In addition, the endocrine abnormality needs to be defined. Testicular function may be assessed by measuring serum testosterone levels before and after hCG stimulation. Primary testicular failure produces an absent response and elevated basal concentrations of LH and follicle-stimulating hormone (FSH). In some cases, a GnRH stimulation test is done as well. Anterior pituitary screening tests include serial measurements of serum glucose, sodium and potassium concentrations, serum cortisol levels, and thyroid function tests. The endocrine evaluation of patients with micropenis is not standardized. MRI of the head should be done to determine the anatomic integrity of the hypothalamus and the anterior pituitary gland as well as the midline structures of the midbrain (Vogts et al. 2008).

CONCLUSION

In Surabaya the mean length of the penis was found 23.5 ± 3.9 mm (with range 12 – 32 mm) from the 195 full term neonate, mean of 22 babies with 34 - 37 weeks neonate was 21.7 ± 4.3 mm (with range 14 – 29 mm). Using the definition of mean length - 2.5 SD for the

definition of micropenis, the value was 13.8 mm for full term neonate and 11 mm for preterm neonate. Result this study showed that mean penile length of newborn neonates in Surabaya lower than other regions as previous reported. We recommend conducting the study with more number of samples in multicenter setting in order to obtain a valid normative value of penile length in the newborns in Indonesia.

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