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1. *The difference of free voiding parameters between male and female newborns,* ***2.*** *1.First Affiliated Hospital of Zhengzhou University, 2.Institute of Clinical Medicine (Universities Henan),* ***3.*** *Institute of Clinical Medicine (Universities Henan),The First Affiliated Hospital of Zhengzhou University,* ***4.*** *PICU, The First Affiliated Hospital of Zhengzhou University China*

THE DIFFERENCE OF FREE VOIDING PARAMETERS BETWEEN MALE AND FEMALE NEWBORNS

Hypothesis / aims of study

Voiding function in infants has attracted the attention of many paediatric physicians. Neonatal period is critical for the bladder development. This period marks the transition from the foetal bladder contraction phase to voluntary infant urination. It was well known that the maximum bladder capacity, the maximum detrusor pressure at voiding and maximum urine flow rate is different between male and female adults. However, few data reviews the differences of voiding parameters between male and female newborns [1]. So, to investigate the difference of free voiding parameters between male and female newborns, we conduct this observational study.

Study design, materials and methods

One hundred and two healthy, single birth newborns (54 preterm and 48 full terms) without low urinary tract pathological diseases, hospitalized in NICU from Mar. 2010 to Mar. 2011 were recruited in this study. Twelve hours (9:00 am ~ 9:00 pm) observation of free voiding was performed. The voiding interval time (VIT), voiding volumes (VV), post-void residual volumes (PRV), bladder capacity (BC), voiding times, state of consciousness at voiding and the number of defecate simultaneously at voiding (DSV) as well as fluid intake were recorded and analyzed retrospectively.

Results

The total number of voiding and DSV of the preterm neonates was 318 and 40 respectively. VIT and BC between male and female preterm newborns had no statistical significance, whereas, the mean PRV of the male was larger ((1.9±0.9) ml vs. (0.9±0.8) ml) and the bladder emptying rate (BER) was lower (8.3% vs.44.1%) than those of the female newborns (P<0.05). If reject the effect of BER, the difference of PRV between the two genders ((2.1±0.5) ml vs. (1. 8±0.6) ml) do not have statistical significance any more. The total number of voiding and DSV of the term neonates was 350 and 43 respectively. The BER of the female term neonates was higher than that of the male term neonates (43.0% vs. 15.3%; P<0.05). BC and the mean PRV between the two genders of term newborns have no statistical significance. Comparing with the female neonates of the same gestational age, the difference of BER of the male neonates do not have statistical significance any more when defecated simultaneously at voiding (preterm 41.7% vs. 25.0%; term 36.4% vs. 28.1%, P>0.05).

Interpretation of results

Our results indicated that as the structure of pelvic floor and urethra in male newborns is different from females, the PRV of male newborn is larger than that of female, and the BER is lower than that of female newborn. When defecated simultaneously at voiding, the difference of BER of the male neonates do not have statistical significance any more with females, indicating that defecate may promote the empty of bladder in male neonates.

Concluding message

Compared to female, male newborns are more likely to have post-void residual volumes.

Table 1 The free voiding parameters of preterm newborns

gender	n	BC (ml)	VV (ml)	PVR (ml)	VIT (h)	BER	*PVR (ml)	#BER
male	26	21.6±5.5	11.2±4.8	1.9±0.9	2.4±1.1	8.3%(13/156)	2.1±0.5	25.0%(4/16)
female	28	22.7±6.1	12.8±5.4	0.9±0.8	2.5±0.9	44.1%(71/162)	1.8±0.6	41.7%(10/24)
t/χ^2		0.694	1.147	4.322	0.367	49.698	1.988	0.554
P		0.491	0.257	<0.0001	0.715	<0.0001	0.052	0.457

Table 2 The free voiding parameters of full term newborns

gender	n	BC(ml)	VV(ml)	PVR(ml)	VIT(h)	BER	*PVR (ml)	#BER

male	30	35.4±9.6	21.2±7.6	1.6±0.8	1.7±0.3	15.3%(34/222)	1.9±0.4	28.1%(9/32)
female	18	36.2±10.3	21.8±8.7	1.1±0.9	1.8±0.4	43.0%(55/128)	1.7±0.5	36.4%(4/11)
t/χ^2		0.272	0.251	2.000	0.985	31.299	1.526	0.018
P		0.787	0.803	0.051	0.330	<0.0001	0.134	0.894

* The post-void residual volumes after reject the effect of BER.
# The bladder emptying rate when defecated simultaneously at voiding.

References
1. Sillén U, Sölsnes E, Hellström AL, et al. The voiding pattern of healthy preterm neonates. J Urol, 2000,163:278-281

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