

Early Application of Clean Intermittent Catheterization in Children with Neurogenic Bladder (#94)

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ABSTRACT

Because during voiding, the bladder contracts, and internal and external sphincters and pelvic floor muscles relax to allow urine to pass through the urethra. Normally, after the bladder empties, a small amount of urine (less than 75 ml), called the post-void residual (PVR), may remain in the bladder. If a person cannot urinate or empty the bladder completely, the PVR increases and can contribute to urinary tract infections (UTIs) and vesicoureteral reflux (VUR), and permanent damage to the bladder and kidneys. Incomplete bladder emptying or urinary retention may lead to the development of a neurogenic bladder, a general term referring to bladder or voiding dysfunction resulting from interrupted innervation from a lesion or disease in the central or peripheral nervous system. Neurogenic bladder can be caused by upper motor neuron disease, or spinal cord diseases such as spina bifida. By inserting the catheter several times during the day, episodes of bladder over distention are avoided [1].

It is well known that NB does not cause timely occurrence of vesicoureteral reflux (VUR), hydronephrosis and urinary tract infections, at the same time the quality of life is significantly reduced. After 1971, the widespread use of CIC effectively improved the symptoms of dysuria and urinary incontinence in children with detrusor-free reflexes. However, it is still controversial whether CIC will be started from the early diagnosis of infants and young children. This study compared the long-term efficacy of the CIC early treatment group (<1 year old) and the late treatment group (>3 years old), and provided a reference for the rational selection of CIC for NB [2].

Meanwhile, the standard CIC operation does not increase the chances of significant UTIs, but the timely emptying of the bladder and the reduction of residual urine can reduce the chance of UTIs. So we are aimed to investigate the effect of earlier application of Clean intermittent Catheterization (CIC) in infants with neurogenic bladder (NB).

METHODS

Eighty-nine children with NB diagnosed in our urodynamic center were less than 1 year old when they first came to hospital from January 2009 to January 2012, and CIC was carried out at different ages. Sixty-four patients were followed up for a long time and were divided into early CIC group (children who begin CIC less than 1 year old) and late CIC group (children who begin CIC after 3 years old). Meanwhile, 29 patients were distributed in early CIC group including 19 boys and 10 girls with the mean age of (7.6±2.6) months.

Among the ones, 4 cases were suffering from postoperative spina bifida manifesta; 22 cases with spina bifida occulta; 2 cases with sacral dysplasia; 1 case with meningitis.

Late CIC group included 35 patients, including 20 boys and 15 girls with the mean age of (8.0±2.8) months. Among which 2 cases were suffering from postoperative spina bifida manifesta; 28 ones were with spina bifida occulta; 4 cases were with sacral dysplasia; 1 case with postoperative pelvic surgery.

Before the treatment, there were no significant differences of the bladder compliance (BC) between the groups. The safety bladder capacity (SBC) and the maximum cystometric capacity (MCC) between two groups also had no statistical difference. Urodynamic parameters and complications of 64 patients who were successfully followed up for as long as 6 years were compared.

RESULTS

① After 3 years following up, BC, SBC and MCC in early CIC group [(7.78±2.59) ml/cmH₂O, (134.74±19.42) ml, (140.26±13.13) ml] were significantly higher than those of late CIC group [(6.63±2.62) ml/cmH₂O, (117.83±15.53) ml, (124.80±11.78) ml]; all P<0.05].

② After 6 years following up, BC, SBC and MCC in early CIC group [(10.21±3.01) ml/cmH₂O, (213.32±24.48) ml, (220.53±15.59) ml] were significantly higher than those of late CIC group [(8.50±2.69) ml/cmH₂O, (194.28±29.71) ml, (206.63±17.90) ml]; all P<0.05].

③ The vesicoureteral reflux rate [24.1% (7/29)] in early treatment group was significantly less than that in late treatment group [54.3% (19/35), P<0.05]. Increases in blood urea nitrogen (BUN) and serum creatinine were found in 6 cases (20.7%) in early CIC group and 17 cases (48.6%) in late CIC group, the difference was significant (P<0.05).

Effect comparison in two groups of children treated with CIC for 3 and 6 years respectively

	early CIC group	late CIC group	t	P
Bladder compliance (ml/cmH ₂ O)				
CIC for 3 years	7.78±2.59	6.63±2.62	2.028	0.046
CIC for 6 years	10.21±3.01	8.50±2.69	2.756	0.007
SBC (ml)				
CIC for 3 years	134.74±19.42	117.83±15.53	4.191	P<0.001
CIC for 6 years	213.32±24.48	194.28±29.71	3.160	0.002
MCC (ml)				
CIC for 3 years	140.26±13.13	124.80±11.78	5.684	P<0.001
CIC for 6 years	220.53±15.59	206.63±17.90	3.718	P<0.001

Note: P<0.05 was considered statistically significant.

BC: Bladder Compliance; SBC: Safe Bladder Capacity; MCC: Maximum Cystometric Capacity

CONCLUSIONS

For NB children, the effect of early CIC is better than that of late CIC. Treatment of CIC beginning before 1 year old is recommended.

REFERENCES

- [1]. Sturm R M, Cheng E Y. The Management of the Pediatric Neurogenic Bladder[J]. Current Bladder Dysfunction Reports, 2016, 11(3):225-233.
- [2]. Limin L. Evaluation and Management of Neurogenic Bladder: What Is New in China?[J]. International Journal of Molecular Sciences, 2015, 16(8):18580-18600.