

Six-Month Postoperative Urodynamic Score: A Potential Predictor of Long-Term Bladder Function after Detethering Surgery in Patients with Tethered Cord Syndrome

Sang Woon Kim, Ji Yong Ha, Yong Seung Lee, Hye Young Lee, Young Jae Im and Sang Won Han*

From the Department of Urology, Urological Science Institute, Yonsei University College of Medicine, Seoul, South Korea

Purpose: We evaluated changes in urodynamic parameters of patients with tethered cord syndrome after detethering surgery and investigated factors predicting long-term urological outcome based on a previously described urodynamic scoring system.

Materials and Methods: A total of 148 patients with tethered cord syndrome underwent detethering surgery at our hospital between January 2005 and March 2011. Of these patients 44 with preoperative and postoperative urodynamic data and a minimum followup of 2 years were included. Urodynamic score was composed of 4 parameters, with the sum ranging from 0 (favorable) to a maximum score of 17 (unfavorable).

Results: Mean \pm SD age at surgery was 38.0 ± 77.2 months and followup was 57.2 ± 20.6 months. Preoperative symptoms were present in 24 patients. Total urodynamic score at 6 months postoperatively was higher than preoperatively (mean \pm SD 5.61 ± 2.71 vs 4.43 ± 3.56 , $p = 0.033$) and remained at a similar value during followup (5.88 ± 3.89). The 6-month postoperative total urodynamic score was significantly lower in the 23 patients with favorable urological outcomes than in those with unfavorable outcomes (3.87 ± 2.02 vs 7.52 ± 1.99 , $p < 0.001$), whereas the preoperative urodynamic scores did not differ between these groups. The difference in urodynamic scores between favorable and unfavorable outcome groups became more prominent with time. By regression analysis the total urodynamic score at 6-month followup was a predictor of urological symptoms at last followup (OR 2.763, 95% CI 1.514–5.043, $p = 0.001$).

Conclusions: Six-month postoperative urodynamic scores accurately predicted the presence of urological symptoms on long-term followup and may be an important predictor of long-term urological outcomes after detethering surgery.

Key Words: neural tube defects, urinary bladder, urodynamics

TETHERED cord syndrome is a neurological disorder caused by abnormal fixation of the spinal cord that results in traction of the spinal cord during development.¹ The condition can lead to various neurological symptoms, including weakness, gait disturbances, pain and urological

dysfunction. Lipomyelomeningocele is the most common cause of primary tethered cord syndrome.

The natural history of TCS includes a high likelihood of progression. Although no neurological deficit may be evident at birth, lower extremity pain and motor dysfunction

Abbreviations and Acronyms

CIC = clean intermittent catheterization
LMMC = lipomyelomeningocele
TCS = tethered cord syndrome
UD = urodynamic
UI = urinary incontinence
UTI = urinary tract infection
VUR = vesicoureteral reflux

Accepted for publication February 21, 2014.
Study received institutional review board approval (No. 4-2013-0521).

* Correspondence: Department of Urology, Urological Science Institute, Yonsei University College of Medicine, 50 Yonsei-ro, Seodaemun-gu, Seoul 120-752, South Korea (telephone: 82-2-2228-2310; FAX: 82-2-312-2538; e-mail: SWHAN@yuhs.ac).

often manifest during early infancy and puberty, when rapid lengthening of the spinal cord occurs. The symptoms caused by spinal cord injury include not only motor and sensory impairment of the lower extremities, but also dysfunction of the gastrointestinal and lower urinary tracts.²⁻⁴

Although there are several reports on the urological outcomes of detethering surgery, the results are controversial.⁵⁻⁷ Moreover, few studies have evaluated changes in UD parameters after detethering.⁷⁻⁹ Urodynamic study is an objective tool for evaluating the urological function of individuals with TCS.¹⁰ Because of difficulties in interpreting UD results, Meyrat et al introduced a multiparameter UD scoring system.¹¹ We assessed whether this scoring system accurately reflects urological symptoms and evaluated urological function during long-term followup after detethering surgery for TCS.

PATIENTS AND METHODS

Patient Selection and Detethering Surgery

A total of 148 patients underwent primary detethering surgery for TCS at our hospital between January 2005 and March 2011. The diagnosis of TCS depended on the clinical features of neurological deterioration and skin manifestation on the lower back, as well as visualization of low-lying conus or any obvious tethering lesions on magnetic resonance imaging. Of the patients 17 were excluded because they had no UD study available within 6 months postoperatively. Children without a preoperative UD study and those who underwent urological evaluation elsewhere were also excluded. Finally, 26 patients were excluded who underwent anorectal surgery for a congenital anomaly (including imperforate anus and cloacal anomaly), as were 33 patients without a long-term followup UD study (2 years or more postoperatively). Thus, 44 patients were included in the study.

Cases were categorized into LMMC and filum terminale lipoma according to the location of lipoma. Based on preoperative magnetic resonance imaging and chart review, LMMC was further divided into dorsal, caudal and transitional type based on Chapman classification.¹²

All detethering surgery was performed by the neurosurgery team at our institution. The practice of our institution is to recommend detethering surgery at diagnosis to prevent any possible neurological deterioration while the patient is asymptomatic.

Clinical Outcomes

Symptoms were reviewed to evaluate the clinical status of the patients at their last visit. Information was obtained from parent interviews regarding febrile UTIs, and UI and other voiding problems (only assessed in toilet trained children). Minor urological problems included delayed toilet training, and occasional UI without medication and no urological symptoms while receiving anticholinergic medications. Major urological problems were defined as VUR, febrile UTI, use of clean intermittent

catheterization, need for augmentation cystoplasty and persistent UI while receiving maximal doses of anticholinergics. Patients with major urological problems were assigned to the "unfavorable outcome" group, while those with no or minor urological problems were assigned to the "favorable outcome" group.

Followup

All patients scheduled for detethering routinely underwent preoperative UD assessment. The postoperative UD evaluation was performed at 3 to 6 months following surgery, and subsequent UD studies were performed as follows. Patients receiving medications or CIC underwent UD testing yearly, whereas those not receiving medications or CIC underwent UD assessment every 2 or 3 years after the second postoperative year. Followup was defined as time from the day of surgery to the day of the last visit.

Urodynamic Study Score

We used the UD scoring system previously described by Meyrat et al.¹¹ This system is composed of 4 parameters, ie bladder volume, bladder compliance, detrusor activity, and vesicosphincteric synergy. Each parameter is graded by the degree of deviation from normal.

Bladder volume was expressed on a scale of 0 to 5 based on the percentage of the normal value for patient age using the formula, $30 + (\text{age in years} \times 30)$. Grade 0 signified normal bladder volume, whereas grade 5 represented bladder volume less than 20% of normal. Bladder compliance was calculated by dividing the incremental change in bladder volume by the incremental change in intravesical pressure. It was graded on a scale of 0 to 4, with 0 representing normal compliance and 4 signifying compliance less than 10 ml/cm H₂O. Detrusor activity was graded from 0 to 5 based on frequency and force of detrusor contractions during the entire bladder filling phase. Vesicosphincteric synergy was graded from 0 to 3, where 0 referred to synergic sphincter action during voiding and 3 signified continuous dyssynergia with crescendo-decrescendo activity of the external sphincter with detrusor activity.

The scores for the 4 parameters were summed to generate the total score, ranging from a lowest possible score of 0 to a maximum score of 17. UD score 0 to 4 was considered normal, 5 to 6 suggested a possible underlying urological disorder and greater than 6 was considered abnormal.¹¹

Statistical Analysis

Data are expressed as mean \pm SD. Variables and UD scores of the 2 groups were compared using unpaired Student t-tests. Paired Student t-tests were used to compare UD scores at different time points. ROC analysis was used to determine the discrimination ability of the UD score system regarding urological problems and unfavorable outcome. A p value of less than 0.05 was considered statistically significant. All statistical analyses were performed with statistical package SPSS®, version 20 for Windows®.

Good Clinical Practice Protocols

The study was performed in accordance with all applicable laws and regulations, good clinical practices and

Download English Version:

<https://daneshyari.com/en/article/3862111>

Download Persian Version:

<https://daneshyari.com/article/3862111>

[Daneshyari.com](https://daneshyari.com)