

# Therapeutic observation of acupuncture plus navel acupuncture for urinary retention after radical hysterectomy for cervical cancer

## 针刺加脐针治疗宫颈癌根治术后尿潴留疗效观察

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### Abstract

**Objective:** To observe the clinical efficacy of acupuncture plus navel acupuncture for patients with urinary retention after radical hysterectomy for cervical cancer.

**Methods:** A total of 64 patients with urinary retention after radical hysterectomy for cervical cancer was divided into a navel acupuncture group (22 cases), an acupuncture group (18 cases) and an acupuncture plus navel acupuncture group (24 cases). All three groups received bladder function training and neuromuscular electrical stimulation. In addition, navel points were combined in the navel acupuncture group. Electroacupuncture was conducted to Qihai (CV 6), Zhongji (CV 3), Dahe (KI 12), Shuidao (ST 28), Ciliao (BL 32) and Huiyang (BL 35) in the acupuncture group. The acupuncture plus navel acupuncture group received both treatments. The catheter was removed after 3 d of treatment. Spontaneous urination, residual urine volume, urinary catheter dependence and recurrence after 3 d, 6 d and 9 d of treatment in each group were observed, respectively.

**Results:** In the acupuncture plus navel acupuncture group, the markedly effective rates after 3 d, 6 d and 9 d of treatment were significantly higher than those in the navel acupuncture group and the acupuncture group; the urinary catheter dependence was lower than that of the other two groups, and the differences were statistically significant ( $P < 0.05$ ,  $P < 0.01$ ); the spontaneous urination time was shorter than that of the navel acupuncture group and the acupuncture group, and the differences were statistically significant ( $P < 0.05$ ,  $P < 0.01$ ); the residual urine volume was significantly less than that of the navel acupuncture group and the acupuncture group, and the differences were statistically significant (both  $P < 0.01$ ). After the catheter was removed, recurrence was observed from the next day after spontaneous urination was resumed. There were 2 cases of recurrence in the navel acupuncture group, 2 cases in the acupuncture group and 1 case in the acupuncture plus navel acupuncture group. The recurrence rate of the acupuncture plus navel acupuncture group was significantly lower than that of the navel acupuncture group and the acupuncture group (both  $P < 0.01$ ).

**Conclusion:** Acupuncture plus navel acupuncture has satisfactory efficacy for urinary retention after radical hysterectomy for cervical cancer. It can significantly shorten the urinary retention time, reduce the patient's dependence on urinary catheter, and reduce the residual urine volume.

**Keywords:** Acupuncture Therapy; Electroacupuncture; Umbilicus; Uterine Cervical Neoplasms; Postoperative Complications; Urinary Retention; Female

**【摘要】目的:** 观察针刺加脐针疗法治疗宫颈癌根治术后尿潴留的临床疗效。**方法:** 将64例宫颈癌根治术后尿潴留患者分为三组, 脐针组22例、针刺组18例和针刺加脐针组24例。三组患者均接受膀胱功能训练及神经肌肉电刺激治疗。此外, 脐针组患者接受针刺脐穴治疗, 针刺组接受电针气海、中极、大赫、水道、次髎和会阳治疗, 针刺加脐针组同时接受电针和脐针治疗。治疗3 d后拔除导尿管。分别观察三组患者治疗3 d、6 d及9 d后的自主排尿情况、残余尿量、尿管依赖及复发情况。**结果:** 针刺加脐针组患者治疗3 d、6 d、9 d后的显效率明显高于脐针组和针刺组, 其尿管依赖情况低于脐针组和针刺组, 组间差异均具有统计学意义( $P < 0.05$ ,  $P < 0.01$ ), 其自主排尿时间短于脐针组和针刺组, 组间差异均具有统计学意义( $P < 0.05$ ,  $P < 0.01$ ); 其残余尿量明显少于脐针组及针刺组, 组间差异均具有统计学意义(均 $P < 0.01$ )。拔管后, 恢复自主排尿次日起观察复发情况, 其中脐针组2例、针刺组2

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例、针刺加脐针组1例，针刺加脐针组复发率明显低于脐针组和针刺组( $P<0.01$ )。结论：针刺加脐针治疗对宫颈癌根治术后尿潴留具有良好的疗效，能明显缩短患者尿潴留时间，降低患者对尿管的依赖，减少残余尿量。

【关键词】针刺疗法；电针；脐；宫颈肿瘤；术后并发症；尿潴留；女性

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According to the global cancer statistics in 2018, cancer is the leading cause of death and the only major obstacle to improving life expectancy worldwide in the 21st century. Among women, breast cancer has the highest incidence, followed by colorectal cancer and lung cancer. Cervical cancer has the fourth highest incidence and mortality rate, seriously threatening women's life and health<sup>[1-2]</sup>. At present, the main treatment is based on stages, and stratified treatment is applied. Radiotherapy, chemotherapy and biologic targeted therapy are the main treatments for patients in advanced stage<sup>[3]</sup>. While for patients in early stage, radical hysterectomy for cervical cancer is the first-line treatment<sup>[4]</sup>, especially the laparoscopic radical hysterectomy in recent years, which has the advantages of a good surgical vision, high clarity, and short operation time and less blood loss. The clinical efficacy has been greatly improved<sup>[5]</sup>. However, the incidence of complications is about 38.7%, and the incidence of bladder dysfunction is about 30%<sup>[6]</sup>. According to statistics, the incidence of postoperative urinary retention is 1.8%-32.4%<sup>[7-8]</sup>. At present, it is mainly dealt with catheterization, physical therapy, receptor blockers and parasympathomimetic drugs. These methods can achieve certain effects, long-term indwelling of catheter increases the risk of urinary tract infection, and Western medications have adverse reactions. In recent years, some scholars have found that acupuncture has significant efficacy in improving urinary retention<sup>[9-10]</sup>. In this study, based on routine bladder training, we used acupuncture to treat patients with urinary retention after radical hysterectomy for cervical cancer.

## 1 Clinical Materials

### 1.1 Diagnostic criteria

The diagnostic criteria of cervical cancer referred to the *International Evidence-based Guidelines for Cervical Cancer Screening*. Clinical staging referred to the *Clinical Staging Criteria for Cervical Cancer* modified by the International Federation of Gynecology and Obstetrics (FIGO) at the 2009 conference<sup>[11-12]</sup>. Postoperative urinary retention means patients are unable to urinate spontaneously for more than 15 d after surgery, or the residual urine volume was  $\geq 100$  mL<sup>[13]</sup>.

### 1.2 Inclusion criteria

Those who had no history of dysuria; patients who underwent radical hysterectomy for cervical cancer within 15 d to 6 months; full bladder, but no urination; with normal liver and kidney function; agreed to participate in this trial and signed informed consent.

### 1.3 Exclusion criteria

Patients with urinary retention due to other surgeries or causes; poor compliance; those who received chemotherapy during treatment; patients with severe infection or other serious complications after surgery; with severe urinary tract infection.

### 1.4 Statistical method

All data were statistically analyzed by the SPSS version 23.0 statistical software. Counting data were processed by Chi-square test. Measurement data in normal distribution were expressed as mean  $\pm$  standard deviation ( $\bar{x} \pm s$ ). One-way ANOVA was applied to the comparison between groups, least significant difference (LSD) was used for comparison between two groups, and paired sample t-test was applied to intra-group comparisons. Measurement data in non-normal distribution were expressed as median (minimum, maximum) [M (min, max)], and rank sum test was applied. Rank sum test was used for comparison of ranked data.  $P<0.05$  was considered to indicate a statistically significant difference.

### 1.5 General data

A total of 64 patients who met the inclusion criteria were enrolled from the Rehabilitation Clinic of the Third Xiangya Hospital of Central South University, between January 2017 and June 2018. All patients were divided into a navel acupuncture group (22 cases), an acupuncture group (18 cases) and an acupuncture plus navel acupuncture group (24 cases) according to their intention. The patients of the navel acupuncture group were 28-65 years old; and the period of postoperative indwelling of catheter was 15-165 d. The patients of the acupuncture group were 32-68 years old; and the period of postoperative indwelling of catheter was 18-171 d. The patients of the acupuncture plus navel acupuncture group were 29-58 years old; and the period of postoperative indwelling of catheter was 23-159 d. There were no significant differences in the general data as age and postoperative indwelling time of catheter among the three groups (all  $P>0.05$ ), (Table 1).

**Table 1. Comparison of the general data of the three groups**

Group	n	Average age ( $\bar{x} \pm s$ , year)	Postoperative indwelling of catheter [M (min, max), day]
Navel acupuncture	22	44.0±7.3	32 (15, 165)
Acupuncture	18	45.0±7.3	33 (18, 171)
Acupuncture plus navel acupuncture	24	42.0±9.0	35 (23, 159)

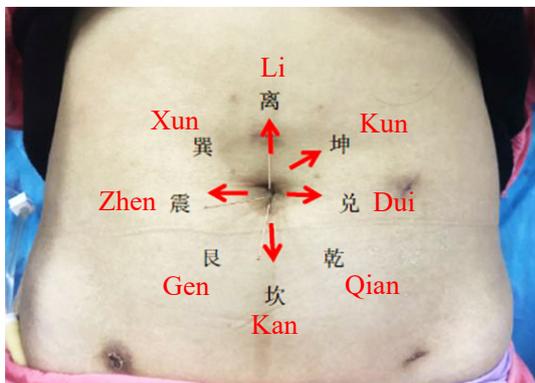
## 2 Treatment Methods

The three groups all received bladder function training before treatment: Individualized water drink plan, voiding diary; percussion of bladder before micturition, and hot compressing on the bladder area and the sacral nerve area; abdominal breathing training. The neuromuscular electrical stimulation was applied to the bladder area and the sacral nerve area at a frequency of 50 Hz for 25 min each time, twice a day.

### 2.1 Navel acupuncture group

Main points: Li, Dui, Kan (Figure 1).

Point combination according to syndrome differentiation: Strong stimulation by twirling manipulation was applied to Kan for patients with deficiency of kidney essence or insufficiency of kidney yang. Strong stimulation by twirling manipulation was applied to Li for patients with accumulation of damp-heat. Kun was added for patients with deficiency of qi and blood. Zhen was added for patients with liver qi stagnation (Figure 1).



**Figure 1. Location of navel points**

Method: The patient took a supine position. After routine disinfection for umbilical region, the physician used disposable acupuncture needles (Hualun Medical Appliance Co., Ltd., China) of 0.25 mm in diameter and 40 mm in length, for subcutaneous insertion. Reducing manipulation by a small-amplitude twirling was applied to Li and Zhen, and reinforcing manipulation by a small-amplitude twirling was applied to Kun. The needles were retained for 25 min. The treatment was performed twice a day.

### 2.2 Acupuncture group

Main points: Qihai (CV 6), Zhongji (CV 3), Dahe (KI 12), Shuidao (ST 28) and Sanyinjiao (SP 6) (the patient in a

supine position); Shenshu (BL 23), Pangguangshu (BL 28), Ciliao (BL 32), Zhongliao (BL 33) and Huiyang (BL 35) (the patient in a prone position).

Point combination according to syndrome differentiation: For syndrome of deficiency of kidney essence or insufficiency of kidney yang, Mingmen (GV 4) and Guanyuan (CV 4) were added; for syndrome of retained dampness-heat, Yinlingquan (SP 9) was added; for syndrome of dual deficiency of qi and blood, Zusanli (ST 36) and Xuehai (SP 10) were added; for syndrome of liver depression and qi stagnation, Taichong (LR 3) was added.

Method: After routine disinfection, the physician obliquely punctured Dahe (KI 12) and Shuidao (ST 28) using acupuncture needles of 0.30 mm in diameter and 50 mm in length with the tip of needle towards the perineum. Heavy stimulation of reduction method was performed to induce the feeling of soreness at the perineum. Then, the physician connected the needles with the electroacupuncture instrument (SDZ- II, Suzhou Medical Supplies Factory Co., Ltd.), using continuous wave, 20 Hz, with output intensity according to patient's tolerance. Ciliao (BL 32), Zhongliao (BL 33) and Huiyang (BL 35) were perpendicularly punctured with needles of 0.30 mm in diameter and 50 mm in length, to make the needling sensation spread to the pelvic cavity. Then, the electroacupuncture instrument was connected, using continuous wave, 20 Hz, with output intensity according to patient's tolerance. Qihai (CV 6), Guanyuan (CV 4), Zhongji (CV 3), and Sanyinjiao (SP 6) were punctured with acupuncture needles of 0.25 mm in diameter and 40 mm in length. After the arrival of qi, the lifting-thrusting and twirling reinforcement manipulation was performed. The needles were retained for 25 min each time. The acupuncture treatment was performed twice a day, alternately in the morning and afternoon.

### 2.3 Acupuncture plus navel acupuncture group

The acupuncture plus navel acupuncture group received both acupuncture treatment (same as that in the acupuncture group) and navel acupuncture treatment (same as that in the navel acupuncture group) at the same time.

Three days constituted a treatment course, and the catheter was removed after 3 d of treatment. Intermittent catheterization was applied to those who could not urinate on their own, and treatment was continued and observed for 3 courses. The treatment

was ended for those who could urinate on their own with residual urine <50 mL.

### 3 Observation of Therapeutic Efficacy

#### 3.1 Observation items

The urination items after 3 d, 6 d and 9 d of treatment were recorded. The residual urine volume, spontaneous urination time, urinary catheter dependence and recurrence of the three groups were observed, respectively.

#### 3.2 Criteria of therapeutic efficacy

Cured: The patient was able to urinate under self-willingness; the residual urine was ≤50 mL.

Marked effect: The patient was able to urinate under self-willingness; the residual urine was >50 mL, but <100 mL.

Effective: The patient was able to urinate under self-willingness occasionally; the residual urine was >50 mL, but <100 mL; had to empty the bladder residual urine by intermittent catheterization.

Invalid: The patient was unable to urinate under self-willingness, and had to use catheter to urinate.

### 3.3 Results

#### 3.3.1 Comparison of total effective rate

The cured and markedly effective rates in the acupuncture plus navel acupuncture group after 3 d, 6 d and 9 d of treatment were significantly higher than those in the acupuncture group and the navel acupuncture group, and the differences were statistically significant ( $P<0.05$  or  $P<0.01$ ), (Table 2-Table 4).

**Table 2. Comparison of efficacy after 3 d of treatment (case)**

Group	n	Cured	Marked effect	Effective	Invalid	Cured and markedly effective rate (%)	Total effective rate (%)
Navel acupuncture	22	1	4	9	8	13.6	63.6
Acupuncture	18	1	6	6	5	38.9 <sup>2)</sup>	72.2
Acupuncture plus navel acupuncture	24	4	8	8	4	50.0 <sup>1)3)</sup>	83.3 <sup>2)3)</sup>

Note: Compared with the navel acupuncture group, 1)  $P<0.01$ , 2)  $P<0.05$ ; compared with the acupuncture group, 3)  $P<0.05$

**Table 3. Comparison of efficacy after 6 d of treatment (case)**

Group	n	Cured	Marked effect	Effective	Failure	Cured and markedly effective rate (%)	Total effective rate (%)
Navel acupuncture	22	4	6	9	3	45.5	86.4
Acupuncture	18	4	7	3	4	61.1 <sup>2)</sup>	77.8
Acupuncture plus navel acupuncture	24	8	11	4	1	83.3 <sup>1)4)</sup>	95.8 <sup>1)3)</sup>

Note: Compared with the navel acupuncture group, 1)  $P<0.01$ , 2)  $P<0.05$ ; compared with the acupuncture group, 3)  $P<0.01$ , 4)  $P<0.05$

**Table 4. Comparison of efficacy after 9 d of treatment (case)**

Group	n	Cured	Marked effect	Effective	Failure	Cured and markedly effective rate (%)	Total effective rate (%)
Navel acupuncture	22	6	8	6	2	63.6	90.9
Acupuncture	18	7	8	2	1	83.3 <sup>2)</sup>	94.4
Acupuncture plus navel acupuncture	24	18	4	2	0	91.7 <sup>1)3)</sup>	100.0 <sup>2)3)</sup>

Note: Compared with the navel acupuncture group, 1)  $P<0.01$ , 2)  $P<0.05$ ; compared with the acupuncture group, 3)  $P<0.05$

#### 3.3.2 Dependence on the urinary catheter

The dependence rates on the urinary catheter in the acupuncture plus navel acupuncture group after 3 d, 6 d and 9 d of treatment were significantly lower than those in the navel acupuncture group and the acupuncture group, and the differences were statistically significant ( $P<0.05$  or  $P<0.01$ ), (Table 5).

#### 3.3.3 Comparison of spontaneous urination time and residual urine volume

The spontaneous urination time in the acupuncture plus navel acupuncture group was significantly shorter than that in the navel acupuncture group and the acupuncture group, and the differences were statistically significant (both  $P<0.05$ ). The residual urine

volume in the acupuncture plus navel acupuncture group was significantly less than that in the navel acupuncture group and the acupuncture group, and the differences were statistically significant (both  $P < 0.01$ ), (Table 6).

### 3.3.4 Recurrence

Counted the cases of recurrence that the patient was unable to urinate spontaneously again from the date of spontaneous urination after the catheter removal, during the three courses of treatment (9 d). There were 2 cases in the navel acupuncture group, 2 cases in the acupuncture group, and 1 case in the acupuncture plus navel acupuncture group. The recurrence rate in the

acupuncture plus navel acupuncture group was lower than that in the navel acupuncture group and the acupuncture group. The recurrence cases were generally older aged, and it usually occurred in the morning after the catheter removal that the patients were unable to urinate under self-willingness. At the night of catheter removal, 4 patients did not urinate on time, resulting in excessive urine storage and intravesical pressure, and the detrusor was too weak to contract. Recurrence rate = Number of recurrence cases ÷ (Number of cured cases + Number of marked effect cases) × 100%. The recurrences of the three groups are showed in Table 7.

**Table 5. Comparison of dependence on the urinary catheter**

Group	n	After 3 d of treatment		After 6 d of treatment		After 9 d of treatment	
		Dependence number (case)	Dependence rate (%)	Dependence number (case)	Dependence rate (%)	Dependence number (case)	Dependence rate (%)
NA	22	12	54.5	7	31.8	5	22.7
Acupuncture	18	8	44.4 <sup>2)</sup>	5	22.7 <sup>2)</sup>	2	11.1 <sup>2)</sup>
APNA	24	6	25.0 <sup>1)3)</sup>	3	12.5 <sup>1)4)</sup>	1	4.0 <sup>1)4)</sup>

Note: NA=Navel acupuncture group; APNA=Acupuncture plus navel acupuncture group; compared with the navel acupuncture group, 1)  $P < 0.01$ , 2)  $P < 0.05$ ; compared with the acupuncture group, 3)  $P < 0.01$ , 4)  $P < 0.05$

**Table 6. Comparison of spontaneous urination time and residual urine volume ( $\bar{x} \pm s$ )**

Group	n	Spontaneous urination time (day)	Residual urine volume (mL)
Navel acupuncture	22	4.87±4.11	59.71±28.37
Acupuncture	18	4.74±3.63	53.17±32.79 <sup>1)</sup>
Acupuncture plus navel acupuncture	24	4.20±4.15 <sup>1)3)</sup>	33.88±24.6 <sup>2)4)</sup>

Note: Compared with the navel acupuncture group, 1)  $P < 0.05$ , 2)  $P < 0.01$ ; compared with the acupuncture group, 3)  $P < 0.05$ , 4)  $P < 0.01$

**Table 7. Comparison of recurrences after 9 d of treatment in the three groups**

Group	Recurrence (case)	Recurrence rate (%)	Detail of recurrence case			
			Age (year)	Catheter removal time	Recurrence time	Recovery (residual urine volume <100 mL)
NA	2	14.3	44	Day 6	Morning on day 7	Forenoon on day 9
			58	Day 3	Morning on day 4	Afternoon on day 5
Acupuncture	2	13.3	55	Day 3	Morning on day 4	Afternoon on day 4
			53	Day 3	Morning on day 4	Afternoon on day 5
APNA	1	4.5 <sup>1)</sup>	68	Day 3	Morning on day 4	Forenoon on day 5

Note: NA=Navel acupuncture group; APNA=Acupuncture plus navel acupuncture group; compared with the navel acupuncture group and the acupuncture group, 1)  $P < 0.05$

## 4 Discussion

### 4.1 Causes of postoperative urinary retention in cervical cancer

Extensive hysterectomy with pelvic lymphadenectomy is the preferred choice for early cervical cancer currently, and urinary retention is a common complication after radical surgery<sup>[14-15]</sup>. The

causes may be related to surgery, anesthesia, indwelling of catheter and psychological factors. Surgical factors: extensive range of radical surgery, big traumas, loss of support of the bladder, and excessive extension to the sacral fossa due to removal of the uterus and para-uterine tissue, obstructing urine and excretion; the damage to the nerve fibers that innervates the bladder, resulting in neurogenic bladder dysfunction. Anesthesia:

intraoperative anesthesia and postoperative analgesia pump reduce the regulation of nerve on bladder smooth muscle. Indwelling of catheter: continuous drainage of urine makes the bladder empty for a longer period time, weakens the bladder muscle, and reduce the contraction of the bladder detrusor. Psychological factors: cancer itself has a great impact on the patient's body and mind. Postoperative pain, anxiety and other negative emotions inhibit the parasympathetic nerve, resulting in bladder detrusor relaxation and urethral sphincter contraction, resulting in an inability to urinate. In addition, it is also related to patient's age and estrogen levels<sup>[16]</sup>.

In traditional Chinese medicine, the postoperative urinary retention falls under the category of Long Bi (difficulty in urination). The location of the disease is bladder, and it is closely related to the kidney, spleen, lung and three Jiao (Triple Energizer). The causes are insufficiency of kidney qi, inhibited qi transformation of the bladder and block of waterways. We believe that the occurrence of this disease is related to the following factors. First, the surgery consumes qi, damages blood, and impairs the qi transformation of the urinary bladder. Second, the surgical damage to meridians and collaterals or postoperative liver qi stagnation causes blood stasis and impairs the qi transformation of the urinary bladder. Third, accumulated damp-heat in the lower Jiao after surgery impairs the qi transformation of the urinary bladder.

#### 4.2 Treatments for urinary retention

At present, the treatment of urinary retention mainly includes indwelling of catheter, glycerine enema clyster, low frequency electric stimulation, Western medication, Chinese medication, acupuncture and moxibustion, pelvic floor muscle function training and transurethral resection of prostate<sup>[17-20]</sup>. Many studies have confirmed that acupuncture has a significant effect on postoperative urinary retention after postpartum, abdominal and anorectal surgery, and functional urinary retention due to mental stress<sup>[21-23]</sup>. Urination function is controlled by low-level and high-grade nerve centers. The lower-level center is mainly located in the S<sub>2</sub>-S<sub>4</sub> sacral ganglion, which forms a micturition reflex. The high-level center is in the cerebral cortex, which controls urination with human will. Acupuncture can improve bladder function by regulating peripheral afferent and central nerves. Studies have confirmed that electroacupuncture can increase the excitability and tension of the urinary bladder and pelvic nerve discharge frequency, cause the contraction of detrusor and relaxation of sphincter of bladder, thus treating urinary retention caused by various factors<sup>[24-25]</sup>. However, it has been found, at clinic, that the treatment of urinary retention by acupuncture alone requires a relatively long treatment time. In recent years, studies have showed that navel acupuncture can treat various

diseases involving internal, external, gynecological and pediatric fields, with an extensive range of treatment and certain efficacy<sup>[26]</sup>.

#### 4.3 Navel acupuncture and acupuncture treatment mechanism

Based on the theories of *Yi Jing (The Book of Changes)* and using the corresponding relationship between the engendering and restraining, inhibition and generation of eight diagrams and five elements, and Zang-fu organs, the navel acupuncture is considered as a new acupuncture therapy that uses only acupuncture at umbilicus to balance yin and yang, and eliminate diseases. *Yi Jing (The Book of Changes)* believes that umbilicus is the biggest holographic center, the connection of innate, and the root of acquired endowment. Anatomically, the umbilicus is the main route for the fetus to absorb maternal nutrients for metabolism, and is the final closure of the abdominal wall during embryonic development. According to the characteristics of the navel acupuncture 'first taking the symptoms, second taking the system, and then taking the disease', Long Bi (difficulty in urination) is mainly manifested by difficulty in urination or even blockage of urination, and mainly caused by insufficiency of kidney qi, inhibited qi transformation of the bladder, and injury of bladder. It belongs to the genitourinary system, and the location of the disease is in the kidney and bladder. Therefore, Kan, corresponded with the kidney and bladder, was selected to tonify the kidney and regulate the bladder; Li pertains to fire, corresponding with the heart and small intestine. The combination of Kan and Li worked for water-fire interaction and harmony. In addition, the small intestine governs the fluid, separating the clear from the turbid, and unblocking the waterways. Reducing Li (fire) can prevent urinary tract infection caused by indwelling of catheter. The lung is the upper origin of water, managing the regulation of the waterways. Kun pertains to earth, corresponding with the spleen. The spleen governs the transportation and transformation of water-dampness, regulating the water metabolism of the whole body. The spleen is the root of acquired endowment, working for the insufficiency of qi and blood after surgery and dysfunctions of the bladder.

In addition to the navel acupoints, in this study, Shenshu (BL 23), Pangguangshu (BL 28), Ciliao (BL 32) and Zhongliao (BL 33) were applied on the basis of the syndrome differentiation of meridians to tonify kidney, assist yang and transform qi. Moreover, acupuncturing Ciliao (BL 32), Zhongliao (BL 33) and Huiyang (BL 35) can excite the deep S<sub>2</sub>-S<sub>3</sub> phrenic nerve and perineal nerve, strengthen bladder detrusor contraction, inhibit urethral sphincter contraction, affect the medullary urination center, and then affect bladder urinary function<sup>[27-28]</sup>. Qihai (CV 6) can regulate and tonify qi. Zhongji (CV 3) plus Pangguangshu (BL 28) is the

combination of Back-Shu and Front-Mu points, which could regulate the bladder function. Guanyuan (CV 4) has the effect of warming and tonifying the lower Jiao, nourishing the middle qi and improving the bladder qi transformation. The combination of all the points made the effect of addressing both the symptoms and root cause, strengthening the bladder detrusor contraction and promoting the relaxation of the urethral sphincter and perineal muscles, thereby improving the urinary function of the bladder and beneficial to the recovery of bladder function after surgery.

Acupuncture at navel points and traditional acupoints both can unblock meridians, regulate qi and blood, relieve localized edema and congestion of lower urinary tract and reduce resistance to urination. Our research findings have suggested that both navel acupuncture and acupuncture treatment could improve the urination of patients after cervical cancer surgery, while the combination of the two treatments produced significantly higher total effective rate and cured and markedly effective rate than single navel acupuncture or acupuncture. And the combined treatment could reduce the patient's dependence on urinary catheter, shorten the urinary retention time, and reduce the residual urine volume. This indicates that acupuncture plus navel acupuncture had a good and reliable effect on urinary retention after radical hysterectomy for cervical cancer, with better effect than single treatment.

In this study, there were recurrences in all three groups, and the recurrence is often seen in the elderly patients. In addition, the recurrence was also related to catheter indwelling time, training of drinking-urination and other bladder function training.

#### Conflict of Interest

The authors declared that there was no potential conflict of interest in this article.

#### Statement of Informed Consent

Informed consent was obtained from all the recruited patients in this study.

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