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Original Article

Effect of overall nursing combined with acupressure in preventing postpartum urinary retention

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Abstract: Objectives: This study investigated the effects of overall nursing care combined with acupressure in preventing postpartum urinary retention. Methods: A total of 200 parturients with vaginal delivery in our hospital from March to October 2019 were enrolled and randomized to a control group and an observation group with 100 cases each. The control group received conventional nursing, while the observation group was also given "overall" nursing combined with acupressure. The two groups were compared in the incidence of urinary retention, time to the first urination, first urine volume, residual urine volume, pelvic floor muscle fiber contraction time, satisfaction, and treatment efficiency. Results: The two groups presented no significant difference in general information (P>0.05). Compared to the control group, the observation group showed a lower incidence of urinary retention and experienced an earlier time to first urination (both P<0.001). A significantly smaller residual urine volume was observed in the observation group as compared to controls at 4 h and 12 h after delivery (P<0.05). The observation group outperformed the control group in terms of pelvic floor muscle fiber contraction duration (P<0.001). Moreover, the observation group showed a treatment efficiency and nursing satisfaction superior to the control group (P<0.05). Conclusions: Overall nursing care combined with acupressure can exert strong positive effects on the incidence of postpartum urinary retention, time to the first urination, and residual urine volume in parturients with vaginal delivery and improve their satisfaction.

Keywords: Overall nursing care, acupressure, postpartum urinary retention

Introduction

Urinary retention is a common complication of vaginal delivery, referring to the retention of a large volume of urine in the bladder for 6 h after delivery because of the inability for independent urination [1]. It exacerbates postpartum bleeding, retards uterine regeneration, and imposes a psychological burden on the parturients, which seriously compromises postpartum recovery. To date, it has been found that any factor involved in the innervated urinary muscles and nerve fibers may increase the risk of urinary retention [2, 3]. Therefore, all parturients are considered to be at a high risk for urinary retention, which needs better postpartum care to prevent urinary retention. A study by Gupta Avantika et al. demonstrated that with prenatal health education, 74.3% of parturients could urinate independently during 3 hours after delivery [4], suggesting the existence of an optimal timing for independent urination after delivery. However, in the vast majority of cases, midwives and nursing staff pay most attention to the perineal wound but neglect the bladder filling [5, 6], and thus miss the vital time point for early care against urinary retention. Accordingly, previous research has implemented a specific nursing intervention for the prevention of early urinary retention in vaginal deliveries and found that overall nursing interventions decreased the incidence of urinary retention by improving urination within 6 h [7, 8]. It is noteworthy that most special nursing interventions involving traditional methods such as hot fumigation, hot compress, and the method of listening to flowing water for promoting urination need to be adopted along with other nursing measures to achieve overall nursing. Acupuncture can improve nerve excitability

and tissue tension and lower the incidence of urinary retention by regulating the internal organs through physical activity and promoting Qi, thus facilitating the restoration of detrusor muscle [9, 10]. So, joint care measures consisting of overall nursing and acupuncture are recommended in clinical practice. Accordingly, this study was designed to investigate the effects of overall nursing care combined with acupressure in preventing postpartum urinary retention.

Materials and methods

General information

A total of 200 women with vaginal delivery at our hospital from March 2019 to October 2019 were identified as the research subjects. The patients were randomized divided into a control group (n=100) and an observation group (n=100). All subjects signed an informed consent form, and the study was ratified by the hospital ethics committee (Approved no. 2018-LC2234).

Inclusion criteria: (1) Patients who met the diagnostic criteria for urinary retention set in Practical Obstetrics [11]; (2) Patients ≥18 years old; (3) Patients with singleton pregnancies; (4) Patients with complete clinical data; (5) Patients who had a vaginal delivery. Exclusion criteria: (1) Patients with cardiovascular disease, spontaneous bleeding disorders, or mechanical bowel obstruction disease; (2) Patients with lesions in the liver, kidneys, lungs, or other vital organs; (3) Patients with communication disorders or psychiatric disorders.

Methods

The control group was given routine care. Specifically, the nursing staff closely observed the vital signs of the parturients, provided instructions on water intake, and encouraged independent urination. Fumigation, listening to the sound of running water, and hot compresses could be adopted to facilitate urination, and catheterization was performed on parturients who could not urinate normally according to medical advice.

The observation group was additionally given overall ursingg care combined with acupressure on the basis of conventional care. Systematic nursing care was performed within 2 h after delivery. (1) With the evidence-based nursing approach, after understanding the risk factors through a review of previous literature, the nursing staff formulated targeted preventive nursing measures for urinary retention in response to risk factors for urinary retention to enhance the scientificity and effectiveness of nursing care. (2) After admission, based on special psychological care training with lectures by senior psychologists, the nursing staff developed psychological care measures according to the psychological conditions of the parturients to provide targeted postpartum psychological care. The nursing staff explained the irrelevance of urination to wound healing from the anatomical perspective and informed them of the risk of postpartum bleeding and the impact on uterine regeneration to further eliminate their concerns arising from fear of urination. The nursing staff also helped the family members of the parturients understand the hazards of urinary retention to enhance their psychological support for the parturients. For family members with weak home care skills, the nursing staff also provided them with basic nursing training before delivery to improve their home care skills. (3) The nursing staff strictly controlled the volume of urine in the bladder based on close observation of the output volume. During the 4th stage of labor, they instructed the parturients to drink 800 mL-1000 mL water. The line at three fingers above the pubic symphysis at the base of the bladder was taken as the alert line for enhanced intervention. Parturients whose volume of urine in the bladder exceeding 800-1000 mL after delivery were strictly requested to drink less water, and those whose volume below 800 mL were encouraged to drink water under the premise of keeping the urine storage in the bladder less than 1000 mL. Subsequently, the parturients were assisted to urinate as early as possible. (4) The parturients in a lying position were percussed from the middle of the umbilicus downward by the indirect percussion method [12, 13]. The junction of the percussion turbid sound and the bulge sound was considered as the top of the bladder. The nursing staff performed routine urination promotion based on the results of the assessment. (5) After percussion, the parturients were required to keep a supine position, with legs flexed and abdomen relaxed, and then given massage at Qugu,

Table 1. General information of the paturients

Group	Observation (n=100)	Control (n=100)	χ^2/t	P
Age ($\bar{x}$±s, years)	27.54±1.26	27.50±1.28	0.244	0.808
Gravidity ($\bar{x}$±s)	1.78±0.33	1.80±0.34	0.462	0.644
Parity ($\bar{x}$±s)	1.26±0.42	1.30±0.51	0.605	0.546
Gestation time ($\bar{x}$±s, weeks)	38.12±0.65	38.15±0.70	0.344	0.731
First labor time ($\bar{x}$±s, h)	6.00±0.35	5.97±0.30	0.713	0.477
Second labor time ($\bar{x}$±s, h)	11.42±0.35	11.45±0.36	0.655	0.513
Third labor time ($\bar{x}$±s, h)	1.52±0.24	1.54±0.28	0.594	0.553
Postpartum bleeding at 2 h ($\bar{x}$±s, ml)	194.68±32.52	192.11±30.68	0.630	0.530
Episiotomy (n)	56	60	0.267	0.605
Newborn weight ($\bar{x}$±s, kg)	3.15±0.25	3.18±0.26	0.911	0.363

Zuwuli, and Sanyinjiao acupoints at both sides with a strong stimulation by finger rubbing according to the theory of meridian points in TCM. Each acupoint was massaged for 5-15 min, with a gradual force from light to heavy, to the extent that the parturients could feel the soreness and swelling, with a continuous force at the acupoints.

Outcome measures

(1) Time to the first urination: the time to the first urination in both groups was recorded. (2) Incidence of maternal urinary retention. (3) Residual urine volume in both groups: Residual urine volume was measured by B-mode ultrasound (TOSHIBA, Nemio 20), bladder residual urine volume = upper and lower diameter × left and right diameter × anterior and posterior diameter × 0.5. (4) Pelvic floor muscle fiber contraction duration. The measurement was performed by an electrical stimulation biofeedback device purchased from LABORIE, Canada. (5) The nursing satisfaction in parturients in the two groups was analyzed and compared. (6) Efficacy evaluation criteria: Markedly effective: the parturient can independently urinate, without incomplete urination and with no bulging and turbid sounds in the bladder area and no urinary retention symptoms. Effective: the parturient can urinate independently, with slight incomplete urination, slight bulging of the bladder area, reduction of the bladder area with dull sound on percussion, and mild symptoms of urinary retention without the need for catheterization. Ineffective: The parturient presents with abdominal swelling, difficulty in urination or dribbling, bulging bladder area, and may be accompanied by a rising fundus, dull sounds on percussion of the bladder area, symptoms of urinary retention, and the need for catheterization.

Statistical analysis

In this study, SPSS 20.0 was used for data processing. Counted data were expressed as percentage % and processed using the Chi-square test, and measured data were expressed as mean ± standard deviation ($\bar{x}$±s) and were processed by independent samplest-test. P<0.05 indicated a significant difference.

Results

Comparison of the general data

As shown in **Table 1**, there were no significant differences in the general data, such as age, gravidity, parity, gestational weeks, and mean time of the first, second, and third stage of labor between the two groups (all (P>0.05); moreover, there were also no significant differences in mean postpartum bleeding volume at 2 h, the average weight of the newborns, and number of cases with episitomy between the two groups (all P>0.05), indicating that the two groups were comparable.

Time to the first urination

In the observation group, there were 50 cases who had first urination within 3 h, 48 cases dur-

Table 2. Comparison of the time to the first urination

Group	<3 h (n)	3~6 h (n)	>6 h (n)	Mean ($\bar{x}$±s, h)
Control group (n=100)	16	64	20	5.34±0.87
Observation group (n=100)	50	48	2	2.41±0.35
t				-31.245
P				<0.001

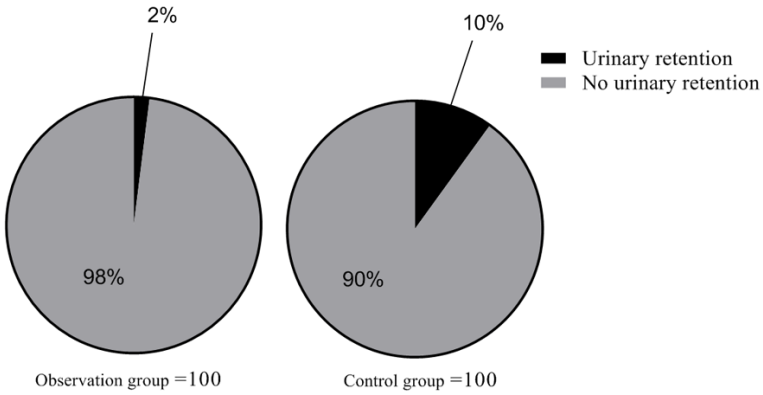

Figure 1. Comparison of the incidence of urinary retention [n (%)].

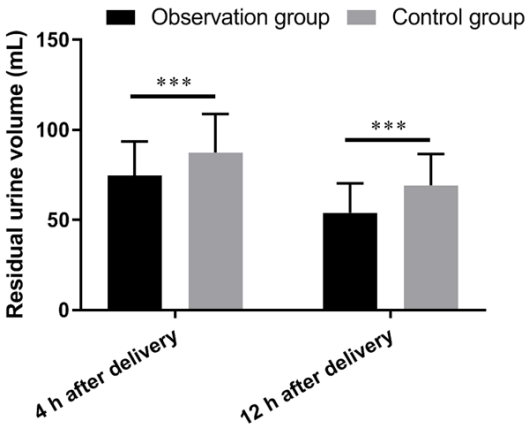

Figure 2. Comparison of residual urine volume at 4 h and 12 h after delivery, ***indicates P<0.001.

ing 3~6 h, and 2 cases after 6 h, with a mean time of (2.41±0.35) h. In the control group, there were 16 cases with 3 h, 64 cases during 3~6 h, and 20 cases after 6 h, with a mean time of (5.34±0.87) h. The observation group experienced a significantly earlier time to the first urination than the control group (P<0.001). See **Table 2**.

Incidence of urinary retention

The observation group showed 2 cases (2%) with urinary retention and 98 cases (98%) without it. The control group showed 10 cases (10%) with urinary retention and 90 cases (90%) cases without it. The incidence of urinary retention in the observation group was lower than that in the control group (P<0.05), **Figure 1**.

Comparison of residual urine volume

At 4 h after delivery, the residual urine volume was (87.39±21.44) mL in the control group and (74.57±18.93) mL in the observation group. At 12 h after delivery, the residual urine volume was (69.22±17.29) mL in the control group and (53.94±16.35) mL in the observation group. The residual urine volume at 12 h after delivery in both groups was less than those at 4 h after delivery. The residual urine volume at 4 h and 12 h after after delivery were all less in the observation group (all P<0.05), **Figure 2**.

Pelvic floor muscle fiber contraction time

The contraction time of the control group before nursing was (1.39±0.44) s in type I muscle fibers and (1.17±0.63) s in type II muscle fibers, while (1.40±0.57) s and (1.15±0.77) s in the observation group, with no difference (all P>0.05). The contraction time of the control group after nursing was (3.31±0.39) in type I muscle fibers and (3.15±0.57) s in type II muscle fibers, but (4.41±0.43) s and (4.19±0.62) s in the observation group, which was significantly higher than controls (all P<0.05), **Table 3**.

Comparison of nursing satisfaction

In the control group, there were 29 cases that were highly satisfied, 47 cases satisfied, 24 cases unsatisfied, with a satisfaction rate of 76%. In the observation group, there were 50 cases highly satisfied, 43 cases satisfied, and 7 cases unsatisfied, with a satisfaction rate of 93%. The observation group showed significantly higher nursing satisfaction rate than the control group (P<0.05). See **Table 4**.

Table 3. Comparison of pelvic floor muscle fiber contraction time ($\bar{x}$±s, s)

Group	Type I muscle fiber		Type II muscle fiber	
	Before nursing	After nursing	Before nursing	After nursing
Control group (n=100)	1.39±0.44	3.31±0.39*	1.17±0.63	3.15±0.57*
Observation group (n=100)	1.40±0.57	4.41±0.43*	1.15±0.77	4.19±0.62*
t	-0.139	-18.949	0.201	-12.349
P	0.89	<0.001	0.841	<0.001

Note: *indicates post-nursing compared with pre-nursing, P<0.001.

Table 4. Comparison of nursing satisfaction

Group	Highly satisfied	Satisfied	Unsatisfied	Satisfaction rate
Control group (n=100)	29	47	24	76
Observation group (n=100)	50	43	7	93
χ^2				11.033
P				0.001

Discussion

Urinary retention can be triggered by factors such as mucosal edema, congestion, and decreased muscle strength due to pressure on the bladder and urethra during labor, or damage to the parasympathetic nerves during prolonged labor. Some parturients face a higher probability of urinary retention due to their more severe postpartum tension and fear of perineal wound dehiscence during urination [14-16]. As urinary retention increases the incidence of other postpartum complications detrimental to postpartum recovery, more attention should be paid to its prevention and treatment in practice. Urinary catheterization is the preferred treatment for urinary retention, which can reduce the residual urine volume, but predisposes to urinary tract infections and higher psychological stress. Therefore, the prevention of postpartum urinary retention is a priority. At the current time, the method of listening to the sound of running water and hot fumigation are the mainstays for urination promotion. Previous studies have applied them in early postpartum nursing care and found that such an early postpartum nursing method reduced the incidence of urinary retention to a certain extent and improved the urination rate of parturients within 6 h after delivery [17, 18]. However, the two methods barely improved the treatment efficiency [19, 20]. Accordingly, overall nursing care should be performed in full integration with other effective care measures to deliver the maximum benefit of care within the optimal time window for postpartum urination.

In this study, the time to the first urination was significantly earlier in the observation group than in the control group. Acupressure has been verified to be effective in ameliorating urinary retention [21]. In traditional Chinese medicine theory, the pathogenesis of urinary retention lies in the bladder, and the Three-Jiao of parturients is unfavorable, with insufficient water and Qi [22]. Acupressure can facilitate the flow of Qi and stimulate bladder gasification by promoting the flow of water and fluids, and thus regulate the water passages in the body [23]. This would explain why urination recovered faster after treatment in the study group.

In this study, the incidence of urinary retention in the observation group was significantly lower than in the controls, with less postpartum residual urine volume and longer pelvic floor muscle fiber contraction duration. Pelvic floor dysfunction is the main cause of postpartum urinary retention, and pelvic floor muscle traning is recommended for persistent postpartum urinary retention (grade A) 3 months after delivery [24]. Previous research has demonstrated that acupressure could improve urinary patency, as it could activate Qi and blood, unblock obstruction, and stimulate the primary center of the meridian sensing urinary reflex to strengthen the ability for independent urination [25]. It had been shown that acupuncture can effectively prevent urinary retention after vaginal delivery in parturients at advanced reproductive age and improve the timing and volume of first urination, which is consistent with the results of this study [26]. Combined with the theory of acupuncture and moxibustion, it could be con-

cluded that Qugu, Zuwuli, and Sanyinjiao adopted in the observation group are common treatment acupoints for urinary retention. Sanyinjiao is the intersection point of Zutaiyin Spleen and Zusanyin meridians, which effectively enhances the Qi-transformation function of Sanjiao, and Zuwuli is the integration point of bladder meridian, which facilitates urination [27]. However, the following limitations were identified in this study. It was a single center study with a small number of participants and short follow-up, and all observation indexes were objective indexes, which were greatly influenced by individual patients. Nursing intervention and acupuncture operations need to be trained, and the effectiveness is affected by the implementer, thus making popularization difficult. More importantly, the mechanism has not been proven and needs to be explored in further research.

Thus, overall nursing care combined with acupressure can exert strong positive effects on the incidence of postpartum urinary retention, voiding patency, the time to the first urination, and residual urine volume in parturients with vaginal delivery.

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Disclosure of conflict of interest

None.

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References

[1] Avondstondt AM, Hidalgo RJ and Salamon CG. Intrapartum risk factors for postpartum urinary retention: a case-control study. Int Urogynecol J 2020; 31: 2395-2398.

[2] Li Q, Zhu S and Xiao X. The risk factors of postpartum urinary retention after vaginal delivery: a systematic review. Int J Nurs Sci 2020; 7: 484-492.

[3] Ain QU, Shetty N and K S. Postpartum urinary retention and its associated obstetric risk factors among women undergoing vaginal delivery in tertiary care hospital. J Gynecol Obstet Hum Reprod 2021; 50: 101837.

[4] Gupta A, Pampapati V, Khare C, Murugesan R, Nayak D and Keepanasseril A. Postpartum urinary retention in women undergoing instrumental delivery: a cross-sectional analytical study. Acta Obstet Gynecol Scand 2021; 100: 41-47.

[5] Gu SF, Li MQ, Li Y, Chen M and Han LL. Acupuncture at Ciliao (BL 32) for prevention of postpartum urinary retention in elderly parturient women: a randomized controlled trial. Zhongguo Zhen Jiu 2020; 40: 611-614.

[6] Kawasoe I and Kataoka Y. Prevalence and risk factors for postpartum urinary retention after vaginal delivery in Japan: a case-control study. Jpn J Nurs Sci 2020; 17: e12293.

[7] Rosenberg M, Many A and Shinar S. Risk factors for overt postpartum urinary retention-the effect of the number of catheterizations during labor. Int Urogynecol J 2020; 31: 529-533.

[8] Gu XD, Wang J, Yu P, Li JH, Yao YH, Fu JM, Wang ZL, Zeng M, Li L, Shi M and Pan WP. Effects of electroacupuncture combined with clean intermittent catheterization on urinary retention after spinal cord injury: a single blind randomized controlled clinical trial. Int J Clin Exp Med 2015; 8: 19757-19763.

[9] Hafizi L, Razmjoo N, Yousefi F and Azizi H. The effect of complementary medicine on maternal health promotion: an experimental study. J Educ Health Promot 2021; 10: 26.

[10] Lamblin G, Chene G, Aeberli C, Soare R, Moret S, Bouvet L and Doret-Dion M. Identification of risk factors for postpartum urinary retention following vaginal deliveries: a retrospective case-control study. Eur J Obstet Gynecol Reprod Biol 2019; 243: 7-11.

[11] Mulder FE, Hakvoort RA, Schoffelmeer MA, Limpens J, Van der Post JA and Roovers JP. Postpartum urinary retention: a systematic review of adverse effects and management. Int Urogynecol J 2014; 25: 1605-1612.

[12] Wang J, Wong YK and Liao F. What has traditional Chinese medicine delivered for modern medicine? Expert Rev Mol Med 2018; 20: e4.

[13] Suzuki S, Kakizaki E, Kobayashi R and Teshima S. Risk factors for postpartum urinary retention after vaginal delivery at term without epidural anesthesia. J Matern Fetal Neonatal Med 2019; 32: 3470-3472.

[14] Dolezal P, Zahumensky J, Otapkova P, Papcun P and Krizko M Jr. Covert postpartum urinary retention. Bratisl Lek Listy 2019; 120: 673-675.

[15] Polat M, Şentürk MB, Pulatoğlu Ç, Doğan O, Kılıççı Ç and Budak M. Postpartum urinary re-

tention: evaluation of risk factors. Turk J Obstet Gynecol 2018; 15: 70-74.
[16] Milart P, Wozniakowska EB, Czuczwar P, Wrona W and Paszkowski T. Extensive postpartum urinary retention successfully treated with clean intermittent catheterization. Ginekol Pol 2018; 89: 174.
[17] Barba M, Frigerio M, Manodoro S, Bernasconi DP, Cola A, Palmieri S, Fumagalli S and Vergani P. Postpartum urinary retention: absolute risk prediction model. Low Urin Tract Symptoms 2021; 13: 257-263.
[18] Tiberon A, Carbonnel M, Vidart A, Ben Halima M, Deffieux X and Ayoubi JM. Risk factors and management of persistent postpartum urinary retention. J Gynecol Obstet Hum Reprod 2018; 47: 437-441.
[19] Mulder FEM, Hakvoort RA, de Bruin JP, Janszen EW, van der Post JAM and Roovers JWR. Long-term micturition problems of asymptomatic postpartum urinary retention: a prospective case-control study. Int Urogynecol J 2018; 29: 481-488.
[20] Wang XM, Gong J, Li SC and Han M. Acupuncture compared with intramuscular injection of neostigmine for postpartum urinary retention: a systematic review and meta-analysis of randomized controlled trials. Evid Based Complement Alternat Med 2018; 2018: 2072091.
[21] Mesini A, Saffioti C, Mariani M, Florio A, Medici C, Moscatelli A and Castagnola E. First case of candida auris colonization in a preterm, extremely low-birth-weight newborn after vaginal delivery. J Fungi (Basel) 2021; 7: 649.
[22] Guo FQ, Wei LQ, Zhang SZ and Zhang XF. Clinical observation of rapid massage at Shuidao (ST 28) to prevent postpartum urinary retention. Zhongguo Zhen Jiu 2019; 39: 263-266.
[23] Zhang D. Thirty-six cases of urinary retention treated by acupuncture. J Tradit Chin Med 2008; 28: 83-85.
[24] Li N, He HB and Wang CW. Clinical observation of urinary retention after hemorrhoid and fistula operation treated with suspen-ding moxibustion. Zhongguo Zhen Jiu 2010; 30: 571-573.
[25] Guo FQ, Wei LQ, Zhang SZ and Zhang XF. Clinical observation of rapid massage at Shuidao (ST 28) to prevent postpartum urinary retention. Zhongguo Zhen Jiu 2019; 39: 263-266.
[26] Gu SF, Li MQ, Li Y, Chen M and Han LL. Acupuncture at Ciliao (BL 32) for prevention of postpartum urinary retention in elderly parturient women: a randomized controlled trial. Zhongguo Zhen Jiu 2020; 40: 611-614.
[27] Li T, Hui X, Wang H, Lin Y and Zhao B. Moxibustion therapy for treating patients with postpartum urinary retention: a protocol for systematic review and meta-analysis. Medicine (Baltimore) 2021; 100: e25683.