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 nursing 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,
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 (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 episiotomy 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-
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Table 2. Comparison of the time to the first urination

<table>
<thead>
<tr>
<th>Group</th>
<th>&lt;3 h (n)</th>
<th>3~6 h (n)</th>
<th>&gt;6 h (n)</th>
<th>Mean (±s, h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (n=100)</td>
<td>16</td>
<td>64</td>
<td>20</td>
<td>5.34±0.87</td>
</tr>
<tr>
<td>Observation group (n=100)</td>
<td>50</td>
<td>48</td>
<td>2</td>
<td>2.41±0.35</td>
</tr>
<tr>
<td>t</td>
<td>-31.245</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

Table 2. Comparison of the time to the first urination

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 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) s 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.
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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 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 training 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-

### Table 3. Comparison of pelvic floor muscle fiber contraction time (X±s, s)

<table>
<thead>
<tr>
<th>Group</th>
<th>Type I muscle fiber</th>
<th>Type II muscle fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before nursing</td>
<td>After nursing</td>
</tr>
<tr>
<td>Control group (n=100)</td>
<td>1.39±0.44</td>
<td>3.31±0.39*</td>
</tr>
<tr>
<td>Observation group (n=100)</td>
<td>1.40±0.57</td>
<td>4.41±0.43*</td>
</tr>
<tr>
<td>t</td>
<td>-0.139</td>
<td>-18.949</td>
</tr>
<tr>
<td>P</td>
<td>0.89</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

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

### Table 4. Comparison of nursing satisfaction

<table>
<thead>
<tr>
<th>Group</th>
<th>Highly satisfied</th>
<th>Satisfied</th>
<th>Unsatisfied</th>
<th>Satisfaction rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (n=100)</td>
<td>29</td>
<td>47</td>
<td>24</td>
<td>76</td>
</tr>
<tr>
<td>Observation group (n=100)</td>
<td>50</td>
<td>43</td>
<td>7</td>
<td>93</td>
</tr>
<tr>
<td>χ²</td>
<td>11.033</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 acupuncture 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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