Original Article
Effect of midwife intervention coupled with acupressure on the vaginal delivery rate and negative emotion in parturients with scarred uterus re-pregnancy

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Abstract: Objective: To investigate the effect of midwife intervention coupled with acupressure on the vaginal delivery rate and negative emotion in parturients with scarred uterus re-pregnancy. Methods: A total of 85 parturients with scarred uterus re-pregnancy who agreed to trial-produce vaginally after assessment were analyzed retrospectively. Parturients were divided into the research group (43 parturients) who received midwife intervention coupled with acupressure and the control group (42 parturients) who received routine nursing intervention. The delivery mode, birth process time, postpartum hemorrhage, maternal and infant outcomes, negative emotion improvement, intrapartum pain score and family care satisfaction of parturients between the two groups were compared. Results: Parturients in the research group had higher spontaneous vaginal delivery rate (67.44% vs. 45.24%, P<0.05), lower rates of lateral episiotomy, puerperal infection and neonatal asphyxia (all P<0.05), compared with the control group. No difference in vaginal midwifery rate was found (P>0.05). Shorter first stage of labor and second stage of labor (both P<0.001) and less postpartum 2 h and 24 h hemorrhage were found in the research group than in the control group (both P<0.05). After intervention, parturients in the research group versus those in the control group showed lower visual analogue scale scores in the incubation period and active period and negative emotion (Hamilton anxiety (HAMA) scale, and Hamilton depression (HAMD) scale) scores (all P<0.05) and greater nursing satisfaction (P<0.05). Conclusion: Midwife intervention coupled with acupressure can alleviate the degree of anxiety and depression in parturients with scarred uterus re-pregnancy, accelerate the progress of labor, relieve pain, increase spontaneous vaginal delivery rate, and improve maternal and infant outcomes.

Keywords: Midwife, acupressure, scarred uterus, vaginal delivery rate, negative emotion

Introduction
The scarred uterus refers to the scar formation in different parts of the uterus caused by damages to the endometrium, serosa and muscular layer due to cesarean section, myomectomy and other gynecological surgeries, and cesarean section in women who most easily produces the scarred uterus [1]. Data have shown that the cesarean section rate (40%) in China has exceeded the warning limit (15%) advocated by the World Health Organization, with a gradually rising trend [2]. Scarred uterus has an incidence rate of about 25%-35%, which increases with the rising of cesarean section rate. Recently, an increasing number of women start to prepare for pregnancy due to the two-child policy, including women with scarred uterus re-pregnancy. These re-pregnant women may have an increased risk of uterine rupture and dangerous placenta previa compared with women with first pregnancy. Most pregnant women worry about the unbearable pain during parturition or have failed vaginal trial of labor due to negative emotion and other factors, so more parturients select direct cesarean section to finish parturition [3]. The way to increase the success rate of vaginal delivery in parturients with scarred uterus re-pregnancy has been the focus of many clinical scholars in recent years.

Parturients, especially those with scarred uterus, are anxious and scared of spontaneous vaginal delivery, and thus the implementation of active nursing intervention is very important. Midwife intervention nursing mode as an
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obstetric nursing mode dominated by midwives is more humanized and targeted versus routine obstetric care. Midwives by virtue of professional technical level provide more scientific, comprehensive and careful nursing services for parturients, ensuring smooth delivery to the maximum extent [4]. A study has confirmed that midwife intervention nursing mode can decrease the risk of adverse maternal and infant outcomes and improve the degree of anxiety and depression of parturients, and as a result more parturients agree to trial-produce vaginally, significantly increasing the success rate of spontaneous vaginal delivery [5]. Targeted acupressure for parturients with scarred uterus re-pregnancy can significantly relieve pain, antepartum anxiety and depression of parturients, which is conducive to better postpartum recovery [6]. Midwife intervention nursing mode and targeted acupressure have their own unique advantages in obstetrical nursing, and both provide effective evidence for the feasibility and safety of comprehensive intervention in improving outcomes of parturients with scarred uterus re-pregnancy [7]. However, there is a lack of reports on the clinically combined application of the two modes in parturients with scarred uterus re-pregnancy. Considering that the two modes may play a synergistic role together, midwife intervention coupled with acupressure was applied to parturients with scarred uterus re-pregnancy in this study to improve the vaginal delivery rate.

Materials and methods

General data

A total of 85 parturients with scarred uterus re-pregnancy who were admitted to our hospital from April 2018 to December 2019 and agreed to trial-produce vaginally after assessment were analyzed retrospectively. Parturients were divided by nursing methods into the research group (43 parturients received midwife intervention coupled with acupressure) and the control group (42 parturients received routine nursing intervention). This study was approved by the Ethics Committee of our hospital. All parturients have signed the informed consent form.

Inclusion criteria: All parturients met the clinical diagnostic criteria for scarred uterus [8]. All parturients had the history of a cesarean section; The time of re-pregnancy was two years or more from last cesarean section; All parturients had singleton pregnancy.

Exclusion criteria: Parturients with gestational diabetes mellitus, hypertension or other complications; parturients with the history of uterus injury or intrauterine infection; parturients with indications for cesarean section.

Methods

Control group: Parturients in the control group received routine nursing. During the first stage of labor, parturients’ vital signs and fetal heart rate were monitored closely, and close attention was paid to whether the parturients had negative emotions or aggravating negative emotions, in order to implement targeted measures. During the second stage of labor, fetal heart rate was measured at an interval of 10-15 min. The parturients were instructed to cooperate with uterine contraction and midwife-aided parturition, and the perineum was fully protected against laceration. During the third stage of labor, whether the placenta was delivered fully was observed, and whether the perineal or intravaginal laceration existed was checked. Infant healthy condition was evaluated, and postpartum vital signs of parturients were monitored closely.

Research group: Parturients in the research group received midwife intervention coupled with acupressure. Specific methods were as follows.

Midwife intervention: (1) Outpatient service: one-to-one midwife outpatient consultation services were provided for parturients at first, second and third trimester. Services mainly included: introducing pregnant women, parturients and their families to the safety and feasibility of spontaneous vaginal delivery in the scarred uterus and answering all questions and doubts of pregnant and parturient women so as to improve their confidence to select spontaneous vaginal delivery; daily popularizing the significance of self-management in prenatal weight, diet and others; strengthening pregnant and parturient women to identify abnormal manifestations and fully know normal pregnant performances so as to perceive abnormal condition timely; introducing pregnant and parturient women to the way to labor during parturi-
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(1) Maternity and auxiliary labor methods like Lamaze breathing method and anodyne labor; psychological counseling to establish the confidence of pregnant and parturient women in spontaneous vaginal delivery, give faith support and release negative emotions; providing corresponding assessment based on the individual condition of pregnant and parturient women and health education, and appropriately increasing outpatient consultation services based on the condition of pregnant and parturient women.

(2) Intrapartum management: Conditions of parturients for spontaneous vaginal delivery were assessed sufficiently, and the reason of last cesarean section was known, taken seriously and avoided. The principle of “stop” was always followed during the labor process. If parturients decided to give up spontaneous vaginal delivery, midwives should fully understand the needs of parturients, immediately reassess the condition for vaginal delivery and provide corresponding intervention, such as psychological counseling and relieving uneasy, anxious and other emotions of parturients [9]. Once fetal distress, uterine rupture with aura and other abnormal phenomena were observed, the preparation for emergency cesarean section was completed immediately, including blood matching, informing the operating room, anesthesiology department and neonatology department, etc. Continuous fetal rate monitoring was performed during the labor process to closely monitor maternal and infant abnormal condition. Parturients were guided to use free position and birthing ball for relieving pain caused by uterine contraction and were advised to select epidural anesthesia for painless labor. Indications for vaginal midwifery were relaxed properly during the second stage of labor, and abdominal pressure was forbidden. A neonatologist was present before the forthcoming delivery of the baby to always adequately prepare for newborn rescue and resuscitation and to give timely intervention. After the delivery of the baby, the delivery of placenta was observed and the completeness of placenta was checked. Moreover, active management and intervention were carried out to prevent postpartum hemorrhage.

(3) Postpartum management: Postpartum management was strengthened, and basic vital signs (heart rate, pulse, blood pressure, etc.) and vaginal bleeding of parturients were observed closely. Thus abnormal condition could be disposed in time. The midwife visited parturients on the first day after delivery to assess the condition of uterine involution, puerpera mentality and breast feeding, and to provide necessary psychological counseling and postpartum rehabilitation training.

Acupressure: Acupressure was carried out gently by the midwife between two uterine contractions. Acupoints for acupressure mainly included Guanyuan, Hoku, Kunlun, Zhongji, and Sanyinjiao points. Guanyuan point, supplemented by Hoku and Kunlun points, was massaged in the incubation period. Zhongji point, supplemented by Sanyinjiao and Hoku points, was massaged in the active period. Subjective pain perception of parturients was always followed to adjust massage manipulation and intensity.

Outcome measures and evaluation criteria

Main outcome measures: Delivery modes, including spontaneous vaginal delivery, lateral episiotomy and vaginal midwifery, were compared. The incidence rates of adverse maternal and infant outcomes, including puerperal infection and neonatal asphyxia, were compared. Birth process time and postpartum hemorrhage were compared, including duration of the first stage of labor, duration of the second stage of labor, postpartum 2 h and 24 h hemorrhage.

Pain score comparison: Pain degree in the incubation period (from the start of regular contractions to cervical dilation of 3 cm) and active period (cervical dilation of 3-10 cm) was assessed using the visual analogue scale (VAS) and classified into 4 grades, including excellent of 0-2 scores, good of 3-5 scores, not bad of 6-8 scores, and bad of >8 scores. Pain degree was in direct proportion to scores [10].

Negative emotion comparison: The degree of anxiety and depression of parturients before and after intervention were assessed using the Hamilton anxiety scale (HAMA) and Hamilton depression scale (HAMD) [11, 12]. Negative emotions on the day of admission and prior to delivery were assessed in 14 items, with a positive result of >18 scores.
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Table 1. General data comparison (x±sd)

<table>
<thead>
<tr>
<th>Group</th>
<th>Average age (years)</th>
<th>Average gestational weeks (weeks)</th>
<th>Average weight (kg)</th>
<th>Thickness of the scar (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (n=42)</td>
<td>32.6±4.1</td>
<td>39.1±1.4</td>
<td>66.36±4.22</td>
<td>3.54±0.63</td>
</tr>
<tr>
<td>Research group (n=43)</td>
<td>33.6±3.9</td>
<td>38.5±1.7</td>
<td>65.78±4.73</td>
<td>3.42±0.76</td>
</tr>
<tr>
<td>t</td>
<td>1.192</td>
<td>1.778</td>
<td>0.597</td>
<td>0.793</td>
</tr>
<tr>
<td>P</td>
<td>0.849</td>
<td>0.079</td>
<td>0.552</td>
<td>0.430</td>
</tr>
</tbody>
</table>

Table 2. Delivery modes comparison (n, %)

<table>
<thead>
<tr>
<th>Group</th>
<th>Spontaneous vaginal delivery rate</th>
<th>Lateral episiotomy rate</th>
<th>Vaginal midwifery rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (n=42)</td>
<td>19 (45.24)</td>
<td>17 (40.48)</td>
<td>6 (14.29)</td>
</tr>
<tr>
<td>Research group (n=43)</td>
<td>29 (67.44)</td>
<td>8 (18.60)</td>
<td>6 (13.95)</td>
</tr>
<tr>
<td>χ²</td>
<td>4.261</td>
<td>4.896</td>
<td>0.002</td>
</tr>
<tr>
<td>P</td>
<td>0.039</td>
<td>0.027</td>
<td>0.965</td>
</tr>
</tbody>
</table>

Secondary outcome measures: Nursing satisfaction comparison: Nursing satisfaction of parturients was evaluated before discharge using the self-made nursing questionnaire, with a total score of 100 [13]. The results were classified into: very satisfied of >80 scores, satisfied of 60-80 scores, and not satisfied of <60 scores. Nursing satisfaction = (number of very satisfied parturients + number of satisfied parturients)/total number of parturients *100.0%.

Statistical analysis

All data were analyzed using the SPSS 21.0 professional statistical software. All measurement data were expressed as mean ± standard deviation (x±sd) and analyzed by independent sample t test, denoted by t. All enumeration data were expressed as number of parturients/percentage (n/%) and analyzed by chi-square test, denoted by χ². P<0.05 showed a significant difference.

Results

General data comparison

No significant difference was found in general data between the two groups (all P>0.05, Table 1).

Delivery modes comparison

Parturients after intervention in the research group compared with the control group had significantly higher spontaneous vaginal delivery rate (67.44% vs. 45.24%, P<0.05), lower lateral episiotomy rate (P<0.05), and no difference in vaginal midwifery rate (P>0.05, Table 2).

Comparison of the incidence rates of adverse maternal and infant outcomes

Parturients after intervention in the research group had significantly lower rates of puerperal infection and neonatal asphyxia compared with the control group (both P<0.05, Figure 1).

Comparison of birth process time and postpartum hemorrhage

After intervention, shorter first stage of labor and second stage of labor (both P<0.001) and
Midwife intervention coupled with acupressure increases vaginal delivery rate

Table 3. Comparison of birth process time and postpartum hemorrhage (X±sd)

<table>
<thead>
<tr>
<th>Group</th>
<th>Control group (n=42)</th>
<th>Research group (n=43)</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of the first stage of labor (min)</td>
<td>410.68±44.98</td>
<td>376.84±45.72</td>
<td>3.440</td>
<td>0.000</td>
</tr>
<tr>
<td>Duration of the second stage of labor (min)</td>
<td>52.63±13.86</td>
<td>40.77±10.57</td>
<td>4.429</td>
<td>0.000</td>
</tr>
<tr>
<td>Postpartum 2 h hemorrhage (mL)</td>
<td>222.23±43.81</td>
<td>200.32±35.51</td>
<td>2.527</td>
<td>0.013</td>
</tr>
<tr>
<td>Postpartum 24 h hemorrhage (mL)</td>
<td>360.21±80.26</td>
<td>321.45±65.34</td>
<td>2.439</td>
<td>0.017</td>
</tr>
</tbody>
</table>

less postpartum 2 h and 24 h hemorrhage were found in the research group than in the control group (both P<0.05, Table 3).

Comparison of pain scores and negative emotion scores before and after intervention

After intervention, parturients in the research group compared with the control group showed significantly lower VAS scores in the incubation period and active period (both P<0.05). There were no significant differences in negative emotion (HAMA and HAMD) scores before intervention between the two groups (both P>0.05). After intervention, negative emotion scores in the two groups were significantly lower than those before intervention (both P<0.05), and the falling range of scores in the research group was significantly higher than that in the control group (P<0.001, Figures 2, 3).

Comparison of nursing satisfaction

Total nursing satisfaction in the research group was significantly greater than that in the control group (P<0.05, Table 4).

Discussion

Some pregnant women give up spontaneous vaginal delivery due to various factors and select cesarean section, increase the probability of getting scarred uterus [14]. Parturients with scarred uterus re-pregnancy is no longer a contraindication to vaginal delivery based on current medical technology level, and the safety and feasibility of vaginal delivery have been confirmed clinically. However, parturients with scarred uterus re-pregnancy demand better perinatal nursing than routine nursing due to their higher delivery risk than first pregnancy [15].

Midwife intervention nursing mode versus routine nursing mode is more targeted and humanized, and its comprehensive and scientific nursing philosophy can provide more scientific, comfortable and careful nursing services for parturients [16]. Miaoran et al. found that midwife outpatient intervention in parturients with scarred uterus re-pregnancy could significantly increase the rate of spontaneous vaginal delivery, accelerate progress of labor, and reduce postpartum hemorrhage and the risk of adverse...
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maternal and infant outcomes [17]. Yinmei et al. revealed that midwife outpatient service significantly decreased the rate of cesarean section and effectively improved maternal and infant outcomes [18]. Wei et al. showed that continuous midwives’ service mode could improve the success rate of vaginal trial-production in parturients with scarred uterus re-pregnancy and safeguard maternal and infant safety more scientifically and effectively [19]. Therefore, midwife intervention nursing mode during pregnancy can directly affect the delivery mode of pregnant and parturient women and their experience and feeling in the process of labor.

In addition, traditional Chinese medicine acupressure originated from Chinese medical theory is often used as an auxiliary method for the treatment of anxiety, depression, insomnia, cognitive disorder, hypertension and other diseases, and has obtained good results [20]. Previous studies have confirmed that intervention like appropriate acupressure during the process of vaginal trial-production in parturients with scarred uterus re-pregnancy can improve the confidence of parturients in vaginal delivery and the success rate, stabilize negative emotions, and relieve pain during labor, which, to some extent, contribute to the successful completion of spontaneous vaginal delivery in parturients with scarred uterus [21, 22]. Hongxia et al. found that routine nursing combined with acupressure could effectively increase the confidence of parturients with scarred uterus in vaginal delivery and the success rate, improve the degree of anxiety and depression, and reduce postpartum hemorrhage, which was conducive to postpartum recovery [23]. Acupressure applied in midwifery and nursing modes during delivery has shown a good effect on relieving parturient pain, accelerating progress of labor and facilitating uterine contraction [24]. Therefore, acupressure was applied in the process of delivery in this study.

In midwife nursing intervention used in this study, one-to-one outpatient consultation service was provided first for parturients to fully answer their doubts and relieve anxiety. Meanwhile, relevant medical knowledge was popularized to pregnant women in order to let them better understand that spontaneous vaginal delivery was good for both mothers and infants. Self-management in prenatal diet and weight and labor skills laid a solid foundation for the successful completion of vaginal trial-production. Especially, parturients with scarred uterus re-pregnancy should start self-management mode early, obtain early evaluation and decide delivery mode, which to some extent, helps to increase the success rate of spontaneous vaginal delivery [25]. Continuous fetal rate monitoring performed during the process of labor could timely and indirectly reflect maternal and infant abnormal signs, such as uterine rupture and fetal distress, so as to provide better and more scientific nursing for mothers and infants. Acupressure during the process of labor could effectively relieve pain caused by uterine contraction. Acupressure by stimulating specific points could dredge the channel and promote blood circulation to arrest pain [26]. Points massaged mainly included Guanyuan, Hoku, Kunlun, Zhongji, and Sanyinjiao points. It is recorded in Compendium of Acupuncture and Moxibustion that “acupuncture by discharging Sanyinjiao point and supplementing Hoku point will make the fetus be born”, and “supplementing Hoku point will make the fetus be delivered”. It clearly indicates that Sanyinjiao and Hoku points can regulate the menstrual function, invigorate the circulation of blood and expedite child delivery, which are of great significance to expediting child delivery in the process of labor. Guanyuan and Zhongji points are located in the Ren channel and are intersections of the Ren channel and three yin meridians of foot, which intend to obtain the essence and blood of three yin meridians for nourishment. The combination of Kunlun and Zhongji points can promote blood circulation to arrest

### Table 4. Comparison of nursing satisfaction (n, %)

<table>
<thead>
<tr>
<th>Group</th>
<th>Very satisfied</th>
<th>Satisfied</th>
<th>Not satisfied</th>
<th>Total satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (n=42)</td>
<td>17 (40.48)</td>
<td>18 (42.86)</td>
<td>7 (16.67)</td>
<td>35 (83.33)</td>
</tr>
<tr>
<td>Research group (n=43)</td>
<td>21 (48.84)</td>
<td>21 (48.84)</td>
<td>1 (2.33)</td>
<td>42 (97.67)</td>
</tr>
<tr>
<td>χ²</td>
<td></td>
<td></td>
<td></td>
<td>5.125</td>
</tr>
<tr>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td>0.024</td>
</tr>
</tbody>
</table>
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pain and to relax muscles and joints, which plays an important role in relieving pain caused by uterine contraction [27, 28].

In this study, parturients in the research group had significantly higher spontaneous vaginal delivery rate, lower rates of lateral episiotomy, puerperal infection and neonatal asphyxia, shorter birth process time and less postpartum 2 h and 24 h hemorrhage compared with the control group. The safety and feasibility of vaginal delivery in parturients with scarred uterus re-pregnancy had been confirmed, which was generally consistent with current reports. Moreover, midwife intervention coupled with acupressure in parturients with scarred uterus re-pregnancy had been confirmed to increase spontaneous delivery rate, shorten birth process time, reduce hemorrhage and avoid adverse maternal and infant outcomes, which was consistent with the above reports. After intervention, negative emotion scores and pain scores of parturients in the research group were significantly lower than those in the control group, confirming that midwife intervention coupled with acupressure contributed to the relief of pain caused by uterine contraction, the improvement of negative emotions such as anxiety and depression and the successful completion of spontaneous delivery, which was consistent with the report by Hongxia et al. [23]. Nursing satisfaction in the research group was significantly higher than that in the control group, suggesting that parturients by the midwifery mode were more satisfied with obstetric nursing services.

The superiority of this study was that midwife intervention coupled with acupressure played a synergistic role in vaginal delivery of parturients with scarred uterus re-pregnancy and promoted the development of traditional Chinese medicine. However, there were some limitations in this nursing mode. High professional skills were required for midwives. Midwives in the majority of hospitals do not have acupressure skills, thus limiting the promotion. Therefore, it is necessary to improve personal ability development of midwives and carry out regular skill training, so as to promote the overall popularization of this nursing mode. There were some shortcomings in this study. Sample size in this study was small, and the effect of different regions and different education background of parturients and their families on the results was not considered. Therefore, a further multi-center study with larger sample size is required at a later stage.

In conclusion, midwife intervention coupled with acupressure can alleviate the degree of anxiety and depression in parturients with scarred uterus re-pregnancy, accelerate the progress of labor, relieve pain, increase the success rate of spontaneous vaginal delivery, and reduce the risk of adverse maternal and infant outcomes.

Disclosure of conflict of interest

None.

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