Original Article

Effect of carboprost tromethamine injection combined with modified B-lynch suture and carboprost methylate suppositories in parturients with placenta previa

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Abstract: Objective: To investigate the clinical value of carboprost tromethamine injection combined with modified B-lynch suture and carboprost methylate suppositories in the treatment of placenta previa parturients with postpartum hemorrhage after cesarean section. Methods: A total of 102 parturients with placenta previa and postpartum hemorrhage after cesarean section in our hospital were selected as the study subjects, and they were divided into Group A (carboprost tromethamine injection combined with modified B-lynch suture, n=35), Group B (carboprost methylate suppositories, n=34), and Group C (carboprost tromethamine injection, n=33) in accordance with a random number table. The amounts of hemorrhaging and clinical indices in the three groups were recorded, and the rescue effects were compared among the three groups. Results: The amount of hemorrhaging in Group A was significantly lower than that in Groups B and C during surgery and 24 h after surgery (P<0.05). There were markedly improved clinical indices in Groups A, B and C, showing statistical significance (P<0.05). There were statistically significant differences in hemostatic failure rate, hysterectomy, postoperative abdominal pain and puerperal infection between Groups A and B (P<0.05). The intraoperative indices, postoperative infection, effective hemostasis rate and rate of advanced postpartum hemorrhage in Group A were remarkably higher than those in Groups B and C (P<0.05), showing statistical significance (P<0.05). There were statistically significant differences in blood oxygen saturation and pulse among the three groups before surgery and 2 h after surgery (P<0.05). Conclusion: Carboprost tromethamine injection combined with modified B-lynch suture and carboprost methylate suppositories can reduce the amount of hemorrhaging and the risk of postoperative infection in placenta previa patients with postpartum hemorrhage after cesarean section.

Keywords: Carboprost tromethamine injection, modified B-lynch suture, postpartum hemorrhage after cesarean section

Introduction

Placenta previa is a dangerous complication during pregnancy. Some pregnant women with placenta previa in the lower part of uterus have to undergo placental separation during delivery [1, 2]. The sinuses begin to enlarge and are less likely to close spontaneously. It will eventually lead to intractable postpartum hemorrhage, and a large amount of bleeding will endanger the life of the pregnant women. Clinically, cesarean section is extensively adopted to eliminate the danger caused by placenta previa [3]. However, some pregnant women with placenta previa attached to the lower part of uterus have to undergo hysterectomy during delivery. In the medical field, intractable postpartum hemorrhage induced by placenta previa indicates a patient whose amount of postpartum hemorrhage exceeds 1500 ml within 1 h and hemorrhages after receiving some conventional surgical procedure [4]. To a certain extent, this may lead to the damage of one or more organs of the pregnant woman, and the obstruction of coagulation functions. Therefore, rapid and effective hemostasis is by far the preferred clinical option in the medical field. Regarding hemostasis, oxytocin combined with interrupted suture for placental separation is adopted to treat this type of postpartum hemorrhage, yet the therapeutic effects need to be further investigated [5].
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Such disease primarily refers to a disease in which the placenta is attached to the lower part of uterus during pregnancy, and it is a very common complication during pregnancy [6]. The placenta previa adds psychological and physical burdens to pregnant women, resulting in a higher incidence of hemorrhage during pregnancy. As a result, the lives of both the pregnant women and fetuses are threatened. Pregnant women with placenta previa need cesarean section when giving birth, because cesarean section can ensure their safety to a certain extent [7]. It is worth noting that patients with placenta previa are susceptible to severe hemorrhaging after cesarean section, which may lead to death. Therefore, proper clinical measures should be taken to treat patients with placenta previa and postpartum hemorrhage after cesarean section. Regarding the current medical level, such patients receive drug treatment to reduce the amount of postpartum hemorrhaging and the side effects. However, most patients have adverse reactions during treatment [8]. Modified B-lynch suture can help to stop hemorrhaging through surgical sutures. Such suturing can greatly retain the reproductive function of pregnant women while reducing the amount of postpartum hemorrhage. Misoprostol can help to increase the frequency and tension of contractions of the uterine smooth muscle, so as to mitigate the occurrence of postpartum hemorrhage [9, 10].

In gynecology and obstetrics, placenta previa is a very common pregnancy complication. At week 28 after pregnancy, the placenta is attached to the lower part of the uterus, the lower edge of the placenta has completely covered the inner cervix, which is called placenta previa [11]. Placenta previa causes late hemorrhage and postpartum hemorrhage during childbirth. If proper measures are not taken, the life of the pregnant woman can be endangered. Therefore, applicable protective measures should be adopted during childbirth to control the amount of hemorrhage during cesarean section [12-14]. Through cesarean section, the fetus can be delivered in the shortest time, and relevant treatment on the placenta under direct vision can be performed, so that the lives of the parturients and the fetuses can be ensured to some extent. A cesarean section can avoid damage to the life and health of parturients and fetuses through a vaginal delivery.

During cesarean section, the parturient’s abdomen and uterus must be cut open, so that the fetus can be delivered in the shortest time possible. Regarding parturients in China, the incidence rate of postpartum hemorrhage after cesarean section is between 2% and 11% [15], contributing significantly to an increased mortality of parturients. Clinically, carboprost tromethamine injection is extensively adopted to treat uterine fatigue, and Modified B-lynch suture has a compression effect on the uterine vessels of parturients, thereby controlling the amount of postpartum hemorrhage.

Materials and methods

General data

A total of 102 placenta previa patients with postpartum hemorrhage after cesarean section admitted to our hospital from May 2019 to May 2020 were selected as the study subjects, and they were divided into Group A (carboprost tromethamine injection combined with modified B-lynch suture, 35 cases), Group B (carboprost methylate suppositories, 34 cases), and Group C (carboprost tromethamine injection, 33 cases) in accordance with a random number table. Upon the review and approval from the Medical Ethics Committee of The First Hospital of Shanxi Medical University, the inclusion criteria as follows: ① parturients with intraoperative hemorrhage after cesarean section, the amount of hemorrhage exceeds 1500 mL, and the hemorrhage speed is fast; ② all clinical indices of parturients are in line with the indications for cesarean section; ③ parturients whose conditions have not improved after clinical treatment; ④ voluntary participation and signing of the informed consent form by the parturient or their families. Exclusion criteria: ① parturients with other chronic diseases; ② parturients with hepatic and renal dysfunction; ③ voluntary withdrawal or dropout of subjects.

Intervention methods

Group A: Carboprost tromethamine injection combined with modified B-lynch suture was adopted. The parturients were treated with Modified B-lynch suture and 0.25 mg of carboprost tromethamine injection. The injection was given with an interval of 15 min-90 min, and the maximum dose was 2 mg. However, the specific dosage and time of administration...
depend on the actual conditions of the parturients.

Group B: Carboprost methylate suppositories were adopted. When the amount of hemorrhage exceeded 500 mL, the parturients were given sublingual medication, and gauze strips were placed into the uterine cavity by the filling technique, and sutured. Within 24 h-48 h after cesarean section, an approximate amount of oxytocin was injected, and the implant in the abdominal cavity was taken out.

Group C: Carboprost tromethamine injection was adopted. When congestion was basically improved, carboprost tromethamine injection was given and the hemostatic effects of parturients were observed. If the hemostatic effect was good, the uterine cavity would be sutured using conventional sutures.

**Observational indices and assessment criteria**

**Amount of hemorrhage after cesarean section:** The amount of intraoperative hemorrhage was measured by weight or volume.

**Amount of hemorrhage within 24 h after cesarean section:** The life conditions and the amount of postpartum hemorrhage of parturients within 24 h were assessed, with care for the amount of hemorrhage not to exceed 100 ml.

**Pregnancy outcomes and complications:** Including failure rate of hemostasis, hysterectomy, postoperative abdominal pain and puerperal infection.

**Blood oxygen saturation:** Blood oxygen saturation (\(\text{SaO}_2\)) refers to the volume percentage of hemoglobin bound with oxygen in human plasma, namely, the concentration of oxygen in the blood. It is an important physiological parameter. The oxygen saturation in a normal human body is 98%, which is close to saturation.

**Pulse:** Refers to the heart beat rate and it can be felt on the surface of the skin. The pulse and the heartbeat of a healthy person are consistent, namely, 60-100 beats per minute. Usually, the pulse of a person at rest is 70 to 80 beats per minute.

**Statistical methods**

SPSS 20.0 was used to perform calculations through digital conversion, for statistical analysis. GraphPad Prism was used to illustrate the figures. Student’s t test was adopted to carry out the statistical detection, so as to enhance the persuasiveness of the experiments. \([n \%] \) was used to conduct standard detection of internal subtle differences among groups. The statistical detection was conducted using the variance. Student’s t test was adopted to carefully detect the measured data, and identify the differences among the experiments. There were significant differences in the results calculated by formulas among groups, and the statistical threshold for significance was set at \(P < 0.05\).

**Results**

**Comparison of differences in general clinical indices among the three groups**

There was no statistically significant difference in the mean age (28.48 ± 3.18, 27.38 ± 4.08, 27.28 ± 3.58), pregnancy times (1.68 ± 0.68, 1.98 ± 0.78, 1.68 ± 0.48) and gestational weeks (37.60 ± 0.60, 37.00 ± 0.70, 37.6 ± 0.80) among Groups A, B and C (Table 1) \((P > 0.05)\).

**Comparison of pregnancy outcomes and complications among the three groups**

The incidence rates of intraoperative hemostatic failure, hysterectomy and postoperative abdominal pain in Groups A and B were lower than those in Group C, and the differences were statistically significant \((P < 0.05)\). The total effective rate (80%) of clinical treatment in Group A was significantly higher than the total effective rates (70.59% and 30.30%) in Groups B and C, and the differences were statistically significant \((P < 0.05)\) (Table 2).

### Table 1. Comparison of general clinical indices among the three groups

<table>
<thead>
<tr>
<th>General clinical data</th>
<th>Group A (n=35)</th>
<th>Group B (n=34)</th>
<th>Group C (n=33)</th>
<th>F/X²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>28.48 ± 3.18</td>
<td>27.38 ± 4.08</td>
<td>27.28 ± 3.58</td>
<td>0.226</td>
<td>0.822</td>
</tr>
<tr>
<td>Pregnancy times</td>
<td>1.68 ± 0.68</td>
<td>1.98 ± 0.78</td>
<td>1.68 ± 0.48</td>
<td>0.109</td>
<td>0.913</td>
</tr>
<tr>
<td>Mean gestational week (weeks)</td>
<td>37.60 ± 0.60</td>
<td>37.00 ± 0.70</td>
<td>37.6 ± 0.80</td>
<td>1.119</td>
<td>0.571</td>
</tr>
</tbody>
</table>
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Table 2. Comparison of pregnancy outcomes and complications among the three groups

<table>
<thead>
<tr>
<th>Items</th>
<th>Group A (n=35)</th>
<th>Group B (n=34)</th>
<th>Group C (n=33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intraoperative hemostatic failure</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
<td>1 (3.03%)</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>0 (0.00%)</td>
<td>2 (5.88%)</td>
<td>3 (9.09%)</td>
</tr>
<tr>
<td>Postoperative abdominal pain</td>
<td>4 (11.43%)</td>
<td>6 (17.64%)</td>
<td>10 (3.03%)</td>
</tr>
<tr>
<td>Puerperal infection</td>
<td>3 (8.57%)</td>
<td>2 (5.88%)</td>
<td>9 (2.73%)</td>
</tr>
</tbody>
</table>

Comparison of the amount of intraoperative hemorrhage among the three groups

After applying different interventions to the three groups of parturients, the amount of intraoperative hemorrhage in Groups A, B and C were (523.58 ± 174.38), (646.58 ± 188.18) and (892.98 ± 233.28), respectively. Therefore, it can be seen that the amount of intraoperative hemorrhage was significantly lower in Group A who received carboprost tromethamine injection combined with modified B-lynch suture, and the differences were statistically significant (P < 0.05) (Figure 1).

Comparison of the amount of postoperative hemorrhage within 24 h among the three groups

After applying different interventions to the three groups of parturients, the amount of postoperative hemorrhage within 24 h in Groups A, B and C were (608.88 ± 197.28), (724.18 ± 213.58) and (866.68 ± 244.38), respectively. Therefore, it can be found that the amount of postoperative hemorrhage within 24 h was significantly lower in Group A that received carboprost tromethamine injection combined with modified B-lynch suture, and the differences were statistically significant (P < 0.05) (Figure 2).

Comparison of the surgical duration among the three groups

After applying the different interventions to the three groups of parturients, there was no statistically significant difference in the surgical duration between Groups A and B (P > 0.05), but there was a difference in the surgical duration between Group C and Groups A and B, and the difference was statistically significant (P < 0.05) (Figure 3).

Comparison of clinical therapeutic effects among the three groups

After applying different interventions to the three groups of parturients, the effective rates of hemostasis, blood transfusion and hysterectomy in Group A were higher than those in Groups B and C (P < 0.05), yet there was no
statistical difference in the late postpartum hemorrhage among the three groups ($P > 0.05$) (Figure 4).

**Comparison of blood oxygen saturation and pulse among the three groups**

After applying the different interventions to the three groups of parturients, there was no significant difference in blood oxygen saturation and pulse among the three groups before and after surgery ($P > 0.05$) (Figure 5).

**Discussion**

Cesarean section is a very common surgical option for the delivery of babies. This option is performed on the abdomen of parturients, and the uterus is cut open with a scalpel, so as to take out the fetus [16, 17]. Parturients with placenta previa undergoing cesarean section may suffer from uterine fatigue, causing hemorrhage and relevant complications. Our study findings show that placenta previa and a huge fetus during childbirth can induce postpartum hemorrhage [18]. In order to eliminate postpartum hemorrhage and improve the quality of childbirth, physicians can help the uterus discharge the fetus after cutting the abdomen and uterus of parturients during cesarean section. In this process, the sinuses of the uterine wall enlarge, leading to hemorrhage. At this time, drug-assistance or surgical methods are adopted to promote uterine contraction, reduce the region of uterine cavity, so as to achieve hemostasis and prevent parturients from having accidents during childbirth. The research data suggest that the improvement in delivery quality with early intervention process can effectively reduce the incidence of postpartum hemorrhage [19]. The clinical postpartum hemorrhage rate and the incidence of other complications decrease. Artery ligation and Oxytocin can be adopted to treat hemorrhage of parturients with placenta previa undergoing cesarean section [20]. However, since oxytocin has a short half-life, there is resistance to placental application. Therefore, oxytocin cannot play a very satisfactory role at the optimal treatment site [21, 22]. Meanwhile, oxytocin can have side effects during use, which invade the immune cells in the human body and may cause the patient to become allergic. Therefore, arterial ligation is usually used to stop massive blood circulation during the clinical surgical processes [23]. Arterial ligation can be difficult, as such it is unlikely to be carried out in basic hospitals, and the process for conducting such surgery is very difficult. Therefore, massage is primarily implemented to reduce postpartum hemorrhage in basic hospitals, and it can markedly reduce hemorrhage of parturients to a certain extent [24, 25]. Carboprost tromethamine injection can promote uterine contraction. A study shows that the hemostatic effect of carboprost tromethamine injection at the muscle level is obviously improved in the postoperative recovery of placenta previa parturients with postpartum hemorrhage after cesarean section. Modified B-lynch suture, a new suture technique, can be used to tightly suture uterine muscles, causing physical compression on blood vessels and thus forming vascular ligation and retaining the reproductive function of patients to the greatest extent [26]. The effective rate of carboprost tromethamine injection combined with modified B-lynch suture in Group A is remarkably higher than that in Groups B and C, which is statistically meaningful. Meanwhile, Modified B-lynch suture has a satisfactory effect on the prevention of complications, such as hemostasis failure and hysterectomy. The general therapeutic effect in Group A is more satisfactory than that in Groups B and C. The high success rate of hemostasis indicates that the reproductive and physiological function of parturients can be retained.
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Therefore, Modified B-lynch suture is worthy of promotion in hospitals. However, the limitation of this study is that on the one hand, the included subjects are relatively few, and on the other hand, the source of patients is relatively single and lacks diversity; which may have a certain impact on the results of the intervention, and therefore the study is planned to be extended and improved in the next step.

Disclosure of conflict of interest

None.

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