Advances in Obstetrics and Gynecology Research, 2023, Volume 1, Issue 2
https://ojs.bbwpublisher.com/index.php/AOGR

Examining Clinical Application Value of Uterine Compression Suture in the Treatment of Postpartum Hemorrhage

Wei Zhang*

Danyang People's Hospital, Danyang 212300, Jiangsu Province, China

***Corresponding author:** Wei Zhang, zhangwei_dy@163.com

Abstract: *Objective:* To observe and explore the clinical effect of uterine compression sutures in treating postpartum hemorrhage. *Methods:* 56 patients with postpartum hemorrhage were diagnosed and treated from January 2020 to December 2022. According to the coin toss method, they were divided into the conventional group (given routine hemostatic treatment) and the research group (given uterine compression suture), with 28 cases in each group. The hemostatic efficiency, postoperative recovery time, postoperative bleeding volume, and complication rate were compared between the two groups. *Results:* The hemostatic efficiency of the research group was higher than that of the conventional group ($P < 0.05$); the hemostasis time, total hospitalization time, lochia excretion promotion time, and time for the menstrual cycle to return to normal in the research group were shorter than those of the conventional group ($P < 0.05$); the bleeding volume at 2 hours and 24 hours after surgery in the research group was lower than that in the conventional group ($P < 0.05$); the total incidence of complications such as fever, uterine adhesions, incisional bleeding, and fluid dark areas in the research group was lower than that in the conventional group ($P < 0.05$). *Conclusion:* The hemostatic effect of the uterine compression suture is accurate. It stops bleeding quickly and can significantly reduce the amount of perioperative bleeding. It can also reduce postoperative complications and speed up recovery with a specific reference value.

Keywords: Postpartum hemorrhage; Uterine compression suture; Postoperative bleeding volume; Complications

Online publication: September 26, 2023

1. Introduction

Postpartum hemorrhage is a standard delivery complication among pregnant women, that is, the amount of maternal bleeding ≥ 500 mL 24 hours after delivery [1]. This condition is dangerous and critical and is an essential factor leading to the perinatal death of pregnant women. Especially within 2 hours after the mother delivers the fetus, it is a high bleeding period that requires great clinical attention [2]. Postpartum hemorrhage is usually related to many factors, such as placenta implantation, placental adhesion, placenta previa, uterine atony, and soft birth canal injury. It seriously threatens the patient's safety and requires timely and effective hemostatic treatment [3]. Uterine compression suture is a highly recommended hemostasis method in modern clinical obstetrics, including B-lynch suture, lower uterine segment compression/constriction suture, Cho

suture, and Hayman suture. It mainly uses squeezing and binding. The uterine wall and other operations are used to promote local thrombus formation, thereby slowing down the blood flow rate of the uterine artery and achieving hemostasis [4]. Therefore, this study includes 56 patients with postpartum hemorrhage as clinical subjects to observe and explore the efficacy of uterine compression sutures, hoping to provide evidence-based support for treating patients with postpartum hemorrhage effectively.

2. General information and methods

2.1. General information

Fifty-six patients with postpartum hemorrhage were diagnosed and treated from January 2020 to December 2022. They were divided into the conventional group (n = 28) and the research group (n = 28) using the coin-tossing method. The patients with postpartum hemorrhage in the conventional group had cesarean section, aged 23–33 years old with an average age of 28.47 ± 3.52 years; gestational age of 37–40 weeks with an average of 38.68 ± 0.62 weeks; 10 were multiparous women and 18 were primiparous women; 12 cases of uterine inertia and bleeding, 4 cases of original scar incision bleeding, 6 cases of soft birth canal injury bleeding, and 6 cases of placental factor bleeding. All patients with postpartum hemorrhage in the research group had cesarean section, aged 22–35 years old with an average age of 28.49 ± 3.55 years; gestational age of 37–39 weeks with an average of 38.66 ± 0.31 weeks; 11 were multiparous women and 17 were primiparous women; 10 cases of uterine atony bleeding, 5 cases of original scar incision bleeding, 7 cases of soft birth canal injury bleeding, and 6 cases of placental factor bleeding. There was no statistical difference in general information such as age, gestational age, mode of delivery, delivery history, and causes of bleeding between the two groups of patients with postpartum hemorrhage ($P > 0.05$).

Inclusion criteria included patients with postpartum hemorrhage confirmed by clinical obstetrics and gynecology examination according to "Practical Gynecology" [5], patients with singleton term pregnancy and delivery, patients with normal coagulation function, and patients with informed consent to this study.

Exclusion criteria included patients with gestational diabetes and hypertension, heart, liver, and kidney insufficiencies, infectious diseases, mental illness, and autoimmune diseases.

2.2. Methods

Twenty-eight patients with postpartum hemorrhage in the conventional group were given routine hemostatic treatment, including gentle massage of the uterus to promote recovery of uterine contractions, removal of retained objects and removal of the placenta, filling of the uterine cavity with gauze or uterine balloon-soaked in hot saline, injection of oxytocin and addition of powerful uterotonic agents such as ergometrine or uterine, application of tranexamic acid to stop bleeding, suture of patients with damaged soft birth canals, and ligation of bilateral uterine arteries or removal of the uterus if necessary to stop bleeding.

In addition to the above measures, 28 patients with postpartum hemorrhage in the research group were also given uterine compression sutures, including:

(1) B-lynch sutures: mainly used for bleeding caused by uterine contraction weakness and excessive placental attachment surface. The needle was inserted 3 cm below the uterine incision and 3 cm from the left edge of the uterus. The needle was then taken at 3 cm above the uterine incision and about 4 cm from the left edge of the uterus. The fundus was crossed backward, and the fundal ligaments were sewed in between and penetrated at a symmetrical point on the right outside. The fundus of the uterus was crossed forward, the right side of the uterus was sutured in the same way, and the sutures were adjusted so that they were symmetrically distributed on the surface of the uterus like overalls.

The sutures were then tightened below the incision, and an assistant was recruited to help compress the uterine body while tying the knot so that there was no mobility. After bleeding, the incision was closed routinely. After the suturing, the uterus was placed in the cavity, and the abdomen was closed if there was no abnormality.

(2) Lower uterine segment compression/constriction sutures: mainly used for bleeding caused by contraction weakness of the lower uterine segment and excessive weakness of the original scar tissue. The peritoneum of the bladder was pushed down and folded to expose the lower uterine segment fully. The descending branches of both uterine arteries were ligated at the level of the internal os of the cervical histology. Then, either the weak lower uterine segment anterior wall or posterior wall was sutured in parallel interrupted rows and knotted on the uterine serosal surface. During interrupted suturing, the front and back walls were fully sutured without penetrating the uterus. Usually, the needle was inserted into the myometrium for 2.5–3.0 cm, and then the needle was removed and knotted to speed up the suturing speed and enhance the compression effect. This suturing method is effective in treating bleeding caused by placenta previa as it is often located in the lower segment of the uterus near the internal os of the cervix.

(3) Cho sutures: suitable for local active bleeding in the uterine cavity. The first needle was inserted into the site of severe uterine bleeding and penetrated the front and back walls of the uterus; then sutured the front and back walls of the uterus 2–3 cm from the exit point of the first needle; the needle was inserted 2–3 cm from one side of the needle and sutures through the front and back walls of the uterus; the needle was inserted 2–3 cm from the exit point of the third needle and sutures through the front and back walls of the uterus. The sutures were knotted and the incision was closed after confirming no active bleeding. If bleeding occurs at the site of placental adhesion, multiple full-thickness square sutures can be performed at the site.

(4) Hayman sutures: modified B-lynch sutures. The bladder's peritoneum was pushed down and folded to fully expose the uterus's lower segment. The needle insertion point was 1–2 cm from the right edge of the uterus and 1–2 cm from the right lower edge of the uterine incision. A straight needle and no. 1 thread were used to penetrate the front and back walls of the uterus and then went around the fundus of the uterus, followed by tying the sutures. The left side was treated similarly. The incision was closed after confirming that there was no active bleeding.

2.3. Observation indicators

The observation indicators of this study included:

(1) Hemostatic efficiency: If the bleeding stopped, all signs were stable, and uterine contractions were effective, it is judged to be markedly effective; if the bleeding volume decreased and was < 50 mL per hour, all signs returned to stable, and the uterine contractions gradually recovered, it is judged to be effective; if the bleeding did not stop and was ≥ 50 mL per hour, the physical signs were still unstable, even continued to worsen, and the uterine contractions had not recovered, so it is judged to be ineffective. Among them, the sum of markedly effective and effective cases accounts for the total effective rate.

(2) Postoperative recovery indicators: Included the hemostasis time, total hospitalization time, lochia excretion promotion time, and time for the menstrual cycle to return to normal.

(3) Postoperative bleeding amount: Included bleeding volume in 2 hours and 24 hours after surgery.

(4) Complications: During hemostatic treatment, patients with postpartum hemorrhage were observed to

have complications such as fever, uterine adhesions, incisional bleeding, and fluid dark areas.

2.4. Data statistical processing

SPSS 22.0 medical software was used to observe the indicators statistically. Count data such as hemostatic efficiency and complication rates of the two groups of patients were described in the form of cases (n) and percentages (%), and the χ^2 test was used to test the data differences between the groups; measurement data such as postoperative recovery indicators including postoperative bleeding volume were described in the form of mean ± standard deviation (SD), and t-test was used to test the data differences between groups; when the test result P value is < 0.05, the difference is statistically significant.

3. Results

3.1. Comparison of hemostatic efficiency between the two groups

Table 1 shows that the hemostatic efficiency of patients with postpartum hemorrhage in the research group was higher than that in the conventional group ($P < 0.05$).

Table 1. Comparison of hemostatic efficiency between two groups [n (%)]

Group	Markedly effective	Effective	Ineffective	Total effective rate
Research group (n = 28)	17 (60.71%)	9 (32.14%)	2 (7.14%)	26 (92.86%)
Conventional group (n = 28)	13 (46.43%)	7 (25.00%)	8 (28.57%)	20 (71.43%)
χ^2				8.740
P				< 0.05

3.2. Comparison of postoperative recovery indicators between the two groups

The hemostasis time, total hospitalization time, lochia excretion promotion time, and time for the menstrual cycle to return to normal in the research group were shorter than in the conventional group ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of postoperative recovery indicators between the two groups (mean ± SD)

Group	Hemostasis time (min)	Total hospitalization time (d)	Lochia excretion promotion time (weeks)	Time for the menstrual cycle to return to normal (months)
Research group (n = 28)	1.33 ± 0.16	5.15 ± 0.99	5.08 ± 1.11	4.45 ± 1.17
Conventional group (n = 28)	3.05 ± 0.12	7.35 ± 0.92	9.34 ± 1.38	7.85 ± 1.62
t	8.096	6.342	7.202	5.189
P	< 0.05	< 0.05	< 0.05	< 0.05

3.3. Comparison of postoperative bleeding volume between the two groups

Table 3 shows that the bleeding volume 2 hours and 24 hours after surgery in the research group was lesser than in the conventional group ($P < 0.05$).

Table 3. Comparison of postoperative bleeding volume between the two groups (mean ± SD, mL)

Group	Bleeding volume 2 hours after surgery	Bleeding volume in 24 hours after surgery
Research group (n = 28)	32.49 ± 3.26	199.84 ± 21.25
Conventional group (n = 28)	45.71 ± 5.88	262.45 ± 19.83
t	5.796	4.332
P	< 0.05	< 0.05

3.4. Comparison of complications between the two groups

Patients with postpartum hemorrhage in the research group had fewer complications during hemostatic treatment than those in the conventional group ($P < 0.05$), as shown in **Table 4**.

Table 4. Comparison of complications between the two groups [n (%)]

Group	Fever	Intrauterine adhesions	Bleeding from the incision	Fluid sonolucent area	Overall incidence
Research group (n = 28)	1 (3.57%)	0	1 (3.57%)	1 (3.57%)	3 (10.71%)
Conventional group (n = 28)	4 (14.29%)	1 (3.57%)	2 (7.14%)	3 (10.71%)	10 (35.71%)
χ^2					9.787
P					< 0.05

4. Discussion

Postpartum hemorrhage poses a severe threat to maternal life safety. Closing the blood sinus promptly and improving hemostasis efficiency are the keys to saving the patient's life [6]. At present, there are many methods to treat patients with postpartum hemorrhages, such as intrauterine packing of saline gauze or uterine balloon, powerful uterotonic and long-acting oxytocin injection, uterine artery ligation, uterine massage, hysterectomy, especially uterine compression suture, is currently the most widely used postpartum hemostasis method [7]. This study was randomized controlled, and the results showed that the hemostatic efficiency of the research group was 92.86%, which was higher than that of the conventional group, 71.43% ($P < 0.05$). It shows that uterine compression suture has a definite hemostatic effect. In a study report by Li and Feng [8], the effects of uterine compression sutures in the observation group and conventional hemostatic treatment in the control group were compared. The results showed that the hemostatic effect of the observation group was 95.83%, which was higher than that of the control group, which was 79.17%. The hemostatic efficiency is highly consistent with this study. Although conventional methods to stop bleeding have a specific effect, they are not compelling enough, and the overall effect is unsatisfactory. For example, during the process of uterine cavity packing with saline gauze, the risk of hidden bleeding may increase because the gauze packing is uneven, dead space is left, or the packing is not tight, leaving saline gauze or uterine cavity balloon in place for a long time can quickly induce infection [9]. Uterine compression suture mainly slows down and delays the local blood flow rate by compressing the uterine wall, thereby promoting the formation of thrombosis at the vascular stump to achieve adequate hemostasis [10]. At the same time, the bleeding volume at 2 hours and 24 hours after surgery in the research group was lower than that in the conventional group. The time to stop bleeding, total hospitalization, promote lochia excretion, and return to normal menstrual cycle were shorter than in the conventional group (P <0.05). It shows that uterine compression sutures can reduce the amount of bleeding and speed up the patient's postoperative recovery. A randomized controlled study conducted by Yang *et al.* reported

the observation group had less intraoperative and postoperative bleeding than the control group [11]. Another randomized controlled study by Chen *et al.* also reported the hemostasis time of uterine compression suture was shorter than that of uterine cavity packing gauze and uterine cavity balloon [12]. Whilst there are currently four most common hemostasis methods for uterine compression suture (B-lynch suture, lower uterine segment compression/constriction suture, Cho suture, and Hayman suture), each has its specific indications, which can meet the treatment needs of different patients and increase clinical benefits [13]. Finally, the total incidence rate of complications such as fever, intrauterine adhesions, incisional bleeding, and fluid dark areas in the research group was 10.71%, which was lower than in the conventional group, 35.71% ($P < 0.05$). A randomized controlled study by Chen found that the overall complication rate after uterine compression suture surgery was 4.00%, which was lower than the 16.00% rate in the control group [14]. Compared with a lower complication rate in this study, this may be related to the sample size. Nonetheless, uterine compression suture is a reliable and safe way to stop bleeding and reduce postoperative complications.

In summary, uterine compression suture has a definite hemostatic effect, can shorten the hemostasis time, reduce the amount of bleeding, reduce complications, and speed up the patient's postoperative recovery, and is worthy of widespread recommendation.

Disclosure statement

The author declares no conflict of interest.

References

[1] Niu X, Guo Y, Yang L, 2022, Research Progress on the Cause, Diagnosis, and Treatment of Postpartum Hemorrhage. Medical Information, 35(20): 161–165.

[2] Huang Q, Luo M, Liao W, et al., 2021, Investigation and Analysis of Postpartum Hemorrhage in Sichuan Provincial People's Hospital from 2013 to 2020. Practical Hospital Clinical Journal, 18(6): 194–197.

[3] Zhou G, Dai H, Chen Y, et al., 2019, Analysis of Risk Factors for Postpartum Hemorrhage. Chinese Journal of Modern Surgery, 23(2): 140–144.

[4] Song L, Zhang Z, 2021, Application of Uterine Compression Suture in Treating Postpartum Hemorrhage. China Rural Health, 13(21): 56–57.

[5] Xu C, Hua K. Practical Gynecology. 4th edn. 2018, People's Medical Publishing House, Beijing.

[6] Zhang X, 2022, Effect of Uterine Compression Suture + Uterine Balloon Compression on the Effectiveness of Hemostasis After Cesarean Section in Pregnant Women with Central Placenta Previa. Jiangxi Medicine, 57(9): 1223–1225.

[7] Fan W, 2021, Clinical Study on Uterine Compression Suture Combined with Ascending Uterine Artery Ligation in Treating Post-Cesarean Hemorrhage. Practical Clinical Integration of Traditional Chinese and Western Medicine, 21(24): 40–41 + 67.

[8] Li Y, Feng Y, 2020, Research on the Clinical Application of Uterine Compression Sutures in Treating Postpartum Hemorrhage. Chinese and Foreign Women's Health Research, 2020(7): 58 + 133.

[9] Chen S, 2020, Application Effect of Uterine Compression Suture Combined with Ascending Uterine Artery Ligation in Cesarean Section in Women with Placenta Previa. Chinese Contemporary Medicine, 27(2): 124–126.

[10] Zhong Y, Cao J, Duan F, et al., 2020, Comparison of the Clinical Efficacy of Two Uterine Compression Sutures in Treating Refractory Postpartum Hemorrhage. Chinese Family Planning and Obstetrics and Gynecology, 12(8): 59–61.

[11] Yang S, Yang L, Feng A, 2019, The Application Effect of Simple Uterine Compression Suture in Women with Uterine Inertia Hemorrhage During Cesarean Section. Clinical Medical Research and Practice, 4(1): 124–125.

[12] Chen W, Li Y, Ji Z, 2019, Comparison of the Clinical Effects of the Uterine Balloon, Gauze Packing, and Uterine Compression Suturing in Preventing and Treating Postpartum Hemorrhage. Chinese Contemporary Medicine, 26(35): 156–158 + 162.

[13] Hong H, Hu Y, 2020, Research Progress on the Impact of Uterine Compression Suture Treatment on Bleeding Volume in Postpartum Hemorrhage. Chinese Medical Science, 10(14): 54–56 + 139.

[14] Chen Y, 2020, Early Uterine Compression Suture Affects Hemostatic Effect and Complications in High-Risk Maternal Postpartum Hemorrhage Patients. Medical Equipment, 33(8): 61–62.