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Effect of Carboprost Tromethamine Combined with Uterine Strap Suture in the Treatment of Patients with Postpartum Hemorrhage Caused by Uterine Atony

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Abstract: *Objective:* To explore and analyze the effect of carboprost tromethamine combined with uterine strap suture in the treatment of postpartum hemorrhage caused by uterine atony. *Methods:* A total of 90 patients with postpartum hemorrhage due to uterine atony who were admitted to the Obstetrics Department of Dazhou Women and Children's Hospital from July 2020 to July 2023 were included in the study. They were grouped by odd and even numbers, and divided into the surgery group (n = 45) and the drug group (n = 45). The surgery group was treated with carboprost tromethamine and uterine strap suture, and the drug group was treated with carboprost tromethamine. The total effective rate, blood coagulation index, fibrinolytic function level, bleeding, and hemoglobin changes were compared between the two groups. *Results:* The total effective rate of the surgery group was significantly higher than that of the medication group ($P < 0.05$). Before treatment, the blood coagulation indicators were insignificant between the groups ($P > 0.05$); after treatment, the blood coagulation indicators in the surgery group were significantly better than those in the drug group ($P < 0.05$). Before treatment, the levels of fibrinolytic functions were insignificant between the groups ($P > 0.05$); after treatment, the levels of fibrinolytic functions in the surgery group were significantly better than those in the drug group ($P < 0.05$). The 2 h and 24 h blood loss and hemoglobin changes in the surgery group were significantly lower than those in the drug group ($P < 0.05$). *Conclusion:* Carboprost tromethamine combined with strap sutures can effectively control postpartum hemorrhage caused by uterine atony.

Keywords: Carboprost tromethamine; Strap sutures; Postpartum hemorrhage; Uterine atony

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1. Introduction

Postpartum hemorrhage is a complication that occurs after childbirth, and it is a key factor leading to maternal mortality, with a high mortality rate [1]. Uterine atony is a common cause of postpartum hemorrhage. With abnormal uterine contraction, the sinusoids on the side of the placenta will be in an open state, which then prevents blood coagulation and causes massive hemorrhage [2]. The symptoms of postpartum hemorrhage are

related to the amount of blood loss, and excessive blood loss can cause severe symptoms such as shock and anemia. Carboprost tromethamine is a prostaglandin that has an effect on the contraction of the uterus and is a commonly used drug in the treatment of postpartum hemorrhage [3]. Uterine strap suture is a method of surgical treatment of postpartum hemorrhage, which can avoid hysterectomy and maintain the patient's reproductive system. Combining carboprost tromethamine with uterine strap suture will have a stronger hemostatic effect and improve the efficiency of treatment [4]. This article aims to study and analyze the effect of carboprost trometamol combined with uterine strap suture in the treatment of patients with postpartum hemorrhage caused by uterine atony.

2. General information and methods

2.1. General information

A total of 90 patients with postpartum hemorrhage due to uterine atony who were admitted to the Obstetrics Department of Dazhou Women and Children's Hospital from July 2020 to July 2023 were included in the study. They were divided into the surgery group (n = 45) and the drug group (n = 45). The age in the surgery group was 24–37 years old, with an average age of 30.27 ± 1.85 years; the pregnancy cycle was 37–42 weeks, with an average pregnancy cycle of 39.68 ± 0.75 weeks. The age in the drug group was 23–37 years old, with an average age of 30.46 ± 1.79 years; the pregnancy cycle was 38–42 weeks, with an average pregnancy cycle of 39.85 ± 0.81 weeks. There was no statistically significant difference (P > 0.05) in general information such as age and pregnancy cycle between the groups.

Inclusion criteria included patients who met the diagnosis of uterine atony postpartum hemorrhage, patients with informed consent, and patients with a single pregnancy.

Exclusion criteria included patients who are allergic to the drugs used, patients with incomplete clinical data, patients with pregnancy complications, and patients with uterine injury.

2.2. Methods

The drug group was treated with intramuscular injection of carboprost tromethamine (250 μg), and the number of injections could be increased according to the condition.

Carboprost tromethamine and uterine strap suture were used in the surgery group, where the usage of carboprost tromethamine was the same as the drug group. The uterine strap suture was given as follows: the needle was inserted at the lower right edge of the uterine ostium, then exited at the side, the thread was pulled to the fundus of the uterus and wrapped vertically towards the posterior wall, the needle was then inserted into the uterine cavity and posterior wall, and passed through the anterior wall vertically. The needle was inserted on the left side of the anterior wall of the uterus, passed through the lower edge of the left incision, and exited, followed by pressing the uterus and tying the suture.

2.3. Observation indicators

The observation indicators of this study included:

(1) The total effective rate of treatment between the groups was categorized into markedly effective (within 15 minutes, the uterine contraction was better, and the bleeding was significantly reduced), effective (within 30 minutes, the uterine contraction was restored, and the bleeding was slightly reduced), and ineffective (poor uterine contraction and uncontrolled bleeding).

(2) Coagulation indicators were compared between groups, including thrombin time (TT), plasma prothrombin time (PT), and activated partial thromboplastin time (APTT).

(3) Fibrinogen (Fib) and D-dimer (DD) levels were compared between groups.

(4) The bleeding and hemoglobin (Hb) changes between the groups were compared, and the amount of bleeding at 2 h and 24 h was counted.

2.4. Statistical analysis

SPSS 21.0 statistical software was selected to process and analyze the data. The count data were expressed by the number of cases (*n*) and percentage (%), and the χ^2 test was implemented. The measurement data were expressed by the mean ± standard deviation (SD), and the *t*-test was implemented. $P < 0.05$ was considered statistically significant.

3. Results

3.1. Comparison of the total effective rate of the surgery group and the drug group

Table 1 showed that the total effective rate of the surgery group was significantly higher than that of the medication group ($P < 0.05$).

Table 1. The comparison of the total effective rate of treatment among the groups [n(%)]

Group	Number of cases	Markedly effective	Effective	Ineffective	Total effective rate
Surgery group	45	32 (71.11)	12 (26.67)	1 (2.22)	44 (97.78)
Drug group	45	28 (62.22)	11 (24.44)	6 (13.33)	39 (86.67)
χ^2 value	-	-	-	-	3.8726
P value	-	-	-	-	0.0490

3.2. Comparison of blood coagulation indicators between the surgery group and the drug group

Before treatment, TT, PT, APTT, and other coagulation indicators were compared between the groups, and there was no statistically significant difference (P>0.05); after treatment, TT, PT, APTT, and other coagulation indicators in the surgery group were significantly better than those in the drug group (P< 0.05). See **Table 2** for details.

Table 2. Comparison of blood coagulation indicators among the groups (mean ± SD, s)

Group	Number of cases	TT		PT		APTT	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Surgery group	45	15.21±1.21	13.57±0.25	11.52±1.64	13.57±0.94	28.54±1.75	31.24±0.56
Drug group	45	15.35±1.26	14.85±1.22	11.62±1.75	12.14±1.24	28.49±1.68	30.55±1.25
t-value	-	0.5376	6.8948	0.2797	6.1649	0.1382	3.3793
P value	-	0.5922	0.0000	0.7804	0.0000	0.8903	0.0011

3.3. Comparing the level of fibrinolytic function between the surgery group and the drug group

Before treatment, the levels of fibrinolytic functions such as Fib and D-D were compared between the groups, and there was no significant difference ($P > 0.05$); after treatment, the levels of fibrinolytic functions such as Fib and D-D in the operation group were significantly better than those in the drug group ($P < 0.05$). See **Table 3** for details.

Table 3. The comparison of fibrinolytic function levels among the groups (mean ± SD)

Group	Number of cases	Fib (g/L)		DD (mg/L)	
		Before treatment	After treatment	Before treatment	After treatment
Surgery group	45	3.15±0.52	3.91±0.45	3.75±0.64	2.45±0.55
Drug group	45	3.16±0.56	3.36±0.39	3.78±0.59	3.01±0.48
t-value	-	0.0877	6.1958	0.2311	5.1460
P value	-	0.9303	0.0000	0.8177	0.0000

3.4. Comparison of bleeding and Hb changes between the surgery group and the drug group

Table 4 showed that the 2 h and 24 h blood loss and Hb changes in the operation group were significantly lower than those in the medication group ($P < 0.05$).

Table 4. The comparison of bleeding and Hb changes among the groups (mean ± SD)

Group	Number of cases	2 h bleeding volume (mL)	24 h bleeding volume (mL)	Hb change (g/L)
Surgery group	45	375.24±65.21	842.61±75.21	37.21±4.28
Drug group	45	410.58±70.59	881.52±90.22	32.45±3.69
t-value	-	2.4668	2.2222	5.6504
P value	-	0.0156	0.0288	0.0000

4. Discussion

After a full-term pregnancy pregnant women face childbirth that has certain risks, and postpartum complications will also seriously affect the health and life of parturients [5]. Postpartum hemorrhage is one of the common complications. Assisted reproductive technology, older women, and scarred uterus are all causes of postpartum hemorrhage. Postpartum hemorrhage caused by uterine atony is the most common type of postpartum hemorrhage [6]. It refers to the after-delivery condition when the uterine contraction power is insufficient, blood cannot coagulate, and the vascular cavity is in an open state, resulting in a large amount of blood outflow, decrease in blood volume, excessive blood loss, and death of the patient [7]. Therefore, it is necessary to take drugs that stimulate uterine contraction, close blood vessels, and reduce postpartum hemorrhage. Carboprost tromethamine is widely used in the treatment of postpartum hemorrhage as it works rapidly and effectively to promote uterine contraction [8,9]. The drug inhibits adenylate cyclase, increases the concentration of calcium ions, and promotes muscle fiber contraction. It can also stimulate cell communication and stabilize the contraction state of the uterus [10]. Carboprost tromethamine can control the blood vessels of muscle fibers in multiple directions, close the blood vessel channels, and then play a hemostatic effect [11,12]. Combined treatment of carboprost tromethamine with uterine strap suture can enhance the effect of hemostasis [13,14]. Uterine strap suture is a new type of suture that sutures the front and rear walls of the uterus under pressure to close the blood sinus, and the effect of hemostasis is immediate. However, it cannot adjust uterine contraction on its own, and its control effect on lower uterine segment bleeding is average. Therefore, it can be used in combination with carboprost tromethamine to achieve hemostasis by pressing the uterus and closing the open blood flow channel. The combined treatment can also promote uterine contraction and strengthen the control of lower uterine segment bleeding [15].

The experimental results are as follows: The total effective rate of the surgery group was significantly higher than that of the drug group ($P < 0.05$); The coagulation indicators between the two groups were insignificantly different before treatment, but the indicators were significantly better in the surgery group as compared to the drug group after treatment ($P < 0.05$). Similarly, the levels of fibrinolytic functions were insignificant between the two groups before treatment, but the levels were better in the surgery group as compared to the drug group after treatment ($P < 0.05$). The 2 h and 24 h blood loss as well as Hb changes in the surgery group were significantly lower than those in the drug group ($P < 0.05$). After the treatment with carboprost tromethamine and uterine strap suture, postpartum hemorrhage was significantly controlled, coagulation indicators were restored to a certain extent, and the amount of bleeding was significantly reduced.

In summary, carboprost tromethamine and uterine strap suture have stronger control on postpartum hemorrhage caused by uterine atony, and the treatment effect is remarkable.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Zhang L, Wu Y, Xiong L, et al., 2022, Clinical Efficacy of Carboprost Trometamol Combined with Carboprost Methylate Suppository in the Treatment of Postpartum Hemorrhage Caused by Uterine Atony and Its Influence on Postpartum Lactation. Clinical Rational Drug Use Journal, 15(36): 128–130.

[2] Luo Y, 2022, Clinical Efficacy of Ergometrine Maleate Injection Combined with Carboprost Methyl Suppository in the Treatment of Postpartum Hemorrhage and Its Effect on Hemoglobin. Journal of Clinical Rational Drug Use, 15(21): 120–122.

[3] Cheng L, Jiang J, Wu J, 2022, Clinical Efficacy of Carboprost Trometamol Combined with Oxytocin in the Treatment of Postpartum Hemorrhage Due to Uterine Atony and Its Effect on Blood Coagulation. Journal of Clinical Rational Drug Use, 15(21): 123–125.

[4] Guo Q, Cai M, Luo X, 2022, Observation on the Application Effect of Modified Hayman Suture in the Prevention of Postpartum Hemorrhage When High-Risk Pregnant Women Undergo Cesarean Section and Uterine Atony is Ineffective. Practical Gynecological Endocrinology Electronic Journal, 9(19): 27–29.

[5] Cheng J, 2022, Analysis of the Effect and Adverse Reactions of Ergometrine Maleate Combined with Carboprost Tromethamine in Patients with Postpartum Hemorrhage After Second Cesarean Section. Basic Medical Forum, 26(16): 41–43.

[6] Dong W, Zhang J, Wan J, et al., 2022, Clinical Efficacy Study of Xinmupei Combined with Improved B-Lynch Uterine Suture in the Treatment of Cesarean Section Refractory Uterine Atony and Postpartum Hemorrhage. Primary Medical Forum, 26(13): 145–147.

[7] Zhang H, 2021, Clinical Efficacy of Xinmupei Combined with Improved B-Lynch Uterine Suture in the Treatment of Cesarean Section Refractory Uterine Atony and Postpartum Hemorrhage. Journal of Shanxi Health Vocational College, 31(5): 19–20.

[8] Ling G, 2021, The Effect of Carboprost Tromethamine Injection (Ximobei) Combined with Oxytocin Injection (Oxytocin) in the Treatment of Postpartum Hemorrhage Caused by Uterine Atony. Heilongjiang Traditional Chinese Medicine, 50(5): 132–133.

[9] Ao H, 2021, Curative Effect Analysis of Xinmupei Combined with Improved B-Lynch Uterine Suture in the Treatment of Cesarean Section Refractory Uterine Atony and Postpartum Hemorrhage. Medical Diet Therapy and

Health, 19(12): 31–32.

[10] Zhou H, Jin H, 2021, Clinical Effect and Safety of Carboprost Methylate Suppository Combined with Carboprost Tromethamine in the Prevention and Treatment of Postpartum Hemorrhage Due to Uterine Atony. Chinese Medicine, 16(5): 741–744.

[11] Sun H, Feng L, Cao S, 2020, Application Analysis of Oxytocin Injection Combined with Carboprost Tromethamine Injection in the Treatment of Postpartum Hemorrhage Caused by Uterine Atony. North Pharmacy, 17(4): 123–124.

[12] Su Y, 2020, Observation on the Effect of Xinmupei Combined with Improved B-Lynch Uterine Suture in the Treatment of Postpartum Hemorrhage Caused by Cesarean Section Refractory Uterine Atony. China Rural Health, 12(6): 72.

[13] Song S, 2019, Exploration of the Value of Hemopec Combined with Improved B-Lynch Uterine Suture in the Treatment of Cesarean Section Refractory Uterine Atony and Postpartum Hemorrhage. Chinese School Medicine, 33(10): 765–766 + 786.

[14] Liu Y, 2019, Observation on the Effect of Carboprost Trometamol Combined with Uterine Cavity Gauze Packing in the Treatment of Postpartum Hemorrhage Caused by Cesarean Section Uterine Atony After Cesarean Section Pregnancy Again. Chinese Medicine Guide, 17(27): 47–48.

[15] Du X, 2019, Observation on the Effect of Improved B-Lynch Uterine Suture Combined with Carboprost Trometamol Injection in the Treatment of Postpartum Hemorrhage Due to Uterine Atony. Journal of Practical Medical Technology, 26(3): 348–350.