doi.org/10.36721/PJPS.2022.35.4.SP.1169-1172.1

Effect of combination drug therapy during cesarean section in preventing postpartum hemorrhage for women with hypertensive disorder complicating pregnancy

Miaomiao Yu[1,2], Yuanzhe Wu[1] and Shibin Li[2]*
[1]Obstetrics and Gynecology Department, Nanjing General Hospital of PLA, Nanjing, China
[2]Department of Public Health, International College Krirk University, Bangkok, Thailand

Abstract: The study was carried out to observe the effect of combination drug therapy during cesarean section in preventing postpartum hemorrhage for women with hypertensive disorder complicating pregnancy (HDCP). The 180 women who had been treated in our hospital for HDCP were enrolled and randomly divided into observation group (sublingual administration of carboprost combined with oxytocin treatment (20IU oxytocin and small pot drip of 10IU oxytocin after delivery) and control group (1mg of carboprost when the fetal head came out and then applied with intramuscular injection of 20IU oxytocin), each containing 90. The comparison of postpartum hemorrhage situation between two groups was carried out. Compared with control group, the observation group had significantly lower intraoperative blood loss and postoperative 1h blood loss, $p<0.0$, but similar postoperative 2-24h blood loss, $p>0.05$; in observation, there were 6 cases of postpartum hemorrhage, while the number in control group was 20 cases. The two groups had no difference in blood pressure after treatment, $p>0.05$.The combination drug therapy during cesarean section is effective and reliable in preventing postpartum hemorrhage for women with HDCP.

Keywords: Cesarean section, drug combination, effect observation, hypertensive disorder complicating pregnancy, prevention of postpartum hemorrhage.

INTRODUCTION

Postpartum hemorrhage refers to blood loss over 500mL within 24h after delivery. Most cases of postpartum hemorrhage occur within 2h after delivery. Late postpartum hemorrhage occurs 24 h after delivery. Severe uterine hemorrhage during puerperium normally occurs 1-2 weeks after delivery (Zhou, *et al*., 2012; Zhang, 2014; Hui *et al*., 2017; Liu *et al*., 2017; Shao *et al*., 2017). Postpartum hemorrhage is a severe complication during delivery period, which may cause death of pregnant women. In recent years, the number of postpartum hemorrhage induced deaths in China is still large, and this situation is especially severe in some remote backward areas.

Relevant research points out that causes of postpartum hemorrhage include uterine atony, coagulation disorders, etc (Shown as fig. 1 and fig. 2). For pregnant women with uterine atony who have accepted cesarean section, the oxytocin treatment is normally applied to prevent postpartum hemorrhage. However, each woman has different degrees of sensitivity to oxytocin, therefore, the therapeutic effect also varies from patient to patient (Lei, 2015; Ceci *et al*., 2017). The women with hypertensive disorder complicating pregnancy should accept cesarean section and a scientific, safe and effective measure of preventing postpartum hemorrhage is very important. By adopting the method of retrospective analysis, this study investigates the effect of combined therapy on preventing postpartum hemorrhage for women (who were accepted by our hospital from June 2018 to March 2021) with hypertensive disorder complicating pregnancy during cesarean section.

Fig. 1: Uterine atony

MATERIALS AND METHODS

General data

The 180 pregnant women who had accepted cesarean section in our hospital from June 2018 to March 2021 for HDCP were selected as research objects. This study has been approved by ethics departments. The inclusion criteria: Meeting the diagnostic criteria of hypertensive disorder complicating pregnancy proposed by U.S. Centers for Disease Control and Prevention (Ceylan and Asik, 2019) (Shown as fig. 3), and accepted cesarean section; no application of prostaglandin inhibitor recently,

**Corresponding author:* e-mail: yu99j88@sina.com

no contraindication to prostaglandins; the pregnant women and relatives had the right to know and signed informed consent form.

The patients were grouped in the observation group and the control group, each containing 90 subjects. The patients were grouped in the observation group and the control group, each containing 90. All selected women met inclusion criteria. In the observation, the women's age varied from 24 years old to 40 years old and their gestational age varied from 35-42 weeks; in control group, the women's age varied from 25 years old to 38 years old and their gestational age varied from 36-42 weeks.

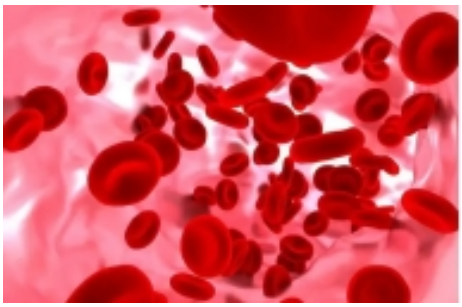

Fig. 2: Coagulation disorders

Method

After the pregnant woman was admitted into a hospital, expectant treatment, such as spasmolysis, decompression, sedation therapy, were performed for patients with moderate and severe preeclampsia. Prior to cesarean section, slow intravenous injection of 1g of ceftriaxone was administered to prevent infection. In this study, epidural anesthesia was adopted (See fig. 4). Joel-Cohen incision was made for operation. Transverse incisions were made at area 3cm under anterior superior iliac spine and area 2cm above Pfannestiel plica, allowing the aspirator to absorb amniotic fluid, until no amniotic fluid occurred upon fundal massage. Then, blunt enlargement of the incision was performed to delivery baby, and the remaining amniotic fluid was absorbed fully. For pregnant women in control group, they were only applied with intramuscular injection of 20IU oxytocin and small pot drip of 10IU oxytocin after delivery; For pregnant in research group, they were applied with sublingual administration of 1mg of carboprost when the fetal head came out and then applied with intramuscular injection of 20IU oxytocin when the baby fully came out.

Observation indexes

The blood loss was measured by volumetric method combined with weighing method. During operation, the blood loss was collected using an aspirator and then volume of blood loss was measured. On the other hand, subtract the weight of blood soaked surgical dressing from the weight of unsoaked surgical dressing, and then divided by 1.05g, the volume of blood soaked on surgical dressing can be obtained, which was another part of blood loss from the woman. By adding the two parts of volume of blood loss, the final accurate blood loss during operation can be obtained (Huppelschoten, *et al*., 2016; Li, Yang, 2015; Ceylan *et al*., 2019; Hopanci *et al*., 2019). Regarding the measurement of the postoperative blood loss, a perineal pad was placed between two leg and under the hip, and the perineal pad was replaced by a new one every two hours. Similarly by subtracting the weight of blood soaked perineal pad from the weight of unsoaked perineal pad, followed by dividing with 1.05g, the final postoperative blood loss can be obtained. The diagnosis criterion for postpartum hemorrhage is the blood loss reaches 500mL or more within 24h after delivery.

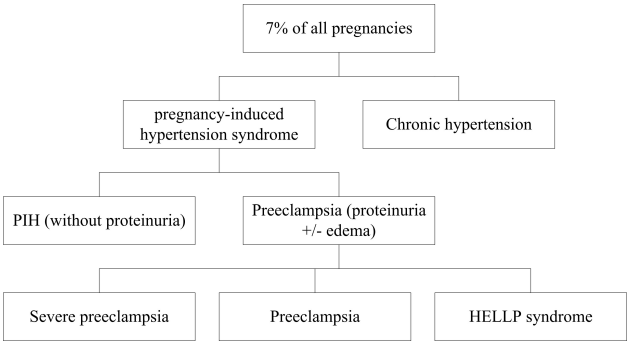

Fig. 3: Hypertensive disorder complicating pregnancy

STATISTICAL ANALYSIS

SPSS21.0 software was used for statistical analysis. The measurement data was expressed in the form of mean±average ($\bar{x}$ ±s), and intergroup difference was compared by t test. The enumeration data was expressed by natural number (n) and percentage (%), and the intergroup difference was tested by chi-square. The intergroup difference was of statistical significance when $P<0.05$.

RESULTS

There was no significant difference in the general data between two groups prior to treatment, $p>0.05$.

Postpartum blood loss

As shown in table 1, the observation group had significantly lower intraoperative blood loss and postoperative 2h blood loss, $P<0.05$ and significantly lower bleeding rate, $P<0.05$.

Blood pressure level before and after drug therapy

As shown in table 2, the two groups had no significant difference in systolic pressure and diastolic pressure before and after drug therapy, $P>0.05$.

Adverse effect rate

As shown in table 3, there was no significance difference in adverse effect rate after drug therapy between two

Table 1: Postpartum blood loss

Group	Case number	Intraoperative blood loss (Ml)	Postoperative 2h blood loss (mL)	Postoperative 2-24h blood loss (mL)	Postpartum haemorrhage rate (%)
Research group	90	170.68±30.29	70.26±16.36	92.37±16.90	6(6.67)
Control group	90	248.79±44.68	98.05±12.38	102.45±18.30	20(33.33)
t/X^2		6.79	12.18	0.68	7.35
P		<0.05	<0.05	>0.05	<0.05

Table 2: Blood pressure level before and after drug therapy between two groups (x ± s)

Group	Case number	Systolic pressure (mmHg)		Diastolic pressure (mmHg)	
		Before drug therapy	After drug therapy	Before drug therapy	After drug therapy
Research group	90	143.48±20.26	138.90±22.03	96.70±8.04	91.20±8.05
Control group	90	144.36±19.05	140.68±20.55	97.60±9.83	92.33±8.71
t		0.22	0.14	0.46	0.83
P		>0.05	>0.05	>0.05	>0.05

Table 3: Adverse effect rate [n(%)]

Group	Nausea and vomiting	Increased heart rate	Chest distress	Facial blushing	Elevated blood pressure	Adverse effect rate
Research group (n=90)	3	1	0	2	2	8 (8.89)
Control group (n=90)	4	2	1	2	2	11(12.22)
X^2						10.23
P						<0.05

groups. Moreover, the adverse effects occurred were mild, which can be fully healed upon timely treatment.

DISCUSSION

Carbonprost is a derivative of prostaglandin PGF2α, which can exert effect at uterine smooth muscle and significantly promote the uterine contraction. Through promoting the uterine contraction, it can reduce the third labor time and the rate of postpartum hemorrhage on one hand, on the other hand, it can help to squeeze the intramuscular vessels and eventually stop the bleeding (Lou *et al*., 2019). Carbonprost can effectively enhance the efficacy of oxytocin in human body, and thus consolidate the uterine contraction effect. In addition, it can bond with PGF2α on uterine artery wall, exerting sound vasoconstrictive function. Carbonprost enjoys fast absorption speed and long action time, and is easy to be administrated (Lou *et al*., 2016). The plasma drug concentration can reach the maximum value within 20 min after administration, and action time length can last 2-3 hours (Liu *et al*., 2016). Sublingual administration is a normal administration way of carbonprost, which gives realize the best drug efficacy. In contrast, administration of carbonprost via vaginal rectum will cause drug dilution (Dweik *et al*., 2018). Oxytocin is a peptide hormone dissociated from blood. The high specificity of oxytocin will exert effect at uterine smooth muscle, activating the carbonprost-related receptor, causing smooth muscle contraction and blood vessel constriction and eventually stopping the bleeding. The half-life period and lasted action time of oxytocin are shorter than carbonprost, which are normally half an hour by average. Oxytocin is normally administrated by the way of intravenous drip, so as to sustain the drug efficacy in the largest degree (Lou *et al*., 2017). Through combination application of carbonprost and oxytocin, their advantages can be supplemented with each other, leading to longer half-life period and action duration of action, faster onset time (Jozwiak *et al*., 2016; Demirel *et al*., 2016; Nie *et al*., 2018). The women in observation group who accepted combination medication had significantly less intraoperative blood loss and postoperative 2h blood loss, $P<0.0$ significant lower postpartum hemorrhage rate, $P<0.05$.

CONCLUSION

In conclusion, the combination drug therapy during cesarean section of women with HDCP can effectively prevent postpartum hemorrhage, which is reliable and worth of being promoted in clinics.

REFERENCES

Ceci O, Cantatore C and Scioscia M (2017). Ultrasonographic and hysteroscopic outcomes of uterine scar healing after cesarean section: Comparison

of two types of single-layer suture. *J. Obstet. Gynaecol. Res.,* **38**(11): 1302-1307.

Ceylan A and Asik I (2019). Percutaneous navigable intradiscal decompression in treatment of lumbar disc herniation: A single-center experience. *Turk. J. Med. Sci.,* **49**(2): 519-524.

Demirel I, Ozer AB and Atilgan R (2016). Comparison of patient-controlled analgesia versus continuous infusion of tramadol in post-cesarean section pain management. *J. Obstet. Gynaecol. Res.,* **40**(2): 392-398.

Dweik D, Girasek E, Treki A, Meszáros M and Pal A (2018). Women's antenatal preferences for delivery route in a setting with high cesarean section rates and a medically dominated maternity system. *Acta Obstet. Gynecol. Scand.,* **93**(4): 408-415.

Hopanci Bicakli D, Cehreli R, Ozveren A, Meseri R, Uslu R, Uyar M, Karabulut B and Akcicek F (2019). Evaluation of sarcopenia, sarcopenic obesity and phase angle in geriatric gastrointestinal cancer patients: Before and after chemotherapy. *Turk. J. Med. Sci.,* **49**(2): 583-588.

Hui L, Xia H S, Tang A S, Zhou Y F, Yin G Z, Hu X L, Du X D and Tang Y (2017). Stereopsis deficits in patients with schizophrenia in a Han Chinese population. *Sci. Rep.,* **7**: 45988.

Huppelschoten AG, VanGinderen JC and VanDenBroek KC (2016). Different ways of subcutaneous tissue and skin closure at cesarean section: A randomized clinical trial on the long-term cosmetic outcome. *Acta Obstet. Gynecol. Scand.,* **92**(8): 916-924.

Jozwiak M, VanDeLest HA and Burger NB (2016). Cervical ripening with Foley catheter for induction of labor after cesarean section: A cohort study. *Acta Obstet. Gynecol. Scand,* **93**(3): 296-301.

Lei Y (2015). Observation of therapeutic effect of combination medication during cesarean section for women with hypertensive disorder complicating pregnancy. *J. Pract. Gynecol. Endocrinol.,* **2**(04): 20.

Li SF and Yang Y (2015). Observation of therapeutic effect of embolization during uterine artery catheterization in preventing dangerous placenta postpartum hemorrhage prior to cesarean section. *J. Third Milit. Med. Univ.,* **37**(21): 2203-2206.

Liu C, Zhao XL, Liu C, Wang YL, Zhang W, Wang XJ and Chen ZM (2016). Application of abdominal aorta balloon block in cesarean section for dangerous placenta previa combined with placenta implantation. *J. Pract. Gynecol. Endocrinol.,* **32**(03): 204-207.

Liu Y, Wang M, Tan X, Wang X, Yang X, Xiao J, Li X and Wang F (2017). Negative correlation between cerebrospinal fluid FGF21 levels and BDI scores in male Chinese subjects. *Psychiat. Res.,* **252**: 111-113.

Lou Y, Guo D, Zhang H and Song L (2016). Effectiveness of mesenchymal stems cells cultured by hanging drop vs. Conventional culturing on the repair of hypoxic-ischemic-damaged mouse brains, measured by stemness gene expression. *Open Life Sci.,* **11**: 519-523.

Lou Y, Shi J, Guo D, Ahmad KQ and Song L (2017). Function of PD-L1 in antitumor immunity of glioma cells. *Saudi J. Biol. Sci.,* **24**: 803-807.

Lou Y, Yang J, Wang L, Chen X, Xin X and Liu Y (2019). The clinical efficacy study of treatment to Chiari malformation type I with syringomyelia under the minimally invasive surgery of resection of Submeningeal cerebellar Tonsillar Herniation and reconstruction of Cisterna magna. *Saudi J. Biol. Sci.,* **26**, 1927-1931.

Nie Y, Luo F and Lin Q (2018). Dietary nutrition and gut microflora: A promising target for treating diseases. Trend. *Food Sci. Technol.,* **75**: 72-80.

Shao TN, Yin GZ, Yin XL, Wu JQ, Du XD, Zhu HL, Liu JH, Wang XQ, Xu DW, Tang WJ and Hui L (2017). Elevated triglyceride levels are associated with cognitive impairments among patients with major depressive disorder. *Compr. Psychiat.,* **75**: 103-109.

Zhang GH (2014). Observation of effect of drug therapy in preventing postpartum hemorrhage after cesarean section for women with hypertensive disorder complicating pregnancy. *Guide China Med.,* **12**(29): 137-138.

Zhou SY, Zheng M and Gao YX (2012). Observation of effect of combination medication in preventing cesarean section postpartum hemorrhage for women with hypertensive disorder complicating pregnancy. *Matern. Matern. Child Health Care China,* **27**(08): 1241-1242.