

# MISOPROSTOL IN POSTPARTUM HEMORRHAGE WITH PREGNANCY-INDUCED HYPERTENSIVE SYNDROME: A COMPREHENSIVE OVERVIEW

**Xiaojie Liu**

Shaanxi Provincial People's Hospital, Xi'an, 710068, Shaanxi, China

## **Abstract:**

*Postpartum hemorrhage, characterized by significant blood loss following delivery, poses a severe risk to maternal well-being. Defined as blood loss exceeding 500ml after vaginal delivery and 1000ml after cesarean section within 24 hours of childbirth, this condition is particularly prevalent among pregnant women with hypertensive pregnancy syndrome. Hypertensive pregnancy syndrome, marked by hypertension developing after 20 weeks' gestation with accompanying proteinuria or organ dysfunction, is a key risk factor for postpartum hemorrhage. The multifaceted etiology of postpartum hemorrhage involves inadequate uterine contractions, often triggered by high blood pressure and vascular irregularities. These factors impede endometrial contraction and hemostatic capabilities, elevating the risk of bleeding. Additionally, hypertensive syndrome during pregnancy can lead to coagulation abnormalities, further diminishing blood clotting and increasing the vulnerability to bleeding. Swift and effective management of postpartum hemorrhage is imperative, as untreated cases can have dire consequences, including endangering the lives of pregnant individuals. Hence, close monitoring and prompt intervention in cases of postpartum hemorrhage in pregnancy-induced hypertensive syndrome are vital components of maternal healthcare.*

**Keywords:** Postpartum hemorrhage, Hypertensive pregnancy syndrome, Uterine contractions, Maternal healthcare, Coagulation abnormalities

## **1. Introduction**

Postpartum hemorrhage refers to the amount of blood loss  $\geq 500$ ml in vaginal delivery and  $1\geq 000$ ml in cesarean delivery within 24 hours after delivery. This condition can occur in pregnant women with hypertensive syndrome of pregnancy, which is hypertension that develops after 20 weeks' gestation with proteinuria or other organ dysfunction [1]. The incidence of postpartum haemorrhage is high and is one of the common complications in obstetrics and gynecology. Postpartum haemorrhage occurs for a variety of reasons. Among them, poor uterine contractions are one of the most common causes. High blood pressure and vascular abnormalities may lead to poor uterine contractions, which in turn affect the contraction and hemostatic ability of the endometrium, increasing the risk of bleeding. In addition, hypertensive syndrome during pregnancy may cause coagulation abnormalities, resulting in decreased blood clotting and increasing the risk of bleeding [2]. Prompt treatment of postpartum haemorrhage in pregnancy-induced hypertension syndrome is essential. Postpartum hemorrhage is a serious complication that, if left untreated, can lead to serious consequences and even endanger the life of the pregnant woman [3]. Therefore, pregnant women who have been diagnosed with hypertensive syndrome of pregnancy should be closely monitored for bleeding after delivery and treated accordingly.

Treatment of postpartum haemorrhage in pregnancy-induced hypertension syndrome includes pharmacologic therapy and surgical intervention [4]. When it comes to medication, misoprostol is a commonly used drug option. Misoprostol may promote uterine smooth muscle contraction, thereby reducing the risk of bleeding [5]. The main objective of this article is to investigate the efficacy of misoprostol in the treatment of postpartum hemorrhage in hypertensive syndrome of pregnancy, as follows:

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## **2. Research objects and methods**

### **2.1. Subjects of study**

A total of 62 cases of postpartum hemorrhage with gestational hypertension syndrome admitted to our hospital from January 2022 to January 2023 were selected as research objects, and all patients were divided into two groups according to the random grouping method, one was the experimental group (n=31) and the other was the control group (n=31). The age of the experimental group was 20-46 years, and the average age was (35.22±3.46) years; The control group was aged 21-44 years and had a mean age of (35.24±3.15) years. After analyzing the general data of the two groups, there was no significant significance ( $P>0.05$ ), which was comparable.

Inclusion Criteria: (1) Pregnant women diagnosed with gestational hypertension syndrome, i.e. high blood pressure (systolic blood pressure  $\geq 140$  mmHg or diastolic blood pressure  $\geq 90$  mmHg) after 20 weeks' gestation. (2) The pregnant woman agrees to receive misoprostol treatment and signs an informed consent form. (3) There are no restrictions on age, gestational age and other basic characteristics.

Exclusion Criteria: (1) Pregnant women with serious heart disease, kidney disease or other serious complications are not suitable for misoprostol treatment. (2) Pregnant women who are allergic to misoprostol or have drug interactions, the use of the drug is prohibited. (3) Pregnant women have active bleeding diseases or abnormal coagulation function. (4) Pregnant women participating in other clinical trials or receiving other interventions at the same time.

### **2.2. Research methods**

#### **2.2.1. Control group**

The control group was given oxytocin (manufacturer: Beijing Saisheng Pharmaceutical Co., Ltd., approval number: Sinopharm H11020364, product specification: 1ml: 5 units). How to use: 5--10 units per intramuscular injection, or 5--10 units added to 5% glucose injection intravenous drip, intravenous drip can continue to use.

#### **2.2.2. Experimental group**

Misoprostol was given to patients in the experimental group (manufacturer: Wuhan Jiulong Renfu Pharmaceutical Co., Ltd., approval number:

Sinopharm H20073696, product specification: 0.2mg) treatment. How to use: a single oral dose of misoprostol 0.6 mg.

Note: (1) Doctor monitoring: Doctors should regularly check the patient's blood pressure, uterine contractions and other relevant indicators to ensure the treatment effect and safety. (2) Drug dose and route: The total dose and route of administration of misoprostol should be adjusted according to the specific situation and clinical judgment of the patient. (3) Allergic reactions: patients may have allergic reactions during the use of misoprostol, such as rash, urticaria, dyspnea, etc., which need to be closely observed. (4) Adverse reactions: misoprostol may cause some adverse reactions, such as headache, nausea, vomiting, abdominal pain, etc. In case of serious adverse reactions or persistent malaise.

### **2.3. Observation indicators**

In this study, the blood loss, blood pressure index, hemoglobin level and incidence of adverse reactions in 2 and 4 hours postpartum were compared between the two groups.

Blood pressure index: Blood pressure index evaluation items mainly include systolic blood pressure (SBP), diastolic blood pressure (DBP) and pulse pressure (PP). The reference range is: systolic blood pressure: 90-120 millimeters of mercury (mmHg); diastolic blood pressure: 60-80 millimeters of mercury (mmHg); Pulse pressure difference: 30-50 mmHg (mmHg) Hemoglobin level: female: 120-150g/L.

Incidence of adverse reactions: Common clinical adverse reactions include: abdominal pain, headache, vomiting, coagulation abnormalities, and the incidence of adverse reactions = (abdominal pain + headache + vomiting + coagulation abnormalities) / total number of cases  $\times 100\%$ .

**2.4. Statistical analysis**

SPSS20.0 software was used to statistically analyze the data obtained in this study, using ( $\bar{x} \pm s$ ) and t to represent measurement data, % and x2 to represent counting data, and  $P < 0.05$  to indicate significant differences in data contrast, which was statistically significant.

**3. Research results****3.1. Comparison of postpartum blood loss in experimental group and control group at 2h and 4h**

After treatment, the amount of postpartum blood loss in the experimental group was lower than that in the control group, and the data differences were statistically significant ( $P < 0.05$ ). See Table 1 for details:

Table 1: Comparison of postpartum blood loss in experimental group and control group in 2h and 4h ( $\bar{x} \pm s$ )

Groups	Number of cases	Postpartum 2h(ml)	Postpartum 4h(ml)
Experimental group	31	237.35 $\pm$ 26.31	87.12 $\pm$ 2.08
Control group	31	339.15 $\pm$ 21.26	99.35 $\pm$ 3.45
t	-	16.756	16.903
P	-	0.001	0.001

**3.2. Comparison of blood pressure indexes before and after treatment between experimental group and control group**

Before treatment, the systolic blood pressure, diastolic blood pressure and pulse pressure difference indexes of patients in the experimental group and the control group were close to each other without significant significance ( $P > 0.05$ ), and after treatment, the systolic blood pressure, diastolic blood pressure and pulse pressure difference indexes of patients in the experimental group were significantly better than those in the control group, with statistical significance ( $P < 0.05$ ). See Table 2 for details:

Table 2: Comparison of blood pressure indexes before and after treatment between experimental group and control group [ $\bar{x} \pm s$ ], mmHg]

Groups	Number of cases	Before treatment			After treatment		
		Systolic blood pressure	Diastolic blood pressure	Differential pulse pressure	Systolic blood pressure	Diastolic blood pressure	Differential pulse pressure
Experimental group	31	126.37 $\pm$ 3.22	86.54 $\pm$ 4.25	52.31 $\pm$ 2.66	116.38 $\pm$ 4.26	68.54 $\pm$ 3.41	25.63 $\pm$ 3.24
Control group	31	125.66 $\pm$ 3.21	86.55 $\pm$ 4.30	52.33 $\pm$ 2.71	118.62 $\pm$ 2.38	70.96 $\pm$ 5.22	27.22 $\pm$ 2.18
t	-	0.869	0.009	0.029	2.556	2.161	2.267
P	-	0.388	0.993	0.977	0.013	0.035	0.027

**3.3. Comparison of hemoglobin levels in experimental group and control group before and after treatment**

Table 3: Comparison of hemoglobin levels in experimental and control groups before and after treatment ( $\bar{x} \pm s$ )

Groups	Number of cases	Hemoglobin levels before treatment(g/L)	Hemoglobin level after treatment(g/L)
Experimental group	31	98.32 $\pm$ 11.20	127.12 $\pm$ 21.62
Control group	31	99.15 $\pm$ 11.26	109.35 $\pm$ 22.14

x <sup>2</sup> /t	-	0.921	3.197
P	-	0.772	0.002

The hemoglobin level of patients in the experimental group before treatment was close to that of the control group without significant significance ( $P > 0.05$ ), and after treatment, the hemoglobin level of patients in the experimental group was significantly better than that in the control group, and the data difference was statistically significant ( $P < 0.05$ ). See Table 3 for details:

### 3.4. Comparison of the incidence of adverse reactions between the experimental group and the control group

The incidence of adverse reactions in the experimental group was 9.68%, and the incidence of adverse reactions in the control group was 22.58%, and the incidence of adverse reactions in the experimental group was lower than that in the control group, and the data comparison was significant and statistically significant ( $P < 0.05$ ). See Table 4 for details:

Table 4: Comparison of the incidence of adverse reactions between experimental group and control group (n, (%))

Groups	Number of cases	Bellyache	Headache	Coagulation abnormalities	Vomit	Total incidence
Experimental group	31	0(0)	1(3.23)	1(3.23)	1(3.23)	3(9.68)
Control group	31	2(6.45)	2(6.45)	2(6.45)	1(3.23)	7(22.58)
x <sup>2</sup>	-	6.615	1.126	1.126	0.000	6.151
P	-	0.010	0.289	0.289	1.000	0.013

## 4. Discussion

Hypertension syndrome of pregnancy is a pregnancy-specific disorder characterized by hypertension and proteinuria in pregnant women. Postpartum haemorrhage is unusually large amounts of vaginal bleeding after delivery. Postpartum haemorrhage is common in patients with pregnancy-induced hypertension syndrome. Postpartum hemorrhage is serious and can lead to massive blood loss, anemia, shock and even life-threatening. Therefore, for patients with hypertensive syndrome during pregnancy, close postpartum monitoring of bleeding and timely measures to prevent and manage postpartum haemorrhage are required. Treatment of postpartum hemorrhage includes pharmacotherapy (use of oxytocin drugs to promote uterine contractions and reduce the amount of bleeding), mechanical stimulation (stimulation of uterine contractions by massaging the uterus and manual removal of the placenta, to promote hemostasis), infusion (fluids as needed to maintain circulatory stability), and surgical intervention (in the setting of severe bleeding, surgical intervention such as hysterectomy) may be required [6]. Medical therapy is used in postpartum haemorrhage in pregnancy-induced hypertension syndrome primarily because it is effective in promoting uterine contractions and thereby reducing the amount of bleeding [7]. For example, oxytocin drugs can stimulate uterine smooth muscle contractions, increase the force and frequency of uterine contractions, help prevent bleeding and promote hemostasis. In addition, drug therapy is usually a rapid, convenient, and controlled method that can respond quickly in a short period of time, especially in the case of severe bleeding. However, attention to dosage and monitoring of patient response when using drug therapy to ensure safety and efficacy. In summary, pharmacotherapy is widely used in postpartum haemorrhage in hypertensive syndrome of pregnancy to control bleeding by promoting uterine contractions to safeguard the health and safety of patients. In clinical practice, oxytocin is commonly used for the treatment of postpartum hemorrhage in pregnancy-induced hypertension syndrome, which is a drug commonly used in the treatment of postpartum hemorrhage in pregnancy-induced hypertension syndrome, and its main role is to promote uterine contractions and reduce the amount of bleeding. However, oxytocin also has some shortcomings in the treatment. On the one hand, oxytocin may cause side effects. Patients taking oxytocin may experience nausea, vomiting, headache, abdominal pain, and other discomfort. These side effects may affect patient comfort and quality of life [8]. On the other hand, the effect of oxytocin on blood

pressure requires careful monitoring. Patients with pregnancy-induced hypertension syndrome often have pre-existing hypertension, and oxytocin use may lead to further elevation of blood pressure [9]. Therefore, it is necessary to closely monitor the patient's blood pressure when using oxytocin to avoid possible adverse reactions. In addition, the effect of oxytocin may vary from individual to individual. Some patients may have a weaker response to oxytocin and require higher doses or longer to achieve the desired uterocontractile effect. This may prolong treatment time and increase drug use, increasing potential risks and costs. Therefore, other treatments need to be considered in combination during treatment to fully control the risk of postpartum haemorrhage. Misoprostol is a drug commonly used in the treatment of postpartum haemorrhage in pregnancy-induced hypertension syndrome, whose primary role is to control the amount of bleeding by promoting uterine smooth muscle contraction [10]. Misoprostol is a synthetic prostaglandin analog that selectively acts on the smooth muscle of the uterus, thereby causing uterine contractions and reducing bleeding. The advantages of misoprostol are multifaceted. First, it has a fast and effective effect. Misoprostol usually starts uterine contractions quickly, reduces bleeding in a short period of time, and has a longer duration of action, helping to stabilize the patient's condition. Second, misoprostol has a good safety profile and tolerability. With proper use, misoprostol has relatively few side effects and is usually mild and short-lived. Common side effects include nausea, vomiting, headache, etc., but these are often temporary and do not cause serious effects on patients. Third, misoprostol is relatively simple to use. It can be administered orally, does not require complex handling and equipment, and is suitable for emergency treatment in emergency situations. Fourth, misoprostol also has a broad indication for the treatment of postpartum hemorrhage [11]. In addition to postpartum hemorrhage in pregnancy-induced hypertension syndrome, it can also be used for postpartum hemorrhage caused by other causes, such as placental abruption, poor uterine contractions, etc. In conclusion, misoprostol has clear advantages as a drug for the treatment of postpartum hemorrhage in hypertensive syndrome during pregnancy. It can control the amount of bleeding by promoting uterine contractions, has a fast, effective effect, and is highly safe. However, patient reactions and side effects still need to be closely monitored during use to ensure the safety and efficacy of treatment. Therefore, it should be used under the guidance of a physician and individualized treatment options should be made on a case-by-case basis. In this study, the efficacy of misoprostol was evaluated experimentally, and the post-treatment follow-up results of the experimental group and the control group showed that the blood loss, blood pressure indexes and adverse reaction incidence of the experimental group were significantly lower than the control group at 2 and 4 hours postpartum, and these differences were statistically significant ( $P < 0.05$ ). In addition, the hemoglobin levels of patients in the experimental group were also higher than those in the control group, and this difference was also statistically significant ( $P < 0.05$ ). These results showed that in the treatment with misoprostol received in the experimental group, there was a reduction in postpartum bleeding, stable blood pressure indicators, and a reduction in the incidence of adverse effects. At the same time, higher hemoglobin levels in patients in the experimental group may mean better anemia prevention and recovery. These results have important clinical implications for improving outcomes in postnatal care. It is important to note that this is only a comparison between experimental and control groups, and further research is needed to confirm the effectiveness and safety of these treatments. In addition, other factors such as sample size, study design, and statistical analysis methods need to be considered in order to draw more accurate conclusions.

In summary, misoprostol in the treatment of postpartum hemorrhage in hypertensive syndrome during pregnancy can effectively reduce the amount of bleeding, regulate the patient's blood pressure, improve the treatment effect, and promote recovery.

#### **Acknowledgements**

Author introduction: Lingyan Zhang (1984.12-), Title: Attending physician; Education: Master's degree; Research direction: The impact of recurrent miscarriage, gestational immune related diseases, gestational hypertension, and gestational blood glucose abnormalities on mothers and offspring.



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