

# Effects of Serum Cortisol Levels on Perinatal Prognosis in Patients with Hypertensive Disorder

Gaoxiang Huo, Yeqiang Qin, Xiucui Bao, Xiaoling Yao, Zhangwei Pu, Jia Sun

Cangzhou People's Hospital, Yihe Obstetrics and Gynecology Hospital, Cangzhou City 061000, Hebei Province, China

**Abstract: Objective:** To investigate the effect of serum cortisol level on perinatal prognosis in patients with hypertensive disorder during pregnancy. **Methods:** In this study, different degrees of patients with hypertensive disorder during pregnancy who were admitted from August 2018 to August 2019 in our hospital were selected as the research subjects, and divided into groups according to the severity of the patients' conditions. The 120 patients were divided into gestational hypertension group, preeclampsia group and eclampsia group, with 40 cases each, and another 40 healthy pregnant women were selected. The detection of serum cortisol levels was carried out for the above 4 groups of pregnant women. **Results:** The serum cortisol level in the control group was  $(260.35 \pm 10.96)$  nmol / L. The case number of neonatal asphyxia was 1 (2.50%), the case number of premature births was 1 (2.50%), the number of fetal growth restriction was 1 (2.50%), the number of deaths was 0, and the other three groups were higher than this. It showed as gestational hypertension <preeclampsia <eclampsia. The Apgar score of pregnant women in the control group was  $(9.13 \pm 0.29)$ , the ZL index was  $(1.07 \pm 0.07)$ , and the other three groups were lower than this. It showed as gestational hypertension > preeclampsia > eclampsia. There were significant differences between groups (all  $P < 0.05$ ). **Conclusion:** Early detection of serum cortisol levels in pregnant women is beneficial to timely improve the symptoms of gestational hypertension, thereby suppressing the effects of serum cortisol on perinatal infants and improving the prognosis of newborns.

**Keywords:** Hypertensive disorder during pregnancy; Serum cortisol levels; Perinatal prognosis

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**\*Corresponding author:** Gaoxiang Huo, hgx13582711701@sina.comn

## 1 Introduction

Hypertensive disorder during pregnancy usually occurs after 20 weeks of pregnancy. The main clinical symptoms are hypertension, edema, protein in the urine, etc. Pregnant women with severe illness may have heart and kidney failure. It is one of the main clinical causes of maternal and perinatal death. In recent years, people's health awareness has been increasing, and more and more attention is paid to gestational hypertension. Studies have shown that serum cortisol levels can have important effects on hypertensive disorder during pregnancy, leading to serious threats to the physical and mental health of pregnant women and the safety of perinatal infants. Therefore, the effect of serum cortisol level on perinatal prognosis in patients with hypertensive disorder during pregnancy needs to be further explored. In the study of our hospital, it is proposed to use chemiluminescence method to detect serum cortisol in patients with hypertensive disorder during pregnancy, and evaluate the prognosis of perinatal infants based on this<sup>[1-4]</sup>. The report is as follows.

## 2 Information and methods

### 2.1 General information

120 patients with hypertensive disorder during pregnancy who were admitted from August 2018 to August 2019 in our hospital were selected as the

research subjects, and divided into 3 groups according to the severity of the patients' conditions. Gestational hypertension group: there were a total of 40 patients with the age of  $(31.2 \pm 3.1)$  years old. The maximum age is 35 and the minimum age is 23. The gestational week was  $(39.53 \pm 1.26)$ . The longest gestational week is 39 weeks and the shortest gestational week is 37 weeks; Preeclampsia group: there were a total of 40 patients with the age of  $(32.0 \pm 2.4)$  years old. The maximum age is 36 and the minimum age is 22. The gestational week was  $(38.44 \pm 1.35)$ . The longest gestational week is 40 weeks and the shortest gestational week is 38 weeks; Eclampsia group: there were a total of 40 patients with the age of  $(31.4 \pm 2.9)$  years old. The maximum age is 35 and the minimum age is 22. The gestational week was  $(40.27 \pm 1.23)$ . The longest gestational week is 40 weeks and the shortest gestational week is 38 weeks; Control group: there were a total of 40 patients with the age of  $(30.4 \pm 2.9)$  years old. The maximum age is 35 and the minimum age is 23. The gestational week was  $(38.27 \pm 2.01)$ . The longest gestational week is 41 weeks and the shortest gestational week is 39 weeks; The research has been approved by the ethics committee, and the research subjects are aware of the purpose, process, meaning and possible results of this study.

## 2.2 Research methods

After all the research objects were admitted to the hospital, blood was collected from their elbow veins in the early morning or after resting for 20 minutes.

The blood collection dose was 4ml and was placed in the sodium citrate anticoagulant tube produced by Shandong Chengwu Huabo Medical Co., Ltd., centrifuged at normal temperature for 10 minutes with a speed of 2500 r / min, and then stored it in an environment with a temperature of  $-20^{\circ}\text{C}$ .

The German E170 automatic chemiluminescence analyzer and Roche chemiluminescence cortisol detection kit are to be prepared, and the chemiluminescence method is used to implement the detection of serum cortisol levels.

## 2.3 Observation index

Serum cortisol levels in pregnant women; asphyxia, premature birth, growth restriction and mortality of the newborns; perinatal Apgar score, ZL index.

## 2.4 Statistical methods

SPSS 20.0 was used to analyze and process the data in the study.

## 3 Result

### 3.1 Comparison of serum cortisol levels in pregnant women of different groups

The serum cortisol level in the control group was  $(260.35 \pm 10.96)$  nmol / L. The other three groups were higher than this, and it was showed as gestational hypertension < preeclampsia < eclampsia There were significant differences between groups ( $P = < 0.05$ ). See Table 1.

**Table 1.** Comparison of serum cortisol levels in pregnant women of different groups ( $\bar{x} \pm s$ , nmol/L)

groups	serum cortisol content	
gestational hypertension group(n=40)	330.56±12.28	
gestational hypertension disease group	preclampsia group(n=40)	484.72±10.78
	eclampsia group(n=40)	611.82±20.21
control group(n=40)	260.35±10.96	

### 3.2 Comparison of perinatal asphyxia, premature birth, growth restriction, and mortality in different groups of pregnant women

In the control group, there was 1 case (2.50%) of perinatal asphyxia, there was 1 case (2.50%) of

preterm births, there was 1 case(2.50%) of growth restriction, and mortality was 0. The other three groups were higher than above and showed as gestational hypertension < preeclampsia < eclampsia. There were significant differences between groups ( $P < 0.05$ ). See Table 2.

**Table 2.** Comparison of perinatal asphyxia, premature birth, growth restriction, and mortality in different groups of pregnant women (n%)

groups	perinatal asphyxia	premature birth	growth restriction	mortality	
gestational hypertension group(n=40)	3(7.50)	2(5.00)	2(5.00)	0	
gestational hypertension disease group	preeclampsia group(n=40)	8(20.00)	9(22.50)	6(15.00)	1(2.50)
	eclampsia group(n=40)	18(45.00)	24(60.00)	12(30.00)	3(7.50)
control group(n=40)	1(2.50)	1(2.50)	1(2.50)	0	

### 3.3 Apgar score and ZL index of perinatal infants in different groups of pregnant women

The Apgar score of the pregnant women in the control group was ( $9.13 \pm 0.29$ ), and the Zhang Lu index

was ( $1.07 \pm 0.07$ ). The other three groups were lower than this and showed as gestational hypertension> preeclampsia> eclampsia. The comparisons have significant differences (all  $P<0.05$ ). See Table 3.

**Table 3.** Apgar score and ZL index of perinatal infants in different groups of pregnant women( $\bar{x} \pm s$ )

groups	Apgar score	ZL index	
gestational hypertension group(n=40)	7.91±0.37	1.01±0.10	
gestational hypertension disease group	preeclampsia group(n=40)	6.75±0.23	0.81±0.08
	eclampsia group(n=40)	4.03±0.17	0.69±0.06
control group(n=40)	9.13±0.29	1.07±0.07	

## 4 Discussion

Hypertensive disease during pregnancy is a disease specific to women during pregnancy, which has a high mortality rate. It is a difficult disease in obstetric clinics and can seriously affect the physical health of pregnant women and perinatal infants<sup>[5]</sup>. The current incidence of the disease in China is about 10%. With the continuous improvement of the national economy, people's awareness of disease prevention has been continuously strengthened, and special attention has been paid to pregnant women and their lives. As a more common and difficult disease in clinical obstetrics and gynecology, hypertensive disease during pregnancy has received widespread attention, and pregnant women and their families have paid more and more attention to standardized prenatal examinations. In fact, hypertensive disorder during pregnancy can cause more serious consequences. Therefore, in order to ensure the health and safety of maternal and fetal, it is necessary to timely control the gestational hypertension. One of the significant features of patients with hypertensive disorder during pregnancy is elevated serum cortisol levels, which can severely affect the growth of perinatal infants. Under normal circumstances, fetal growth is the growth, development and maturation process of

tissue and organ, while elevated serum cortisol levels in patients with gestational hypertension can lead to a decline in placental function, which has seriously inhibiting affect of the growth of perinatal infants, and lead to growth retardation, asphyxia, premature birth and death<sup>[6-8]</sup>.

Although the specific pathogenesis of hypertensive disorder during pregnancy is not completely clear, it can be understood that it mainly includes infant factors, maternal factors, and mutual factors of maternity and infant, as well as environmental factors and other factors. According to related research, patients with hypertension and coronary heart disease have significantly higher serum cortisol than healthy people. The increase in serum cortisol levels can lead to an increase in not only the patient's reactivity to catechol ammonia and other substances, but also the contractile effect of patient's norepinephrine on the arteries, further promoting the combination of renin and angiotensinogen. All of the above factors can lead to increased blood pressure, and once a pregnant woman suffers from hypertension during pregnancy, it may cause systemic small blood vessel spasm, which causes the pregnant woman and fetus to be in a state of stress. At this time, the serum cortisol level increases. As a result, their blood pressure rises and eventually a

vicious circle is formed.

The study showed that the serum cortisol level in the control group was  $(260.35 \pm 10.96)$  nmol / L. The case number of neonatal asphyxia was 1 (2.50%), the case number of premature births was 1 (2.50%), the number of fetal growth restriction was 1 (2.50%), the number of deaths was 0, and the other three groups were higher than this. It showed as gestational hypertension <preeclampsia < eclampsia. The Apgar score of pregnant women in the control group was  $(9.13 \pm 0.29)$ , the ZL index was  $(1.07 \pm 0.07)$ , and the other three groups were lower than this. It showed as gestational hypertension > preeclampsia > eclampsia. There were significant differences between groups (all  $P < 0.05$ ).

In summary, the early detection of the serum cortisol level of pregnant women is conducive to the timely improvement of the symptoms of hypertension during pregnancy, thereby inhibiting the effect of serum cortisol on the perinatal infants, and promoting the improvement of the prognosis of the newborn.

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