Research Article

Vitamin D Level in Patients Suffering from Pregnancy Induced Hypertension

Mohamed T. Gad Alrb, Mo'men M. Hassan, Haitham A. Bahaa El-Den and Asmaa M. Bakr Abd ELhakim Ali
Department of Obstetrics and Gynecology, El-Minia Faculty of Medicine

Abstract
Introduction: Pregnancy-induced hypertension (PIH) is defined as blood pressure greater than or equal 140/90 mmHg on two consecutive occasions ≥6 h apart occurring after 20 weeks of pregnancy, PIH includes gestational hypertension as well as preeclampsia and eclampsia. **Aim of the study:** To find out if lower level of Vitamin D is more prevalent in pregnancy induced hypertensive women. **Patients and Methods:** This is prospective case control study included 90 patients divided in to 2 groups; **Results:** This prospective case control study included 90 women from Minia Maternity University Hospital who were divided in to two groups, 45 normotensive pregnant women and 45 hypertensive pregnant women who fulfilled the entry criteria during the period between the 1ST of May 2018 to 30st of September 2018. **Conclusion:** This study has shown an association between vitamin D level and pregnancy induced hypertension supporting definit role for vitamin D as a preventative agent against pregnancy induced hypertension.
Keywords: Vitamin D, Pregnancy Induced Hypertension

Introduction
Pregnancy-induced hypertension (PIH) is defined as blood pressure greater than or equal 140/90 mmHg on two consecutive occasions ≥6 h apart occurring after 20 weeks of pregnancy ,PIH includes gestational hypertension as well as preeclampsia and eclampsia. Gestational hypertension is characterized by an abnormal rise in blood pressure that usually develops after 20th week of pregnancy without proteinuria, and Pre-eclampsia (PE) is hypertension and proteinuria (protein in urine ≥0.3 g/24 h (+1 dipstick) on two occasions ≥6 h apart) or edema, Eclampsia is considered as one of the most severe manifestations of preeclampsia that involves convulsions[(1)].

It is a major cause of maternal and perinatal morbidity and mortality and complicates 2% to 8% of pregnancies[(2)]

The complications include eclampsia, disseminated intravascular coagulation and the HELLP syndrome (hemolytic anemia, elevated liver enzymes, and low platelets)[(3)]. Women with a history of PE also have a higher risk of cardiovascular disease later in life[(4)]

Fetus of women with preeclampsia also at risks which include intrauterine growth restriction (IUGR) and fetal death[(5)].

For years, PE has been hypothesized to be a two-stage disorder[(6)]. In the first stage, placental perfusion is reduced resulting in defective placental implantation. In the second stage, reduced vascularization at the placental site activates a maternal inflammatory response.

This leads to generalized endothelial dysfunction and the release of excessive anti-angiogenic factors into the maternal blood stream resulting in hypertension.

Aim of the study
To find out if lower level of Vitamin D is more prevalent in pregnancy induced hypertensive women.

Researsh hypothesis:
In pregnancy induced hypertensive women; Vitamin D level may be lower than controls.

Research question
Does Vitamin D level is lower in cases than controls?

Patients and Methods

This is prospective case control study included 90 patients divided in to 2 groups ;The 2 groups were admitted either from the labour ward or from obstetric outpatient clinic in Minia maternity university Hospital in the period between 1st of May2018 to 30st of September 2018.

According to the hospital protocol, all patients consented for data collection for research purpose at time of admission after ensuring the confidentiality. So the study poses no harm regarding the safety issues to the mother or the fetus.

The potential benefits and inconveniences of all aspects of the study were clearly stated to the participants.

Plan of the study:

A prospective case control study involving 90 women divided in to 2 groups; 1st group is 45 patients diagnosed with pregnancy induced hypertension or one of its complications (cases) admitted at Minia maternity University hospital, Egypt. and 2nd group is 45 normotensive pregnant women (controls)

Sample Size Calculation:

Before the study, the number of patients required in each group was determined after a power calculation according to data obtained previous study (Singla R. et al., 2014). In that study, Vitamin D in cases was 9.7±4.95 and in control was 14.8±6.68. A sample size of 45 patient in each group was determined to provide 98% power for independent samples T test at the level of 0.05 significance using G Power 3.1 9.2 software.

Results

This prospective case control study included 90 women from Minia Maternity University Hospital who were divided in to two groups, 45 normotensive pregnant women and 45 hypertensive pregnant women who fulfilled the entry criteria during the period between the 1st of May 2018 to 31th of September 2018.

Table (1): shows Demographic and obstetric data in both groups

		Control	Hypertensive	P Value
		N=45	N=45	
Age	*Range* *Mean ± SD*	(20-33) 26.9±3.4	(19-40) 28.3±5.1	0.133
BMI	*Range* *Mean ± SD*	(20-35.1) 25.2±3.7	(18.8-37.8) 26.4±5.1	0.202
Gravidity	*Range* *Mean ± SD* *Median*	(1-6) 2.5±1.3 2	(1-10) 3.2±2.1 3	0.212
Parity	*Range* *Mean ± SD* *Median*	(0-4) 1.4±1.2 1	(0-5) 1.6±1.5 2	0.708
Abortion	*Range* *Mean ± SD* *Median*	(0-1) 0.1±0.3 0	(0-7) 0.6±1.2 0	**0.004***
Gestational age	*Range* *Mean ± SD*	(34-37) 35.6±0.7	(33-37) 35.4±1.03	0.201
Delivery	*VD* *CS*	27(60%) 18(40%)	17(37.8%) 28(62.2%)	0.058

- BMI : Body Mass Index

Demographic and obstetric data were obtained from both control and hypertensive groups and found no significant difference between both groups except frequency of abortion has statistical significance (P value= 0.004) between 2 groups

Discussion

This study is prospective case-control study which was conducted at Minia University Maternity Hospital in the period between 1st of May 2018 to 31th of September 2018 on 90 pregnant women, They were classified into 2 groups:

- Group (1): 45 pregnancy induced hypertensive women.
- Group (2): 45 normotensive women.

Hypertension is one of the most common medical complications of pregnancy. It remains one of the leading causes of maternal deaths all over the world. Despite growing knowledge of the pathophysiology of pregnancy induced hypertensive disorders, there is no preventive measures have been shown to be effective[(6)].

Vitamin D deficiency in pregnant women and their children is a major health problem, with potential adverse consequences for overall health. Vitamin D deficiency has been associated with many chronic illnesses include skeletal diseases such as rickets, osteomalacia, osteoporosis and nonskeletal diseases including autoimmune diseases (e.g., multiple sclerosis, type 1diabetes), inflammatory bowel disease, infections (such as upper respiratory tract infection), immune deficiency, cardiovascular diseases (e.g., coronary heart disease and hypertension)[(7)].

More recently, vitamin D deficiency has been associated with several adverse pregnancy outcomes, including pre-eclampsia, gestational diabetes mellitus, intrauterine growth restriction and preterm birth[(8)].

Pregnancy induced hypertension was apparently higher in younger pregnant women (<30 years)[(9)], as in present study, most of hypertensive cases were young (mean= 28 years).

The incidence of pregnancy induced hypertension is higher in nullipara than multipara[(10)] but in the present study, it was higher in multipara (mean ± SD =1.6±1.5) than in nullipara (mean ± SD =1.4±1.2) this may be explained by irrelevant history given by patients, absence of record system for the cases, improper diagnosis in previous pregnancies.

Conclusion

This study has shown an association between vitamin D level and pregnancy induced hypertension supporting definite role for vitamin D as a preventative agent against pregnancy induced hypertension.

Recommendations

- Vitamin D assay can be used for prediction of pregnancy induced hypertension and can be used for prediction of severity of pregnancy induced hypertension if vitamin D deficiency is less than 13ng/ml in pregnancy induced hypertensive women.
- Vitamin D supplementation can be routinely recommended in prevention of pregnancy induced hypertension and can be prescribed to women who have vitamin D level less than 13ng/ml when assessment is done at 20 weeks gestation to prevent occurance of pregnancy induced hypertension complications .

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