



STUDY OF CHANGES IN LEVELS OF LDH AND GGT IN PREECLAMPSIA PATIENTS

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ABSTRACT

Background- Preeclampsia is classified under hypertensive disorders of pregnancy (HDP). There is widespread endothelial dysfunction leading to hypertension and damage to vital organs such as liver, kidney, brain etc. Damage to such organs may lead to elevation in serum levels of specific enzymes and metabolites which can be used for predicting severity of the disease.

Objectives- This study was done to compare serum levels of lactate dehydrogenase (LDH) and gamma glutamyl transferase (GGT) among women with preeclampsia and normal pregnancy.

Materials and methods- Case control study was done taking 50 women with preeclampsia (cases) and 50 normotensive pregnant women (controls). Serum levels of LDH and GGT were measured using commercially available kits. Statistical analysis was done.

Results- Serum levels of LDH and GGT were significantly increased in women with preeclampsia compared with controls.

Conclusion- High levels of GGT and LDH may be useful for the monitoring and correct management of preeclampsia to decrease maternal and fetal morbidity and mortality.

KEYWORDS : Preeclampsia, GGT, LDH.

INTRODUCTION

Preeclampsia is one of the most common medical complications of pregnancy and it is characterized by hypertension, proteinuria and/or edema, usually occurring after 20 weeks of gestation. It is an important cause of maternal and perinatal morbidity and mortality worldwide, especially in developing countries. In India, the incidence of preeclampsia amongst the hospital patients is about 7-10% of all antenatal admissions. Although the precise etiology of preeclampsia is not clear, defective placentation and endothelial dysfunction are considered the core features of preeclampsia. [1,2]

It is a multisystem disorder that affects the maternal kidneys, liver, brain, clotting system and primarily the placenta. Hepatic dysfunction with preeclampsia has long been recognized. Several studies have suggested that liver involvement in preeclampsia is serious and frequently accompanied by evidence of other organs involvement, especially the kidney and brain along with hemolysis and thrombocytopenia. This is commonly referred to as HELLP syndrome (hemolysis, elevated liver enzymes and low platelets) [3,4].

The enzyme γ -glutamyltransferase (GGT) is widely distributed throughout the body in many tissues, particularly the liver. At the cellular level, significant activity occurs in both endothelium and epithelium. Association between serum GGT concentration and blood pressure in non pregnant hypertensive patients have been reported in some population surveys. Also raised levels of serum GGT have been reported in stroke patients, which were assumed to be due to vascular endothelial damage. [5,6]

Lactate dehydrogenase (LDH) is an intracellular enzyme which converts lactic acid to pyruvic acid and its elevated levels indicates cellular death and leakage of enzyme from the cell. Increased levels of LDH were found in association with preeclampsia in a limited numbers of studies [7,8].

RESULTS:

Table is showing comparison between cases and controls, whereas figure 1 & 2 graphically represent data.

Parameters	Biological Reference Interval	Control group (n=50)			Study group (n=50)			Significance
		Min	Max	Mean \pm SD	Min	Max	Mean \pm SD	
LDH	200-450 IU/l	140	416	248.6 \pm 59.1	248	788	451.9 \pm 97.7	t=12.59, **p < 0.001
GGT	10-30 IU/l	9.9	56.6	21.7 \pm 9.7	22.2	92.9	51.6 \pm 20.03	t= 9.504, **p < 0.001

This study was undertaken to evaluate the effect of hypertensive disorders of pregnancy on serum concentrations of LDH and GGT.

MATERIALS AND METHODS

This study was conducted in the department of Biochemistry, at civil hospital, Ahmedabad during January 2016 to July 2016. A total of 50 preeclampsia women (Cases) and 50 healthy normotensive pregnant women (controls) was enrolled in the study. All the cases were selected after 20 weeks of pregnancy and belongs to the age group 20-45 years cases with any medical history of hypertension, diabetes, renal disease, thyroid disease or liver disease, were excluded from the study. Controls were selected from the patients regularly attending the Antenatal clinic (ANC) and preeclampsia cases were selected from the patients admitted in the ANC ward.

Mild preeclampsia is defined as onset of hypertension after 20 weeks of gestation with diastolic blood pressure (DBP) >90 and \leq 110 mmHg with or without proteinuria. When diastolic blood pressure (DBP) > 110 mmHg was measured on two occasions 6 hours apart with significant proteinuria (>500mg / 24hrs or \geq 2+ on dipstick), preeclampsia considered as severe.

Detailed clinical and anthropometric data was recorded using proforma. 5ml of fasting venous blood was collected aseptically from all cases by venipuncture. The blood was allowed to clot and serum separated was used for the estimations. Serum GGT was estimated using colorimetric end point method (Glupa-C).

LDH was estimated using by DGKC, Kinetic method. The estimations were carried out on Erba XL640 Fully Automated Analyzer. The results were expressed as means \pm SD and compared by applying unpaired student 't' test to find out the statistical significance according to the severity of preeclampsia.

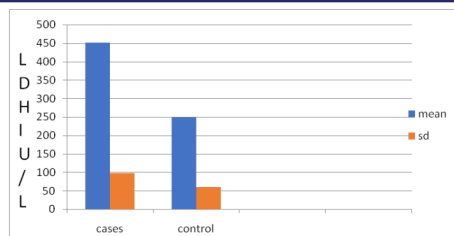


Figure 1

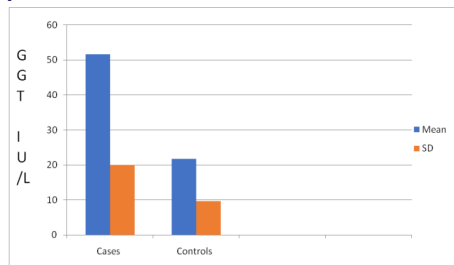


Figure 2

DISCUSSION:

Preeclampsia is a pregnancy-specific disease with multisystem complications. A complex of endocrinological mechanisms is believed to be responsible for the multiorgan dysfunction. Several potential markers have been proposed to predict the severity of preeclampsia. Most useful among these are GGT and LDH. This study was undertaken to investigate the possible role of GGT and LDH in the prediction of preeclampsia to prevent further complications. Young age and primigravida are the well known risk factors for the development of preeclampsia.[1,7]

Preeclampsia is associated with reduced placental perfusion and fetal growth retardation. Vascular endothelial dysfunction has been recently suggested as central pathogenic cause of preeclampsia. This dysfunction increases the sensitivity of the vasculature to vasoactive substances, with a subsequent reduction of perfusion and loss of fluid from intravascular compartment. These hemodynamic changes along with the activation of a coagulation cascade with micro thrombi formation as a result of endothelial damage leads to various clinical complications associated with preeclampsia [9]. Eclampsia, abruptio placenta, HELLP syndrome, acute renal failure, intracranial hemorrhage is well recognized complications of preeclampsia [10].

Table 21: Comparison of Serum LDH of present study with other study.

	Case	Control	P value
Present Study	451.9±97.7	248.6±51.1	<0.001
Amit D et al 2012 ^[05]	356±158	151 ± 47.47	<0.001
Noura Al-jamiel et al 2012 ^[04]	360±78.68	201±50.73	<0.001

In present study serum LDH level found increase in preeclamptic patients (451.9±97.7) as compared to normal pregnant women (248.6±51.1). Results of the present study correlated well with the Amit D et al and Noura Al-jamiel et al studies and demonstrate that serum concentration of LDH increases in preeclampsia. Lactate Dehydrogenase (LDH) is mainly an intracellular enzyme. It is responsible for interconversion of pyruvate and lactate in the cells. Its levels are several times greater inside the cells than in the plasma. So its levels are increased in the scenario of increased cell leakiness, hemolysis and cell death. such condition occurs in inflammatory states.^[15]

Table 21: Comparison of Serum GGT of present study with other study.

	Case	Control	P value
Present Study	51.6±20.03	21.7±9.70	<0.001
Ravi B et al 2013 ^[08]	45.68 ± 4.5	13.8± 2.39	<0.01
Hazari N R et al 2014 ^[32]	61.6 ± 12.04	10.25 ± 2.01	<0.001

In present study serum GGT level found increase in preeclamptic patients (51.6±20.03) as compared to normal pregnant women (21.7±9.70). Results of the present study are analogues with previous studies by Ravi B et al 2013 and Hazari N R et al 2014.

The enzyme γ-glutamyltransferase (GGT) is widely distributed throughout the body in many tissues, particularly the liver. At the cellular level, significant activity occurs in both endothelium and epithelium. Association between serum GGT concentration and blood pressure in non pregnant hypertensive patients have been reported in some population surveys. Also raised levels of serum GGT have been reported in stroke patients, which were assumed to be due to vascular endothelial damage.^[16]

CONCLUSION:

Results prove that these biomarkers can be used as diagnostic markers of preeclampsia which can be very helpful for management of such a multisystem disorder.

We suggest to take larger sample size for further studies.

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