



A CASE-CONTROL STUDY: MATERNAL SERUM CYSTATIN-C LEVELS IN THIRD TRIMESTER OF PREECLAMPTIC AND NORMOTENSIVE PREGNANTS

Biochemistry

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ABSTRACT

Certain morphological changes occur in various organs of the body of preeclamptic women like in kidney there is decreased glomerular filtration rate. Cystatin-C is a sensitive marker to estimate glomerular filtration rate (GFR). The aim of this study was comparison of serum level of Cystatin-C in third trimester of normal pregnancy without preeclampsia and pregnancy with preeclampsia. In this study, 250 normal pregnant females without preeclampsia and 250 cases of preeclampsia were evaluated. They were compared for serum Cystatin-C. Preeclamptic pregnant females showed a highly-significant relationship in serum Cystatin-C levels when the results were compared with normal pregnant females without preeclampsia.

KEYWORDS

Cystatin-C, Trimesters, Preeclampsia

INTRODUCTION

Altered renal function is an essential component of the pathophysiological process in pre-eclampsia and close monitoring of renal function is important to ensure a timely delivery before serious renal damage occurs. [1]

The protease inhibitor cystatin C is a low molecular weight, non-glycosylated protein which is produced by all nucleated cells at a constant rate, freely filtered by the renal glomeruli, and catabolized in the tubules. It is mainly used as a biomarker of kidney function.

Cystatin C protein produced from nucleated cells is a member of cystatin superfamily. Cystatin C is protease inhibitor and plays a significant role in normal cellular metabolism and collagen degradation process. [2]

Cysteine protease is necessary for trophoblastic invasion in normal placental development during pregnancy. The maternal decidua limits the placentation process by expression of cystatin C. [3] High expression of cystatin C in the placenta will result in abnormal vessel formation and microvascular endotheliosis, which is a pathognomonic pathology found in preeclampsia. [4], [5]

Therefore the present study was conducted to evaluate the role of Cystatin-C in third trimesters of preeclamptic patients with an aim to explore utility of this parameter in pathogenesis of complications and better management of preeclamptic pregnancy.

MATERIALS AND METHOD

The study was conducted on 250 pregnant females having preeclampsia attending the Ante Natal Clinic, department of Gynaecology and Obstetrics, Umaid Hospital for Women and Children and MDM Hospital, Jodhpur (Rajasthan). The results were compared with age matched 250 normal (healthy) pregnant females without preeclampsia. Subjects included in this study were in their third trimester of pregnancy.

A thorough clinical and symptomatic examination of all the patients was done under the guidance of the treating gynecologist and the evidences of symptoms to confirm the presence of preeclampsia were recorded in a proforma. The clinical course and the complications, if present, in relation to the disease were also recorded.

Test for Serum Cystatin-C was carried out in the clinical laboratory of the Department of Biochemistry at Dr. S. N. Medical College, Jodhpur and Research laboratory, Dr. S. N. Medical College, Jodhpur.

RESULTS

The present study had been conducted on 500 pregnant females of same age group (18-40 years), comprising of 250 clinically established preeclamptic pregnant females and equal number of normal pregnant women.

The mean Serum Cystatin C of the preeclamptic pregnant females was 1.76 ± 0.27 mg/L; which varies from 1.2 to 2.7 mg/L. It was 1.38 ± 0.24 mg/L in normal pregnant females without preeclampsia which varies from 0.8 to 2.1 mg/dL. (**Table: 1**).

A statistically highly-significant difference ($p < 0.0001$) was observed in Serum Cystatin C of preeclamptic pregnant females ($t = 16.63$) when results were compared with the normal pregnant females without preeclampsia (**Table: 2**).

Table 1: Mean Serum Cystatin - C level (mg/L) of the subjects studied

Group studied	Serum Cystatin-C (Mean \pm SD) [Range]
Preeclamptic Pregnant	1.76 ± 0.27 [1.2-2.7]
Normal Pregnant	1.38 ± 0.24 [0.8-2.1]

Table 2: Statistical analysis of serum Cystatin-C among the groups studied

Group Compared	t - value	p - value
Preeclamptic pregnant v/s Normal pregnant	16.63	$P < 0.0001$ (HS)

*HS-Highly Significant

DISCUSSIONS AND CONCLUSIONS:

In this study, Serum Cystatin-C showed a highly-significant relationship between both the groups studied.

These findings are in accordance with those of Novakov Mikic A *et al* (2012) [6] as they observed that the mean serum Cystatin C levels showed a highly-significant difference in preeclamptic pregnant women as compared to the healthy pregnant females.

Again in relation to our study, Apeksha Niraula *et al* (2017) [7] observed that the mean serum Cystatin C levels was 1.15 ± 0.37 and 0.55 ± 0.12 in preeclamptic pregnant females and normotensive pregnant females respectively. The study showed a statistically highly-significant relation when serum Cystatin C was compared in preeclamptic pregnant females and normotensive pregnant females.

Similarly, Cimona Lyn Saldanha *et al* (2017) [8] also observed statistically highly-significant difference when they compared mean serum Cystatin C levels in preeclamptic pregnant females (1.86 ± 0.82) and normal pregnant females (1.08 ± 0.33).

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