

## ROLE OF URINARY CALCIUM: CREATININE RATIO AS AN EARLY PREDICTOR OF PRE- ECALAMPSIA

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### ABSTRACT

**Objective:-**To evaluate the efficacy and association of urinary calcium:creatinine ratio in predicting preeclampsia from second trimester of pregnancy.

**Method:-** A prospective study was conducted in Antenatal clinic at Muzaffarnagar Medical College and Hospital. Urinary calcium:creatinine ratio was determined in 200 asymptomatic patient who have their first visit in second trimester of pregnancy. Three samples were taken at 16-20 weeks, 32-34 weeks and 36-38 weeks. The data was analyzed using Analysis of variance (ANOVA).

**Result:-** The value of urinary calcium:creatinine ratio was found to be significantly lower(0.03) in pre-eclamptic patient than in normotensive patients.

**Conclusion:-** Urinary calcium:creatinine ratio is helpful in predicting pre-eclampsia as it is easy to use and cost-effective also. So it can be used as a predictor for pre-eclampsia from second trimester onwards.

### Keywords:

Urinary calcium:creatinine ratio, Preeclampsia.

### Introduction

Hypertension in pregnancy is very vast entity in itself, is a group of disorder that includes pre-eclampsia, eclampsia , gestational hypertension, chronic hypertension with or without superimposed pre-ecalpampsia and HELLP syndrome. A hypertensive disorder has increased from 10.3 to 13.8% of all pregnancies [1]. They contribute to significant maternal and prenatal morbidity and mortality. In many cases, treating obstetrician left

with less treating option because it is only diagnosed when the pathological changes are established.

This study is basically enlighten on pre-eclampsia which is defined as new onset hypertension which occurs most often after 20 weeks of gestation and frequently near term and accompanied by new-onset proteinuria. From time to time many researchers have tried to develop new screening test to identify development of preeclampsia. In this present study we will discuss the role of calcium:creatinine ratio in prediction of preeclampsia in patient who missed their first trimester visit.

### Material and Method:-

This Prospective study was conducted in Muzaffarnagar Medical College and Hospital between December 2022 and June 2023. All the normotensive gravid patient who missed their first visit and come directly in second trimester are enrolled with consent at 16-20 weeks fulfilling the inclusion criteria and their subsequent visit at 32-34 weeks and then at 36-38 weeks. Those with proteinuria, diabetes mellitus, chronic hypertension, and chronic renal or vascular disease were excluded from study. The data was subjected to statically analyze using the ANOVA and p value less than  $<0.05$  was considered very highly significant.

### Result:-

In our study, 200 asymptomatic patients were enrolled at 16-20 weeks and all followed till 36-38 weeks of gestation, out of 200 patients, 28 patients were diagnosed as pre-eclampsia. Majority of subjects were in between 21 to 25 years with the mean of  $24.43 \pm 2.93$  with 23 (47%) were primigravida and 27 (53%) were multigravida. The study shows that out of 200 patients, 28 had urinary CCR  $<0.003$  trimester wise and incidence turned out to be 14.002%. Out of 28 patients who had urinary CCR value  $<0.003$ , 21 patients had non-severe Pre-Eclampsia, while 7 patient had severe Pre- Eclampsia.

**Table 1- Data of patients trimester wise**

Visit	Reference Range	Mean S.D	t- value	p-value
1 (16-18 Weeks)	0.10-0.20	$0.16 \pm 0.05$	3.316	$=0.002$
2 (32-34 Weeks)	0.03-0.10	$0.05 \pm 0.04$	4.930	$<0.001$
3 (36-38 Weeks)	0.03-0.30	$0.05 \pm 0.00$	4.318	$<0.001$

**Table: 2 shows pre-eclampsia and normal patients**

No. of Patients		Calcium-to-creatinine ratio
172 Normotensive		<0.003
28 Pre-eclamptic	21-severe Pre-elcamptic	<0.003
	7- non-severe Pre-eclamptic	

**Discussion**

Hypertension and their associated complication always create both maternal and fetal morbidity. Calcium-to-creatinine ratio has been suggested by many to be a good predictor test for pre-eclampsia [2] Creatinine clearance indicates renal damage in PIH. Lower the creatinine clearance, more severe is the renal disease. This has been shown to parallel the decline in urinary calcium in preeclampsia, even before the clinical appearance of signs and symptoms. Many studies have shown that there is a significantly lower mean urinary calcium level in patients with pre-eclampsia than in group with normotensive patients [3].

Studies	Sample Size	Calcium-to-creatinine ratio
Ozecan et.al [4]	56	<0.04
Kamra et.al [5]	104	<0.04
Kazerooni et.al [6]	102	<0.03

The total decline of calcium concentration in maternal serum averages about 5-6%, suggesting strongly that the fall involves the protein-bound fraction. Endotheliosis and the alteration in renal function are the basis for using urinary calcium/creatinine ratio as a predictor [7]. According to the World Health Organization (WHO), the incidence of preeclampsia ranges between 2% and 10% of pregnancies worldwide. About 1.8-16.7% of the incidents are reported in developing countries, while in developed countries, the rate is 0.4% [8]. Our study was also cost- effective and easy to use, here below the table show different test with their cost. The limitation was less sample size.

**Conclusion**

From above study, it can be concluded that urinary calcium:creatinine ratio found to be very cost-effective, easy to use and strong predictor and can be taken for the prevention of pre-eclampsia, and despite of small sample size, it give valuable glimpse of prediction.

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