



Calcium Creatinine Ratio and Microalbuminuria as A Screening Test for Pre Eclampsia

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ABSTRACT Pre eclampsia is a hypertensive disorder of pregnancy characterized by hypertension and excess protein excretion in the urine. It complicates 5-10 % of all pregnancies. Being a major cause for maternal and fetal morbidity and mortality, screening test for pre-eclampsia is essential to prevent complications. This study provides an effective screening test thereby an idea to implement measures of prevention. This is a prospective study, including 200 asymptomatic pregnant women of 20-24 weeks gestational age, having regular antenatal visits in GOVT RSRM LYING IN HOSPITAL, in the year 2015-2016. Urine samples are tested for microalbuminuria, calcium and creatinine using commercially available kits. Among those, who test positive for urine calcium creatinine ratio 82.6% and those who test positive for urine microalbumin, 38.1% developed pre Onset of pre eclampsia occurs after 20 weeks of gestation. Incidence is markedly influenced by race, ethnicity, environmental, socioeconomic and seasonal events. Incidence in nulliparous ranges from 3-10%. Spot urine estimation of calcium creatinine ratio less than 0.04 is found to be a good test for predicting pre-eclampsia.

KEYWORDS

INTRODUCTION :

Hypertensive disorders during pregnancy are the commonest medical disorders during pregnancy and continue to be the most important cause of maternal and perinatal mortality and morbidity worldwide. Hypertensive disorders complicate 5-10% of all pregnancies with hypertension.

To reduce the impact of pre-eclampsia on maternal mortality, it is necessary to establish correct diagnosis of preeclampsia and to proceed with early interventions to prevent complications.

AIM:

To determine the predictive values of decreasing urinary calcium to creatinine ratio and microalbuminuria for preeclampsia, in a spot urine sample, in asymptomatic pregnant women between 20-24 weeks of gestation in order to recommend it as screening test for preeclampsia.

METHODS:

Study Design: PROSPECTIVE
 Study Sample: 200 asymptomatic pregnant women
 Study Place: GOVT. RSRM LYING IN HOSPITAL
 Study Period: 2015-2016

METHODOLOGY:

- Patients were counseled, given proforma and written informed consent obtained
- Detailed history obtained
- Blood pressure recorded in sitting position in right arm
- Urine samples for microalbumin, calcium and creatinine using commercially available kits.
- O Cresolphthalein complex reaction was used to estimate calcium. Jaffes method was used to estimate creatinine
- Microalbumin was detected by immunometric assay.
- Pre eclampsia was defined as systolic arterial blood pressure of more than or equal to 140/90 mmHg and or diastolic blood pressure of more than or equal to 90mmHg
- Calcium creatinine ratio less than or equal to 0.04 were considered test positive and those with ratio of more than 0.04 were considered negative.
- Urine microalbumin levels between 30 to 300 mg/l were considered test positive, and those with levels <30 mg/l were considered test negative.
- Predictive values of calcium to creatinine at less than or

equal to 0.04 and microalbuminuria determined by statistical analysis

**STATISTICAL METHODS:
 TEST USED: CHI SQUARE AND FISHER
 P value:**

<or equal to 0.01- strongly significant
 0.01-0.05- moderately significant
 0.05-0.1- significant

ESTIMATION OF URINARY CALCIUM:

- ORTHO CRESOLPHTHALEIN COMPLEX REACTION
- Measurement of calcium is done in coloured complex at wavelength of 570nm-580nm.

ESTIMATION OF URINARY CREATININE:

- JAFFE'S METHOD
- The intensity of the coloured orange red complex formed by creatinine in an alkaline picrate solution is estimated.

ESTIMATION OF URINE MICROALBUMIN:

- IMMUNOMETRIC ASSAY
- Microalbumin in urine is measured by turbidometric-immunoassay. It is based on agglutination reaction. The turbidity produced by albumin is measured at a wavelength of 340nm.

**RESULTS:
 URINE CALCIUM-CREATINIE RATIO (UCCR) AND DEVELOPMENT OF PRE ECLAMPSIA**

TABLE 1

UCCR	DEVELOPED PREECLAMP-SIA	NORMOTEN-SIVE	TOTAL
TEST POSITIVE	19(9.5%)	4(2%)	23(11.5%)
TEST NEGA-TIVE	7(3.5%)	170(85%)	177(88.5%)
TOTAL	26(13%)	174(87%)	200(100%)

URINE MICRO ALBUMIN AND DEVELOPMENT OF PRE ECLAMPSIA

TABLE 2

URINE MICROALBUMIN	DEVELOPED PRE ECLAMPSIA	NORMOTENSIVE	TOTAL
POSITIVE	16(8%)	26(13%)	42(21%)
NEGATIVE	10(5%)	148(74%)	158(79%)
TOTAL	26(13%)	174(87%)	200(100%)

ASSOCIATION OF URINE CALCIUM –CREATINIE RATIO AND PRE ECLAMPSIA

TABLE 3

UCCR<0.04	DEVELOPED PRE ECLAMPSIA	NORMOTENSIVE
POSITIVE(23)	19(9.5%)	4(2%)
NEGATIVE(177)	7(3.5%)	170(85%)
TOTAL	26(13%)	174(87%)

ASSOCIATION OF MICROALBUMINURIA AND PRE ECLAMPSIA

TABLE 4

URINE MICROALBUMIN	DEVELOPED PRE ECLAMPSIA	NORMOTENSIVE
POSITIVE(42)	16(8%)	26(13%)
NEGATIVE	10(5%)	138(74%)

SUMMARY:

- In this study ,majority 65.5% were in age group of 21 to 30 years,26% were in the age group of below 20 years,8.5% were in the agegroup of above 30 years of age.
- Preeclampsia developed in 46.2% of study group who were in the age group of 21 30 years, 34.6% who were below the age group of 20 years and 19.2% who were above 30 years of age.
- 65.4% ofprimigravidae developed preeclampsia and 34.6% of multigravidae developed preeclampsia.
- Among the women who test positive for urinocalcium-creatinine ratio,82.6% developed pre eclampsia.
- Among thosewith test positive for urinemicroalbumin ,38.1% developed preeclampsia.
- Predictive value of urine calcium creatinine ratio using area under curve of ROC showed UCCR at less than or equal to 0.04 was a good test.

TABLE 5

STATISTICS	UCCR<0.04	Urine Microalbumin 30-300mg
P value	<0.001	<0.001
Sensitivity	73.1%	61.5%
Specificity	97.7%	85%
Positive Predictive Value	82.6%	38.1%
Negative Predictive Value	96%	93.7%
Statistical Accuracy	94.5%	82%

CONCLUSION:

Screening test for preeclampsia is very essential to prevent complications .

In this study of asymptomatic pregnant women between 20-24 weeks gestation ,estimation of calcium –creatinieratioat less than or equal to 0.04 in a spot urine sample was found to be a GOOD test for predicting pre eclampsia.

Estimation of urinemicroalbumin in a spot sample was a FAIR test for predicting pre eclampsia.

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