



## ESTIMATION OF URINARY PROTEIN CREATININE INDEX IN PREECLAMPTIC WOMEN

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### ABSTRACT

Preeclampsia is defined by development of hypertension in pregnancy to the extent of 140/90 mmHg or more. Usually in the pregnancy the hypertensive disorders appear after the 20th week of gestation. The high blood pressure and proteinuria are major signs and symptoms of PIH (pregnancy induced hypertension). Urinary protein:creatinine index (PCI) is reported to be a good indicator of microproteinuria, which obviates the need for collection of 24-hour urine. Therefore, the present investigation was undertaken to measure urinary PCI in preeclamptic women. The investigation was conducted on 25 preeclamptic women (Pregnant women with hypertension, a blood pressure of 140/90mmHg or more) and matched 25 healthy pregnant women control subjects. Urinary PCI of each subject was measured in random urine specimens. The urinary PCI was significantly higher in preeclamptic women as compared to controls. The present study shows that: (a) urinary protein excretion is increased in preeclamptic women and (b) urinary PCI in random urine specimens can be a good alternative to measurement of proteins in 24-hour urine.

**KEYWORDS :** Preeclampsia, Microproteinuria, PCI

### INTRODUCTION

Preeclampsia is defined by development of hypertension in pregnancy to the extent of 140/90 mmHg or more. Usually in the pregnancy the hypertensive disorders appear after the 20th week of gestation. The high blood pressure and proteinuria are major signs and symptoms of PIH (pregnancy induced hypertension). During pregnancy, development of hypertensive disorder is the most common medical complication. Increased blood pressure (BP) is a common denominator in a number of clinical conditions that complicate pregnancy, including PIH, preeclampsia, eclampsia, and Hemolysis, Elevated Liver Enzyme and Low Platelet Count (HELLP) syndrome.<sup>1</sup>

The potential causes of pregnancy induced hypertension are- 1.Abnormal placentation 2.Vasculopathy and inflammatory changes 3. Immunological factors 4. Genetic factors 5.Nutritional factors.<sup>2,3</sup>

Proteinuria is defined as excretion of 300 mg or more protein in 24-hour urine. Proteinuria is the main component of preeclampsia and one of the diagnostic criteria of its severity. Persistent proteinuria is the key indicator of diabetic nephropathy.<sup>4</sup> Elevated creatinine level also indicates renal insufficiency.<sup>5</sup>

Measurement of protein in the 24-hour urine sample is the traditional standard method for the detection of proteinuria.<sup>6</sup> In pregnancy, numerous studies have observed a high correlation between the protein-to-creatinine ratio in a spot urine sample and 24 hour urinary protein excretion. Many national organizations have adopted use of the protein-to-creatinine ratio to diagnose significant proteinuria.<sup>7,8</sup> The first voided morning specimen is preferred, but any random/spot urine sample may be used. Although a single mid-stream urine sample is used to screen for proteinuria, studies have shown that urinary dipstick is a poor predictor of the 24-hour urine total protein level.<sup>9,10</sup> Proteinuria may be assessed by various methods such as dipsticks, calculation of the protein-to-creatinine ratio, calculation of the albumin-to-creatinine ratio and protein creatinine index (PCI) in random urine samples. In the non-pregnant population, the protein-to-creatinine ratio in a single voided urine sample is considered accurate and is largely used for detection and quantification of proteinuria.<sup>11</sup> These ratios are based on the fact that the creatinine excretion remains fairly invariable in the presence of a stable glomerular filtration rate, and therefore, these ratios neutralize the variations in the urinary

protein excretion during the day.<sup>12</sup>

The present study was undertaken to find out whether urinary protein excretion is increased in preeclamptic women and whether increase in protein excretion can be detected in random urine specimens by measuring PCI.

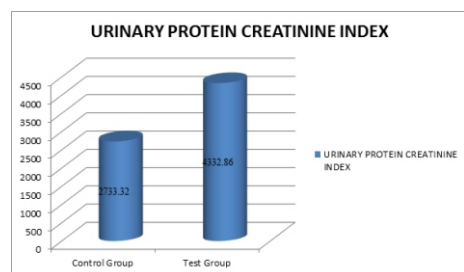
### MATERIAL AND METHODS

The study was conducted on 50 subjects, who were taken from the OPD and IPD patients, which included: 25 preeclamptic women and matched 25 healthy pregnant women control subjects. A random urine sample was collected from each subject without adding any preservative. Immediately after collection, the urine samples were quantitatively analyzed for protein<sup>13</sup> and creatinine.<sup>5</sup> Urinary PCI was calculated by using the equation proposed by Shaw et al.<sup>14</sup>

	Control group (n=25)	Test group (n=25)	p value
Urinary protein (mg/dl)	1839.20 ± 453.96	3692.00 ± 474.21	<0.001*
Urinary creatinine (mmol/dl)	7.49 ± 2.56	8.90 ± 1.84	>0.05**
Urinary PCI	2733.32 ± 1082.90	4332.86 ± 1081.21	<0.001*

\* Highly significant

\*\* Non-significant



**Fig.1 - Urinary PCI in Control Group and Preeclamptic Patients (Test Group).**

### DISCUSSION

In the present study, the mean urinary protein concentration and PCI were found to be significantly higher in the preeclamptic group as compared to the control group while the creatinine excretion in

these two groups was comparable. This means that increased PCI was due to increased protein excretion.

Anuradha had estimated the protein/creatinine ratio in normal pregnancy and preeclampsia. She found that urinary protein/creatinine ratio showed statistically significantly higher levels among preeclamptic patients when compared to normal pregnancy. Urinary protein/creatinine ratio showed wide variation of results among preeclamptic patients. She concluded that it is a good screening method to predict preeclampsia which reduces prenatal morbidity and mortality.<sup>15</sup>

Hossain et al estimated spot urine protein-creatinine and 24 hour urine protein excretion for diagnostic accuracy in preeclampsia. They concluded that spot urinary protein/creatinine ratio is a good predictor of proteinuria in preeclampsia.<sup>16</sup>

Our results are in conformity with these two previous reports. In the present study, the increased protein excretion could only be due to preeclampsia. A minor increase in protein excretion (microproteinuria) could be an early indicator of renal dysfunction. This shows that preeclamptic individuals should be screened for microproteinuria, and that urinary PCI could be a quick and convenient alternative to 24-hour urine protein estimation for detection of microproteinuria.

## CONCLUSION

The present study shows that urinary protein excretion is increased in preeclampsia and that this increase can be easily detected by measuring PCI in a random urine sample.

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