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## Altered renal parameters on fetal and maternal outcome in pre-eclamptic patients

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### Abstract

Preeclampsia and eclampsia are still the major cause of fetomaternal mortality and morbidity. An attempt is made to study the correlation between renal parameters and fetomaternal outcome in tertiary hospital, Vijayawada. A retrospective study was conducted by verifying case sheets and high risk pregnancy registers of 150 preeclampsia patients. (100 cases and 50 controls) who were delivered between Jan 2022 and Dec 2022 in GGH. Renal parameters were studied both in pre and postnatal period and the effect on fetal and maternal outcome in patients with raised parameters analyzed.

**Keywords:** Altered renal parameters, fetal, maternal outcome, pre-eclamptic patients

### Introduction

#### Aims and objectives of the study

- To identify altered renal function tests in pre-eclamptic females.
- To correlate altered renal function with fetomaternal outcome in pre-eclamptic patients.

### Materials and Methods

**Study Design-** The study is retrospective observational and cross sectional.

**Duration of the study-** January 2022 to December 2022 (12 months)

**Place of study:** GGH, Vijayawada

### Sample Size

Case sheets and records of 100 patients of Pre-eclampsia with one or more raised renal parameters and fifty age matched pre-eclamptic cases with normal renal parameters were considered as controls for the study.

### Inclusion criteria

Study group consists of patients of preeclampsia with any of the following criteria

- 1) Serum creatinine > 0.9mg/dl
- 2) Blood urea > 26mg/dl
- 3) Raised Serum uric acid as per gestational age

### Exclusion criteria-

- Multiple pregnancy, chronic hypertension
- With any other pre-existing co-morbidities such as heart disease, Diabetes, anemia, thyroid disorders, and epilepsy.

### Results

**Table 1:** Gestational age in weeks at the time of delivery

Gestational Age	Cases		Controls	
	N	%	N	%
28 – 32	36	36.0	7	14.0
33 – 36	42	42.0	26	52.0
37 – 42	22	22.0	17	34.0
Total	100	100.0	50	100.0

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This observation was statistically significant. Patients with altered renal parameters were induced at an early gestational age, to prevent further morbidity.

**Table 2:** Blood urea

Blood Urea	Cases		Controls	
	N	%	N	%
Normal	50	50.0	50	100
Abnormal	50	50.0	0	0
Total	100	100	50	100.0

3rd trimester: 6 – 22 mg / dl

In the cases group, 50% had normal blood urea level, 50% had abnormal blood urea level.

**Table 3:** Serum creatinine

Serum Creatinine	cases		controls	
	N	%	N	%
Normal	24	24.0	50	100.0
Abnormal	76	76.0	0	0
Total	100	100.0	50	100.0

Among cases, 76% had abnormal serum creatinine level. Among controls, 100% had normal serum creatinine level.

**Table 4:** Uric Acid

Uric Acid	Cases		Controls	
	N	%	N	%
Normal	20	20.0	50	100.0
Abnormal	80	80.0	0	0
Total	100	100.0	50	100.0

Among cases, 80% had abnormal uric acid levels.

**Table 5:** 24 hour urine protein

Urine protein	cases		controls	
	N	%	N	%
<1 gm	18	18.0	0	0
1 – 3 gm	48	48.0	40	80
>3 gm	34	34.0	10	20
Total	100	100.0	50	100.0

Table 5 shows distribution based on 24 hour urine protein levels, among cases 18% had 24 hour urine protein levels <1 gm, 48% had urine protein levels 1-3gm, >3 gm in 34%.

**Table 6:** Mode of delivery

Mode of Delivery	cases		controls		Total	
	N	%	N	%	N	%
Normal delivery	60	60.0	19	38.0	49	49.0
LSCS	30	30.0	22	44.0	37	37.0
Outlet forceps	4	4.0	2	4.0	4	4.0
Vacuum	6	6.0	7	14.0	10	10.0
Total	100	100.0	50	100.0	100	100.0

Chi square test=5.39 p=0.1 Inference : Is Not Statistically Significant

Among cases, 60% had normal delivery, 30% had LSCS, 4% had outlet forceps delivery and 6% had vacuum delivery. Among controls, 38% had normal delivery, 44% had LSCS, 4% had outlet forceps delivery and 14% had vacuum delivery. Lscs rate is more in controls as gestational age is near term and in cases low acceptance of Lscs as patients opted for normal when risk of neonatal mortality is explained.

**Table 7:** Nature of labour - Spontaneous/Induced

Nature of Labour	cases		controls	
	N	%	N	%
Spontaneous	26	26	7	25.0
Induced	74	74	21	75.0
Total	100	100.0	28	100.0

Among cases, 50% had spontaneous and 50% had induced labour.

Among controls, 25% had spontaneous and 75% had induced labour.

**Table 8:** Perinatal outcome

Perinatal outcome	cases		controls	
	N	%	N	%
Alive	64	64.0	37	74.0
Neonatal deaths	36	36.0	13	26.0
Total	100	100.0	50	100.0

In the cases group, 64% were live births and in control group 74% were live births.

**Table 9:** IUGR and low birth weight

IUGR & low birth weight	cases		controls		Total	
	N	%	N	%	N	%
+	56	56	20	40.0	48	48%
-	44	44	30	60.0	52	52%
Total	100	100.0	50	100.0	100	100.0

Chi square test=27.3 p<0.001\*Inference : Is Statistically Significant

Among cases, 56% and among controls 40% had IUGR. This observation was statistically significant

Among cases, 25.7% had Apgar score of <3, 37.1% had a score of 4-6 and 37.1% had a score of >7.

Among controls, 12.5% had Apgar score of <3, 27.5% had Apgar score of 27.5% and 60% had a score of >7.

**Table 10:** Maternal morbidity

Maternal morbidity	cases		controls		Total	
	N	%	N	%	N	%
Pulmonary embolism	1	7.7%	0	0.0%	1	6.3%
Renal failure	1	7.7%	0	0.0%	1	6.3%
Abruptio placenta	2	15.4%	1	33.3%	3	18.8%
PPH	3	23.1%	1	33.3%	4	25.0%
Eclampsia	4	30.8%	1	33.3%	5	31.3%
Eclampsia + Abruptio placenta	2	15.4%	0	0.0%	2	12.5%
Total	13	100.0	3	100.0%	16	100%

Chi square test=11.04 p=0.01\* Inference: statistically Significant

6.3% had pulmonary embolism and renal failure, 18.8% had abruptio placenta, 25% had PPH, 31.3% had eclampsia, 12.5% had eclampsia + abruptio placenta  
No maternal death observed in the study.

**Table 11:** Perinatal mortality

Perinatal mortality	CASES		CONTROLS		Total	
	N	%	N	%	N	%
IUDs	2	11.1%	4	30.8%	6	19.4%
Still births	11	61.1%	7	53.8%	18	58.1%
Neonatal deaths	5	27.8%	2	15.4%	7	22.6%
Total	18	100%	13	100%	31	100%

Chi square test= 2.08 p=0.35 Inference Is Not Statistically Significant

Among cases, out of 18 cases 11.1% were IUD, 61.1% were still births, 27.8% were neonatal deaths.

Among controls, out of 13 cases 30.8% were IUD, 53.8% were still births, 15.4% were neonatal deaths.

### Discussion

Mean GA in the cases group was  $33.68 \pm 2.98$  and in control group was  $35.4 \pm 3.07$ . In the cases group, 36% were with GA of 28-32 weeks, 42% with GA of 33-36 weeks, and 22% with GA of 37 – 42 weeks. In the control group, 14% with GA of 28-32 weeks, 52% with GA of 33-36 weeks, 34% with GA of 37-42 weeks. This is because of early induction in cases in the interest of mother to prevent further deterioration of renal function.

Among cases 62% had normal serum creatinine levels, 38% had abnormal levels. 76% had abnormal serum creatinine levels. Among cases, 80% had abnormal uric acid levels. 18% had 24 hour urine protein levels <1 gm, 48% had urine protein levels 1-3gm, >3 gm in 34%.

In the study 49% had normal delivery, 37% had LSCS, 4% had Outlet forceps, 10% had Vacuum. Among cases, 60% had Normal vaginal delivery, 30% had LSCS, 4% had outlet forceps and 6% had Vacuum. Among controls, 38% had Normal vaginal delivery, 44% had LSCS, 45 had Outlet forceps and 14% had Vacuum delivery. Lscs rate is more in controls as gestational age is near term and in cases low acceptance of lscs as patients opted for normal when risk of neonatal mortality is explained.

In 38.7% labour was spontaneous and in 61.3% it was induced. Among cases, 50% had Spontaneous and 50% had Induced labor. Among controls, 25% had Spontaneous and 75% had induced labor.

68% were live birth and 32% were Neonatal deaths. In the cases group, 64% were live birth and in control group 72% were live birth. 48% had IUGR. Among cases, 56% and among Controls 40% had IUGR. 18.7% had APGR score of <3, 32% had a score of 4-6 and 49.3% had APGAR score of >7. Among cases, 25.7% had APGAR score of <3, 37.1% had a score of 4-6 and 37.1% had score of >7. Among controls, 12.5% had APGAR score of <3, 27.5% had APGAR score of 27.5% and 60% had score of >7. Out of 31 cases died, 19.4% had IUD, 58.1% had still birth and 22.6% had Neonatal death. Among cases, out of 18 cases 11.1% were IUD, 61.1% were Still-birth, 27.8% were Neonatal deaths. Among controls, out of 13 cases 30.8% were IUD, 53.8% were Still-birth, 15.4% were Neonatal deaths

### Summary

100 cases of preeclampsia with one or more altered renal parameters were studied against 50 pre-eclamptic patients with normal parameters. It is found that there is increased incidence of induction of labor at an earlier gestational period due to altered renal function to prevent further damage to kidney whereas the controls were carried till nearly 36 weeks. Operative interference is more in controls, may be due to option given to patient and attendants who opted operative delivery for a near term baby, but denied for a preterm baby when neonatal risks are explained. Maternal morbidity is increased in cases; however mortality is NIL in the study group. IUGR and low birth weight babies are more in cases when compared to controls. Still-birth rate and neonatal deaths are more in cases, but not significant when compared to controls

### Conclusion

- Raised renal parameters in Pre-eclampsia are associated with increased incidence of perinatal morbidity.
- Raised renal parameters in Pre-eclampsia are not associated with significant increase in perinatal mortality.
- Raised renal parameters in Pre-eclampsia are associated

with increased incidence of maternal morbidity.

- Raised renal parameters in Pre-eclampsia are not associated with significant raise in maternal mortality.
- Patients of Preeclampsia with raised renal parameters needs close monitoring and due interventions promptly in view of associated consequences

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