

GLOMERULAR FILTRATION RATES BY CREATININE CLEARANCE IN TOXAEMIAS OF PREGNANCY

S. CHHABRA • VINAYA SOMAN

SUMMARY

Present study was done in 130 cases of toxemia of pregnancy and 50 control cases were taken. All cases were indoor patients of department of Obstetrics and Gynaecology of Mahatma Gandhi Institute of Medical Sciences Sevagram Eastern Maharashtra. GFR was measured by measuring endogenous clearance. It was found that GFR is reduced in all cases of toxemia. Mean value was 55.55 ml/min in toxemic group and 137.15 ml/min. in normal pregnant women. As the severity of the disease increased the difference in each group was statistically significant. All 15 cases of stillbirths in toxemic mothers had markedly reduced GFR (50 ml/minute). Similarly both the patients who died had GFR of 20 and 30.5 ml. minute. However there was no correlation found between GFR and IUGR.

Toxaemia of pregnancy has been recognised as a disorder peculiar to pregnant and puerperal women. Although etiology of this disease is still obscure pathophysiology is little bit understood now. It is sure that renal glomerular damage does occur and it affects the renal haemodynamics. Glomerular filtration rate (GFR) reflects renal plasma flow (RPF), Various clearance tests are used to know the GFR. Roy and Sinha (1984) have showed that creatinine clearance gets lowered as the severity of the condition increases. In the

present study an attempt has been made to find out the relationship between severity of the disease and creatinine clearance and intrauterine growth retardation (IUGR).

Material and Methods

The present study was done in 180 cases (One hundred and thirty cases of toxemia of pregnancy and fifty matched control cases) admitted to the department of obstetrics and gynaecology of Mahatma Gandhi Institute of Medical Sciences, Sevagram, Wardha, Eastern Maharashtra. GFR was measured by endogenous creatinine clearance assay.

*Mahatma Gandhi Institute of Medical Sciences
Sevagram, Wardha, Maharashtra, India
Accepted for publication on 23/12/1989.*

$$\text{Creatinine clearance} = \frac{\text{Urine creatinine (mg/100ml)}}{\text{Serum creatinine (mg/100 ml)}} \times \text{Volume of Urine (ml/min)}$$

Observations

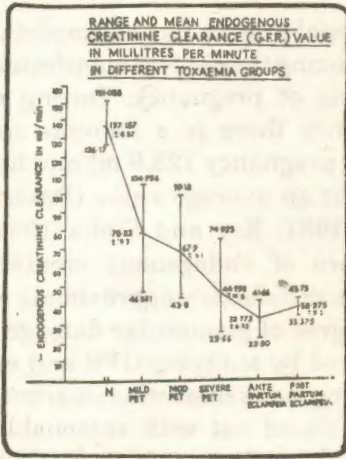
In normal pregnant women (control) the GFR ranged between 126.17 ml/minute to 151.08 ml/min while in cases of various degrees of severity of toxæmia it ranged between 22.5 to 104.95/ml (Table I). Statistically (Z test) the fall from control group to mild Preeclamptic toxæmia (PET) was also highly significant ($p < 0.001$) so also from moderate to severe group ($p < .001$). All patients with toxæmia had low GFR (128.9 ml/min average value for normal pregnancy). No correlation could be found between IUGR and GFR. 43.84% babies were small for date in all cases of toxæmia and 56.16% were appropriate for age (AGE). However all the 15 cases with stillbirths had GFR less than 50 ml/min (Statistically significant difference from live birth cases ($p < .01$). Toxæmia accounted for 28.57% of maternal mortality of the same period. GFR in both these cases was as low as 23.0 ml/mt and 30.5 ml/mt respectively.

Discussion

Renal system has an important role in producing the clinical manifestations of toxæmia of pregnancy. During normal pregnancy there is a increase in GFR. During pregnancy 128.9 ml/min has been taken as an average value (Davison and Nobel 1981, Roy and Sinha 1984). The clearance of endogenous creatinine is taken as satisfactory approximate of GFR. The degree of glomerular damage can be measured by studying GFR and evaluating endogenous creatinine clearance, GFR can be found out with reasonable accuracy. Roy and Sinha (1984) also found that creatinine clearance got lowered as the severity of the disease increased as was found in our study (Fig.1). There was a statistically significant difference from control to mild ($P < .001$), mild to moderate ($P < .01$), from moderate to severe ($P < .001$) and also from severe disease to eclampsia ($P < .001$). We could not find any relationship between GFR and IUGR. However all patients with still births had less than 50 ml/mt GFR. This was statistically significant difference when compared with live births ($P < .001$). Similarly patients who died (2) had very markedly reduced GFR.

TABLE - I
GLOMERULAR FILTRATION RATE IN ML/MIN:

Group of Patients	No. of cases	Range of GFR (Cr. clearance in ml/min)	Mean of GFR in ml/min \pm S.D
Mild PET cases	25	46.54 - 104.95	78.229 \pm 19.3
Moderate PET cases	42	43.80 - 99.18	67.943 \pm 15.1
Severe PET cases	46	25.66 - 74.925	44.992 \pm 10.8
Ante + Intra partum eclampsia cases	14	22.50 - 41.66	32.773 \pm 6.23
Post Partum ecl. cases	3	33.37 - 43.75	38.275 \pm 5.21
Control cases	50	126.171 - 151.08	137.157 \pm 6.57



It is possible that the markedly reduced reduction in GFR reflects the completely deranged circulation in the body which not only affects foetal circulation badly but sometimes leads to maternal death also.

Conclusion

In the study of 130 cases of toxemia

of pregnancy with 50 control cases, it was found that GFR is reduced in all cases of toxemia of pregnancy. The difference was statistically significant from control group and between each group. Though number of cases of IUGR increased with increased severity of toxemia no relation could be found between GFR and IUGR. However markedly reduced GFR may be adding to intrauterine deaths and sometimes maternal death as all cases with stillbirths had markedly reduced GFR and both the patients who died had very low GFR levels.

Acknowledgements

We are thankful to the members of department of Biochemistry and department of Obstetrics and Gynaecology for helping in doing this work.

References

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2. Roy, P., Sinha, A.: *J. of Obstet. and Gynec. of India* 36:272, 1984.

Group	Mean GFR (ml/min)	Range (ml/min)	n
Normal	79.23	46.81 - 104.78	50
Mild PET	67.9	43.9 - 99.18	25
Med PET	46.66	29.44 - 74.92	25
Severe PET	37.50	23.44 - 61.66	25
Ante partum eclampsia	33.375	15.12 - 49.75	25
Post partum eclampsia	33.375	15.12 - 49.75	25