ABSTRACT

Renal haemodynamics and renal functions have been shown to be markedly altered during pregnancy and reversed *post-partum*. This community based longitudinal study was carried out in a selected population of women in Sri Lanka with the objective of assessing the renal functions during normal pregnancy. After obtaining informed written consent, irrespective of age and parity, women with a period of amenorrhoea (POA) of ≤13 weeks and free of diseases were recruited to the study. Their serum osmolality (S_{osm}), urine osmolality (U_{osm}), 24 hour urine output, serum creatinine (S_{creat}), creatinine clearance (CrCl), serum uric acid (UA) and blood urea (BU) were assessed at registration (visit 1), at POA 16±1 week (visit 2), POA 26±1 week (visit 3), POA 36±1 week (visit 4) and between 12–16 weeks *post-partum*. The *post-partum* values were considered the baseline for each individual. The blood pressure was measured and urine was cultured at each visit to detect hypertension and urinary tract infections. Of the 45 (56.3%) who completed the study, 11 (13.7%) developed complications and the rest were considered normal.

The mean S_{osm} increased from visit 1 (269.0 mOsmol/kg, 95% CI: 267.5-270.5 mOsmol/kg) to visit 2 (273.0 mOsmol/kg, 95% CI: 272.2-274.8 mOsmol/kg, $p<0.05$), plateaued thereafter and further increased *post-partum* (285.3 mOsmol/kg, 95% CI: 283.3-287.3 mOsmol/kg, $p<0.05$).

The mean S_{creat} decreased from visit 1 (0.51 mg/dl, 95% CI: 0.47-0.55 mg/dl) to visit 2 (0.41mg/dl, CI: 0.37-0.45 mg/dl, $p<0.05$) and then to visit 4 (0.38 mg/dl, 95% CI: 0.34-0.42 mg/dl) but increased *post-partum* to a value higher than that of visit 1 (0.59 mg/dl, CI: 0.54-0.64

mg/dl, $p<0.05$).

The mean CrCl increased from visit 1 (94.4 ml/min, 95% CI: 79.8-109 ml/min) to visit 3 (139.9 ml/min, 95% CI: 117.8-162.0 ml/min, $p<0.05$) and then to visit 4 (159.8 ml/min, 95% CI: 132.1-187.5 ml/min) but decreased *post-partum* to a value lower than that of visit 1 (87.8, 95% CI: 72-110 ml/min, $p>0.05$).

The mean serum UA increased from visit 1 (4.2 mg/dl, 95% CI: 3.6-4.8 mg/dl) to visit 3 (6.2 mg/dl, 95% CI: 5.3-7.0 mg/dl, $p<0.05$) but decreased *post-partum*, to a value higher than that of visit 1 (5.4 mg/dl, 95% CI: 4.8-6.0 mg/dl, $p<0.05$).

The mean BU concentration decreased from visit 1 (24.5 mg/dl, 95% CI: 21.5-27.5 mg/dl) to visit 2 (21.6 mg/dl, 95% CI: 18.7-24.5 mg/dl, $p<0.05$) and then to visit 3 (21.3 mg/dl, 95% CI: 18.5-24.1 mg/dl) but increased again at visit 4 (25.0 mg/dl, 95% CI: 21.9-28.1 mg/dl, $p>0.05$). The *post-partum* mean value was higher than that of visit 1 (28.0 mg/dl, 95% CI: 25.8-31.2 mg/dl, $p>0.05$).

Although the U_{osm} and 24 hour urine output fluctuated during pregnancy the changes were not significant and all the mean values were within the normal non-pregnant ranges.

Throughout pregnancy, the mean S_{osm} and S_{creat} were significantly lower than the lower limits and the mean CrCl at mid and late pregnancy were significantly higher than the upper limit of the normal non-pregnant ranges. The serum UA increased significantly but remained below the

upper limit and the BU decreased significantly but remained above the lower limit of normal non-pregnant range.

The *post-partum* mean values of all the variables considered baseline for each subject were within the normal non-pregnant ranges and the S_{osm}, S_{creat} and CrCl during pregnancy showed significant differences when compared with their *post-partum* mean values.

The patterns of the changes observed during pregnancy in all the parameters were consistent with most of the studies in other countries. However, the mean values of S_{osm}, U_{osm} and CrCl are significantly lower and S_{creat} and UA are significantly higher than those of other countries.

Since in S_{osm} and S_{creat} appear to be significantly lower and CrCl appear to be significantly higher during pregnancy compared to the non-pregnant norms of these variables, they should not be used in the interpretation of renal functions of pregnant women. Pregnancy specific reference values for all renal function tests should be established in Sri Lanka.