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A Study on Biochemical Profile and Outcome of Acute Renal Failure In Obstetric Patients In Bundelkhand Region Of Uttar Pradesh

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Abstract
Objective: *To measure the biochemical profile and outcome of acute renal failure in obstetric patients in Bundelkhand region Uttar Pradesh*
Methods: *The present was a cross-sectional study design. The women with previously healthy kidneys who developed renal complications during their pregnancy due to obstetrical causes were included in the study. The blood was collected from each patient and analysed for Hb, urea, serum creatinine level, sodium and potasium. Ultrasonographic was done in each patient. The criteria for diagnosis of ARF was: urine output output<400 ml/day, history<3 month, bilateral normal sized kidney (9-12 cm) on ultrasonographic examination and abrupt rise of blood urea and serum creatinine.*
Results: *The decreased level of Hb was observed (8.81±1.83, 95%CI=8.29-9.33). The mean TLC and serum Na was 8779.72 (±4167.45) and 128.60 (±13.59) respectively. However, serum potassium and creatinine was found to be 3.10 (±0.63) and 2.26 (±1.09) respectively. The blood urea was 98.56 (±12.34). The 95% confidence interval was narrow in all the parameters. The serum potassium was observed to be significantly (p=0.03) lower in the patients of age <30 (2.95±0.51, 95%CI=2.75-3.14) than ≥30 (3.33±0.73, 95%CI=2.99-3.67) years. Only Hb was found to be significantly (p=0.009) associated with semester of pregnancy. The maternal mortality was 24%.*
Conclusion: *Any patient with pregnancy related renal failure should be referred early for prompt diagnosis and timely nephrological intervention. Dai or quack handling should be avoided. Ideal care for women with acute renal failure in pregnancy or postpartum requires a multidisciplinary approach that may include maternal-fetal medicine, critical care medicine, nephrology, and neonatology specialists.*
Key words: *Renal failure, biochemical profile, obstetric patients*

Introduction

Acute renal failure (ARF) is a clinical syndrome characterized by abrupt and sustained decrease in renal function resulting in retention of nitrogenous (urea and creatinine) and non-nitrogenous waste products. Depending on the severity and duration of the renal dysfunction, it can be accompanied by metabolic disturbances, such as metabolic acidosis and hyperkalaemia, changes in body fluid balance, and effects on many other organ systems (Rajeshwari et al, 2015). Apart from these anticipated challenges many other renal problems can develop during the pregnancy in patients with normal renal function such as urinary tract infections, acute kidney injury or renal trauma during pregnancy (Bajwa and Kulshrestha, 2012).Incidence of ARF in pregnancy is about 1/20,000 births (Gammill and Jeyabalan, 2005). Mortality varies from 10% to 56% but the incidence has decreased tenfold during the last 30 years (Prakash et al, 2006). This decrease is most likely due to liberalization of abortion laws, availability of more aggressive and effective antibiotic therapy and improved prenatal care. Maternal mortality associated with ARF has decreased due to early diagnosis and improved care. Etiology is varied ranging from functional causes to a variety of other causes.The present study was designed to measure the biochemical profile and outcome of acute renal failure in obstetric patients in Bundelkhand region of Uttar Pradesh.

.Material And Methods

The present was a cross-sectional study conducted in a tertiary care hospital in north India. The study was approved by the Ethical Committee of the Institute. The written informed consent was taken from each participant before enrolling in the study. The women with previously healthy kidneys who developed renal

complications during their pregnancy due to obstetrical causes were included in the study. Any patient with previous renal disease becoming pregnant was excluded from the study.

The blood was collected from each patient and analysed for Hb, urea, serum creatinine level, sodium and potasium. Ultrasonographic was done in each patient. The criteria for diagnosis of ARF was: urine output output<400 ml/day, history<3 month, bilateral normal sized kidney (9-12 cm) on ultrasonographic examination and abrupt rise of blood urea and serum creatinine.

Statistical Analysis

The results are presented in mean±SD. The Unpaired t-test was used to compare the biochemical parameters between the two age groups. The one way analysis of variance followed by Bonferroni Post hoc tests was used to compare the biochemical parameters among the three semester strata. The p-value<0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

Results

The decreased level of Hb was observed (8.81±1.83, 95%CI=8.29-9.33). The mean TLC and serum Na was 8779.72 (±4167.45) and 128.60 (±13.59) respectively. However, serum potassium and creatinine was found to be 3.10 (±0.63) and 2.26 (±1.09) respectively. The blood urea was 98.56 (±12.34). The 95% confidence interval was narrow in all the parameters (Table-1).There was no significant (p>0.05) difference in Hb, TLC, serum sodium, creatinine and blood urea between the age <30 and ≥30 years. However, serum potassium was observed to be significantly (p=0.03) lower in the patients of age <30 (2.95±0.51, 95%CI=2.75-3.14) than ≥30 (3.33±0.73, 95%CI=2.99-3.67) years (Table-2).Table-3 shows the comparison of biochemical profile of the ARF patients with semester. Only Hb was found to be significantly (p=0.009) associated with semester of pregnancy. The maternal mortality was 24% (Fig.1).

Discussion

Patients with acute renal failure are often asymptomatic, and the condition is diagnosed by observed elevations of blood urea nitrogen (BUN) and serum creatinine levels. Most authorities define the condition as an acute increase of the serum creatinine level from baseline (i.e., an increase of at least 0.5 mg per dL [44.2 μmol per L]) (Agrawal and Swartz, 2000).In the present study, the decreased level of Hb was observed (8.81±1.83, 95%CI=8.29-9.33). The mean TLC and serum Na was 8779.72 (±4167.45) and 128.60 (±13.59) respectively in this study. However, serum potassium found to be 3.10 (±0.63) and blood urea was 98.56 (±12.34) in the present study. In the present study, the 95% confidence interval was narrow in all the parameters. In a case series, the hemoglobin level was 10.6 g/dl, the leukocyte count 15.8 x 10'/l (86% neutrophils). The serum levels observed was sodium 134 mmol/l, potassium 2.5 mmol/l, chloride 86 mmol/l, bicarbonate 24 mmol/l, blood urea nitrogen 16.8 mmol/l (47 mg/dl) and creatinine 663 u.mol/l (7.5 mg/dl) (Edward et al 1980).

We compared the biochemical parameters between two age groups. We found no significant (p>0.05) difference in Hb, TLC, serum sodium, creatinine and blood urea between the age <30 and ≥30 years. However, we observed serum potassium to be significantly (p=0.03) lower in the patients of age <30 (2.95±0.51, 95%CI=2.75-3.14) than ≥30 (3.33±0.73, 95%CI=2.99-3.67) years. Only Hb was found to be significantly (p=0.009) associated with semester of pregnancy.

In the present study, the mean creatinine was found to be 2.26 (±1.09). Sulaniya et al (2015) found the mean creatinine level being 4.5±0.62. The lower creatinine level in this study might be due to different socio-demographic difference.

In the present study, the maternal mortality was 24%. Kumar et al reported a maternal mortality rate of 24%. Seluk et al detected the maternal mortality as 18% (Lutfullah et al, 2005). Utas et al (2000) detected that maternal mortality reduced to 20.8% in 1991-97 when compared to 31.8% in 1983-90. This appears to be the result of aseptic delivery practices and early management of ante partum and postpartum haemorrhages. The mortality related to PR-ARF has declined to < 10% in Europe and North America, while the reported mortality rate of PR-ARF has decreased from 56% in 1987 to 24.39% in 2005 in India (Najar et al, 2008).

Conclusion

Any patient with pregnancy related renal failure should be referred early for prompt diagnosis and timely nephrological intervention. Dai or quack handling should be avoided. Ideal care for women with acute renal failure in pregnancy or postpartum requires a multidisciplinary approach that may include maternal-fetal medicine, critical care medicine, nephrology, and neonatology specialists.

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Table-1: Biochemical profile of the ARF patients

Biochemical parameters	**Mean±SD**	**95%CI**
Hb	8.81±1.83	8.29-9.33
TLC	8779.72±4167.45	7595.34-9964.10
Serum Na (mEw/lit)	128.60±13.59	124.74-132.46
Serum K (mEq/li)	3.10±0.63	2.92-3.28
Creatinine (mg/dl)	2.26±1.09	1.95-2.58
Blood urea (mg/dl)	98.56±12.34	78.3-120.7

Table-2: Comparison of biochemical profile of the ARF patients with age

Biochemical parameters	**Age in years**		**p-value[1]**
	<30 (n=30)	**≥30 (n=20)**	
	Mean±SD (95%CI)	**(95%CI)**	
Hb	8.52±1.82 (7.83-9.20)	9.26±1.78 (8.42-10.09)	0.16
TLC	9147.70±4699.26 (7392.97-10902.43)	8227.75±3248.10 (6707.59-9747.91)	0.45
Serum Na (mEw/lit)	125.90±12.94 (121.07-130.73)	132.65±13.85 (126.17-139.13)	0.08
Serum K (mEq/li)	2.95±0.51 (2.75-3.14)	3.33±0.73 (2.99-3.67)	0.03*
Creatinine (mg/dl)	2.42±1.10 (2.01-2.83)	2.03±1.07 (1.53-2.54)	0.22
Blood urea (mg/dl)	97.56±13.45 (67.56-110.78)	111.34±12.56 (99.12-134.11)	0.11

[1]Unpaired t-test, *Significant

Table-3: Comparison of biochemical profile of the ARF patients with semester

Biochemical parameters	**Semester**			**p-value[1]**
	1st (n=18)	**2nd (n=16)**	**3rd (n=16)**	
	Mean±SD (95%CI)	**Mean±SD (95%CI)**	**Mean±SD (95%CI)**	
Hb	7.82±1.38 [a] (7.13-8.50)	9.64±1.69 [a] (8.73-10.54)	9.11±1.97 (8.05-10.16)	0.009*
TLC	8337.83±3648.54 (6523.45-10152.21)	8129.00±3821.18 (6092.84-10165.16)	9927.56±4995.48 (7265.65-12589.47)	0.41
Serum Na (mEw/lit)	130.72±16.95 (122.29-139.16)	128.50±14.74 (120.64-136.36)	126.31±7.00 (122.58-130.04)	0.64
Serum K (mEq/li)	3.15±0.89 (2.71-3.59)	3.11±0.56 (2.81-3.41)	3.04±0.31 (2.87-3.21)	0.88
Creatinine (mg/dl)	2.02±1.04 (1.51-2.54)	2.58±1.05 (2.02-3.14)	2.22±1.19 (1.59-2.86)	0.34
Blood urea (mg/dl)	78.45±14.56 (65.56-89.34)	97.23±13.46 (77.78-113.34)	105.14±15.67 (89.34-117.67)	0.23

[1]ANOVA test, [a]p=0.009 (Bonferroni Post hoc tests), *Significant

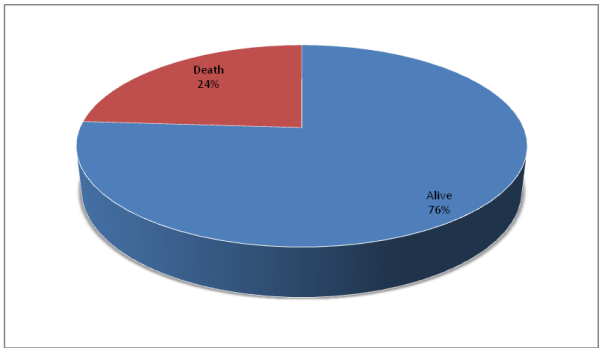

Fig.1: Distribution of maternal mortality