AETIOLOGY, MATERNAL AND FOETAL OUTCOME IN 60 CASES OF OBSTETRICAL ACUTE RENAL FAILURE

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Background: Acute renal failure is a serious complication in pregnancy. Not only does it result in significant maternal morbidity and mortality but also results in significant number of foetal loss. Although incidence of obstetrical acute renal failure has decreased in developed countries but still it is one of the major health problem of developing nations. The objective of this study was to study aetiology, maternal and foetal outcome in obstetrical acute renal failure. **Methods:** This study was conducted at Department of Nephrology, Khyber Teaching Hospital, Peshawar from August 2006 to December 2007. It was a descriptive, case series study. Female patients with pregnancy and acute renal failure, irrespective of age, were included in the study. Patients were thoroughly examined and baseline urea, creatinine, serum electrolytes, peripheral smear, prothrombin time, partial thromboplastin time, fibrinogen degradation products, renal and obstetrical ultrasound were performed on each patient and 24-hr urinary protein and bacterial culture sensitivity on blood, urine or vaginal swabs were done in selected patients. Foetal and maternal outcome were recorded. Data were analysed using SPSS. **Results:** A total of 60 patients were included in the study. Mean age of the patients was 29±5.4 years and duration of gestation was 33±4.9 weeks. Mean gravidity was 4±2.2. Sixteen patients (26.66%) were treated conservatively while 44 (73.33%) required dialysis. Postpartum haemorrhage was present in 14 (23.33%), postpartum haemorrhage and disseminated intravascular coagulation (DIC) in 11 (18.33%), eclampsia-preeclampsia in 8 (13.33%), antepartum haemorrhage in 8 (13.33%), antepartum haemorrhage with DIC in 6 (10%), DIC alone in 4 (6.66%), obstructed labour in 3 (5%), septic abortion in 3 (3.33%), HELLP (haemolysis elevated liver enzyme and low platelet) in 2 (3.33%), urinary tract infection with sepsis in 1 (1.66%) and puerperal sepsis in 1 (1.66%). Foetal loss was 40 (66.66%). Maternal mortality was 9 (15%) while 28 (46.66%) fully recovered. Among the rest 6 (30%) had partial recovery and 5 (8.33%) had dialysis dependent chronic kidney disease. **Conclusion:** Obstetrical acute renal failure not only results in foetal loss but also causes significant maternal morbidity and mortality.

Keywords: Obstetrical acute renal failure, ARF, Aetiology, Foetal outcome, Maternal outcome

INTRODUCTION

Acute renal failure is a challenging entity for the nephrologists. Its incidence varies from 100 to 600 millions per year.[1] Acute renal failure is a serious complication of pregnancy. Acute renal failure in pregnancy follows a bimodal distribution.[2] There are peaks in first trimester related to unregulated and septic abortion. The peak in late 3rd trimester is usually due to obstetric complications. ARF in pregnancy results in acute tubular necrosis and cortical necrosis. In developed world the incidence of acute renal failure in pregnancy has declined over recent decades as a result of improved prenatal care and decreased post abortal sepsis.[3] The proportion of acute renal failure related to septic abortion has decreased dramatically from 33.3% to1.8% over the past 20 years.[4] The incidence of cortical necrosis has also decreased over the last few years.[5] In developing countries there is lack of health facilities, poverty and population expansion. As a result obstetrical ARF is still an epidemic in the developing countries.[6] Pakistan is no exception to this generalisation.

The aims of this study are to determine the Aetiology, maternal and foetal outcome in obstetrical acute renal failure.

PATIENTS AND METHODS

This study was conducted at the Department of Nephrology Khyber Teaching Hospital Peshawar. Nephrology Department is one of the two centres in the province providing nephrological care. It is a referral centre for NWFP and bordering Afghanistan for nephrological care. A total of 60 patients, with obstetrical ARF, referred to our unit were selected through non-probability sampling of convenience type. The inclusion and exclusion criteria were:

1. All patients with obstetrical ARF were included in the study.
2. Patients with end stage kidney disease, prior hypertension, diabetes mellitus, history of urological surgery, history of renal stones and small echogenic kidneys on ultrasound were excluded from the study.

Acute renal failure was defined as patients with acute elevation of serum creatinine greater than 1.5 mg/dl or doubling of serum creatinine from the

baseline if known. Detailed obstetrical and medical history was taken. Questions were asked regarding various aetiologies like abortion, pre-eclampsia, eclampsia, antepartum haemorrhages, post partum haemorrhages and symptoms of septicaemia and DIC. Moreover questions were also asked about duration of amenorrhea and parity. Temperature, pulse, blood pressure and urinary output of each patient were recorded. Urinalysis, urea, creatinine, serum electrolytes, peripheral smear, prothrombin time, activated partial thromboplastin time, fibrinogen degradation product, ultrasound abdomen, liver function tests were done on each patient. Blood culture and vaginal swabs were taken for culture only in patients with septicaemia. Moreover, 24-hr urinary protein was done in patients with eclampsia-preeclampsia.

Maternal outcome was recorded as full recovery, partial recovery, end stage renal failure or death. Full recovery was defined as return of renal functions to normal. Partial recovery was defined as patients with impaired renal functions but not requiring dialysis. End stage renal disease was defined as patients with impaired renal functions for more than 3 months and requiring dialysis. The foetal outcome was recorded as alive or dead.

For variables like age, parity, duration of amenorrhea mean and standard deviation were determined. For categorical variables like aetiology of obstetrical acute renal failure, maternal and foetal outcome proportion and percentages were calculated. Data was analysed through SPSS version 16.

RESULTS

During the study period, 60 cases of pregnancy with acute renal failure were managed at Department of Nephrology Khyber Teaching Hospital Peshawar and they were then followed for a period of 3 months after their discharge for the outcome. Their age ranged from 18 to 40 years with mean age of 29±5.4 years. Duration of gestation was 33±4.9 weeks. The gravidity and parity were 4±2.2 and 3.8±2.1 respectively. Mean creatinine was 6.75±3.71 and mean urea was 149±69. Twenty patients has hyperkalemia with mean serum potassium of 4.92±1.16. Haemodialysis was done in 44 (73.33%) patients while 16 (26.66%) were treated conservatively. (Table-1)

Out of 60 patients, postpartum haemorrhage was present in 14 (23.33%), post partum haemorrhage and DIC in 11 (18.33%), eclampsia-preeclampsia in 8 (13.33%), antepartum haemorrhage in 8 (13.33%), antepartum haemorrhage with DIC in 6 (10%), DIC alone in 4 (6.66%), obstructed labour in 3 (5%), septic abortion in 2 (3.33%), HELLP in 2 (3.33%), urinary tract infection with sepsis in 1 (1.66%) and puerperal sepsis in 1 (1.66%). (Table-2)

Out of 60 patients 28 (46.66%) fully recovered from acute renal failure. Eighteen (30%) patients had partial recovery. The patients with partial recovery had renal dysfunction but they did not require renal replacement therapy. Five patients (8.33%) had dialysis dependent chronic kidney disease. Maternal mortality was 9 (15%) and foetal loss was 40 (66.66%). (Table-3)

Table-1: General characteristics of the patients

Age	29±5.4 years
Amenorrhoea	33±4.9 weeks
Gravidity	4±2.2
Parity	3.8±2.1
Pulse	93±12
Systolic BP	100±30
Diastolic BP	64±22
Electrolytes	Sodium 135±5.9 Potassium 4.92±1.16
Renal Function Tests	Urea 149±69 Creatinine 6.75±3.71
Management	Conservative 16 (26.66%) Haemodialysis 44 (73.33%)

Table-2: Aetiology of obstetrical acute renal failure

Postpartum Haemorrhages	14 (23.33%)
Postpartum Haemorrhages+DIC	11 (18.33%)
Antepartum haemorrhages	8 (13.33%)
Eclampsia-preeclampsia	8 (13.33%)
Antepartum haemorrhages+DIC	6 (10%)
DIC	4 (6.66%)
Obstructed Labour	3 (5%)
HELLP	2 (3.33%)
Urinary Tract Infection with septicaemia	1 (1.66%)
Puerperal sepsis	1 (1.66%)

Table-3: Foetal and maternal outcome

Foetal outcome	
Alive	20 (33.33%)
Death	40 (66.66%)
Maternal outcome	
Full recovery	28 (46.66%)
Partial recovery	18 (30%)
Dialysis dependent chronic kidney disease	5 (8.33%)
Death	9 (15%)

DISCUSSION

Acute renal failure in pregnancy is a serious complication and causes significant maternal and foetal mortality. In developed world, ARF secondary to infectious agents like malaria and gastro-eneteritis is almost eradicated. Similarly the incidence of obstetrical ARF has declined over the recent decades as a result of improved prenatal care and decreased postabortal sepsis.[3] Today, road traffic accident, contrast exposure, hospital acquired ARF and chemotherapeutic agents are the main causes of ARF in the developed world. Although obstetrical ARF is also on decline in developing countries, still it is one of the main causes of acute renal failure in the developing countries.[7]

The aetiology of obstetrical ARF has also changed over the last few decades. Abortion was the

cause of obstetrical ARF in late seventies.[8] The proportion of ARF secondary to septic abortions has decreased from 33.3% to 1.8% over the past 20 years.[4] We found obstetrical haemorrhages in 64.99% followed by DIC and eclampsia which were present in 34.99% and 16.66 % respectively. Akhter *et al*[9] and Naqvi *et al*[10] found obstetrical haemorrhages in 58.13% and 63% respectively which are comparable to our results. Although Ansari *et al*[11] found obstetrical haemorrhages as one of the leading cause of obstetrical ARF but they reported it to be present only in 38%. We found DIC either alone or in combination with obstetrical haemorrhages in 34.99% while Ansari *et al* reported DIC in combination with puerperal sepsis and septic abortion in 31%.[11] Eclampsia has been found in 12–23% in various studies.[13,14] In our patients the eclampsia-preeclampsia was observed in 16.66%.

In developed countries the aetiology of obstetrical ARF is different than ours. Majority of the studies have reported eclampsia-preeclampsia as a major cause of obstetrical ARF.[12,13] Hachim *et al*[14] and Venturae *et al*[15] found eclampsia-preeclampsia in 74.5% and 47.7% respectively. This discrepancy in aetiology of obstetrical ARF between various studies conducted in Pakistan and developed countries might be due to good antenatal care abroad leading to decrease incidence of obstetrical haemorrhages and early detection of eclampsia-preeclampsia.

While managing patients with obstetrical ARF, majority of the patients require haemodialysis as a renal replacement therapy. In the present study, around two third (73.33%) of the patients required haemodialysis while the rest were treated conservatively. Similar results were found by Akhter *et al*[9], Ansari *et al*[11] and Hachim *et al*[14] who reported renal replacement therapy in 76%, 71% and 74.6% respectively. However Alexopoulos *et al*[16] from Greece reported that only 55.55% of their patients needed dialysis. This might be due to early referral, better obstetrical and renal care.

Obstetrical ARF causes significant maternal morbidity. Although some of the patients regain their renal function back to normal, others are left with persistent renal dysfunction. We found recovery of renal function in 76.66%, with full recovery in 46.66% cases. The majority of the remaining patients (30%) had partial recovery, not requiring renal replacement therapy. Only 8.33% of the patient had dialysis dependent chronic kidney disease. Abroad Hachim *et al*[14], Venturae *et al*[15] and Alexopoulos *et al*[16] reported better results than ours. They reported recovery of renal functions in 87.3%, 87.48% and 84.6% of their cases. In Pakistan Akhter *et al*[9] and Naqvi *et al*[10] reported recovery of renal function in 82% and 51% respectively. The better results reported in various studies from developed world might be due to good literacy rate, better health care facilities and good antenatal and obstetrical care.

Obstetrical ARF not only cause significant morbidity but also increases maternal mortality. Maternal mortality found in our study was 15%. Akhter *et al* found maternal mortality in 18% of the patients, which is comparable with the finding of our study.[9] However our results are better than Naqvi *et al* and Ansari *et al* who found maternal mortality in 26%.[10,11] Various other studies have reported low maternal mortality. Hachim *et al*, Ventura *et al* and Randeree *et al* reported maternal death in 9.1%, 2% and 5% cases respectively.[14,15,17] The foetal mortality in our study is also high as compared to various studies abroad. We found foetal loss in 66.66% as compared to 44–55% in other studies abroad.[15,17] These findings might be due to better health care facilities and good antenatal and perinatal care in those countries.

Thus this study shows that obstetrical haemorrhages DIC and eclampsia-preeclampsia are the predominant causes of acute renal failure. Fifteen percent of the patients lost their lives and majority had partial recovery. Approximately two third of the mothers lost their babies. These are very alarming figures but we can change this threatening scenario by providing good antenatal care and health facilities in the far-flung areas.

CONCLUSION

Obstetrical ARF is still a common occurring. Obstetrical haemorrhages, DIC and eclampsia-preeclampsia are the major causes of obstetrical acute renal failure. Haemodialysis was required in two third of our patients. Bulk of the patients had either partial or full recovery and 8.33% had dialysis dependent chronic kidney disease. Fifteen percent of the patients succumbed to death and more than two third of the patients could not carry their pregnancies successfully. This alarming scenario can only be prevented by good antenatal care and provision of health facility.

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