

Hemodialysis among pregnancy related acute kidney injury patients: A single center experience in North-Western Nigeria

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ABSTRACT

Pregnancy related acute kidney injury (PRAKI) patients that underwent hemodialysis (HD) between May 2007 and April 2015 were studied with specific reference to clinical features, laboratory values, duration of pregnancy at the diagnosis of acute kidney injury and outcome. It involved 38 patients aged between 15 and 30 years. The main clinical features were fever, edema and oliguria. The leading etiological factors included ante/postpartum hemorrhage, septic abortion, and toxemia of pregnancy. The majority of cases occurred during the third trimester. PRAKI is a dreaded complication of pregnancy with high morbidity and mortality. HD improved patient survival in our study.

Key words: Hemodialysis, pregnancy, pregnancy related acute kidney injury

Introduction

Acute kidney injury (AKI) is a clinical syndrome characterized by a sudden reduction in glomerular filtration rate sufficient to cause accumulation of toxic nitrogenous waste products.^[1] Morbidity and mortality in AKI are high despite enormous research on the patho-physiology and technological advances in its management.^[2] The contributory factors to high mortality rate in AKI include late presentation, inadequate dialysis, and overwhelming sepsis. Studies have demonstrated that 5% of all hospital admissions and 30% of patients admitted into Intensive Care Unit are attributed to AKI.^[2,3] Although the incidence of pregnancy related AKI (PRAKI) has significantly

reduced in developed countries as a result of increase in awareness programs on etiological factors and prompt treatment of volume responsive cases,^[4,5] it is still responsible for 15–30% of AKI in developing nations.^[6,7] PRAKI due to ante/postpartum hemorrhage, septic abortion, and toxemia of pregnancy remains a major challenge to health care givers.^[8-10] Intermittent hemodialysis (HD) is the most frequent form of renal replacement therapy for AKI in developing countries including Nigeria.^[8] In recent times, there has been increased in awareness program on PRAKI, improvement in gynecological and obstetric care, and upgrading of our HD facilities. It is, however, not clear if the foregoing has translated into better outcome of PRAKI. We, therefore, undertook an 8-year retrospective study of PRAKI in Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, North-Western Nigeria in a bid to document our current status.

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Materials and Methods

An audit was undertaken of PRAKI cases managed with intermittent HD between May 2007 and April 2015 at the Renal Care Centre of UDUTH, Sokoto, the only tertiary and referral centre for Sokoto, Kebbi, and Zamfara states with a population of over 3 million people.

Patient demographics, causes of AKI, clinical features, duration of pregnancy at diagnosis, number of dialysis sessions, and outcome were obtained from the patients' records.

The diagnosis of PRAKI was based on sudden onset of oliguria/anuria and/or serum creatinine elevation of >2.5 mg/dl in a setting of pregnancy.^[10]

Preeclampsia, eclampsia, postpartum of AKI and RIFLE were defined as in a previous study.^[10]

The data were analyzed using SPSS version 20 (Statistical package for the Social Sciences, a proprietary software by IBM Corporation, Chicago IL). Quantitative variables were expressed as percentages and qualitative variables as median or mean. A $P < 0.05$ was taken as the level of statistical significance.

Results

A total of 38 cases of PRAKI with an age range between 15 and 30 years were dialyzed during the period under review. The majority were primigravidas (87%) and unbooked (92%) patients. Oliguria, body swelling, clinical pallor, fever, hypertension, and hypotension were the observed clinical features as shown in Table 1. Table 2 shows the mean laboratory parameters preceding the first session of HD.

Duration of pregnancy at the diagnosis of AKI revealed that the majority was in the third trimester accounting for 55.3% followed by postpartum period (26.3%), first trimester (13%), and second trimester (5%), respectively. Overall mortality was 45% with majority occurring in the third trimester (38%).

The HD sessions ranged from 1 to 6 times and majority (61%) required 3 sessions before full recovery of renal function. All patients had dialysis as at when due because the unit has a policy of commencing dialysis before payment is made for all cases of AKI. Seventeen of the patients died giving mortality rate of 45%. It was only 5 of the 21 patients who survived that came for follow-up and in fact, one of them was pregnant with normal renal function at follow-up visit [Figure 1].

Table 1: Clinical characteristics of the patients

Parameters	Number of cases	Percentage
Oliguria	36	94.7
Edema	33	86.8
Parlor	31	81.5
Fever	27	71
Hypertension	26	68.4
Hypotension	11	28.9
Encephalopathy	11	28.9
Convulsion	10	36.3

Table 2: Laboratory parameters at the first session of dialysis

Parameter	Value
Hemoglobin (g/dl)	6.05±2.01
Serum creatinine (mg/dl)	3.93±2.73
Serum urea (mg/dl)	76.42±33.23
Serum sodium (meq/l)	135.94±11.84
Serum potassium (meq/l)	5.11±1.42
Serum chloride (meq/l)	106.56±2.23
Serum bicarbonate (meq/l)	25.80±2.61

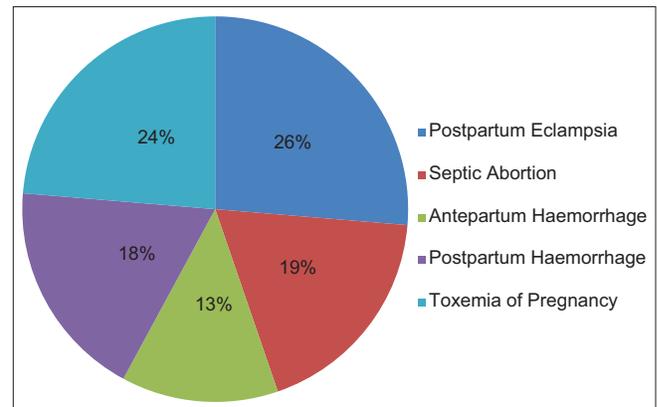


Figure 1: Etiological causes of pregnancy related acute kidney injury

Discussion

PRAKI is a disease of young women; the youngest in our study was 15-year-old, while the oldest was 30-year-old. This finding is in accord with report by Najjar *et al.*^[9] and also similar to observations by Arrayhani *et al.*^[10] who reported the age ranged from 18 to 40 years. A major contributory factor is early marriage, which is a very common practice in this part of the country and, is closely linked with Islamic practices. The majority of the patients were un-booked and primigravidas, which was not surprising because of the general low level of education and poor health care facilities in sub-Saharan Africa including Nigeria.^[8] The level of education in this part of Nigeria is very low, in particular, among females and is associated with low health care seeking behavior.

Oliguria was common in our study and is related to blood loss as ante/postpartum hemorrhage. The previous

studies^[1,6,8] have alluded to the fact that oliguria is a frequent feature in AKI of varied etiologies. Prerenal AKI is the leading form of AKI worldwide and oliguria is attributable to poor renal perfusion.^[2,3] PRAKI was very frequent in the third trimester (55%), and similar result was observed in Pakistan^[11] (86%), but our findings contrast with report from India^[12] where majority were in postpartum period (75.6%). The major causes of PRAKI in the third trimester included eclampsia, ruptured uterus, and ante-partum hemorrhage. Two cases of PRAKI that occurred in the second trimester in our study were attributable to sepsis and pregnancy-related hypertension. Septicemia as a major cause of AKI in developing countries has been reported in previous studies.^[1-3]

The low hemoglobin is attributable to ante-partum and postpartum hemorrhage. It is not surprising that prerenal AKI features dominated the biochemical parameters of our patients which are in accord with findings from an Indian study.

The mortality was higher among patients that presented in the third trimester and postpartum period. Studies^[13,14] have shown that postpartum eclampsia is associated with unfavorable outcomes; hence, the poor clinical outcome among our patients is not surprising. PRAKI is a very serious complication of pregnancy with associated high morbidity and mortality.^[15]

In conclusion, PRAKI is a disease of young women in their reproductive age group with a poor outcome in a setting of predominantly preventable etiologies. A more intensive health education and improvement in gynecological and obstetric care has the potential of impacting positively on the outcome of PRAKI.

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Conflicts of interest

There are no conflicts of interest.

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