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Spectrum of Postpartum Kidney Injury –A Tertiary Care Center Experience in a Developing Nation

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Abstract:
Introduction*: Pregnancy related kidney injury is a serious medical complication with significant mortality in developing countries.*
Methods: *A prospective observational study performed on postpartum women with acute kidney injury in a tertiary centre in south India over a 2 year period(2013-2014). Demographic and clinical data were collected and maternal, neonatal and fetal outcomes were analysed.*
Results: *Incidence of postpartum AKI in our study was 10.5%(48/457). Mean age was 24.75±4.34 years and mean serum creatinine at admission was 4.4.9±2.76mg/dl. In this study puerperal sepsis was predominant etiology in 33.37%,preeclampsia/eclampsia(25.6%), postpartum haemorrhage(12.8%),glomerular diseases (10.41%),abruption placenta in (4.16%). Renal biopsy was done in 11cases(22.91%). Frequent renal pathological lesions were cortical necrosis (12.5%), lupus nephritis (8.3%) , TMA (7.8%). Dialysis was required in 47% patients, of them 35.41% completely recovered, 4.1% partial recovered and ESRD seen in 8.3%.In the present study mortality rate was 8.3% and Puerperal sepsis is the cause of death in these patients . Foetal outcomes were preterm in 22.91% IUGR in 20.83%, normal 41.66% and IUD seen in 14.58 %babies.*
Conclusions: *Renal function monitoring in the peripartum period is equally significant ,even though uneventful ante partum period and normal renal function, as it is associated with adverse maternal and renal outcomes.*
Keywords: *acute kidney injury, akin, postpartum, outcomes.*

I. Introduction

Acute kidney injury is a rare but life threatening complication of pregnancy. In the industrialized world, the incidence of dialysis- requiring AKI in the setting of pregnancy is approximately 1 in 20,000 Births (1). The marked decline in this complication over the past 50 years is a result of improved prenatal care advancements in obstetrics practice and legalization of abortion. The rate of septic abortion as the reason of AKI was 33% in 1980-85 has decreased to 6.3% in 1989-97(2) . Acute renal failure associated with late obstetrical complications is well described in literature(1,3) in developed countries but there is a limited data on postpartum AKI from India, so this study was designed to study the incidence and clinical spectrum maternal and fetal outcomes of AKI in Postpartum period.

II. Materials And Methods

This prospective observational study was conducted over a period of two years from December 2012 to November 2014 in Nephrology unit in association with Department of Obstetrics and Gynecology, Government General hospital, Vishakhapatnam, Andhra pradesh , India.

After informed consent and ethical clearance from Institutional ethics committee, a total 48 patients who developed acute kidney injury in the postpartum period were analyzed. For each case, a detailed history, thorough physical examination like temperature, pulse rate, blood pressure, fluid intake and urine output was recorded. Relevant laboratory investigations such as complete hemogram, blood urea, serum creatinine, electrolytes, coagulation profile, liver function test, 24-hour urinary protein, and ultrasound abdomen were carried out. Blood culture and vaginal swab were taken for culture and sensitivity in patients with septicemia.

Hemodialysis or peritoneal dialysis was done when indicated. Renal biopsy was done in non recovering AKI lasting> 3 weeks. Maternal outcome was recorded as full recovery, partial recovery, end stage renal failure or death. End stage renal disease was defined as patients with impaired renal functions for more than 3 months and requiring hemodialysis. The fetal outcomes were recorded as live /dead, preterm-term-low birth weight-IUGR were recorded.

AKI was diagnosed when there was a history of sudden onset oliguria (urine output <400 ml over 24 hours), or anuria ,with an increase in serum creatinine of more than 0.3 mg/dl per day from base line based on AKIN criteria. Complete recovery from AKI was declared when renal function returned to normal range. Partial recovery was suspected when renal functions showed improvement but did not return to normal even after 12

weeks. Cortical necrosis is diagnosed in the presence of anuria or oliguria for >4 weeks and diagnosed with characteristic CECT scan finding of hypo attenuating sub capsular rim of cortex.

Preeclampsia was defined as the onset hypertension and proteinuria after 20 weeks of gestation in previously normotensive and non proteinuric pregnant women. Eclampsia was defined as the onset of grand mal seizure in a patient with preeclampsia. HELLP syndrome was defined as laboratory evidence of haemolysis ,elevation of enzymes and low platelet count in preclamptic women.

The diagnosis of severe sepsis used the definitions of the American College of Chest Physicians and the Society of Critical Care Medicine .

Postpartum haemorrhage was diagnosed when blood loss in the first 24 h after delivery was greater than 500ml following vaginal delivery and 1000ml following cesarean section

Thrombotic microangiopathy is defined by microangiopathic haemolytic anaemia, low platelet count, renal failure and elevated LDH. Exclusion criteria : All patients with pre-existing renal insufficiency , hypertension Diabetes, history of renal stone disease, small size of kidneys.

III. Results

Of total of 457 cases of acute kidney injury (AKI), 48 cases were related to obstetric problems admitted during December 2013 to November 2014, Thus, incidence of postpartum AKI was 10.5%.

The age of patients with AKI in puerperium ranged between 14 and 32 years with the mean age of 24.75±4.31 years. Majority 34 (70.83%) of the patients belonged to the peak reproductive age ranged between 20 and 30 years. Primigravida and multigravida constituted 79.16% and 20.83 % of the patients, respectively.

The mean peak serum creatinine and blood urea concentration were 4.49 ± 2.76 mg/dl and 121.24 ± 39.91 respectively. Most of the renal failure occurred in early (<24 hours after delivery) postpartum period 22(45.8%),18 (37.5%) patients had between 24hrs to7days, 8(16.7%) patients had in late postpartum period (7 to42 days).The main clinical profile of patients is shown in Table 1.

Most of the women were anemic and mean hemoglobin concentration was 8.09±2.06 mg/dl. Vaginal delivery occurred in 30 (62.5%) patients and caesarean section in 18 patients (37.5%).

Dialysis was carried out in 23(47%) patients ,of them 13 recovered completely(<1mg) after four sessions of dialysis, 2 incompletely recovered, 4 were on continuous renal replacement therapy while 25(52.08%) patients spontaneously improved and did not require dialysis.

Puerperal sepsis was the most common cause of Acute kidney injury observed in 16 (33.33%) patients. Preeclampsia /eclampsia/HELLP syndrome contributed in 12(25%), postpartum hemorrhage in 6 (12.5%), ante partum hemorrhage in 2(4.16%),glomerular diseases 5 (10.41%),complicated malaria in 3(6.25%),ruptureuterus1(2.08%),unexplained 2 (4.16%). The etiology of patients is shown in Table 2.

Of 48 patients Complete recovery of renal function was observed in 38 (25+13) (79.4%) patients and partial improvement of kidney function occurred in 2 patients(4.1%) ,4(8.3%) patients were on maintenance hemodialysis. Four patient died during acute phase of illness and the deaths were due to puerperal sepsis complicated by disseminated intravascular coagulation, multiorgan failure.

Among foetal outcomes, total live births were 41(85.3%) among 48 deliveries, 7(14.7%) were intra uterine death. Of live children, 20 were are normal healthy babies ,10 were IUGR,11 were preterm babies. The outcomes of the patients are shown in table 3.

Among patients who underwent biopsy Renal cortical necrosis (RCN) was the most common histological diagnosis in 6 (12.5%), lupus nephritis 4(8.3%) and thrombotic microangiopathy 3(6.24%) ,focal segmental sclerosis in 1(2.08%), acute tubular necrosis 1 (2.08%). (table 4).

IV. Discussion

Obstetrical AKI is now a rare entity in the developed countries. The incidence of AKI in pregnancy has drastically decreased in the past 50 years from 20 to 40 % in 1960 to <10% in recent series due to meticulous antenatal management. There is no case of AKI was observed in 12,000 and 20,000 births, respectively, in two studies reported from western countries(4,5).

In developing countries, AKI in pregnancy is on decreasing trend including India but is still common in some part of the developing country. Recent epidemiological studies have confirmed the decreasing incidence of PRAKI in India, with a decrease from 14.5% in 1987 to 4.3% in 2005(6,7) . In our study the incidence of postpartum kidney injury is 10.5%.The possible reasons for a very high incidence of ARF in postpartum period were poor socioeconomic status, ignorance, and unavailability of equipped hospitals for management of complicated obstetrical complication and a long time needed in travelling to reach the hospitals. The incidence of pregnancy related acute kidney injury in India among various studies is shown in table 5.

AKI in pregnancy affects peak reproductive age group. Mean age of patient, parity in our study were 24.15±4.36 years, 1.24±0.56 respectively. The similar observation with respect to age of pregnant women,

parity, were reported by other workers(8,9). Oligoanuria was the main presenting symptom seen in 41 (85.88%) patients, and mean duration of oligoanuria was 5.91±2.77 days(1).

In a recent study, Postpartum haemorrhage (PPH), abruption placenta, preeclampsia–eclampsia, are common causes of AKI in late pregnancy & postpartum period(3,10). In our study we observed puerperal sepsis as the most common cause contributing to AKI in 16 (33.33%) patients. Similar to our observation, Ansari et al. reported puerperal sepsis in 31% of AKI during pregnancy(9), Kumar et al. reported puerperal sepsis in 29% of patient in PRAKI(11).Goplani et al noted puerperal sepsis as the most common (61%) etiology of PRAKI(8).

Preeclampsia/eclampsia was reported as the cause of PRAKI in 50% of cases in the series of Grünfeld et al(1).The recent reported frequencies of preeclampsia–eclampsia in two studies were 5–7%(17,18). Hachim et al. reported preeclampsia and eclampsia in 41 of 55 (74.5%) cases as main etiology of PRARF(12). Recent study from Hyderabad, India, noted that hypertensive disorders ofpregnancy were leading (43.9%) causes of PRARF.we observed preeclampsia-eclampsia as a cause of AKI in (12) 25% of patients.

Uterine haemorrhage including postpartum (2/48 = 10.59%) and ante partum haemorrhage (7/48 = 8.29%) were responsible for ARF in 18.88% of patients in third trimester of pregnancy in this study. Similar to our study, Kumar et al. observed that haemorrhage of pregnancy constitutes 17% of PRAKI(13).In contrast to our observation, uterine haemorrhage was the dominant cause of PRAKI in the studies by Ansari et al. (38%), Naqvi etal.(58%),and Alexopoulos et al. (38%).(9,13,14)

Dialysis was required in (23) 47% of patients in our study. The need for dialysis was reported in 70–100% of cases in other series as well(9,10,16).Of 48, 13(27.08%) recovered on dialysis and 25(52.08%) recovered spontaneously(total79.16%). Two (4.16%) patients had incomplete recovery, and four were on long term renal replacement therapy (8.3%).Similar to our observation, Goplani et al. have reported that 54.28 and 12.85% patients had complete and partial recovery of renal function, respectively(8). In Kumar et al.'s study, complete recovery was observed in 51.22% and partial, that is, dialysis independent, in 9.76% patients(11)

Maternal Mortality of PRAKI seems to be high in developing countries. Overall, maternal mortality was 8.3% in our study. Previously mortality was very high (55.3%) due to poor antenatal care, late referral, frequent sepsis, and high incidence of bilateral diffuse cortical necrosis(16). Reported mortality from other studies varies from 23 to 33%(9,10,14).Sepsis and coagulation abnormalities were the main factors responsible for mortality in Naqvi et al.'s study(13).

Incidence of cortical necrosis was 12.52% in this study. RCN is a rare cause of AKI in developed countries, but still occurs in developing countries mainly due to the obstetrical complications of pregnancy(15,19,20).However, incidence of cortical necrosis in PRAKI has decreased significantly ($p< 0.001$) from 17% in 1982–1991 to 2.4% in the 2000(16)

Fetal mortality was observed in 7(14.58%) pregnant women. Ventura et al reported perinatal mortality of 40% in ARF in pregnancy(21)

V. Tables

Table 1 main clinical profile of patients:

Parameters	Mean ± SD
Age (years)	24.75±4.3
Parity	1.24±0.59
Mean serum creatinine	4.49± 2..76
Mean duration of Oligi anuria	5.91±2.77
Mean haemoglobin	8.09±2.06
Mean leucocyte count	10935.417±5229.88
Primi gravida	79.16%
Multipara	20.83%
vaginal delivery	62.50%
caesarean delivery	37.50%
Live births	85.41%
complete recovery	79.16%
Maintenance haemodialysis	8.30%

Table 2 Etiology of patients

Etiology	**N=48**	**%**
Puerperal sepsis	16	33.33
PIH /ECLAMPSIA	12	25
Postpartum haemorrhage	7	14.58
Glomerular diseases	5	10.41
Ante partum haemorrhage	2	4.16
Rupture uterus	1	2.08
Complicated malaria	3	6.25
Unexplained	2	4.16

Table 3 outcomes

Maternal Outcome	N=48	%
Complete recovery	38	79.4
Incomplete recovery	2	4.1
Dialysis dependent	4	8.3
Death	4	8.3
Foetal outcome		
Live birth	41	85.3%
IUD	7	14.7%

Table 4 Common Histology

Histology	No=15	%
cortical necrosis	6	12.5
Lupus	4	8.3
thrombotic microangiopathy	3	6.24
FSGS	1	2.08
Acute tubular necrosis	1	2.08

Table 5 Incidence of AKI in India

AUTHOR	No	PRAKI as % AKI
Chugh (1987)	270	15
Prakashet al (1995)	59	13.9
Rani et al (2002)	82	12.2
Kilari et al (2006)	41	4.24
Gopalani et al	70	9.06
Saleemm najjar et al	40	7.02
Our study	48	10.5

VI. Conclusion

Postpartum kidney injury is usually a consequence of obstetric complications. In our study, most common etiological factor was puerperal sepsis and it was the cause for morbidity and mortality. The incidence of biopsy proven renal cortical necrosis (12.5%)was also high, so the priorities in managing AKI should include early recognition, institution of appropriate preventive measures, identification and treatment of cause, timely initiation of renal replacement therapy

References

[1]. Grunfeld JP, Ganeval D, Bourneris F. Acute renal failure in pregnancy. Kidney Int.1980;18:179–191
[2]. SelcukNY, Tonbul HZ, San A, Odabas AR. Changes in frequency of acute renal failure in pregnancy (1980-1997)Ren Fail 1998;20:513-7.
[3]. Prakash J, Niwas SS, Parekh A, et al. Acute kidney injury in late pregnancy in developing countries. Ren Fail 2010;32:309-13
[4]. Stratta P, Besso L, Canavese C, et al. Is pregnancy-related acute renal failure a disappearing clinical entity? Ren Fail.1996;18:575–584
[5]. Brady HR, Clarkson MR, Lieberthal W. Acute renal failure.In: Brenner BM, ed. The Kidney. 7th ed. Philadelphia, PA:Saunders; 2000:1215–1270.
[6]. Chugh KS. Etiopathogenesis of acute renal failure in the tropics.Ann Natl Acad Med Sci (India) l987;23: 88-99
[7]. Chugh S, Sakhuja V, Malhotra HS et al. Changing trends in acute renal failure in third world countries—Chandigarh study. Q J Med 1989; 272: 1117–23.
[8]. Goplani KR, Shah PR, Gera DN, et al. Pregnancy related acute renal failure: a single centre experience. Indian J Nephrol 2008;18:7–21.
[9]. Ansari MR, Laghari MS, Solangi KB, et al. Acute renal failure in pregnancy: One year observational study at Liaquat University Hospital, Hyderabad. J Pak Med Assoc.2008;58:61–64.
[10]. Prakash J, Singh RG, Tripathi K, et al. Acute renal failure in pregnancy. J Obstet Gynaecol India.1985;XXXV:233–238
[11]. Kumar SK, Krishna CR, Kumar VS. Pregnancy related acute renal failure. J Obstet Gynecol India.2006;56:308–310.
[12]. Hachim K, Badahi K, Benghanem M, et al. Obstetrical acute renal failure. Experience of the nephrology department, Central University Hospital ibn Rochd, Casablanca. Nephrologie. 2001;22:29–31.
[13]. Naqvi R, Akhtar F, Ahmed E,et al. Acute renal failure of obstetrical origin during 1994 at one centre. Ren Fail 1996;18:681–683
[14]. Alexopoulos E, Tambakoudis P, Bili H, et al. Acute renal failure in pregnancy. Ren Fail.1993;15:609–613.
[15]. Prakash J, Tripathi K, Usha, et al. Pregnancy related acute renal failure in Eastern India. J Nephrol.1995;8:214–218.
[16]. Chugh KS, Singhal PC, Sharma BK, et al. Acute renal failure of obstetric origin. Obstet Gynecol.1976;48:642–646
[17]. Karumanchi SA, Maynard SE, Stillman IE, Epstein FH, Sukhatme VP. Preeclampsia: a renal perspective. Kidney Int 2005;67:2101-13
[18]. Walker JJ. Pre-eclampsia. Lancet 2000;356:1260-5.
[19]. Chugh KS, Jha V, Sakhuja V, et al. Acute renal cortical necrosis – a study of 113 patients. Ren Fail.1994;16:37–47.
[20]. Prakash J, Tripathi K, PandeyLK, et al. Spectrum of renal cortical necrosis in ARF in eastern India. Postgrad Med J.1995;71:208–210.
[21]. Ventura JE, Villa M, Mizraji R, et al. Acute renal failure in pregnancy. Ren Fail.1997;19:217–220.