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A Prospective Study of Pregnancy Related Kidney Injury and Its Outcome in a Tertiary Care Hospital

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Abstract
Introduction: *Acute kidney injury (AKI) is a life threatening complication of pregnancy. Incidence of pregnancy related AKI has decreased.Nearly 15-20% of AKI in India between 1970 and 1980 was attributable to obstetric complication. The current scenario of pregnancy related AKI in developed countries, is only 8%. However, it is still frequent in developing countries, having incidence of 4.2-15%. The declining trend of Pregnancy related AKI is attributed to legalization of termination of pregnancy and to better antenatal and postnatal care.*
Materials and methods: *Retrospective observational study conducted in the Department of Obstetrics and Gynecology, Bankura Sammilani Medical College, Bankura, West Bengal, India from January 2018 to December 2018 (1 year). Total 100 cases were studied and analysed. Data collected from cases were analyzed, computed and tabulated according to standard performa.*
Results: *In present study, total 100 patients were studied. As shown in Table 1, pregnancy related acute kidney injury was most common in patients with pre-eclampsia, eclampsia and HELLP syndrome. About 62% of PRAKI cases were due to hypertension related complications in pregnancy. Next most common being septicemia accounting for about 23% of cases.*
Conclusion: *AKI complicating pregnancies are not uncommon in tertiary care centres. If recognized and treated promptly, recovery is assured in majority of cases (85%). Early identification and prompt management of pre-eclampsia and sepsis can prevent majority of ARF cases. Prolonged duration of oliguria and antepartum haemorrhage were strong predictors of poor renal outcome and irreversible renal failure. Multidisciplinary care is required for PRAKI including obstetrician /ICU /nephrologist /neonatologist.*
Key Words: *Acute kidney injury, Pregnancy, ARF, hypertension.*

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I. Introduction

Acute kidney injury (AKI) is a life-threatening complication of pregnancy. Incidence of pregnancy related AKI has decrease., Nearly 15-20% of AKI in India between 1970 and 1980 was attributable to obstetric complication. The current scenario of pregnancy related AKI in developed countries, is only 8%. However, it is still frequent in developing countries, having incidence of 4.2-15%. The declining trend of Pregnancy related AKI is attributed to legalization of termination of pregnancy and to better antenatal and postnatal care.

Acute tubular necrosis is the most common pathological lesion and has good prognosis as compared to other pathological lesions associated with DIC (Disseminated Intravascular Coagulation), HUS (Haemolytic Uremic Syndrome), severe eclampsia and HELLP syndrome (Haemolysis elevated liver enzymes and low platelet count) in which glomerular involvement is predominant.

Acute bilateral renal cortical necrosis has the worst prognosis in obstetrically induced ARF which is mostly seen after APH and prolonged retention of dead fetus. Management of such patients require close monitoring and a multi-disciplinary approach and surveillance by obstetrician, nephrologist, gastroenterologist, neonatologist and anaesthesiologist.

Pre-eclampsia, eclampsia, HELLP, abruptio placentae manifest with acute intravascular volume depletion and severe reactive vasospasm which are responsible for decreased renal perfusion leading to AKI.

Severe hypovolemia results in decreased blood flow to renal cortex whereas perfusion to medullary area is preserved. Cortical ischemia results in marked decrease in GFR, concentrating ability and urinary volume. This stage of severe impairment in renal function is recognized as pre renal ARF. If cortical hypo perfusion occurs, or persists, functional changes are followed by ATN or cortical necrosis.

II. Materials And Methods

Retrospective observational study conducted in the Department of Obstetrics and Gynecology, Bankura Sammilani Medical College, Bankura, West Bengal, India from January 2018 to December 2018 (1 year). Total 100 cases were studied and analysed. Data collected from cases were analysed, computed and tabulated according to standard performa.

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Inclusion criteria

- Sudden oliguria 24 hours Urine output <400 ml
- Anuria
- Serum Creatinine >1.5mg/dl.

Exclusion criteria

- Already known cases of chronic kidney diseases.

The etiological factors, associated liver pathology, coagulation abnormality, thrombocytopenia, sepsis, recovery status and feto maternal outcome were studied and results were tabulated.

III. Results

In present study, total 100 patients were studied. As shown in Table 1, pregnancy related acute kidney injury was most common in patients with pre-eclampsia, eclampsia and HELLP syndrome. About 62% of PRAKI cases were due to hypertension related complications in pregnancy. Next most common being septicemia accounting for about 23% of cases.

Etiological factor	N=100	Percentage
Preeclampsia/ Eclampsia/ HELLP	62	62
Abruption	5	5
Septicemia	23	23
Haemorrhage (APH+PPH)	10	10

Table 1: Etiological factors of PRAKI in pregnant study

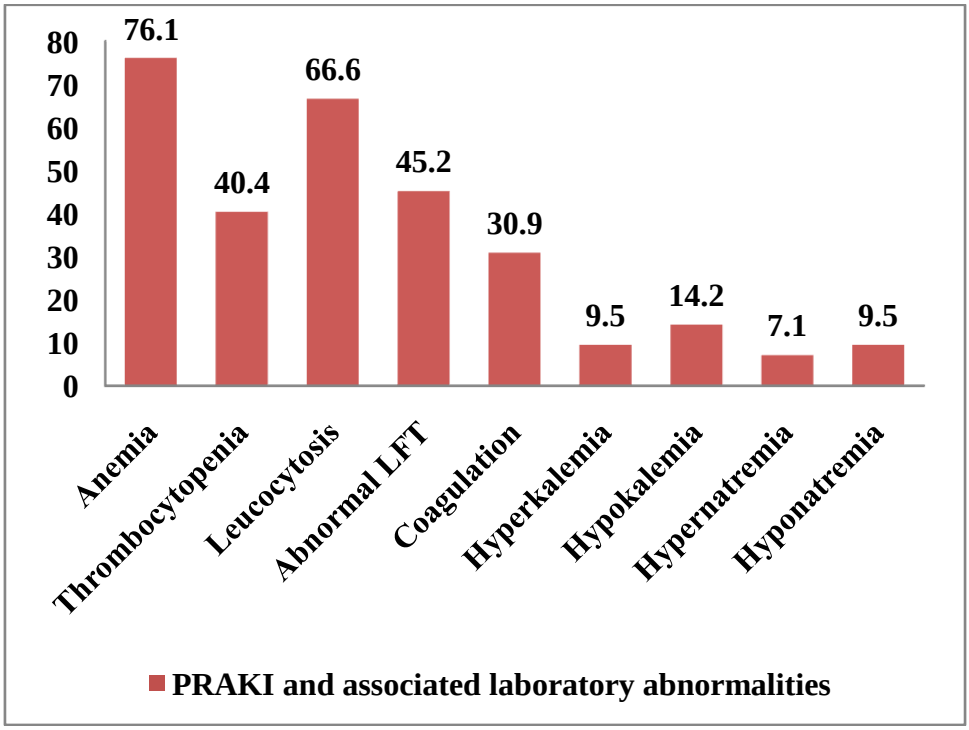

Figure 1: PRAKI and associated laboratory abnormalities

As shown in following Figure 1, pregnancy related acute kidney injury usually is associated with various laboratory abnormalities and majority of the patient had more than 1 abnormality. Anaemia, leucocytosis and abnormal liver function test were present in about two-third of cases. Hypertension related complications are frequently associated with abnormal liver function tests and also leucocytosis is a common laboratory abnormality in such patients. Electrolyte abnormalities were relatively less common.

Age	N=100	Percentage
<35	34	34
>35	66	66

Table 2: Relationship between maternal age and PRAKI

As described in Table 2, pregnancy related acute kidney injury was more common in patients with age >35 years as chances of hypertension related complications increase with increasing maternal age and pregnancy related hypertensive disorders being the commonest etiological factor of PRAKI.

Recovery	N=100	Percentage
Complete	81	81
Partial	5	5
Death	14	14

Table 3: Renal recovery in patients with acute kidney injury

Results mentioned in Table 3 show that, complete renal recovery was seen in 81 (81%) cases, partial recovery in 5 (5%) cases and maternal death occurred in 14 (14%) cases. From 14 cases of maternal death, all cases were referred case, diagnosed during intrapartum and postpartum period. Admission to delivery time was 3 to 12 hours in cases of maternal death. 10 cases delivered vaginally and other 4 cases delivered by cesarean section. Out of 14 seven cases had severe and other 7 cases had moderate severity of renal failure.

Maternal or fetal	Outcome	N=100	Percentage
Maternal	**Recovery**	**85**	**85**
	Death	**15**	**15**
Fetal	**Stillbirth/IUD**	**71**	**71**
	Live	**29**	**29**

Tablet 4: Maternal and fetal outcome in patients with PRAKI

Table 4 shows that, 85% of cases had recovery and maternal death occurred in 15 cases. PRAKI was associated with poor fetal outcome. Only 29 out of 100 had live birth, rest 31 were stillbirth and 40 were intrauterine death.

	Huang C et al,	**Rao S et al,**	**Present Study**
Incidence (%)	0.81%	0.45%	0.31%
Most common cause	PIH	PIH	PIH
Recovery (%)	94%	93%	85%

Table 5: In comparison to Huang C et al, study and Rao S et al, study in terms of recovery and commonest cause

As we can see in Table 5, comparing present study with other studies relating to acute kidney injury in pregnancy, gave similar results. Incidence of PRAKI has reduced in developed countries but is still a significant cause of maternal morbidity and mortality in developing countries. Hypertensive disorders of pregnancy (pre-eclampsia, eclampsia and HELLP syndrome) are the commonest causes of PRAKI. Though maternal outcomes

are good, intensive management is required for good recovery rates. PRAKI due to hypertensive disorders usually have better outcomes than those occurring secondary to haemorrhage or septicaemia.

IV. Discussion

ARF is an infrequent but life-threatening complication. Though PRAKI accounts for 17-43% of total ARF cases, the worldwide incidence of pregnancy-related acute kidney injury (PRAKI) has decreased in developed countries through legalization of abortion and improvement of antenatal and obstetric care. In the recent years, the incidence of PRAKI in developed countries is only 1 to 2.8%. However, PRAKI is still frequent in developing countries and the incidence is around 4.2-15%.[6]

Hypertension and its related complications were most common causes of PRAKI in present study followed by sepsis. Incidence is more in females of age >35 years of age.[8] This is due to increased risk of hypertensive complications with increasing age. Though maternal outcome is good if early diagnosis and prompt management is done but neonatal outcome is usually poor in pregnancies associated with acute kidney injury.[9] Also, PRAKI is associated with number of laboratory abnormalities and majority of patients have more than one laboratory abnormalities requiring intensive management. Prevention, early recognition and prompt treatment are ideal. Avoiding nephrotoxic drugs, ensuring volume status/perfusion pressure, functional haemodynamic monitoring and monitoring of serum creatinine and urine output is must.[10]

The reported mortality rate of PRAKI in present study was 14/100 (14%). Comparing results with other studies, similar outcome was obtained. Huang C et al study on pregnancy related acute kidney injury at china had similar results showing decreasing incidence of PRAKI in developed countries but still a matter of concern for developing countries, hypertensive disorders being the commonest cause of PRAKI, poor neonatal outcomes and intensive management required for good recovery rates. As shown above, similar were the results obtained from Rao S et al study.[11]

V. Conclusion

AKI complicating pregnancies are not uncommon in tertiary care centres. If recognized and treated promptly, recovery is assured in majority of cases (85%). Early identification and prompt management of pre-eclampsia and sepsis can prevent majority of ARF cases. Prolonged duration of oliguria and antepartum haemorrhage were strong predictors of poor renal outcome and irreversible renal failure. Multidisciplinary care is required for PRAKI including obstetrician /ICU /nephrologist /neonatologist.

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