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Original Research Article

A one year prospective study of acute renal failure in pregnancy and its maternal and fetal outcome

Rajashekhar D. Kerure[1], Amaresh Biradar[2], Swetha Lakshetty[3], Sudha Biradar[4]*

[1]Department of Nephrology, M. R. Medical College and Basaweshwara Teaching Hospital, Kalaburagi, Gulbarga, Karnataka, India
[2]Department of Plastic Surgery. M. R. Medical College and Basaweshwara Teaching Hospital. Kalaburagi, Gulbarga, Karnataka, India
[2]Department of General Medicine**,** M. R. Medical College and Basaweshwara Teaching Hospital, Kalaburagi, Gulbarga, Karnataka, India
[4]Department of Obstetrics and Gynaecology, ESIC Medical College, Kalaburagi, Gulbarga, Karnataka, India

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***Correspondence:**
Dr. Sudha Biradar,
E-mail: sudhabiradar333@gmail.com

ABSTRACT

Background: Pregnancy related acute renal failure is still common in developing countries. This study is aimed to evaluate the etiological factors responsible for ARF in pregnancy, and, maternal and fetal outcome of this condition. It contributes upto 20-22% of the referrals to higher centers and is associated with high risk of maternal mortality (9 to 55%) in developing countries.
Methods: This is a prospective study carried out at M. R. medical college and Basaweshwara teaching hospital, Kalaburagi (Gulbarga), for one year from January 2017 to December 2017.
Results: A total of 38 patients were hospitalised with renal failure in pregnancy. Majority of the patients (73.68%) were multigravida. Eclampsia (42.10%) and severe post-partum hemorrhage (21.05%) were the most common causes of acute renal failure in late third trimester and in post-partum period. Edema (65.78%) and oliguria (50%) were the most common presenting complaints. Most cases (73.68%) responded to diuretics and IV fluids. 21.05% required dialysis, 39.47% needed ICU admissions. Maternal mortality amounted to 13.15%. Fetal IUGR (18.42%), preterm delivery (13.15%), fetal distress (10.52%), NICU admissions (15.78%), and still births (7.89%) were noted.
Conclusions: Pregnancy related acute renal failure is still high in developing countries. Good antenatal care, correction of anaemia, early diagnosis and management of pre-eclampsia, good transport facilities to shift to tertiary care centers are essential requirements to reduce maternal and fetal mortality and morbidity due to acute renal failure in pregnancy.

Keywords: Maternal mortality, Acute renal failure, Pregnancy

INTRODUCTION

Pregnancy related acute renal failure is a preventable condition if the causes are identified and treated at a correct time.[1] Acute renal failure is the sudden cessation of the functions of kidney, resulting in retention of urea and creatinine and other nitrogenous waste products. It also results in alteration of electrolytes and extracellular volume.[2]

ARF in pregnancy is still common and may lead to serious complications in developing countries. There is an overall marked reduction in the prevalence of pregnancy related ARF in developed countries as a result of improved antenatal care and improved obstetric practices.[3] But, the incidence has increased almost three times in the past few years in the United States, from 0.04% in 2006 to 0.12% in 2015, because of the increased maternal age, more co-morbidities during pregnancy, increase in incidence of pre-

eclampsia and eclampsia in pregnancy, and increase in obesity rates.[1,5]

ARF in pregnancy contributes up to 20-22% of referrals to dialysis centers and is associated with high risk of maternal mortality.[2,4,6]

ARF in pregnancy follows a bimodal pattern of gestational age. In early pregnancy, between 6-16 weeks, ARF is associated with septic abortions and rarely hyperemesis gravidarum. In late pregnancy (third trimester) and in puerperium, ARF results due to pre-eclampsia, eclampsia, abruptio placenta, post-partum hemorrhage, HELLP syndrome, etc.

This study was conducted to study the contributing factors for ARF in pregnancy, the maternal and fetal morbidity and mortality.

METHODS

Study area

Department of nephrology and department of obstetrics and gynaecology of M. R. medical college and Basaweshwara teaching hospital, Kalaburagi, Karnataka.

Study design

Prospective observational study design was used.

Study population

All pregnant women and delivered women with signs of acute renal failure and deranged renal function tests admitted at department of obstetrics and gynaecology and at department of nephrology of M. R. medical college and Basaweshwara teaching hospital, Kalaburagi, Karnataka.

Study period

Study carried out from January 2017 to December 2017.

Out of 7292 pregnant patients delivered during the one-year period, 38 patients had been referred to Nephrology department due to deranged renal parameters.

Inclusion criteria

Previously healthy pregnant females between the ages 16-45 years who developed acute renal failure (ARF), having oliguria (urine output less than 300 ml/day), or anuria, or increase in serum creatinine to more than 1.5 mg/dl were included in study.

Exclusion criteria

Pregnant women with past history of renal disease, past history of renal calculus, past history of diabetes mellitus or hypertension, shrunken kidney or renal scarring on ultrasonography, small size of kidneys, raised serum creatinine levels prior to pregnancy.

Sampling method

Ethical committee clearance was taken. After taking the informed consent, detailed history, physical examination, relevant lab investigations were done and master chart was prepared.

Sample size

The 38 pregnant women with ARF in pregnancy were taken into study.

Methodology

Patients fulfilling the inclusion criteria were considered. Written informed consent was taken. Age, Demographic characteristics, gravida, period of pregnancy, ANC visits, presenting complaints and other details were taken. Patients were examined through blood pressure. Facial puffiness, pedal edema, icterus and pallor were checked. Laboratory investigations of renal function tests, complete blood count, serum electrolytes were performed. Mode of delivery, need for blood transfusion and any need for surgical intervention were observed.

Maternal and fetal outcome were observed based on improvement of symptoms, patients not requiring dialysis. Fetal outcome was observed if fetus was delivered at early gestation, IUGR, NICU admissions and intrauterine fetal death due to maternal ARF in pregnancy. The details of all patients were entered in Microsoft excel. They were statistically analysed, tabulated in numbers and percentages.

RESULTS

Out of 7292 pregnant patients delivered during the study period, 38 patients were diagnosed as ARF in pregnancy.

Table 1 shows the age wise distribution of patients with ARF in pregnancy. The most common age group affected were between 26-30 years, comprising 39.47%, followed by 21-25 years, comprising 36.84%, and 3.33% of patients belonged to more than 40 years age.

According to Table 2, out of 38 patients with ARF in pregnancy, 28 patients (73.68%) were multiparous and 10 patients were primiparous (26.31%).

Table 3 shows the pregnancy outcome of our study. In 18 patients (47.36%), there was more than one live birth. Intrauterine fetal death and abortions constituted to 13.15% and 10.50% respectively.

The clinical features of all patients were tabulated in Table 4. Odema was the most common presenting complaint in

25 patients comprising 65.78%, followed by oliguria in 19 patients (50%). Pain abdomen was observed in 11 patients (28.94%).

Table 5 shows that eclampsia was the most common cause of ARF in our study, 16 patients (42.10%) presented with eclampsia, followed by Post partum hemorrhage , which was observed in 8 patients, comprising 21.05%. Pre-eclampsia was noted in 6 patients (15.78%) and Abruptio placenta in 3 patients (7.89%). Septic abortion was noted in 2 patients (5.26%). Puerperal sepsis, HELLP syndrome and DIC was observed in the one each patient (2.63% each).

Table 6 shows the maternal outcome, 28 patients (73.68%) improved with conservative treatment. Conservative management included diuretics, IV fluids, with monitoring of vitals and urine output and treating the cause of ARF. Correction of acidosis and correction of electrolyte imbalance was done.

Antihypertensives like nefidepine, amlodipine were used to control hypertension, 12 patients (31.57%) required blood transfusion and fresh frozen plasma transfusion was given in disseminated intra vascular coagulation (DIC) patients. Blood urea levels and serum creatinine levels were performed on daily basis to monitor the progress of treatment, 8 patients (21.05%) required dialysis and 15 patients (39.47%) required ICU admission in view of raised serum creatinine levels. Most of the ICU patients recovered after dialysis.

Fetal outcome is tabulated in table 7. Fetal IUGR was most commonly noted in 7 patients (18.42%), out of 38 deliveries, 6 babies (15.78%) were admitted to NICU, five patients (13.15%) had preterm birth due to abruptio placenta, pre-eclampsia.

Mean birth weight of babies was 2.32±0.62 kg. Four babies (10.52%) had fetal distress, 3 babies were fresh still born (7.89%) due to severe oligohydramnios, abruption placenta and eclampsia each.

Table 9 shows that five patients (13.15%) died due to failure of the treatment in ICU. The commonest causes of maternal mortality were eclampsia (40%) as well as post-partum haemorrhage (40%), followed by the pre-eclampsia (20%).

Table 1: Age wise distribution of patients with ARF, (n=38).

Age (In years)	N	Percentage (%)
16-20	4	10.52
21-25	14	36.84
26-30	15	39.47
31-35	3	7.89
36-40	1	3.33
More than 40	1	3.33

Table 2: Distribution of patients according to parity, (n=38).

Gravida	N	Percentage (%)
Primi gravida	10	26.31
Multi gravida	28	73.68

Table 3: Distribution of patients according to pregnancy outcome, (n=38).

Pregnancy outcome	N	Percentage (%)
Single live birth	11	
More than 1 live birth	18	
Intravterine fetal death	5	13.15
Abortions	4	10.5

Table 4: Distribution of cases according to presentation of clinical features of patients.

Clinical features	N	Percentage (%)
Oliguria	11	28.94
Anuria	2	5.26
Oedema	25	65.78
Fever	5	13.15
Pain abdomen	19	50.00
Loss of consciousness	8	21.05

Table 5: Distribution of patients according to causes of pregnancy related acute renal failure, (n=38).

Causes	N	Percentage (%)
Preeclampsia	6	15.78
Eclampsia	16	42.10
Abruptio placenta	3	7.89
Septic abortion	2	5.26
Post partum hemorrhage	8	21.05
Puerpural sepsis	1	2.63
HELLP syndrome	1	2.63
DIC	1	2.63

Table 6: Distribution of cases according to maternal outcome.

Maternal outcome	N	Percentage (%)
Conservative management	28	73.68
Requirement of blood and blood products transfusion	12	31.57
Dialysis requirement	08	21.05
ICU admission	15	39.47
Maternal mortality	05	13.15

Table 7: Distribution of cases according to fetal outcome.

Fetal outcome	N	Percentages (%)
Preterm birth	5	13.15
NICU admission	6	15.78
Fetal IUGR	7	18.42
Fetal distress	4	10.52
Still birth	3	7.89

Table 8: Renal function tests at admission.

Laboratory parameter	Minimum	Maximum	Mean
Serum urea (mg/dl)	52	242.00	101.36
Serum creatinine (mg/dl)	1.9	10.20	5.50

Table 9: Distribution of causes of maternal mortality, (n=5).

Causes of maternal mortality	N	Percentage (%)
Eclampsia	2	40
Post partum hemorrhage	2	40
Pre-eclampsia	1	20

DISCUSSION

In this prospective study conducted over a period of one year, 38 patients had signs and symptoms of acute renal failure (ARF).

In the present study, the most common age group affected were in the age group of 26-30 years (39.47%) which was comparable to Pandey et al and Chaudri et al study.[2,7] The 14 patients (36.84%) were in the age group of 21-25 years. In India, most women are married early and so, pregnancy related complications occur more commonly due to associated malnutrition and anaemia.

Multigravidas were more commonly observed with acute renal failure in 28 patients (73.68%), which was similar to studies of Gopalani et al and Chaudhri et al.[7,8]

In our study, 16 patients (42.10%) had eclampsia as the main cause of acute renal failure in pregnancy, followed by post-partum hemorrhage in 8 patients (21.05%). This is comparable to Prakash et al study and Soumya et al which observed pre-eclampsia and eclampsia to be the most common cause of acute renal failure in pregnancy, contributing to 35.29% of cases.[1,9]

Septic abortion was observed in 2 cases (5.26%) and puerperal sepsis in 1 patient (2.63%) in our study. Kumar et al in their study observed puerperal sepsis as the most common cause of ARF in pregnancy amounting to 61%.[10] In our study, PPH was present in 8 cases (21.05%). So, this shows the change in peak of renal failure cases to third trimester. Due to legalization of abortion laws, better aseptic precautions taken during surgical procedures have reduced the rates of sepsis in pregnancy and the post-partum.

In Our study, 25 patients (65.78%) presented with edema, followed by oliguria in 19 patients (50%). This was comparable with Soumya et al.[1]

The mean serum urea at the time of admission was 101.36 & mean serum creatinine was 5.50 similar to Prakash et al study.[9]

In our study, most of the patients responded to conservative management i. e., 28 patients (73.68%), and 8 patients (21.05%) required dialysis in our study. These results are similar to Soumya et.al study.[1] Prakash et al study had 54.6% cases requiring dialysis and 45.2% cases requiring conservative management.[9]

The 15 cases (39.47%) required ICU admission in our study which is similar to Soumya et al study.[1]

In our study, 5 maternal deaths (13.15%) were observed. Two cases each of eclampsia and post-partum hemorrhage (40%) were the causes of maternal mortality, followed by pre-eclampsia in one patient (20%) in our study. This is similar to Gopalani et al study of 18.57% and Rani et al study.[8,11] Kumar et al had a maternal mortality of 24.39% which is higher than our study.[10] This difference in maternal mortality may be due to early identification of renal failure of pregnancy, timely intervention by ICU admission and hemodialysis.

In our study, commonest fetal morbidity noted was fetal IUGR in 7 cases (18.42%), 6 babies (15.78%) required NICU admissions for fetal distress, IUGR and preterm delivery. Fetal mortality was noted in 3 babies (7.89%) due to preterm delivery and sepsis, which is similar to Soumya et al study.[1]

CONCLUSION

Pregnancy related acute renal failure is still high in India. Maternal morbidity and mortality are still high in India due to renal failure. Most of the causes of renal failure in pregnancy are preventable by providing adequate ante natal care, early identification of warning signs of pre-eclampsia and eclampsia and early intervention of the complications. Timely treatment of complications in ICU and timely management using hemodialysis in patients can reduce the maternal and fetal mortality and morbidity.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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