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Pregnancy Related Acute Renal Failure in A Tertiary Care Hospital.

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Abstract: ***Introduction****: The incidence of pregnancy related acute renal failure (PRARF) has declined over the past few years. The objective of the study was to determine the prevalence, clinical profile, management and outcome of patients with pregnancy related acute renal failure.*
Material & Methods*: The present study was based on the retrospective analysis of hospital case records of Government General Hospital, Guntur Medical College, Guntur. It was intended to bring out the profile of the pregnancy related acute renal failure (PR-ARF) cases in pregnancy admitted in the hospital from 2010 to 2018. Pregnant women who had developed acute renal failure with oliguria (urine output <400ml in 24 hours and serum creatinine >1.5 mg/dL.*
Results*: Out of the 5788 admissions, 2236 admitted cases were due to Acute Renal Failure (ARF). the prevalence of PRARF in the present study was 11.09%(n=248). The most common cause of PRARF was toxemias of pregnancy seen in more than one third cases (37.1%). Out of the total 248 cases, majority (64.1%, n=159) were treated on hemodialysis and rest 89 cases (35.9%) were managed conservatively with complete recovery in 91.1% (n=226).*
Conclusions*: Though the prevalence of pregnancy related ARF has been declining over the years, but the present 9 years hospital based retrospective study found a higher prevalence of 11.09% with toxemias in pregnancy being the most common cause.*
Keywords*: pregnancy, acute renal failure, prevalence, outcome*

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I. Introduction

There are several significant physiological changes that occur during pregnancy. Increased blood volume, reduced vascular resistance, and other anatomical and physiological changes which might affect kidney function and, in some cases, can cause renal failure [1,2,3].

The incidence of pregnancy related acute renal failure (PRARF) has declined over the past few years. The incidence of pregnancy related acute renal failure ranges from 5-15% in developing countries with a much lesser percentage in developed countries. The reasons for the decline are multifactorial owing to better understanding and pathophysiology, decreased septic abortion cases due to abortion laws, judicious and early termination in severe pre-eclampsia and others [4,5].

Causes of pregnancy related acute renal failure can be divided into pre renal ARF, Intrinsic ARF and post renal ARF. Pre renal is the most common form of ARF, the causes of which include hemorrhage, infections, septic abortion, severe pre-eclampsia and eclampsia, abruptio placenta and severe dehydration. Intrinsic renal causes are ischemia, toxins, renal disease, DIC and others [3].

During the reversible stages of Anuria, the clinical condition can be divided into four phases: Incipient stage, phase of anuria, phase of diuresis and phase of recovery. Phase of anuria can last from few hours to few weeks. Initially asymptomatic, gradually patients might develop anorexia, vomiting and diarrhea. And in the later stages, patient looks toxic with raised blood pressure, mental confusion and finally delirium followed by coma might be the end result if not managed [3,4].

There is gradual increase in the concentration of plasma urea, potassium, creatinine and phosphate as a result of endogenous protein catabolism. Rise in phosphate leads to lowering of plasma calcium. The fall in calcium with rise in potassium might have an adverse effect on cardiac function [6].

Though the incidence of the pregnancy related acute renal failure is declining but still it's an important medical condition which must be diagnosed and promptly managed. It is therefore essential to understand the changes to make a proper interpretation of the clinical and laboratory findings in pregnancy.

The objective of the study was to determine the prevalence, clinical profile, management and outcome of patients with pregnancy related acute renal failure.

II. Material and methods

The present study was based on the retrospective analysis of hospital case records of Department of Nephrology in Government General Hospital, Guntur Medical College, Guntur. It was intended to bring out the profile of the pregnancy related acute renal failure (PR-ARF) cases in pregnancy admitted in the hospital from 2010 to 2018.

Inclusion criteria: Pregnant women who had developed acute renal failure with oliguria (urine output <400ml in 24 hours and serum creatinine >1.5 mg/dL during antepartum and postpartum period

Exclusion criteria: History of any renal disease prior to pregnancy including renal stones or any medical history of hypertension or diabetes before the pregnancy were excluded from the study.

Patients were monitored carefully and managed accordingly. Hemodialysis was performed according to the standard protocols.

ARF is a clinical syndrome that indicates an abrupt decline in glomerular filtration rate (GFR) to a sufficient amount to decrease the excretion of nitrogenous waste products (urea and creatinine) and other uremic toxins [4,7]. PR-ARF was diagnosed on the basis of clinical and laboratory findings. Sudden oliguria (urine <400 mL in 24 h) or anuria or serum creatinine increased above 1.5 mg/dL was defined as ARF [8].

A predesigned proforma was used to get the information from the case records. The basic demographic data, clinical and laboratory details of all the patients were recorded properly. Statistical analysis was done by using Microsoft Excel 2007 and EPI INFO 7 version. Data was presented in percentages and proportions.

III. Results

A total of 5788 patients were admitted in the department of Nephrology at our institute over 9 years period (2010 to 2018). Out of the 5788 admissions, 2236 admitted cases were due to Acute Renal Failure (ARF). Among the total ARF cases, pregnancy related acute renal failure cases were 248 (11.09%), hence the prevalence of PRARF in the present study was 11.09%. A complete review of the hospital case records was done among these 248 PRARF cases.

Observation of year wise distribution of the PRARF cases found that highest number of cases were seen in 2018 and lowest in 2014 & 2017 years respectively. Mean age of the study population was 23 years.

Table 1: Prevalence of Pregnancy Related Acute Renal Failure (PR-ARF)

Total number of admissions (2010-2018)	5788
Total number of Acute Renal Failure	2236 (38.63%)
Obstetric ARF	248 (11.09%)

With regards to causes of pregnancy related acute renal failure, the most common cause in the present study was toxemias of pregnancy which was seen in more than one third cases (37.1%). Next common causes were postpartum hemorrhage which was seen in 32 cases (12.9%), puerperal sepsis (10.5%), ante partum hemorrhage (9.2%). Other causes were Acute Gastroenteritis (5.2%), Acute viral hepatitis (4.8%), Septic abortion (4.4%). Post LSCS Hemodynamic and Thrombotic Micro Angiopathies were seen in 9 cases each respectively.

Table 2: Causes of Pregnancy related acute renal failure

Cause of ARF	**Number (Percentage)**
Toxemias of pregnancy	92 (37.1%)
Post-Partum Hemorrhage	32 (12.9%)
Puerperal Sepsis	26 (10.5%)
Ante-Partum Hemorrhage	23 (9.2%)
Acute Gastroenteritis	13 (5.2%)
Acute viral hepatitis	12 (4.8%)
Septic abortion	11 (4.4%)
Post LSCS , Hemodynamic	9 (3.6%)
Thrombotic Micro Angiopathies	9 (3.6%)
Blood transfusion reaction	3 (1.2%)
Miscellaneous	9 (3.6%)
Idiopathic	9 (3.6%)

Out of the total 248 cases, majority (64.1%, n=159) were treated on hemodialysis and rest 89 cases (35.9%) were managed conservatively. A complete recovery was seen in majority of the patients (91.1%, n=226) followed by partial recovery in 14 cases (5.7%).

In the 9 years study period, there were 8 patients (3.2%) who expired due to pregnancy related ARF.

Table 3: Recovery

Recovery	Number (Percentage)
Complete recovery	226 (91.1%)
Partial recovery	14 (5.7%)
Expired	8 (3.2%)

IV. Discussion

Acute Renal failure is alife-threatening complication in pregnancy. The present study had been conducted in a tertiary care institute with an objective to determine the prevalence, clinical profile, management and outcome of patients with pregnancy related acute renal failure. A retrospective analysis of hospital case records was done with an intention to bring out the profile of the pregnancy related acute renal failure (PR-ARF) cases in pregnancy admitted in the hospital from 2010 to 2018.

In the present study, the prevalence of pregnancy related acute renal failure was found to be 11.09%. Slightly lower incidence of PRARF was seen in study by Goplani K R et al [4] where incidence was 9.06%.

A systemic review by Zynab Karimi et al [3] on prevalence of pregnancy-related Acute Renal Failure in Asia observed that the prevalence ranged from 0.1% in China to 21.6% in Bangladesh. Another study from India revealed 19.3% developed acute kidney failure in the first trimester, 10.5% in the second, and 70.2% during the puerperium period.

Sivakumar et al [9] reported that out of 1,353 cases with ARF seen between 1999 and 2009, 59 (4.36%) were pregnancy-related. The prevalence rates of ARF during different trimesters pregnancy were as follows: 1.7% in the first trimester, 6.7% in the second trimester, 16.9% in the third trimester, and 74.6% in the postpartum period.

With regards to causes related PRARF, present study found that the most common cause was toxemias of pregnancy (37.1%) followed by postpartum hemorrhage (12.9%), puerperal sepsis (10.5%) and ante partum hemorrhage (9.2%).

Similar findings were observed in Mohamed Arrayhani et al [10] study from Morocco where pregnancy toxaemia was the commonest cause (66.6%), followed by pregnancy hemorrhages (25%) and functional kidney injury (8.3%).

In contrast to the present study, Rani, P.U et al [11] found that hypertensive disorders were the commonest primary cause (43.9%) followed by infective hepatitis (14.6%), postpartum hemorrhage (12.2%), ante partum hemorrhage (9.8%), post abortal (9.8%), gastro enteritis (3.7%), puerperal sepsis (1.2%), mismatched blood transfusion (1.2%) and idiopathic (3.7%). This difference in the cause might be due to that fact that Rani P.U study was done in about two decades back where the diagnostic modalities were not as advanced as today.

A changing picture of acute kidney injury in pregnancy study from 33 years observation by J.Prakash et al [12] observed post abortal AKI as the commonest cause followed by puerperal sepsis, hypertensive disorders and haemorrhage (ante partum & postpartum).

In the present study, about two thirds were managed with hemodialysis and rest conservatively. A complete recovery was seen in majority of the patients (91.1%) followed by partial recovery in 5.7%. In the 9 years study period, there were 8 patients (3.2%) who expired due to pregnancy related ARF.

A single centre experience by Najar MS et al [13] observed that about one third patients were given hemodialysis, peritoneal dialysis in 15% and both modalities in 12.5%. Only medical treatment was given in majority (40%) of the cases. About three fourth of patients recovered completely. A higher mortality was found in this study (20%) compared to the present study.

V. Conclusion

Though the prevalence of pregnancy related ARF has been declining over the years, but the present 9 years hospital based retrospective study found a higher prevalence of 11.09% with toxemias in pregnancy being the most common cause followed by postpartum hemorrhage and sepsis. Two thirds of them were managed through hemodialysis. Prognosis was good with majority of them recovered completely. Therefore, a good quality of ante natal care with accurate diagnosis would be an important factor in reducing the burden.

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