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Pregnancy related acute renal failure

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OBJECTIVE(S): To study the clinical profile, management and outcome of the patients with pregnancy related acute renal failure (PRARF).

METHOD(S): All patients with PRARF admitted between July 1999 and December 2004 were analyzed.

RESULTS: Total number of women with PRARF was 41, whereas the total number of patients with acute renal failure (ARF) was 966. Age range of women with PRARF was 15 to 45 years. 75.61% of the cases of PRARF were seen in the postpartum period. It was caused by sepsis in 39.02% (16/41), toxemias of pregnancy in 24.39% (10/41), and hemorrhages of pregnancy in 17.07% (7/41). Puerperal sepsis was the cause in 29.27%, and septic abortion in 9.76%. Dialysis was needed in 53.66%. Twenty-five patients (60.98%) recovered, six (14.63%) left against medical advice and 10 (24.39%) expired.

CONCLUSION(S): PRARF constitutes 4.24% of ARF. The majority of PRARF cases were seen in the postpartum period. Postpartum sepsis was the most common cause of PRARF. The overall mortality was 24.39%.

Key words : acute renal failure in pregnancy, acute renal failure

Introduction

Acute renal failure (ARF) is a rare but an important complication during pregnancy. There is a marked decline in the incidence of pregnancy related acute renal failure (PRARF) over the past 50 years in industrialized countries as a result of improved antenatal care and obstetric practices [1]. In contrast, it is still a relatively common cause of ARF in developing countries. There are only a few studies in our country addressing this issue. It is observed that the frequency of PRARF is on the decline in our country too [1-3]. PRARF is commonly caused by septic abortion in early pregnancy and by toxemia of pregnancy, hemorrhages during pregnancy (antepartum and postpartum), and ischemic acute tubular necrosis in late pregnancy [4,5]. Acute fatty liver of pregnancy is an uncommon cause of PRARF and, usually occurs in third trimester of pregnancy. Puerperal sepsis and thrombotic microangiopathies are seen in the postpartum period. Very rarely, acute pyelonephritis can cause PRARF. In developing countries, PRARF used to be caused most commonly, by septic abortion unlike in developed countries [3,6]. But, now a days, its incidence has significantly come down in our country too [1,2]. World wide, the major cause of sepsis leading to PRARF is illegal abortion. At least 5% of women undergoing illegal abortions become gravely ill. Other causes are puerperal sepsis, chorioamnionitis and acute pyelonephritis [7]. We present here our experience with PRARF from July 1999 to December 2005. Our institute is situated in the Rayalaseema region at the border zones of three states; Andhra Pradesh, Tamilnadu and Karnataka. Hence, it partly represents the trend in all the three states.

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Methods

All the PRARF cases admitted in our Nephrology Department, between July 1999 and December 2004 were analyzed. PRARF was diagnosed when there was a sudden oliguria (24 hour urine output < 400 mL) or anuria with serum

creatinine elevated to > 1.5 mg%). Serum creatinine was estimated by modified Jaffe's reaction.

Those with underlying chronic renal failure prior to pregnancy (serum creatinine >1.5 mg%) were excluded from the study.

Results

Total number of women with PRARF was 41. The age ranged between 15 and 45 years with a mean of 26.2 years. The total number of ARF cases during the period was 966. PRARF constituted 4.24% of ARF cases.

PRARF was seen in the postpartum period in 75.61% (31/41) of the cases, in the 2nd trimester in 7.32% (3/41) and in the 3rd trimester in 17.07% (7/41). It followed normal spontaneous vaginal delivery in 15 cases (36.59%), cesarean section in 15 cases (36.59%), hysterectomy in two cases (4.88%) – in one for ruptured uterus amd in one for couvelaire uterus induced vaginal delivery (4.88%), and abortion in four cases (9.76%). The remaining three women are continuing their pregnancy.

The various abnormal laboratory findings are given in Table 1. Anemia was seen in 87.80%, leukocytosis in 80.49% and thrombocytopenia in 31.71%. Electrolyte abnormalities were seen in 75.68% and they were hypernatremia in 14.63%, hyponatremia in 36.59%, hyperkalemia in 9.76% and hypokalemia in 14.63%. Duration of hospital stay ranged from 1 to 30 days (mean 8.22 days).

Table 1. Abnormal laboratory findings in pregnancy related acute renal failure (n=41).

Laboratory finding	Number of cases	Percent
Anemia	36	87.80
Leukocytosis	49	80.49
Thrombocytopenia	13	31.71
Hypernatremia	06	14.63
Hyponatremia	15	36.59
Hyperkalemia	04	09.76
Hypokalemia	06	14.63
Metabolic acidosis	07	17.01
Abnormal liver function tests	17	41.46

The causes of PRARF are shown in Table 2. It can be observed that sepsis was still the most common cause of PRARF (16/41, 39.02%), followed by toxemias of pregnancy 10/41,24.39%), and hemorrhages in pregnancy (7/41,17.08%).

Table 2. Causes of pregnancy related acute failure (n=14).

Cause	Number	Percent
Sepsis	16	39.02
Toxemias of pregnancy	10	24.39
Postpartum hemorrhage	04	09.76
Antepartum hemorrhage	03	07.32
Miscellaneous	08	19.51

Puerperal sepsis was the most common cause of sepsis induced PRARF; 19.51% (8/41) followed cesarean section and 9.76% (4/41) followed normal spontaneous vaginal delivery. Septic abortion was noted in only four cases (4/41, 9.76%).

In the remaining cases, PRARF was secondary to post-partum hemolytic uremic syndrome, postinfectious glomerulonephritis, hysterectomy for rupture of the uterus, enteric fever, and falciparum malaria. The etiology could not be made out in three (7.32%) cases. Intrauterine deaths were noted in 17.07% (7/41). Majority had other organ involvement; more than three organs were involved in 22 cases (53.66%), two organs in 12 (29.27%) and single organ in seven (17.07%).

Dialysis was needed in 22 or 53.66% of the patients; hemodialysis was given to 17 (41.46%), continuous veno-venous hemodialysis to three (7.32%), and peritoneal dialysis to two (4.88%).

Of the 41 women, 25 (60.98%) showed recovery (complete in 21 51.22% and partial i.e. dialysis independence in four or 9.76%); six (14.63%) left against medical advice and 10 (24.39%) succumbed.

Table 3. Comparative frequency of PRARF reported in India.

Author	Number	PRARF as percentage of ARF
Chugh (1987) [3]	1862	14.5
Prakash et al (1995) [5]	59	13.9
Rani et al (2002) [1]	82	12.2
Present study (2005)	41	04.3

ARF - Acute renal failure. PRARF - Pregnancy related acute renal failure

Discussion

ARF is an infrequent but life threatening complication of

pregnancy. Though PRARF accounted for 17 to 43% of cases of ARF in the 1960's, it now accounts for less than 10% in most of the countries including India [2,4]. In our study, it accounted for 4.24%. The declining trend of PRARF is attributed to the legalization of termination of pregnancies and to better antenatal and postnatal care [1,3,7].

The frequency distribution of PRARF is bimodal in relation to the period of gestation [7]. The first peak is seen between 7 and 16 weeks, being caused by septic abortion while toxemias, hemorrhages and puerperal sepsis account for the second peak which is seen between 34 and 36 weeks [3,4]. In our study, it was observed that significant proportion of cases occur in the later part of pregnancy and in the puerperium.

Sepsis was the most common cause of PRARF (16/14, 39.02%) in our study. The next in order were toxemias of pregnancy (24.39%) and hemorrhages of pregnancy (17.08%). Puerperal sepsis was found to be the most common cause of sepsis induced PRARF (12/16, 75%). In contrast to the trend observed in earlier times, septic abortion was noted in only four cases (9.76%). Aseptic management of labor and abortion would eliminate avoidable ARF. Prompt treatment of any hemorrhage during pregnancy and labor would also reduce ARF significantly.

In our study, preeclampsia/eclampsia was the cause of PRARF in 24.39% of cases, while it was reported to be in around 50% of cases in some earlier studies [1,4].

The reported mortality rate of PRARF was up to 56% in the developing countries, whereas it was less than 30% in the developed countries [1,4,5]. In our study, it was 24.39% (10/41) which is still substantial.

Conclusion

The frequency of PRARF was 4.24% of ARF in our study. The majority of PRARF cases were noted in the later part of pregnancy and in the puerperium. Puerperal sepsis was the most common cause of PRARF. Of the 41 patients, 53.66% were given dialysis support. Septic abortion accounted for 9.76% of the cases. Twenty-five patients recoverd (60.98%), six left against medical advice (14.63%) and 10 succumbed (24.39%).

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